“Innovation in Osteopathic Education and Outreach”

Poster Session Abstracts

AOA Bureau of International Osteopathic Medicine

Saturday, October 17, 2015
8:00 a.m. to 5 p.m.
Orange County Convention Center
Orlando, FL
Room: Winter Park 54
Posters in Exhibit Hall
Abstract: Introduction: Over the past 50 years, many developing countries struggle to both export agricultural products to more developed countries while also feeding their citizens. Slash and burn farming methods coupled with increased pressure in the international market are leading to increasingly unsustainable agriculture practices. This has historically and currently increased poverty, and decreased food access and food security for these nations. At the same time, globalization of fast food industries has created a source of food cheaper than buying fresh produce at a grocery store. Due to the diversion of agricultural products to developed nations and the rise of inexpensive fast food chains, these populations have experienced increased instances of obesity, diabetes, and severe malnutrition. This outreach project examines how public health can be successfully implemented during short-term medical mission trips and leave long-lasting and sustainable practices for rural underserved communities abroad through the community garden model. The community garden model has been shown to improve education, health, and access to healthy food in St. Kitts and Nevis, Nicaragua, Guatemala, Indonesia, and Morocco.

Materials and Methods: Community gardens were created during two week and one month medical mission trips to St. Kitts and Nevis, Nicaragua, Guatemala, Indonesia, and Morocco. Cross-sectional surveys were distributed to communities with 20 questions on knowledge of nutrition, 15 questions on their normal caloric intake, and 3 questions about why they believed they could not eat healthier. This survey was created in conjunction with the WHO health assessment questionnaire and Clarence Fitzroy College of the Eastern Caribbean. Surveys were translated by the respective Ministry of Health translators. With the help of each countries’ Ministry of Health and NGOs, three community gardens were created at primary public schools in each country with the help of medical students and local community members.

Results: There were a total of 1,385 surveys completed (St. Kitts and Nevis: 123 surveys, Nicaragua: 307, Guatemala: 362, Indonesia: 389, and Morocco: 204). The questions pertaining to the knowledge of nutrition were 45.08% correct (Highest in St. Kitts and Nevis being 69.45% and lowest in Indonesia at 33.89%). In regards to normal caloric intake, all countries responded to a diet heavy in carbohydrates including breads and rice and minimal intake of fruits and vegetables. A poor diet was caused most often by a lack of access to healthy foods (43.02%) and second at 39.56% was the increased prices of fruits and vegetables. In response to these surveys, both NGOs and Ministries of Health have increased the support for the community garden movement. During the medical mission trips, community gardens were successfully implemented in 5 countries over a 4 year period.

Conclusions: Increased access to nutritional foods is positively correlated with more healthy diet choices in all participating countries. The community garden model has expanded in St. Kitts, Indonesia, and Nicaragua into more primary schools and has been incorporated into the students’ science curriculum. This study demonstrates that the use of public health activities during medical mission trips can lead to long-term positive impacts on communities. Community gardens in St. Kitts and Nevis are now even used to train students for jobs in their domestic economy and while also earning an Associate degree in Sustainable Agriculture through Clarence Fitzroy College.
Despite the availability of multiple prevention strategies, cervical cancer remains the leading cause of cancer deaths among Peruvian women (1). Low resource settings throughout the country and difficulty with follow-up care have contributed to the inefficacy of cervical cancer screening in Peru. With the incidence of cervical cancer continuing to rise throughout the country, more novel prevention strategies are needed (1).

Infection with high-risk (HR) Human Papillomavirus (HPV) genotypes 16 and 18 is responsible for 70% of cervical cancer worldwide (1). However, previous research has shown that, in contrast to North America, Europe, and Asia, HR HPV genotypes 31, 33, 35, 39, 45, 51, 56, 58, 59, 66 and 68 may be more prevalent in South American countries, specifically Peru (2,3). Current HPV vaccination offers protection from seven HR HPV genotypes: 16, 18, 31, 33, 45, 52, and 58. Michigan State University College of Osteopathic Medicine, in collaboration with Universidad Cesar Vallejo, aims to discover the most common HR HPV genotypes infecting Peruvian women in the regions of Loreto and Puno in order to determine the most cost-effective vaccination approach to cervical cancer prevention.

In August 2015, Michigan State University College of Osteopathic Medicine provided medical care to Iquitos, Peru. Women requiring a pelvic examination for routine or diagnostic purposes were asked to participate in this study and complete a brief survey. Investigators used Hologic Pap Test Physician’s Kit to collect cervical cell scrapings from women demonstrating cervical abnormalities on colposcope examination. In September through November 2015, Peruvian physicians will continue to collect cervical cell scrapings from women demonstrating cervical dysplasia in the regions of Loreto and Puno. All samples will be stored at 2-8°C until December 2015, when they will be shipped to Michigan State University, where investigators will use molecular techniques to identify thirteen different HR HPV genotypes: 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68. To date, investigators have collected 51 cervical cell samples and interviewed 54 women, of whom only two (3.7%) admitted to having received HPV vaccination.

While multiple barriers to health care access have contributed to the failure of cervical cancer screening in Peru, targeted HPV vaccination offers a practical solution. This project will help reveal which HR HPV genotypes are most common among Peruvian women in the Puno and Loreto Regions, ultimately producing information necessary for implementing HPV genotype-specific vaccination. Furthermore, this data will contribute to a nationwide comprehensive understanding of the HPV burden, allowing for maximized cervical cancer prevention throughout Peru.

**Literature Cited**


2nd Place Winner - SOMA Award
3 Distributing Antiretrovirals (ARVs) in a Community Setting to HIV Patients in Kabale, Uganda
Primary Author: Samantha Rose Paglinco, OMS II
Rowan University School of Osteopathic Medicine

Abstract: Methods/Summary: In recent years, HIV has been on the rise in Uganda. The government provides free antiretrovirals (ARVs) and care to those with HIV. Since 2000, KIHEFO (Kigezi Healthcare Foundation), a local privately owned clinic in Kabale, Uganda goes to three set locations into the community, once a month to distribute ARVs. Before distributing ARVs, every month there is a support group, where patients discuss side effects of their medications, and symptoms from their HIV. After the support group, patients have the option of meeting with a doctor to discuss any new health problems as a result of the side effects of the ARVs or symptoms of their HIV/AIDS. The clinic staff brings a variety of medications to treat common illnesses, and pharmacy students distribute the medication to the patients that the doctors prescribe on site, in addition to the patients receiving their ARVs. Since 2000, KIHEFO has distributed ARVs to over 1000 patients, including 5 pregnant women and 40 children.

Results/Conclusions: Going into the community and distributing ARVs to HIV patients has resulted in an increased ARV compliance, since most people are not able to travel from their village into the city of Kabale to pick up their ARVs every month. Even if someone is not able to pick up their ARVs on the distribution day, he or she can give his or her ARV card to someone else, to pick up his or her medication up, to ensure that they have their medication for the month. The support group provides an outlet for patients to talk about any problems with medication side-effects, and HIV symptoms, which creates a community among HIV patients, since this may be the only time that patients can talk about their HIV because of the HIV stigma in Uganda. Often HIV positive people do not tell family members and friends about their status, and patients normally travel to other communities to pick up their ARVs, so no one from their village will discover that they are HIV positive. Having access to a doctor while receiving their ARVs, lets people address their health problems, that they otherwise probably would not have addressed, due to lack of access to a doctor, lack of money, and or they are not able to take time away from the family. Bringing ARVs directly to the community and patients is a great approach to make it easier for patients to be compliant with their ARVs.

2nd Place Winner - COSGP Award
4 Obstacles to implementation of neonatal resuscitation techniques following training at a Rural District Hospital in Tanzania
Primary Author; Mallory Mitchell, OMS II; Secondary Authors: Durany Mohammed, OMS II, Chirange Bweri, Audra Lehman and Eiman Mahmoud
Touro University College of Osteopathic Medicine—California

Introduction: Helping Babies Breathe (HBB) is an evidence-based protocol to guide neonatal resuscitation in resource-limited circumstances. It has been shown to reduce newborn mortality, a prime focus of the World Health Organization’s Millennium Development Goals (UN Millennium Project, 2006) and a significant public health burden in Tanzania (Msemo, et al., 2013). Post training data from larger studies indicated positive impact. However, more data must be obtained following such training from district hospitals on change in attitude and practice, as only one of seven hospitals studied was a district hospital. The rest are referral and regional hospitals, which are well equipped. This study examines the obstacles in implementing the resuscitation techniques at the level of district hospitals.
**Method:** This study examines what specific obstacles are preventing implementation of the Helping Babies Breathe protocol at Shirati Hospital, a resource-limited district hospital in the Mara region of Tanzania. Master trainer provided a previous training for second year medical students and faculty to train providers in Shirati district hospitals for two consecutive years during 2014 and 2015. Forty-eight first and second year nursing students attended the 2015 course, and gave their feedback about whether or not they felt they could implement what was taught to them at Shirati Hospital, and why. The study population of nursing students is selected because in their second year they are typically put in charge of vaginal deliveries at Shirati Hospital. Their feedback provides a vital look into what may prevent implementation of this protocol.

**Results:** Of the participants, 25% indicated that they did not have all of the necessary resources to implement the Helping Babies Breathe program at Shirati Hospital, with 14.5% of participants citing the lack of sufficient clean, dry cloths available to use at deliveries. Furthermore, 12.5% of participants reported not having enough bag valve masks in various sizes and 6.25% reported the lack of a drying rack. Clean water and soap were also cited as resources that were insufficient at Shirati Hospital.

**Discussion:** HBB has been shown to decrease the number of neonatal fatalities following training of health care providers. However, our results shows that the availability of trained staff might not be sufficient to implement the training in resource limited settings such as district hospitals. A closer look at the individual attitudes of the nursing students in attendance would have been a valuable addition to the study. Many of the health care participants believed that they did not have access to all of the proper resources to implement the entire Helping Babies Breathe protocol, but it would be valuable to know if they are willing to implement steps from the protocol that they could in their daily practice. This emphasizes that programs designed to improve health care delivery in resource limited areas should be adequately evaluated at the district and peripheral clinics level point of health care facilities in addition to referral and specialized hospitals. Additionally, several participants indicated that they are frequently given conflicting information from various sources on the best way to care for neonates. It would be valuable to know which specific sources are providing the conflicting information so that health care professionals could come to an agreement on the best protocol and implementation of the protocol to provide the highest possible care for neonatal patients in low resource settings.

**Conclusion:** Training workshops in low resource hospitals can be very valuable, but only if the hospital staff has access to the necessary resources to implement the teaching in their patient care. If these resources are not available locally, it may be appropriate to provide sustainable access to these resources when offering a teaching workshop. It is also important to allocate resources to secure the maximum benefits from any training available to health care professionals; otherwise lack of resources will certainly decrease the technical efficiency of these training opportunities. Helping Babies Breathe as a protocol has shown very promising results in the reduction of neonatal mortality in many low resource areas, which would justify the additional preparation and funding that would be needed to also provide all necessary materials for implementation upon teaching the protocol in low-resource areas. However, these trainings should be carried out at smaller centers and community clinics to accurately evaluate the efficacy of such training in change in practice among health care providers.

**References:**

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5 Assessing the Efficacy of Community Based Screening on Schistosomiasis Prevalence and Community Awareness in Rural Tanzania: a two Year Pilot Study

**Primary Author:** Audra Lehman; Chirange Bwiru ; Eiman Mahmoud ; Katano Matias ; Lauren Ogawa ; Matea Orlovic
Touro University College of Osteopathic Medicine—California
Abstract: Background: Schistosomiasis is the 3rd most devastating tropical disease attributing to 200,000 deaths per year in sub-Saharan Africa. The parasite lives in freshwater snails endemic to Lake Victoria where it remains a health issue because the local community relies on the lake for water and various activities. Community based interventions and educational programs on the prominence of sanitation and hygiene are essential components of disease control.

Hypothesis: The purpose of this study is to examine the effectiveness of community based screening on the prevalence and awareness of Schistosomiasis. For two consecutive years we conducted a study in the same location in rural Tanzania, and we suspect that prevalence will follow a downward trend and knowledge about the disease will improve.

Methods: Students participating in Touro University-CA Global Health Program partnered with Global Physician Corps and Shirati District Hospital conducted community outreach clinics in village dispensaries in Masonga and Burere. Participants ages 4 to 89 were screened and provided with health education and treatment for Schistosomiasis. All fishermen and participants positive for Schistosoma were treated with Praziquantel 40mg/kg. Children under 4 years-old were excluded from treatment.

Materials: included paper questionnaires, electronic iSurveys, and stool analysis by light microscopy performed by certified technicians from Shirati District Hospital. History and physical exams were administered by students with supervision by local physicians. The study design had institutional review board approval by TUC IRB #M-0513.

Results: Data analysis shows that out of 236 participants and 229 stools examined, 18.8% were positive for Schistosomiasis but in 2014, a total of 43.7% were positive for the infection. The data demonstrates a 24.97% decrease in infection in villages of Masonga and Burere. A majority of the participants demonstrated an understanding of the infection and prevention of schistosomiasis but continued education is essential. 70% know that schistosomiasis is spread by contact with contaminated water (a similar result of 75.4% was found in 2014). However, only 12.25% indicated that the infection could be eliminated by avoiding contact with contaminated water, while in 2014, 52% were aware of this preventative measure.

Conclusion: Community based screening has a positive effect on health education as reflected by a high level of awareness of schistosomiasis in the community. It also shows that lack of access to treatment and clean water remains a challenge to the provision of preventive care. A 24.97% decrease in prevalence of schistosomiasis from 2014 suggests that community outreach clinics and periodic mass treatments may be reducing the infection. Continued improvements in educational resources and screening by the use of urine schistosoma circulating cathodic antigens will help pave the way for potential eradication of this deadly disease.

6 Impact of Osteopathic Manipulative Treatment Aboard the USNS Comfort
Primary Authors: Sheri Frickey, OMS-II, Shawn Hamm, OMS-II, Coleman Cosgrove, OMS-II;
Additional Authors: LCDR Steven Weatherspoon, DO Family Medicine Physician MC USN, USNS Comfort, LCDR Denise Boggs-Wilkerson, DO USNS Comfort

Background: The USNS Comfort is a converted oil tanker turned hospital ship serving as the centerpiece of the U.S. Navy humanitarian mission Continuing Promise 2015. The mission of the USNS Comfort and Continuing Promise 2015 is to conduct civil-military operations including Humanitarian Civic Assistance (HCA), subject matter expert exchange, medical, dental, veterinary and engineering support and disaster response to partner nations and show U.S. support and commitment to Central and South America and the Caribbean. Through a contract with the U.S. Navy, three osteopathic medical students provided cultural, language and regional expertise training to more than 1,000 medical
personnel and 50 Non-Governmental Organization volunteers aboard the USNS Comfort in preparation for their service in 12 countries in the aforementioned regions. To date, the USNS Comfort has treated over 110,000 patients, performed over 1,000 surgeries and over 10,000 dentistry procedures for the medically underserved over the 6-month deployment of mission Continuing Promise 2015.

**Description:** In addition to serving as Subject Matter Experts aboard the USNS Comfort, as osteopathic medical students, we were also able to provide Osteopathic Manipulative Treatment (OMT) to medical personnel in the Sick Bay under the supervision of our preceptor, LCDR. Steven Weatherspoon, DO. Due to the physical and mental demands of providing medical care aboard the USNS Comfort, there was a significant need for OMT among the medical personnel to alleviate chronic shoulder, neck, back and hip pain. After assessing for somatic dysfunction, we were able to employ soft tissue, muscle energy, counterstrain and high velocity, low amplitude OMT techniques to improve a total of 35 individuals' deep muscle pain, tender points, overall range of motion and lymphatic flow. For example, one individual with chronic shoulder somatic dysfunction was being managed with muscle relaxants and pain medications without complete relief. After two OMT sessions, her shoulder range of motion and pain improved by 90% and was able to discontinue all medications. Each individual treated reported a 50% or greater improvement in pain symptoms.

**Discussion:** The musculoskeletal stress and onset of somatic dysfunction among medical personnel serving aboard the USNS Comfort during the Continuing Promise 2015 mission was evident. As osteopathic medical students, we had the opportunity to showcase our OMT skills and provide treatment to medical personnel under the direct supervision of fellow osteopathic physicians. This opportunity allowed us to share newer OMT techniques, as well as learn field-tested and proven OMT techniques, in order to effectively decrease and relieve the pain levels in these amazing service men and women. Through the proven benefits of OMT, somatic dysfunction among medical personnel aboard the USNS Comfort was alleviated and their overall health maximized, allowing them to continue to provide critical medical care to those in need. We believe the crew of the USNS Comfort greatly benefitted from receiving OMT during their deployment and would continue to benefit from OMT on future deployments.

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7 Safety in the Home  
**Primary Author:** Clare Gallego Bajamundi, OMS IV  
Lincoln Memorial University-DeBusk College of Osteopathic Medicine

**Abstract: Hypothesis:** San Andres Itzapal is a rural community in Chimaltenango, Guatemala. Most inhabitants are farmers who make about $1.00 a day. Due to these financial limitations, families lack access to primary care. Additionally, many do not have a stove and must use open fire cooking in the home which increases the risk of respiratory disease due to smoke inhalation. Two projects have been started by ASSADE (a Guatemala based nonprofit) and the DOCare clinic to address these issues. First is the construction of Saving Stoves, wood fire stoves with an enclosed fire pit and chimney to contain and let out carbon monoxide and smoke. Additionally, DOCare student volunteers and ASSADE staff have been educating families about basic health care and created a first aid kit for the community. The goal of this poster project is to raise awareness of these issues and fundraise for Saving Stoves and first aid kits for 30 families. The poster will also contain follow up data of the families who currently own a Saving Stove to educate about the impact of this project.

**Materials:** The poster will contain a detailed explanation of Saving Stoves components with pictures of construction in a home. As a brief overview, stoves are made of three concrete bases stacked on top of each other. One base contains a brick combustion chamber. The chimney is added to the back of a metal ash trap. A metal cooking surface is added on top. Purchase, delivery and construction will be
coordinated by ASSADE in Guatemala. A detailed explanation of the contents of the First Aid kit as well as pictures of the First Aid class spearheaded by DOCare volunteers this summer will also be included in the poster.

**Methods:** In addition to the information in the poster (detailed above), we will provide fliers about the construction of the stoves, components of kits and how to donate. Benefactors will have the option of purchasing a first aid kit or a component of the stove. Donations go to a gofundme.com fundraising account that is directly linked to the nonprofit account of ASSADE. Donations for first aid kits will similarly go through gofundme.com. Kits will be assembled by medical students involved in this project to be sent to the DOCare Guatemala clinic.

**Results:** The poster will contain data compiled for families who currently have a Saving Stove in order to educate participants attending the poster session about the impact of the project. Follow up will continue in the future for fundraising and research purposes.

**Conclusion:** To date, there are still 16 families who need Saving Stoves. In order to provide the remainder of the stoves, $2,560 dollars must be raised. Additionally there is only one first aid kit for a community of 30 families so approximately $900.00 must be raised. It is our hope that the “Safety in the Home” poster project will educate students and medical professionals at the AOA convention about these issues and start a stronger, long term fundraising effort to offset these costs.

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8 **Lichen Planus Actinicus**

**Primary Author:** Felicia Ekpo, OMS IV; Edidiong C.N. Kaminska ;; Thomas L. Cibull

Sampson Regional Medical Center & Campbell University School of Osteopathic Medicine

**Abstract:** A man in his 50s of Indian descent presented with a pruritic eruption on his scalp, arms, neck, and feet. The eruption began during the summer three months prior to presentation. Physical examination revealed hyperpigmented annular plaques with violaceous borders on his scalp and superior forehead, along with violaceous papules on the dorsal hands, extensor arms, and the nape of the neck. Lichen Planus (LP) actinicus is a rare subtype of LP that is not commonly seen in the United States. The majority of reported cases have occurred in individuals with dark complexions of Middle Eastern and Indian descent living in subtropical regions. We hypothesized that these individuals have more of a predilection due to genetics and sun-exposure. A skin biopsy of the affected individual was performed to definitively make the diagnosis of LP actinicus with clinical correlation. Histopathological results demonstrated a prominent granular cell layer with acanthosis and hyperkeratosis of the epidermis and a lymphocytic infiltrate predominance at the dermo-epidermal junction. These results were consistent with LP actinicus. Our patient had complete resolution of the skin eruption with treatment of strict sun protection in conjunction with potent topical corticosteroids.

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9 **A case study on an unusual presentation of intracardiac thrombus in a patient with metastatic breast cancer**

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**Abstract:** It has been reported that thrombosis represents the second most frequent cause of death in cancer patients. A hypercoagulable state of malignancy occurs due to the ability of tumor cells to activate the coagulation system. The goal of the case study is to gain knowledge about an unusual presentation of a migrating thrombus, due to possible hypercoagulation from a metastasizing cancer. There have been no studies previously published regarding a presentation of intracardiac
thrombus in a patient with metastatic breast cancer. This unique case study reinforces the osteopathic principles of evaluating the body as a whole.

A 62-year-old woman with a history of left breast cancer, left cerebellar tumor, and leptomeningeal metastasis was admitted to TITHC Taipei Hospital’s emergency department for complaints of intermittent involuntary movement for days as well as conscious change noted the evening prior to admission. After imaging, laboratory work-up, and admission, patient was diagnosed with seizure attack and electrolyte imbalance and was discharged after several days when electrolyte levels were normal. However upon discharge, patient had a syncopal episode and collapsed. Her consciousness recovered gradually after several minutes. Patient was immediately readmitted and work up was performed to try to find cause for syncope. This case study was performed by obtaining permission from the Taipei Hospital and gathering data such as laboratory values, imaging work-up, medications given, as well as speaking to the attendings regarding the patient. Patient’s clinical progression was closely followed.

**Investigation:** Upon first emergency department admission, brain computed tomography was taken. Electrocardiogram, chest x-ray, laboratory workup, and electroencephalogram were performed. Upon second admission, similar tests were repeated. Cardiac enzymes were checked and cardiac echogram was performed. In addition, cardiac computed tomography and D-dimer tests were placed. Blood gas values were also obtained. Cardiac enzymes showed a high level of troponin, D-dimer was revealed to be elevated. Electrocardiogram revealed the presence of a right bundle branch block. Echocardiogram revealed an organized thrombus with a size of 2.65 x1.2cm floating in the right atrium of the heart.

**Results/Diagnosis:** The resulting diagnoses for this patient were 1) migrating thrombus, 2) conscious loss due to obstruction of blood flow by right atrial tumor, and 3) cardiogenic shock.

**Treatment and Management:** An emergent cardiac embolectomy was performed to save and stabilize the patient’s condition. However, when the right atrium of the heart was opened to perform the embolectomy, the thrombus had already exited the heart and became lodged at the left main pulmonary artery. The main thrombus was removed and the patient was monitored afterwards for stable recovery. The patient was continued on prednisolone 5mg (first prescribed due to her cancer), and given saline injection 0.9% 500ml, amiodarone 200mg (to prevent paroxysmal a-fib), ranitidine 150mg, cetalin injection 1mg, rasitol 40mg (to decrease loading of the heart and dry the lungs), cofarin 2mg qd (to maintain international normalized ratio between 2.3).

**Discussion and Conclusion:** It is rare to see an intracardiac thrombus in patients with metastatic breast cancers, as usually it passes through to the pulmonary trunk and into the lungs by the time the patients are admitted into the hospital. This case reinforces the osteopathic principles of evaluating the body as a whole and to examine all affected systems (and not just metabolite levels) to ensure that all systems are properly functioning and that disruption in one system is not manifesting problems in another, such as in this case. More specifically, this case also serves to stress the importance of ruling out cardiogenic problems, such as a migrating thrombus, while evaluating for conscious change and syncope of a patient with a history of metastatic cancer.
Introduction: Imagine how difficult it would be to see a doctor if you had no car, no money for transportation and the local clinic had no doctors. These realities prevent many rural Ugandans from accessing life-saving health care. Just Health Network is a non-profit organization that works to deliver basic health care for the people of Patongo, a remote village in northern Uganda. In January 2014, board members worked alongside local physicians to develop a health care center (Rwot Telo Yoo) that allows Ugandans to take an active part in addressing the medical needs of their community. The clinic is run by Ugandan doctors and nurses with monetary and educational support provided by members of Just Health Network. Our goal is to improve the health of Ugandans living in and around Patongo by developing a health care center that strengthens primary care systems and also contributes towards the autonomous and self-sufficient continuation of the projects implemented.

Materials and Methods: During our three-week trip, a fellow board member and I had the opportunity to observe and assist with various components of a health care system: health professionals, infrastructure, government and community. We accompanied Ugandan physicians as they managed patients in outpatient, inpatient and surgical capacities. We raised approximately $2000 in donations, which we then used to work closely with the clinic staff as well as local contractors to buy medications and renovate the clinic. With the help of the head physician, who was employed in the Ministry of Health we had the chance to visit several government clinics in neighboring areas. Given the long-term goals of our organization it was important for us to build a relationship with the Patongo community. We stayed at the local parish, which allowed us to interact with religious leaders, attend public functions and learn about the Ugandan culture.

Results/Conclusion: By addressing the different aspects of a health care system we were able to achieve several important milestones. The most noticeable of which were a newly renovated room and a stocked pharmacy. The physicians were able to perform several successful surgeries and carry through their treatment protocols. We were also able to educate the staff and implement a more efficient and transparent system of data collection. There is still a lot of work to be done in terms of renovations, equipment, hiring full time personnel and eventually making the clinic self-sufficient. However, the progress we made during our visit brought us several steps closer to providing the people of Patongo a reliable and affordable alternative for their primary care needs.

12 Students Conducting Research during International Medical Outreach Programs: Lessons Learned

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NovaSoutheastern University College of Osteopathic Medicine

Introduction: Short-term university-school sponsored medical outreach trips focus generally on patient clinical care when assisting underserved communities. However, there seems to be a lack of interest in conducting research that could inform clinical practice with the populations served. Studies have shown that research findings specific to certain developing regions or patient groups can have enduring beneficial effects on these communities, which tend to outweigh the short-term benefits of patient care. On a university-sponsored medical outreach trip to the Milpe region of Ecuador, student researchers collected data to examine the chronic illnesses and medication adherence among residents in the region. The purpose of this paper is to discuss the preparation for and conducting exploratory medical research during a brief school-sponsored international medical outreach trip.

Methods: Prior to the medical outreach trip student researchers were trained by the faculty researcher and director of international medicine who is also a seasoned medical researcher on the survey content,
participant recruitment, consent process, data collection, and working with human subjects in research. All student researchers were required to complete the online Collaborative Institutional Training Initiative (CITI) program prior to data collection. Meetings were held to ensure student researchers were trained in conducting the survey research in a professional, ethical manner. Throughout the 1-week medical outreach trip during clinic hours, data were collected about chronic illness and medication-taking behaviors via an anonymous pen-and-paper questionnaire offered in Spanish, which took 20 minutes to complete. The survey was administered in a private area away from the designated patient waiting area. Spanish-speaking researchers assisted participants, when necessary, in completing the survey by reading each question aloud.

Discussion: The process and outcome of conducting the study was rewarding, but not without some challenges. Recruitment of eligible participants or persons that were willing to participate was compromised by not having enough designated student researches dedicated to administering the survey. Students were there to focus on learning clinical skills and spent most of their time observing preceptors and in didactic sessions. Also challenging were low literacy rates among participants, which led to extended time needed to assist participants in completing the survey. To address this unexpected time factor, student researchers rotated between clinical care duties and research responsibilities. Moreover, although most of our research assistants spoke Spanish, the use of a designated translators would have promoted a more efficient communication between the researchers and the participants. In addition, some eligible participants believed if they participated in the survey they would not be able to receive clinical care, and vice versa. Clarification on the meaning of the survey and care provided was necessary to avoid lost opportunities in data collection.

Conclusion: Conducting research during medical school-sponsored international medical outreach trips affords students the opportunity to be exposed to the considerations involved while designing and implementing survey research studies with diverse populations from resource poor communities. The opportunity to learn from and be mentored by research faculty members can be inspirational and encouraging for osteopathic medical students to become future physician-scientists.

13 The challenges and opportunities in establishing a student driven international osteopathic medical outreach program in Imbabura, Ecuador
Primary Author: David Rezin Mann, OMS III; Mark J. Hernandez, PhD
Alabama College of Osteopathic Medicine

Abstract: In many rural regions of the State of Alabama there is a need for medical practitioners who have basic medical communication skills in Spanish to better serve their patients who come from minority populations where English is the second language. As the Hispanic population in Alabama, similar to that of the rest of the nation, continues to grow there is also a continuous need for physicians who can meet the needs of these patient populations. At the Alabama College of Osteopathic medicine (ACOM), a new osteopathic medical school that opened its doors in 2013, students from the Medical Spanish Club, with the assistance of faculty and staff, organized a week long osteopathic medical outreach trip which took place in Imbabura, Ecuador in the summer of 2015. Here we report the challenges and opportunities that presented in the implementation of an outreach program at a newly established medical school. 13 students and 2 faculty chaperones participated in this program in coordination with a local physician located in Imbabura, Ecuador who coordinated all the shadowing experiences for the students at different regional rural clinics and also hospitals. The immersion in the Ecuadorian healthcare system and culture under the supervision of local clinicians and under the supervision of ACOM faculty chaperones led to numerous educational opportunities and positive experiences.
14 International Medical Outreach Mission Trips: Parallels to Caring for the Underserved On the Home Front

**Primary Author:** Romeena Lee, OMS II, MPH; **Secondary Authors:** Nadine Chipon-Schoepp, DO; Estefania Niewialkouski, BA; Robin Jacobs, PHD, MSW, MS
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**Abstract:**

**Introduction/Hypothesis:** We often think of the underserved as individuals living in developing countries, malnourished and without homes. However, medically underserved individuals are often in the shadows of our nation’s city buildings, neighboring towns, prisons, and working on farms. These individuals have little to no access to medical care, cannot afford the costs of medical care, and are socially stigmatized. Interestingly, volunteer and outreach work conducted through global health and international medical outreach efforts can be paralleled to provide care to the underserved in the United States and to abate suffering on both fronts.

**Materials and Methods:** During 2013 the Boston Health Care for the Homeless Program’s Street Team served over 300 indigent persons. During NSUCOM’s one-week outreach program to Ecuador, volunteer physicians and students treated more than 300 patients who lacked sufficient health care. The poster presented will illustrate relevant data assembled from the Boston Health Care for the Homeless’ Street Team and the medical outreach Ecuador trip. In an effort to improve future care provided to the underserved populations nationally and internationally, various experiences and images from the Boston Health Care for the Homeless Program’s Street Team and the Nova Southeastern University College of Osteopathic Medicine’s (NSU-COM) International 2015 Medical Outreach trip to Ecuador were compiled and will be exemplified in the poster.

**Discussion:** We describe and discuss the impact of international medical outreach programs and give insight into the similarities of providing medical care to the underserved both nationally and internationally. There are common entities seen between international medicine and medical care provided to underserved groups in the United States. We present the idea that both venues have patients with multiple comorbidities and complex medical cases due to the lack of access to adequate health care. Furthermore, comparable medical supplies are essential for both international and domestic medical care and teamwork as well as multi-disciplinary approach is imperative.

**Conclusion:** Underserved individuals and their complex medical cases are found everywhere. The work that is done through International Medical Outreach provides not only a foundation for medical principles, but it also allows osteopathic physicians in training to attain a foundation for newly sparked or continued interest in working with the medically disadvantaged in underserved areas nationally and internationally. Learning cultural sensitivity is an invaluable lesson learned through international medical outreach and can be and should be utilized when caring for patients in our country. Therefore, the lessons and experiences one has had through international travel are more than just memories. They should be used as tools to provide compassionate and empathetic care in the United States.

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15 Shifting the Paradigm: Treatment to Preventative Based Medicine in Rural Ecuador

**Primary Author:** Heather Ann Theobald, OMS II; Christopher-Armand Zaragoza Mabini; Daphne L. Wong; Jessica White, OMS II; Julie Marie V. Timple; Taylor Martin, OMS II
Alabama College of Osteopathic Medicine

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**Abstract:** The Republic of Ecuador’s Ministry of Public Health regulates both public and social security health care systems at no out-of-pocket cost to the patient. These national health care systems guarantee access to healthcare but ultimately can result in overutilization of the health care system. The remote
mountainous countryside is home to a variety of indigenous populations that have limited access to healthcare facilities within the cities. The Ministry of Public Health has implemented primary care outpatient clinics that are located throughout Ecuador to address both access to care and overutilization of the hospitals located in these cities. Unfortunately, many of the patients present to the clinics with advanced illnesses and injuries that mandate transportation to the overcrowded hospitals at the expense of the clinics. The increasing incidence of severe disease and illness also results in amplified costs of diagnosis and treatment.

The Inaugural Osteopathic Outreach Program with Alabama College of Osteopathic Medicine gave second and third year medical students the opportunity to shadow physicians in these outpatient clinics. Although the physicians collected detailed medical histories and completed thorough physical exams, their ability to diagnosis and treat patients was blunted based on limited resources. The physicians also encountered difficulties with patient compliance and medication adherence that resulted in worsened disease outcomes.

Ecuador, like most developing countries, faces financial barriers that affect the number of resources that they can provide. Therefore, the only modifiable factors that the physicians can address are the behaviors of the patient. Interventions aimed at patient education and preventative care will not only allow these clinics to address the healthcare needs of a majority of patients but will provide cost-savings to an already stretched public health system as well.

16 Community Centered Healthcare in the Rural Villages of Dokur and Kotakadra
Primary Co-Authors; Seethal Motamarri, OMS II and Meghan Brombach, OMS II
A.T. Still University, School of Osteopathic Medicine in Arizona

Abstract: Introduction/Hypothesis: Dokur, India is a village of approximately 3,000 people in the district of Mahabubnagar and is one of the most impoverished villages in the state of Telangana. The Institute for Rural Health Studies (IRHS) has accomplished increased access to care by implementing a community based healthcare system consisting of locally trained healthcare workers, perinatal and pediatric house visits, a travel clinic, a referral system to the city of Hyderabad and a volunteer network of visiting doctors and students. This community model has produced many positive healthcare outcomes for this region.

Material and Methods: The IRHS clinics are run by locally trained paramedics, volunteer physicians, and students. Referral patients are sent to Hyderabad through a travel clinic program. Once in Hyderabad, IRHS counselors assist patients by navigating through the city hospital system at no cost. We participated in well child and well women house visits alongside well-respected community midwives. During this time we administered health education on child growth/nutrition, perinatal care, female cervical cancer risk and family planning. In the clinic, we performed full histories and physicals as well as introduced Osteopathic Manipulative Medicine for therapy needs. As volunteers we developed health educational curriculum for clinic’s health workers and attended weekly community leaders meetings lead by IRHS staff.

Results: All health workers employed at the local clinic were members of the community which succeeded in breaking down many barriers of trust, aided in economic perspective as well as helped in understanding each patient's social determinants of health. The patients of this community benefited from having healthcare workers as neighbors who were readily available for any emergent need. The persistence and commitment of the midwives to patients (often their neighbors) during house visits allowed for the awareness of cervical cancer screening, access to prenatal vitamins, education for proper nutrition and family planning. The volunteer physicians and students have a tremendous impact on the basic science and clinical education of the health care workers as most of these individuals lack more
than a grade school education. We, as DO student volunteers, found that the use of Osteopathic Manipulative Therapy helped further eliminate the patient barrier and created a bond of trust between patient and healer.

**Conclusion:** The most important aspect of what we observed was the contribution made by the health care professionals trained from these communities. These workers are empowered through education and are committed to strive everyday for improved healthcare in their local villages. The opportunities we had to perform OMM techniques for this population proved as an effective means to holistically approach patients and to witness true healing through the power of touch.

### 17 Using Osteopathic Manipulative Medicine to serve aboriginal populations in rural Taiwan with the Taiwan Root Medical Peace Corps

**Primary Author:** Daisy Young, OMS II; **Secondary Authors:** Danny Troung, OMS II; Eureka Wu, OMS II; Patrick Hsu, OMS II

Touro University College of Osteopathic Medicine—California

**Abstract:**

**Hypothesis:** It is hypothesized that Osteopathic Manipulative Medicine can be an effective treatment modality in rural areas of Taiwan.

**Materials and Methods**

There remains many rural areas of Taiwan that do not have access to the advanced medical technology in the major cities. Taiwan’s aborigines are typically farmers that reside in the countryside or in the mountains, far from the nearest hospitals. As such, poverty and accessibility to healthcare remain an issue for these people, and they rely on the charity of volunteers for basic needs.

Taiwan Root Medical Peace Corp (TRMPC), founded in 1995 by a group of health professionals, is a non-profit organization dedicated to bringing medical care to the indigenous populations of remote Taiwan. The team provides medical and dental services.

On July 2015, four students representing Touro University accompanied TRMPC on their two day medical mission to Miaoli County, a mountainous area on the northeastern coast of Taiwan. They helped set up the different stations for the villagers at each location, including an Osteopathic Manipulative Medicine (OMM) station where they had a large inflow of patients. When evaluating patients, a history and physical exam were conducted to screen for somatic dysfunction that included tissue texture changes, asymmetry, restrictions, and tenderness (TART). The most common complaint from patients was pain. The most significant somatic dysfunctions were treated with the appropriate modality individualized to each patient. A varying combination of soft tissue, high velocity low amplitude thrust (HVLA), muscle energy, and counterstrain were utilized. Patients were reassessed for tissue changes and improvement in their condition.

**Results:** Each Touro University medical student effectively increased the range of motion and decreased pain for each patient. By reducing the somatic dysfunction present, patients expressed immediate relief. Counterstrain was a particularly effective modality.
**Conclusion:** The two day medical volunteer trip in the mountain areas of Miaoli provided a different perspective of the healthcare system in Taiwan. It is a stark contrast to how easily and convenient people living in the cities have access to healthcare. It was clear that Taiwan’s aborigines found TRMPC’s efforts necessary. Osteopathy remains a rather foreign concept to many physicians in Taiwan. However, some of the techniques used are similar to a Traditional Chinese Medicine (TCM) manipulative modality - Tui-na.

Osteopathy was introduced and quickly accepted by health professionals in Taiwan as well as patients because the modality and principles of OMT closely aligned with TCM. Students felt fortunate to be part of the team to offer their time and skills to the indigenous populations. There is considerable hope that there will be more utilization and integration of OMM with the future Global Health students joining TRMPC on medical mission trips.

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**18 Exploring the Impact of Environmental Design at a Rural District Hospital in Ghana**

Primary Author: David T Guernsey, OMS III; Deborah Lardner, DO; Michael Passafaro, DO; Thomas Ng, OMS II

New York College of Osteopathic Medicine of New York Institute of Technology

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**Abstract: Background:** The environmental design of the hospital, based on specific regulations, ensure the safety and proper care of its workers and patients. For instance, in the United States, 100 square feet per bed in a 2-bed room is recommended. Resource-rich countries have the ability to create hospitals with good environmental design. Published research has confirmed noise levels and number of patients per room impact the quality of care and the patient’s health. Studies have also confirmed that environmental design prevents the spread of nosocomial infections. Ghana, located in West Africa, like many low-income countries, lack the resources to produce an effective environmental design, especially in rural settings. Instead, rural hospitals are forced to allocate their limited resources by placing more patients per room and overlooking patient privacy.

**Description:** Through the Center for Global Health at New York Institute of Technology (NYIT), we conducted an assessment of the HAWA Memorial Saviour Hospital (HAWA) located in Osem, Ghana. We participated in the daily activities of the hospital (morning rounds, outpatient, surgery, and labor & delivery), and in addition, we also took measurements of the wards, outpatient department, surgical suite, and maternity. Professional floorplans were created showing the square footage of each building at HAWA. The floorplans detailed no more than 60 square feet of space per bed. There was also no access to potable water and no method for providing privacy or noise reduction. Patients relied on families for food, potable water, and medicines. Despite these limitations, the hospital staff still provides the highest quality of care in the region. Presently, a new facility is being constructed with larger wards, modern operating rooms, and a central nursing station to facilitate communication.

**Discussion:** The fundamental tenants of osteopathic medicine guide medical students and physicians to provide a more comprehensive care by incorporating not only the environment but also the physical, mental, emotional and spiritual aspects of self. At HAWA, barriers exist that limit patient healing. Simple structural interventions like windows and room dividers can have a significant impact on patient recovery. For new hospital construction in low-income countries, focus on environmental design should be emphasized due to the significant impact it can have on patient outcomes.

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**19 Medical Outreach with a Holistic Medical Approach in Tegucigalpa, Honduras**

Primary Author: Bradley Weir, OMS II
Abstract: Background: Honduras is classified as a developing nation with second lowest economic status of all the Central American countries. Honduras has a current population of 8.7 million and approximately 65% of the population is under the poverty line, meaning 5.5 million people are currently living in poverty. The severe impoverishment of the population directly correlates to the pronounced need for holistic medical care and medical education. The World Gospel Outreach (WGO) was established to not only help meet the medical needs of the Honduran people, but also incorporate psychosocial well-being into the treatment model. The WGO organizes “medical-evangelical” corps that voluntarily go into the impoverished neighborhoods of Tegucigalpa, Honduras offering medical care to those who are in dire need.

Description: Through the WGO, I had the opportunity to volunteer in one of their medical clinics. Daily, I interacted with numerous patients, some of whom had walked many miles to be evaluated. Admirably, these patients waited patiently for hours at a time in long, sweltering lines. This experience was a pivotal opportunity for me to learn, and grow as an osteopathic medical student. My medical tasks as a volunteer comprised obtaining historical intakes, conducting physical exams, developing assessments as well as helping to formulate treatment plans. 3,300 people were evaluated during my week stint and most notable to me was the fact that the patient’s history and physical exam provided the core basis of all their assessments and treatment secondary to lack of access to pertinent diagnostic modalities. The holistic approach for these patients often included osteopathic manipulative treatment, patient education on sanitation/hygiene, multivitamin regimens, and anti-parasitic medications. Furthermore, incorporating a patient centered psycho-social-spiritual component during the encounter was offered and often relevant to the patient’s chief complaint.

Discussion: Embedding as a standard a holistic medical approach for this patient population suffering severe poverty is paramount in my opinion as it seeks to optimize the patient’s self-regulatory and self-healing mechanisms. Many Honduran families are locked into a devastating cycle of disease, unemployment and illiteracy. Providing a patient-centered, holistic approach, in part, mitigated the need for prescription medicine, and a more expensive diagnostic work up, which these patients could not afford. Utilizing the fundamental concepts native to osteopathic medicine, including structure/function reciprocity, and the self-healing mechanisms innate to us all, many of these Hondurans were able to receive appropriate, though limited, medical care in a manner which is largely unavailable to them. This treatment model helped patients receive adequate medical care, some for the first time in their lives.

20 Medical Missions Trip to Uganda
Primary Author: Paul Ott, OMS II
Lake Erie College of Osteopathic Medicine

Abstract: This is to be a poster presentation on a medical missions trip experience carried out over the course of the summer of 2015 in Uganda and Kenya. A major goal of the presentation is to provide first-hand insights into the medical care being delivered by non-governmental organizations (NGOs) and others in the developing world, along with challenges, resources, and possibilities for the future. Many African countries face both long-term difficulties and recent obstacles with regards to health care. Issues with infrastructure remain to be addressed, as well as with the delivery of health care in existing facilities. NGOs are working across Africa to remedy some of these issues and they rely on the support of students and other volunteers in order to carry on with their programs. The Foundation for International Medical Relief of Children (FIMRC) is one such organization, which is working to deliver health care to the underserved in the rural areas in the east of Uganda. The
FIMRC clinic operates in the Bududa district, with a total population of over 200,000, and sees patients from more remote areas of the district. Malaria and HIV are among the common medical issues in the area, and the clinic also runs outreach programs to reduce the impact of those diseases. Student volunteers are able to assist with these programs, implement new ones as appropriate, and to assist in the clinic as much as possible. On the other side of the border with Kenya, the Maasai are among the populations the outside world sometimes seems to forget. People there must often travel hours to the nearest western medical practitioner, and potentially even further in order to reach a hospital for emergent issues. The people there maintain their own traditional medical practices as well, and one of the obstacles in this area is gaining acceptance of western medicine among the population. Some, however, are quite accepting of westerners in general, and they are happy to have students stay with them. There is a lot to be learned from cultural exchanges with populations such as these, and they can help to further improve health care for many around the world. Students come back from missions trips motivated, enriched, and often enlightened. Perhaps the most important part, however, is that they carry this enthusiasm with them afterwards, and then share what they learned with others for the betterment of all.

21 Primary Prevention by Promoting Exercise in Physical Education Classes in Nicaragua

Primary Author: Lindsey Peragallo, OMS II
Rowan University School of Osteopathic Medicine

Abstract: Methods/Summary: Chronic diseases, such as diabetes mellitus and hypertension, are major health problems in villages such as Las Salinas, Nicaragua. This summer I had the opportunity to volunteer at the Foundation for International Medical Relief of Children (FIMRC) health clinic in Las Salinas, Nicaragua and experience the treatment of chronic disease in a remote region first hand. Remote residency often leads to minimal access to nutrients found in fruits and vegetables, as non-locally grown food sold in stores is often heavily processed. In addition, the top 3 ingredients in most food items are sugar, salt, and oil. However, trying to change the traditional local diet of rice and beans is neither practical nor culturally sensitive; not only can most families not afford or access fresher foods, but local recipes are cemented in the multidimensional Nicaraguan culture. Therefore, in order to teach children how to prevent a variety of chronic diseases, two other volunteers and I focused on exercise as a preventive measure.

There is one physical education teacher responsible for the 6 villages surrounding Las Salinas, and the four of us collaborated to plan and implement a series of physical education classes for 5 of the 6 villages, with participants from grades 3-6. The first week of classes were focused on bodyweight exercises and cardio based games such as tag and relay races. The second week of classes was spent teaching the children coordination skills through soccer and softball, and showing them how to incorporate sports and fun games into an active lifestyle. At the beginning of each class, we asked the students a few questions related to living a healthy lifestyle and questions specific to the sports we would be playing that day.

Results/Conclusions: Overall, the classes were successful. Many of the students knew how to do pushups, sit-ups, jumping jacks, and other bodyweight and cardio exercises, but it was apparent that they had little experience doing them first hand. We spent a lot of time teaching the students correct form to prevent injury. Also, we found that the sports skill classes were better in keeping the kids active and attentive throughout the entire session. The students already knew all of the answers to our questions about healthy living habits; however, when you look at their diets and activity level there is a
big disconnect between what they know and what they actually do. Despite the successes, there were many barriers we faced throughout our classes, including a language barrier, little equipment to work with, and variability of class size and age of the children.

The physical education teacher was very appreciative that we taught him more games and different types of activities to teach and play with the kids so that they do not have to play the same games all of the time. However, one physical education class per week is not enough to keep these students active enough to make up for their unvaried diets. More emphasis needs to be placed on physical activity throughout the school day and integrated into the social lifestyle so that future chronic diseases can be avoided.


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22 The Impact of First Year Osteopathic Medical Education On Medically Underserved Communities in Guatemala

Primary Author: Michael Lovačchini, OMS II; Secondary Authors: Julia Olson, OMS II; Shalin Patel; OMS II; Zane Baqai, OMS II

Midwestern University/Arizona College of Osteopathic Medicine

**Abstract:** Methods/Summary: The first year osteopathic medical education at The Arizona College of Osteopathic Medicine provided our group the education and ability to provide free health care and medical assistance to third-world villages in Guatemala. We worked to promote community health by taking focused history and physical exams and utilized OMM to provide targeted treatments. Our team received a variety of OTC medications from Midwestern University-AZCOM to distribute in rural areas of Guatemala. The nonprofit organization Life of Promise Ministries organized locations of mobile clinics and coordinated Spanish translators to assist our student doctors. Our team attended to the medical needs of over 250 people in the villages of Puente Blanco, Conevisa, Pueblo Modelo, and Pinalito in the region of Zacapa. In addition, we distributed food, vitamins, toys, and clothing to surrounding communities to improve local quality of life. In our spare time, we constructed a playground for homeless children living in the local garbage dump to provide a safe recreational environment for children.

**Results/Conclusions:** As the first group of osteopathic medical students to serve the communities around Zacapa, we learned that our first year medical education can provide sufficient relief to remote and underserved populations in third world countries such as Guatemala. Some common chief complaints included: muscle/joint pain, cough, fever, GI discomfort, and rash. We noticed recurring somatic dysfunctions in villagers such as thoracic/lumbar hypertonicity, sacral torsions, and pelvic shears. We hypothesize this is due to the physically intensive nature of their daily work and lack of proper body mechanics. To alleviate these symptoms we performed OMM and administered OTC medicines such as cough suppressants, anti-parasite medications, and NSAIDS. Notably, soft tissue osteopathic treatments such as counterstrain and muscle energy were the most effective and commonly requested techniques. Local community leaders emphasized the positive impact our team had on their villages and requested subsequent treatments. This international outreach trip gave us the opportunity to use our medical skills in a uniquely underserved environment to see firsthand the benefit of osteopathic medicine.
Purpose: Every year nearly 40% of all child deaths under age five are among neonates, and asphyxia is one of the main causes. Birth asphyxia and birth trauma are the 6th leading cause of death in Tanzania, and killed 13.4 thousand neonates in 2012. Most of these deaths can easily prevented if there are skilled health workers to perform effective health measures at birth. Helping Babies Breathe (HBB) is an evidence-based educational program used to teach neonatal resuscitation techniques in resource-limited areas, in order to reduce the number of these deaths. The purpose of this study is to identify important factors essential for improving effectiveness of training programs in international settings.

Methods: Second year medical students at Touro University completed 12 hours of training in order to become HBB trainers to train health care providers in rural settings such as Tanzania, in neonatal resuscitation techniques. Participants from this rural health care setting were selected from nursing and medical officer students to attend a HBB training session at Shirati district hospital. The basis of selection was attending to deliveries on a daily basis at the hospital. An ID number was assigned to each participant in order to keep track of individual post training outcomes. The HBB training was provided to the 48 medical officer and nursing students who participated. In order to be able to assess the confidence and attitude of participants as well as identify factors which may influence the outcome and efficacy of the training, a post training session questionnaire was administered to all health care providers who participated. The survey administered consisted of questions about the helpfulness of the class and the comfort of the user to use the neonatal resuscitation skills taught, in order to measure willingness and confidence. There were also questions to help identify organizational strengths and limitations in implementing the HBB training. We believe that HBB training and education will improve the confidence of utilizing resuscitation techniques to reduce neonatal mortality. However, current hospital instruction may be conflicting with the guidelines taught in the training, which could prevent successful integration into the current health care structure. The specific aims were: 1) to assess coverage and delivery of the training program, and 2) to determine the impact of the training program on health care providers’ knowledge of resuscitation practices and attitudes towards implementing these practices.

Results: The transcribed interviews were analyzed using a didactic approach. Process evaluation showed that the training had good coverage, and was delivered as intended. In addition, 81.25 % of participants reported they felt more confident utilizing the neonatal resuscitation techniques taught after receiving the HBB training. However, one of the outstanding results which appeared on the survey, was that 70.83% of participants reported receiving conflicting instruction from multiple sources on the best way to care for neonates all or some of the time.

Conclusion: In conclusion, the HBB training program in Shirati district hospital had good coverage and was effective in imparting knowledge to health care professionals and improving their attitudes towards implementing this skill. Yet, it pointed to a deficiency in initial planning reflected by inadequate knowledge of the existing national training received by participants. This study emphasizes important factors affecting outcome of educational programs in international settings. In order to create an evidence-based safety practice environment that is sustainable, awareness of current instruction in the health care institution and whether the guidelines trying to be integrated conflict is advised. If there is conflicting information between the evidence based guidelines trying to be implemented and the status quo of the healthcare institution in question, this could create a barrier in implementing the evidence based guidelines in everyday clinical practice. It would be helpful to further investigate what type of conflicting information is being received and what sources this information is coming from. Once the
conflicting information itself and its sources are identified, the evidence based practice can be adapted or refined to meet specific institution needs or the health care institution’s culture can be changed to better suit an evidence-based safety practice environment.

24 A Holistic Model for Improving Malnutrition of the Ba’Twa of Rwanda
Primary Author: Jessica McElroy, OMS II; Secondary Author: Joshua Steele, OMS II
Liberty University College of Osteopathic Medicine

Abstract: Introduction/ Hypothesis: The United Nations has described the Ba’Twa as the forgotten victims of the 1994 Rwandan genocide, marginalized by prejudice from all ethnic groups in their country and desperately poor. With limited clean water sources, community members are forced to walk hours each day for small quantities of often contaminated water. Families often go days without food, leaving the children severely malnourished.

Materials/ Methods: The Osteopathic community strives to implement a holistic approach to medicine. Global outreach calls for the same method. Rwanda Sustainable Families, a 501c3 non profit organization, addresses the social, cultural, educational and health issues within one of Rwanda’s most marginalized populations; the Ba’Twa. International medical outreach reminds us that through the holistic model, addressing the most basic needs of a person comes first, followed by health assessments that implement preventative medicine effectively. After traveling to Gisenyi, Rwanda for 5 consecutive years as a co-founder of our NGO, I have witnessed firsthand how effective the holistic approach truly is. During July 2015, myself, another Osteopathic medical student, a teacher, pharmacist, and law student, traveled to Rwanda to implement sustainable programs to improve the well-being of the Ba’Twa children. We performed over 125 health screenings for every child in the village to further assess malnutrition and health status within the community. After addressing the most crucial needs of the community, we built 5 kitchen gardens at the homes of those families whose children face severe malnutrition. Our team also built a chicken coop in our Mucyo preschool. The coop will house over 80 Hens that will provide one egg per day, allowing for one egg per child for each school day. This summer we also started a longitudinal study, which will track the growth and development of the Ba’Twa children and will investigate the correlation between improving their nutrition and their attendance in school. Through a clean water program, started in 2012, we assessed the condition of 6 one thousand gallon water tanks in the village and taught the Ba’Twa how to clean them and educated the village on the importance of using a safe, clean water source.

Results/ Conclusion: Through our work in Rwanda this summer, we were able to address the health of the Ba’Twa children and provide health education to their parents. After working with this village over the past 5 years, I have seen the impact a holistic approach has had on the community. 4 years ago, we implemented our clean water program, which allowed us to construct 6 tanks for the Ba’Twa. Now that clean water has been addressed, we spent the summer working on their nutrition and education. Over the coming years we will examine the data of our longitudinal health study to identify new projects to improve their overall health.

25 Short Term Surgical Missions: Cost-Effectiveness of Six Missions 2012 to 2015
Primary Author: David Ohlson, OMS IV.
Pacific Northwest University of Health Sciences, College of Osteopathic Medicine

Methods/Summary:
Cost-effectiveness of short term surgical missions by Pacific Northwest Surgical Outreach (PNSO) was calculated. Surgeries were primarily tension free inguinal hernia repair, but also included other hernias,
cholecystectomies, minor amputations and benign tumor resections among others. Data were obtained from 6 trips between 2012 and 2015 in Sudan, Guatemala and Peru (two trips each.) Data included operational and transportation costs, number of volunteers, total patients screened and number treated. Cost effectiveness analysis (CEA) was carried out. For each location the cost per surgery was calculated. A subset of patient data was analyzed to determine the number of DALYs averted and the cost effectiveness ratio (CER).

**Results/Conclusions:**
Over six trips 78 volunteers participated. A total of 549 patients were evaluated. Of these, 210 patients received surgical treatment. The mean cost per surgery was $1,017.04 in South Sudan, $400.98 in Guatemala and $738.24 in Peru. The main source of variation in costs was due to transportation. A subset of patient data from Peru and South Sudan is still being analyzed. However, consider a 29 year old Peruvian male treated by the author. He was unable to work due to a large (10-20cm), nearly irreducible hernia. According to WHO life tables for Peru, he can expect to live another 52.9 years. With a disability weight of 0.3, but without age weighting or discounting DALY[0; 0] = 15.9 years. With them, DALY[1; 0.03] = 9.1 years. Cost-effectiveness of this surgery then ranges from $46.43 to $81.13 per DALY averted. This is well below Peru’s per-capita Gross Domestic Product of $6,661.59, indicating that this is a very cost-effective intervention. Analysis of all the available data is likely to demonstrate that PNSO interventions are cost-effective in all locations when compared to no treatment.

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**Non-Compete Abstract**
**Osteopathic Family Medicine on the Amazon River**

**Primary Author:** Travis Jeremy Gordon, DO; **Secondary Authors:** Elizabeth Clay, DO; Mark Turpin, DO; Matthew CiRullo, DO; Mei-Tsi Ellis, DO; Miranda McGahan, DO; Sean McCann, DO; Steven Gallas, DO;

Family Medicine/Neuromusculoskeletal Medicine, Florida Hospital East Orlando FM/NMM Osteopathic Residency

**Abstract: Methods/Summary:** Iquitos, Peru is not by any means a large city, but it is the largest city in the world that cannot be reached by land. As such, its surrounding villages depend on the Amazon River for almost all aspects of life, including transportation to the city when medically necessary. Even the closest health post of meager capabilities can take days of travel with significant cost for a population relying on subsistence fishing and farming. This isolation deters many patients from acquiring necessary healthcare, which is concerning to the government as it leads to higher morbidity and mortality.

The Peruvian Navy has sought to bridge this gap in recent years by making routine visits to these remote populations through use of clinic boats staffed with Navy members and providing dentistry, social services, vaccinations, laboratory and medical consultation. Unfortunately, these services are generally understaffed and overwhelmed by high patient volume. Our endeavors sought to augment the assistance to this population by collaborating with the Peruvian Navy to provide basic, yet further-reaching medical services to all ages encountered along the Amazon River. Family medicine was the scope of our practice.

Seven Family Medicine Residents under the supervision of one Family Medicine Attending visited the region of Iquitos, Peru where we were chaperoned by the Peruvian Navy on one of their vessels. We stayed on this vessel for 5 days, visiting a total of 8 villages along the Nanay and Amazon rivers. Patients were treated either on-board in small medical rooms or within the village itself, depending on difficulty of terrain. Basic pharmacologic treatments, OMT and prolotherapy were available to patients. No radiological or laboratory capabilities were afforded. When treatment was not available, the Navy was made aware of the patient’s case so that follow up could be arranged.
Results/Conclusions: Amongst 8 physicians we were able to treat just over 1,000 patients during 5 days of clinic. We recorded 483 complaints that were musculoskeletal in nature, to which we attributed the very physically demanding lifestyle of the Amazon inhabitants. Of these cases, we provided 231 osteopathic manipulative treatments, 51 large joint prolotherapy injections, and 78 trigger point injections. More of these treatments could have been used, however, were limited by tables needed for OMT, injection supplies, and sheer number of patients.

Most patients expressed symptoms of enteral parasitic infections including sub-acute to chronic abdominal pain and other GI disturbances. Skin infections, mostly fungal, were very common among the population. Some severe pathology was seen, including invasive squamous cell cancer covering the majority of a woman’s face.

It has become apparent that the underlying cause of many issues in this region stem from poor water quality, lack of health education, and musculoskeletal overuse. We believe that these issues could be mitigated on subsequent trips by providing basic water filtration systems to each village, health education through accompanying local health promoters, and continued osteopathic principles. Plans are in place to make these modifications.

A medical outreach experience of this nature would not have been feasible without the support of the Peruvian Navy, who assisted not only in travel logistics but also security, food preparation, clinic setup and some translations. We believe the impact of our outreach was significantly increased by working together with a common objective. We are very grateful for their contributions and intend to continue to foster this relationship to provide better, more sustainable health care to the Amazonian villages of Peru.
Research Category - 1st Place Winner – SOMA Award
Patients with Six Cannulation Sites for Hemodialysis Correlated with Decreased Occurrence of AV Shunt Thrombosis in Taipei Hospital

Primary Authors: Michael Lee, OMS, II
Touro University College of Osteopathic Medicine - CA

Abstract: Background: Taiwan has the highest prevalence of ESRD and dialysis at 2,902 per million. It is desirable to encounter fewer complications to alleviate the burden on nephrologists and government funding. Thrombosis is a common complication that can lead to failed arteriovenous shunts (AV shunt). Treatment of clotted AV shunts at Taipei Hospital involves the use of tissue plasminogen activator (tPA). While studies have shown that tPA is effective in reestablishing blood flow, cases still present with persistent clotting. In these situations, surgical intervention may be necessary with further risk of emboli and ruptures.

Hypothesis: We hypothesize that patients with more injection sites for hemodialysis would have fewer incidences of clotted AV shunts and the need to use t2278A in Taipei Hospital.

Materials and Methods: Data was collected from 115 patients undergoing hemodialysis at Taipei Hospital, having excluded inactive patients or treatment for fewer than 6 months. Patient’s age, duration of treatment, diabetes and hypertension status, number of arterial and venous injection sites, number of times the shunt has been cleared, and Karnofsky score was obtained via electronic records and hemodialysis nurses in assessing the number of available injection sites, which was averaged from two nurse’s reports.

Results: From 115 hemodialysis patients, 7 had 2 injection sites, 9 had 3, 26 had 4, and 73 had 6. Of the 73 with 6 sites, 43.7% (n=31) had no history of tPA use. This was notably higher than patients with 3 and 4 sites, which had 22.2% (n=2) and 23.1% (n=6) respectively. The patients with 6 injection sites made up 68.9% (31 out of 45) of the total with no history of tPA use. The patients with 6 sites presented with the lowest rate requiring the use of tPA five times or more at 5.6% of patients (n=4). In comparison, patients with 2, 3, and 4 injection sites had 14.3% (n=1), 11.1% (n=1), and 7.7% (n=2) respectively. The patients with 6 injection sites presented with an average of 1.27 thrombotic events per patient while those with 2 to 4 injection sites had an average of 1.52 thrombotic events per patient.

Conclusion: This study suggests that patients with 6 injection sites tend to be more likely to have no occurrences of the use of tPA for thrombosis at Taipei Hospital. As most patients undergo hemodialysis three times a week, 6 injection sites would allow for one site for arterial and venous access each day of treatment. The data did not show associations between number of injection sites and the prevalence of studied co-morbidities, nor differences in the patients’ Karnofsky score among the various patient groups. Consequently, no connection was made advising against the use of AV shunts capable of 6 injection sites in these situations. This preliminary study suggests that it may be beneficial for nephrologists and surgeons to pursue AV shunts capable of 6 injection sites in order to decrease the occurrence of thrombosis.

1st Place Winner – COSGP Award
The Impact of OMM on Cervical Spine Range of Motion and on Laryngeal Function

Primary Authors: Laura Lepczyk, OMS IV; Bo Pang, OMS IV; Theresa, Sexton, OMS IV; Lawrence Prokop, DO; Peter LaPine; Shane Sergent, DO
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Abstract: Background: A wide range of structural, infectious and/or neurological conditions can
lead to a change in voice quality known as dysphonia. Dysphonia can be the initial sign of an underlying pathology, as is the case with the qualitative change in vocal function known as hoarseness, which may be a sign of laryngeal cancer. Manual treatments have been used in the multidisciplinary approach to reduce a variety of musculoskeletal conditions. The focus of this research was to evaluate the impact of osteopathic manipulative medicine (OMM) on the quantitative changes in laryngeal efficiency as measured by vocal quality. There is little data on the treatment of voice changes and their associated pathologies using OMM. In our study, we use OMM of the upper extremity, neck, and face to determine correlation with measurable changes in range of motion (ROM) and voice quality.

**Research Methods:** Inclusion criteria included patients 18 years or older with a swallow dysfunction or audible changes in vocal quality, who had a positive history of neck pain, cerebrovascular accident, degenerative disease, traumatic brain injury, spinal cord injury, or musculoskeletal disorder. Exclusion criteria included: clinically deaf, recognized developmental delay, or history of reconstruction of velum or pharyngeal flap. Our controls were 18 years or older, had no active pathology, but had tissue texture changes in the areas examined. Our research took place in Iquitos and Lima, Peru. 51 patients were included in this study, 15 served as controls and the remaining 36 had active pathology. Prior to examination and treatment with OMM, ROM of subject’s cervical spine was measured using a CROM cervical ROM device that was calibrated before each use. The following degrees of cervical motions were recorded: left rotation, right rotation, left sidebending, right sidebending, flexion and extension. Using acoustics software, we collected data on the voice fundamental frequency (F0) and frequency perturbation from the algorithm for Relative Average Perturbation (RAP). Next, the patients were examined using standard OMM visual and palpatory diagnostic techniques to identify muscle spasm and decreased mobility in the targeted muscles. Restrictions were treated using the following OMM techniques; soft tissue stretch, myofascial release, articulatory, and muscle energy. Post-OMM, the voice and ROM analyses were repeated.

**Results:** The hypothesis was supported by the data - a positive correlation exists between cervical spine change in ROM and perturbation measure. This correlation suggests a relationship between increased ROM and increased quality of voice production. As such, there is greater musculoskeletal movement with less dysphonia observed following OMM. Overall, 50 of the 51 subjects had an overall increase in degrees of ROM across all 6 categories of movement, with the mean increase per individual at 55 degrees. The mean increase in the cervical motion were as follows: left rotation – 12.2 degrees, right rotation – 9.4 degrees, left sidebending – 8.2 degrees, right sidebending – 6.0 degrees, flexion – 7.5 degrees, extension – 11.3 degrees. **Conclusion:** Results show a quantifiable, positive change in laryngeal function as a result of the use of OMM. This is of special importance in a developing country, such as Peru, where access to many diagnostic procedures and treatments may be limited due to cost and accessibility. Further, the findings also suggest a new potential application for the use of OMM as a treatment for functional dysphonia, such as Muscle Tension Dysphonia. Using OMM to treat patients with neck pain secondary to musculoskeletal problems or voice changes secondary to an underlying pathology, has the ability to reduce pain, restore motor and communicative function, and to improve the overall quality of life in a cost-effective manner. Future research will investigate the effect of OMM treatment on specific pathologies associated with voice changes. Our research could extend to other pathologies, including dysphagia and dysarthria.**Technical assistance was provided by Anthony Argusa and Carley Metevier

2nd Place Winner – SOMA Award
Developing Osteopathic Manipulative Medicine as an adjunct tool for Community Health Workers in four remote underserved Peruvian Amazon Communities

Primary Authors: Daniel Ebbs OMS-III; Secondary Authors: Dr. Deborah Heath; Jenni Adams; Julian Hirschbaum; Stanton Jasicki
A.T. Still University, School of Osteopathic Medicine in Arizona

Osteopathic Manipulative Medicine (OMM) provides a low-risk and cost effective option to Community Health Workers (CHWs) for the treatment of musculoskeletal related complaints, especially in the context of resource limited settings. This study explores the use of OMM as an adjunct tool for CHWs working within four communities serving approximately 500 people in a region with little to no access to health care: the Loreto Region of the NE Peruvian Amazon Jungle. The study measures the effect of Information Communication Technology (ICT) on CHW long-term retention of OMM knowledge and skills. During the initial training workshop in November of 2014, six CHWs were instructed on how to perform and record the Osteopathic Structural Exam and the Abdominal Plexus Release, and their competencies were assessed and documented. Following the initial training workshop, CHWs were instructed to utilize the OMM knowledge and skills to treat members of their respective communities. They were provided with ICT in the form of handheld computer tablets pre-programmed with educational podcast materials to review the OMM curricula and document OMM treatment. Eight months after the initial training, CHW retention of the previously taught OMM material was reevaluated. CHW’s were scored using rubrics created based upon the information taught in November of 2014. Overall, the CHWs demonstrated a higher retention rate for understanding and performance of the Abdominal Plexus Release (85%) than for the Osteopathic Structural Exam (56%). Subsequently, CHW’s re-taught how to perform the OMM techniques and were reminded to use their handheld computer tablets in order to support knowledge retention of the landmarks needed to complete the Structural Exam. Retention of this material will continue to be assessed in November of 2015, one year after the initial training. Furthermore, application of OMM techniques by CHW’s, as documented through their handheld computer tablets, will be measured and reevaluated in November of 2015.

2nd Place Winner – COSGP Award
Cross-Sectional Comparison of Cardiovascular Disease Risk Factors and Physical Activity Between Children of the Dominican Republic and Michigan

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I

Introduction: Over the past few decades the prevalence of cardiovascular disease (CVD) risk factors including obesity dyslipidemia hypertension and type 2 diabetes have increased in pediatric populations in developed countries,¹,² and more recently, have also increased in many developing countries.³ This is an international public health concern since CVD risk factors tend to track into adulthood and increase CVD morbidity and mortality.⁴ Significant factors are contributing to the increases in pediatric CVD risks include decreases in physical activity (PA),⁵ and decreases in consumption of nutrient dense foods and increases in caloric dense foods.⁶ To our knowledge no comparisons between US and Dominican Republic (DR) children’s CVD risk factor status and PA behaviors have been reported.

Objectives: To compare CVD risk factors and PA between children from Michigan (MI) and the
To determine the prevalence of children meeting recommended pediatric cut-points for CVD risk factors and PA.

**Materials and Methods:** Experimental Design: Cross-sectional comparison of MI and DR children. The study protocol was approved by MSU IRB.

**Participants:** The MI sample included 5th grade public school students n=104 (Males: 42; Females: 62), 10.16±0.50 years who participated in SPartners for Heart Health baseline measurement in the fall of 2014. In the summer of 2014 a similar age group of children were recruited in the DR: n=102 (Males: 35; Females: 67), 10.33±1.39 years (9-13 years). Students from both the MI and the DR assented and their parent or primary caregiver consented.

**Outcome Measures:** The assessment measurement teams in both MI and DR included MSU medical students who were trained and certified using the same measurement protocol. Standardized procedures for each measure were used specific to a pediatric population as summarized below. All written materials including consents and assents and survey questions were translated to Spanish.

**Anthropometrics:** Stature (HT) was measured without shoes using a Shorrboard (Shorr Production, Olney, MD) stadiometer or similar to the nearest 0.1cm. Weight (kg) and percent body fat (%BF) was measured using a Tanita BC-534 InnerScan Body Composition Monitor (Tokyo, Japan; US Service Center, Arlington Heights, IL). HT and weight were used to calculate body mass index (BMI) (kg/m²). Waist circumference (WC) was obtained using a Gullick measuring tape superior to the iliac crest, and below the navel. WC procedure was replicated using the NHLBI Clinical Guidelines Evidence Report.

**Blood Lipids:** Non fasting blood samples were taken via fingerstick and collected in heparinized capillary tubes placed in Cardiochek (Alere, Waltham, MA) cassettes to analyze total cholesterol (TC), high density lipoprotein (HDL), and TC:HDL.

**Blood Pressure:** Blood pressure (BP) was measured in a resting state with standard procedures. Systolic BP and diastolic BP were taken after subject had been seated for 10 minutes. Three BP measures were taken at 1 minute increments, and the second and third values were averaged.

**Physical Activity:** PA was assessed using one self-reported question adopted from the YRBSS survey which was designed to assess the number of minutes per day of moderate to vigorous PA. The question stated “During the last 7 days, how many days were you physically active for a total of at least 60 minutes per day (add up all of the time you spend in any type of activity that increases your heart rate and makes you breath hard some of the time)?” The scale range is 0-7 days.

**Statistics:** General Linear Models were performed for between group comparisons controlling for sex and age. Crude and adjusted (sex, age) logistic regression were performed comparing odds of at risk CVD risk factors. At risk cutoff values for CVD risk factors were: %BF standards from Fitnessgram (low risk: males- ≥69th percentile, females - ≥68th percentile; high risk: ≥90th percentile); WC:HT ≥0.5; TC >170mg/dl; HDL<40mg/dL; and pre-hypertensive BP (systolic BP>120 mmHg; and/or diastolic BP>80 mmHg); PA <7 days/wk. All analyses were performed using SPSS version 21 (SPSS Inc., Chicago, IL). Statistical significance was set at p ≤ .05.

**Results:** MI children had significantly greater BMI, %BF, WC, and WC:HT ratio compared to DR after adjusting for covariates. TC, HDL, TC:HDL, systolic BP, and diastolic BP were not significantly different between groups, however, there was a trend for a greater mean TC in DR children and greater systolic and diastolic BP in MI children. Children from DR reported significantly greater levels of PA (6.0±2.0 vs. 4.5±2.1 days; p<0.001). In addition, MI children had a greater prevalence of low and high risk %BF, adverse WC:HT, and at-risk PA levels compared to DR children. Children from MI were 7 times more likely to have low risk %BF, 11.5 times more likely to have high risk %BF, 11.2 times more likely to have adverse WC:HT ratio and 10.5 times more likely not to meet PA recommendations compared to DR children.
**Discussion/Conclusion:** Children from MI have a significantly greater prevalence of CVD risk factors than DR children; this may be due to a higher incidence of obesity and levels of adiposity, as well as a smaller proportion meeting PA recommendations. This data is similar to other global comparisons. Previous data has revealed that US adults have a higher BMI and WC compared to Asian/Indian adults. Only 22.8% of DR children were not meeting PA recommendations, however, in DR adults, 38.3% are physically inactive. A strength of the research is that it is the first comparison of CVD risk factors and PA between US and DR children. This research was subject to a number of limitations. Since the data is cross-sectional causal inference is unable to be concluded. Additionally, the small sample sizes may not be representative of the larger US and DR populations. Future analysis on this sample will include an evaluation the relationship of PA levels to CVD risk factors, as well as the evaluation of screen time and dietary behaviors to assess their differences and their contributions to CVD risks status.

Background: The accurate estimation of a child’s weight is essential. With this number, physicians can effectively calculate medication dosages, equipment sizes, level of shock voltage on defibrillation devices, and other interventions that can be used during emergency treatments (Chiengkriwate et al, 2014). However, in such critical situations, the time required to weigh a child on a proper scale would draw away from the time that could be used to evaluate and treat. To avoid any medication errors or adverse effects due to improper dosing, practical and accurate resources need to be implemented. The Broselow Tape is a cheap, fast, and effective method using color-coded tape that relates patients’ height to their weight. The Broselow Tape is designed for children equal to or less than 12 years, equal to or less than 80 lbs, and between 46-143cm. Meguerdichian and Clapper 2012, a systematic review, concluded that the Broselow Tape was the most consistent and reliable tool available in pediatric resuscitation. Although, other studies have shown varying results of accuracy depending on the demographic studied. Currently Peru, like many international communities, lacks standardized weight estimation devices that could play a large role in their recovery from natural disasters associated with El Niño. The potential for heavy rainfalls and floods threaten not only the people, but also the developing country’s health facility infrastructure. Therefore, the Broselow Tape could prove to be a necessary tool in the future.

Objectives: Michigan State University College of Osteopathic Medicine (MSUCOM) has been collecting pediatric information from various regions throughout Peru from 2010-2014. This study set out to investigate the accuracy of the Broselow Tape in predicting weight of Peruvian children.

Methods: Pediatric patients ages 2-19 years were enlisted from years 2010-2014 in various regions across Peru, including coastal, Amazonian, and mountainous regions. Biometric measurements were obtained using an anthropometer and body composition monitor. Height and weight were measured twice and averaged; a predetermined error in measurements was means for exclusion. n = 909 children were surveyed in this cross sectional study. Analysis of data was conducted using an ANOVA regression model.

Results: Results revealed an interaction between sex, region, and color code. Analysis showed that color code was predictive of weight ($F_{(7,908)}=40.805, P<0.001, \eta^2=0.254$), and region was predictive of weight also ($F_{(6,908)}=4.01, P<0.001, \eta^2=0.028$). Age and height were also separately predictive of weight, ($F=158.116, P<0.001, \eta^2=0.158$) and ($F=65.012, P<0.001, \eta^2=0.072$) respectively. Broselow Tape color code predictability varied, between $r^2 = 0.197-0.972$, depending on region and sex. Predictability increased as height increased in a linear, cubic, and quartic fashion (all $P<0.001$). Although, when adjusted for variables of sex and region, Broselow color code was no longer statistically predictive ($F_{(16,908)}=1.740, P = .035, \eta^2=.032$) of weight, compared to actual weight.

Conclusions: In conclusion, standardization of Peruvian resuscitation is important for improved pediatric outcomes. Based on the findings of this study, the Broselow Tape was not statistically predictive of actual weight for Peruvian pediatric patients. In this case, Broselow Tape would lead to under-resuscitate of patients. This finding would suggest that an alternative method of predicting weight or modifier to Broselow estimation would be most beneficial in emergency situations. In some regions, Peruvian children tend to be overweight, therefore, a standardized adjustment percentage or another type of measurement (such as mid-arm circumference) would
Is knowledge enough to change the attitude and practice of a community?
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Abstract: Hypothesis: Schistosomiasis is one of the top neglected tropical diseases, producing over 200,000 deaths per year. The helminth thrives in the freshwater of Lake Victoria used by the population for daily needs. Many intervention programs target education and prevention to shift behaviors. This study examines the knowledge of Lake Victoria residents about schistosomiasis and the residents’ habits in regards to disease prevention. We hypothesized that although the education about disease prevention is adequate, the community engages in high-risk behaviors. The purpose of this study is to demonstrate whether knowledge is sufficient to change attitude and practice towards decreasing schistosomiasis incidence.

Materials and Methods: An analytic observational case-control study was carried out at health dispensaries in Burere and Masonga, Tanzania. The study population consisted of anyone 4 years and older who gave verbal informed consent to participate in a survey, screening, treatment and education. 313 persons responded to the radio advertisements announcing the screening and treatment of schistosomiasis. Medical students carried out a multiple-choice survey in Swahili with translator assistance. Subjects testing positive for schistosomiasis were given praziquantel under direct observation of district hospital doctors. The study was IRB-approved by Touro University and Shirati hospital board.

Results: 72.8% of the survey population is aware that drinking contaminated water can expose one to schistosomiasis, but 64.2% drink un-boiled water from the lake. 67% of subjects said boiling water will prevent infection by schistosomiasis, but only 39.3% of subjects boil water before use. 75.4% is aware of schistosomiasis infection through contact with contaminated water while swimming, bathing, or fishing, yet 78% swim and 87.5% bathe in the lake. 63% of patients said urinating or defecating in the water spreads schistosomiasis. However, when we asked patients where they defecate, 54.6% of patients defecate in the lake and 79.2% of patients use latrines. 91.8% of subjects know that the schistosomiasis parasite survives in snails.

Conclusion: From this data it was concluded the studied population is knowledgeable about schistosomiasis prevention and spread, yet the risky behavior is not changed accordingly, as the majority of the population continues to bath in lakes and use unclean drinking water. If the patient population is engaging in behaviors that risk their health, it may be out of necessity and seemingly insurmountable obstacles to change. The barriers to changing risk behaviors must be addressed if an effective intervention is to be instituted to decrease incidence of schistosomiasis. A limitation was that health dispensaries may not have been the optimal site to reach a majority of populations, producing a small sample size. This project was funded by Global Physicians Corps.

Medication Adherence in Persons with Chronic Conditions in Medically Underserved Regions of Ecuador

Introduction: In Ecuador, where chronic illness is a relatively new phenomenon, cultural models for patient care are still very much in the making. Elucidation of noncommunicable chronic conditions (NCC) and medication adherence in medically underserved areas of Ecuador has yet to be achieved and remains a priority for the World Health Organization. Anecdotal data indicates that developing countries in South America are experiencing increases in chronic illnesses and that
there is an expanding need for interventions that target improved health and management of these conditions. The primary goal of this study was to advance the understanding of medication adherence in rural Ecuadorians living with chronic conditions.

**Method:** A cross-sectional, correlational study was conducted to evaluate NCC in the Milpe region of Ecuador. A convenience sample of 31 patients aged 18 and older currently taking medications for chronic illness who received medical care during a university-based medical outreach trip completed an anonymous pen-and-paper questionnaire. The survey collected data on medication adherence, health literacy (re: medications), perception of personal health status, and access to medical care. The survey, offered in Spanish, took about 20 minutes to complete. Chi square analyses were computed to assess the relationship between medication knowledge and medication adherence behaviors in rural Ecuadorians using SPSS statistical software. This study was approved by the researchers’ university’s Institutional Review Board.

**Results:** The majority (n=29; 93.5%) of the participants reported a net income of less than $5,000 per year and 84% reported having less than a high school education. Sixty-five percent of participants rated their health as fair or poor. The most commonly reported conditions were diabetes, hypertension, high cholesterol, and heart disease; 45.2% (n=14) participants reported having multimorbid chronic conditions. Nearly one-fifth (n=6; 19.4%) had no health care provider and reported there was no clinic or hospital to go to for their chronic conditions. Fifty-five percent (n=17) reported it was hard or very hard to get medication refills on time, and 58.1% (n=19) reported they sometimes or often put off getting refills because they were unable to get to the pharmacy. Analyses revealed no statistically significant relationship between knowledge and behaviors with regard to medication adherence. While many participants understood the benefits of and how to take their medications, medication adherence behaviors were still sub-optimal (M=2; possible total score range 1 to 4, low numbers represent less adherence).

**Conclusion:** This is the first study to our knowledge that examined medication adherence behaviors in Ecuadorians with chronic conditions living in rural, medically underserved areas. Data from this study will assist in determining which treatment strategies will be most beneficial when considering the development of health care services and generate guidance protocols to improve medication adherence among this understudied group and for whom interventions have not yet been developed.

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Perception of Personal Health and Social Support in Rural Ecuadorians with Chronic Conditions

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**Hypothesis:** Adherence to medication (i.e. frequency of dose and refill times) in persons with noncommunicable chronic conditions (NCC) is a process that is complex and dynamic, involving patients' behavioral, physical and mental health. Anecdotal data suggests that vigilant patient self-care is universally essential to improve prognostic outcomes. However, in underserved populations of Ecuador, undeveloped infrastructure, inadequate nutrition, physician shortage, and inaccessibility to pharmacies are challenges to personal healthcare. This study offers information on how patients'
perception of his/her physical and mental health can influence his/her medical self-managing behavior.

**Materials and Methods:** During a five-day medical outreach trip serving four locations in the Milpe region of rural Ecuador, first-year osteopathic medical students administered a brief pen-and-paper survey in Spanish to patients being treated for chronic illness. Items on the questionnaire included information regarding current chronic condition diagnosis and medications, perception of personal physical and mental health, and level of social support for managing their chronic illness. Frequency data were analyzed using SPSS statistical software. This study was approved by our institution's IRB.

**Results:** Among the 31 participants who completed the survey, the most commonly reported conditions were diabetes, hypertension, high cholesterol, and heart disease; 45.2% \(n=14\) of the participants reported having multimorbid chronic conditions. Regarding perception of health, nearly two-thirds \(n=20, 66\%\) reported their health as fair or poor. Forty-three percent \(n=13\) said that their physical health during 10 days or more (out of the last 30 days) was ‘not good’ and 20% \(n=6\) reported that their mental health for same time period was ‘not good.’ Thirty percent \(n=10\) said they sometimes or often forget to take their medications. In addition, nearly 30% \(n=9\) reported poor physical and mental health prevented them from doing usual activities such as self-care, work, and recreational activities. Regarding social support, 58% \(n=18\) stated that it was either hard or very hard to get the support they need from others in taking their medications such as from family, friends, doctor, nurse, or pharmacist.

**Conclusion:** This is the first study to our knowledge that examined perceptions of health and social support in rural Ecuadorians living with chronic conditions. Participants with these current diseases reported physical and mental indications consistent with their poor general health and often times forget to take their medications as a result. Daily activities such as going to work, engaging in hobbies, or partaking in recreational activities are deterred and positive attitudes, perception and outlook on physical health have declined. When combined with inadequate social support needed from family and friends, the manifestation of diabetes, hypertension, high cholesterol and other chronic conditions can worsen. Findings from this study serve as impetus to conduct more thorough investigations during our outreach efforts to this region to guide interventions and tailor treatment strategies for improved patient medical self-management.

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**Education Level and Knowledge of Infectious Disease Transmission in Rural El Salvador**

**Primary Author:** Laura Lorenz Ramirez, OMS III; **Secondary Authors:** Alexis Stoner, OMS III; Ashley Jenna Werbin, OMS III; Dean Sutphin, PhD

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**Intro/Hypothesis:** Infectious diseases are a major cause of morbidity in developing countries such as El Salvador. Also, though by law children are required to complete at least 9 years of education, the average number of school years completed in rural El Salvador was 4.1 as of 2010. The purpose of this study is to examine the association between the two. It was hypothesized that the completion of a higher grade level of education would indicate increased knowledge of modes of transmission of infectious disease prevalent to the area.

**Methods:** Prior IRB approval was acquired for all methods of this study. Research was conducted in 3 sites in rural El Salvador: Santa Agueda School: Sonsonate, AMILAT Community Clinic: Santiago Texicuangos, and Village Clinic: El Tremedal. During a VCOM outreach trip in October 2014, medical students explained the research to 149 subjects, all of which consented to participate in the study. Verbally administered questionnaires in Spanish were directed to each head of the...
Results: Survey participants who answered transmission knowledge questions correctly had, on average, higher education levels when compared to those who answered them incorrectly or who reported not knowing the answer. The association of education (grade level) in predicting the correct answers to questions about disease transmission was found statistically significant for Chikungunya, Tuberculosis, Rabies, Dengue, and HIV.

Conclusion: Based on the results obtained, it is evident that education plays an important role in the knowledge of infectious disease transmission. Schooling allows individuals to understand how diseases in their area are transmitted. It is presumed that awareness of transmission modes would then also provide the individual with ways to avoid disease. The need for education is therefore vital through schools, a health promoter, or other sources. Limitations of the study include a small sample size, language barriers, and time constraints. Future studies should incorporate more sites, both rural and urban, in order to thoroughly explore the education differences in each setting.

BIOM 2099

Low Colorectal Screening Rate Contributes to the Symptomatic Late Stage Colorectal cancer Incidence in Patients Received in Taipei Hospital

Primary Authors:

Background: Colorectal cancer (CRC) is the second most common cause of cancer death in developed countries among men and the third most common among women. Interestingly, for the sixth consecutive year, CRC remains the most prevalent cancer amongst Taiwanese males, and the second most prevalent amongst Taiwanese women (after breast cancer). According to the World Health Organization (WHO), prevention is the most cost-effective, long-term control strategy for cancer. Despite the development and promotion of CRC screening programs in Taiwan in the last 20 years, only 38.2% of the eligible population (people aged 50-74) have been screened for CRC in Taiwan compared to the 60-70% of the same age group in other countries with similar programs of similar lengths. Up to date, very few studies have been published to address the popularity or acceptance of CRC screening by the Taiwanese people and its impact on the CRC prognosis. Osteopathic philosophy promotes the proper care of the body through health maintenance and pushes preventative screenings that detect and remove early signs of cancer. To help better understand the incidence and improve prognosis of CRC in Taiwan, this retrospective study is aimed at investigating the role of CRC screening in the frequency of CRC incidence and prognosis in patients at the Taipei Hospital, Ministry of Health and Welfare, in Taiwan. It is anticipated that results obtained from this study will help raise the awareness and strengthen the CRC screening program.

Hypothesis: It is hypothesized that low adherence rate of colorectal cancer screenings contributes to the symptomatic CRC incidence and a higher ratio of late-stage to early-stage colorectal cancers in Taipei Hospital, Ministry of Health and Welfare.

Materials and Methods: Data was collected from 76 patients diagnosed with colorectal cancer during the years 2013-2015 at the Taipei Hospital, Ministry of Health and Welfare in Taipei, Taiwan. Data was obtained by reviewing charts and admissions files of patients diagnosed with colorectal
cancer acquired from the Patient Records Office at the Taipei Hospital, Ministry of Health and Welfare. The data collected includes the tumor/node/metastasis (TNM) staging of the cancers, cancer location, colorectal screening history, medical history, admission date, diagnosis date, age, gender, chief symptomatic complaint, and duration of cancer symptoms before diagnosis. No other identifying information was taken from these files during this time period. Data was analyzed using linear regression analysis.

**Results:** Out of the 76 cases of confirmed colorectal cancers, 70 patients were above the age cutoff (age ≥ 50 years old) for CRC screening recommendation. Of the 70 patients, only 8.6% of patients (n=6) were diagnosed through regular immunological fecal occult blood test (iFOBT) CRC screenings. The other 64 patients were diagnosed during patient visits due to CRC-related symptoms (n=57), found during work-ups of other non-related problems (n=3), or had no recorded method of diagnosis (n=4). Patients who were symptomatic at the time of diagnosis typically had later stage cancers (Stage 2 or higher) than those who had been screened through the iFOBT test (linear regression analysis, F=14.08, p=0.0004, R² = 0.18513). Of those who were symptomatic and had TNM and metastasis information available (n=45), 57.8% of patients had CRC that had spread to regional lymph nodes or distant organ metastatic sites at the time of diagnosis.

**Discussion and Conclusion:** This study suggests that a majority of colorectal cancer patients do not go through regular CRC screening and that most CRC cases are caught during advanced, symptomatic stages at the Taipei Hospital. The lack of screening could be explained by time, financial, and work constraints that often affect the lower socioeconomic and industrial occupation population that the hospital typically serves. Overall, a focus of Taiwan’s CRC screening program is to improve participation in its screening program. The strategy should include evaluating main modality of screenings used (iFOBT in Taiwan vs. total colonoscopy of U.S. and Europe), frequency of screenings (biennial in Taiwan vs. annual of U.S. and Europe), cultural sensitivities (fear of cancer diagnoses and “contagiousness” of cancer in Taiwan), and educational barriers (lack of knowledge about typical CRC symptoms) that may affect a person’s choice to participate in a CRC screening in Taiwan.

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**Increased risk of hepatotoxicity and hyperuricemia in elderly Taiwanese multidrug-resistant tuberculosis patients taking pyrazinamide**

**Primary Authors:** Danny Truong, OMS II; **Secondary Authors:** Gregory Arthur Peng, OMS II, Athena Lin, PhD

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**Abstract: Background:** One-third of the world’s population is infected with tuberculosis (TB), which accounted for 1.5 million deaths in 2013. An estimated 5% of total active TB cases in 2013 were multidrug-resistant tuberculosis (MDR-TB), defined as strains of TB resistant to the first line drugs Isoniazid (INH) and Rifampin (RMP). Although the overall prevalence of TB decreased over the past 15 years, cases of MDR-TB increased 3-folds in 2013 compared to 2009.

Taiwan has a 10 times higher rate of TB (53 cases / 100,000 people) as compared to the United States and many other western countries (< 5 cases / 100,000 people) in 2012. Of the 140 cases of MDR-TB in 2012, the majority of cases were in New Taipei City. In addition, most MDR-TB cases were elderly, aged 65 and above, with an increased risk of mortality in this age group.

Given the increased prevalence of MDR-TB, treatment guidelines must be refined in order to optimize treatment. Current standard of care consists of a stepwise drug selection process, potentially increasing the duration and risk of side effects. Many MDR-TB drug regimens include
the first-line drug Pyrazinamide (PZA), which is known to cause hepatotoxicity. We assessed patients taking ethionamide with PZA, a combination that a prior study has shown to worsen hepatotoxicity. Elevated creatinine (Cr) is also associated with poorer prognosis for hepatotoxicity. In addition, PZA is a known antiuricosuric drug, increasing serum uric acid (UA) of patients by inhibiting renal tubular excretion of urate.

When hepatotoxicity occurs, anti-TB treatment is stopped until liver transaminase levels normalize. During this interim, the patient risks developing drug resistance to the previously used anti-TB regimen. By studying which patients are at a higher risk for hepatotoxicity, physicians can better tailor drug regimens without causing excessive side effects, thus allowing the patient’s own body to better assist in fighting the disease. This study upholds osteopathic philosophy and practice, which applies rational treatment based on the principle that the body is a single dynamic unit of function.

Hypothesis: Hepatotoxicity is a known side effect of PZA, which is a first-line anti-TB agent but is also commonly included in second-line treatment regimens for MDR-TB. There has been at least one report suggesting that PZA is safe for short-term treatment of elderly Japanese patients with pulmonary tuberculosis. However, it is unclear whether PZA is generally safe in MDR-TB patients who require prolonged treatment. This study is designed to test the hypothesis that a subset of MDR-TB patients would be more susceptible to PZA-induced hepatotoxicity. We hypothesize that older patients on PZA (>60 years old) are more susceptible to developing hepatotoxicity. The use of PZA should also increase the serum UA levels (hyperuricemia) in MDR-TB patients. The goal of this study is to help establish favorable treatment regimens for these patients to prevent additional disease burden and treatment interruption.

Research Method: Data was collected through a retrospective study of patients’ medical records. An IRB was submitted to Touro University California but is exempt given the type of study. All patients in the study were diagnosed between 2012-2014 with MDR-TB at Taipei Hospital (n=14). There was no exclusion criteria. A time course for each patient recorded the following: age, hepatitis B and C status, history of smoking or alcoholism, date and result of renal and liver function tests (blood urea nitrogen, creatinine, serum uric acid, total bilirubin, Alanine Transaminase (ALT), and Aspartate Transaminase (AST)), and anti-TB drug regimen at the time of each renal and liver function tests.

Data Analysis: Normal levels of ALT and AST were defined as 5-35 IU/L. Hepatotoxicity was defined as 3 times the upper limit of ALT and/or AST levels (> 105 IU/L) and/or when clinicians stopped TB medication due to hepatotoxicity. Elevated liver enzymes were defined as ALT and/or AST > 35 IU/L. Hyperuricemia was defined as UA > 7.5 mg/dL. Any complications were also noted in the analysis. Time to hepatotoxicity was defined as the days from onset of PZA treatment until hepatotoxicity. Time to elevated liver enzymes was defined as the days from onset of PZA treatment until elevated liver enzymes. Normal levels of serum uric acid (UA) levels were defined as 2.5-7.5 mg/dL and normal creatinine levels defined as 0.5-1.3 mg/dL.

Results: 29% (4/14) of patients taking PZA had hepatotoxicity, with 2/4 having elevated creatinine. Average time to hepatotoxicity was 92 days, and average time to recovery was 39 days. An additional 2 patients had elevated liver enzymes. Average time to elevated liver enzymes was 61 days, and average recovery time was 93 days. Average age of all MDR-TB patients was 60 years (n=14). Average age of patients with hepatotoxicity was 77.5 years (n=4). Of those > 60 years old, 42% (3/7) patients developed hepatotoxicity. Of those < 60 years old, 14% (1/7) developed hepatotoxicity (with the comorbidity of hepatitis B antigen positive). The 4 patients with hepatotoxicity also were taking ethionamide. 84% (11/13) of patients taking PZA had elevated UA.
Average total treatment time for all patients was 606 days versus patients with hepatotoxicity 702 days (excluding those with ongoing treatment or stopped treatment early due to comorbidities, n=5).

Conclusion: Cases of MDR-TB are referred to Taipei Hospital. The hospital is located in New Taipei City, the location of most MDR-TB cases in Taiwan. We therefore conducted a pilot study there to investigate increased risk of hepatotoxicity in MDR-TB treatment with PZA. Our data suggests that those in the age group of > 60 years had an increased risk for hepatotoxicity as defined by AST/ALT levels. PZA and ethionamide combination is consistent with previously published reports of increased hepatotoxicity. Hyperuricemia is also consistent with currently published trends, suggesting PZA avoidance for elderly patients with gout or arthralgia.

Treating MDR-TB requires a preemptive consideration of the complications that develop for a certain population group. Avoiding PZA for elderly patients > 60 years old may shorten treatment duration that often requires stopping medications for hepatotoxicity recovery. The lapses in treatment increases the risk of developing further drug resistance and worsens prognosis. This study reiterates that the osteopathic philosophy of comprehensive patient care can help optimize the body’s ability to recover.

Acknowledgment: We would like to thank Dr. Lin Chen Chien at Taipei Hospital for his assistance.

Beneficial effects of consuming a genistein (soy)-rich diet on phenotype and intestinal function in diabetic obesity
Primary Authors: Faisal Masood, OMS II; Kathryn Arthur; Lana Leung; Layla Al-Nakkash; Shawn Catmull, OMS II
Midwestern University; Arizona College of Osteopathic Medicine

Abstract: Hypothesis: We predicted that genistein-diet would have beneficial effects on phenotype (i.e. reduce body weight, adipocyte loss) and would improve intestinal function (i.e. increases in contractility and expression of proteins involved in smooth muscle contraction) in the ob/ob mouse.

Methods & Materials: Mouse model: leptin deficient (ob/ob) and lean control mice were used. This murine model has merit since it mimics the slowed gastrointestinal transit seen in diabetic patients. Mice were fed either genistein (600 mg genistein/kg diet) or standard chow. Contractility: Freshly isolated small segments of jejunum were mounted in KBR and contractility (tension) measured in response to incrementally increasing concentrations of KCl (0-100 mM). Wall structure: Jejunum segments were placed in optimal cutting temperature compound, frozen, sectioned (10 µm), and stained with Hemotoxylin and Eosin. Image J was used to analyze the morphometric characteristics. AChR detection: AChR was detected using α-bungarotoxin and analyzed using Axiovision software. SERCA/MLC/MYPT Western blot: Jejunum samples were homogenized and run on 4-12% B-T gels, according to traditional western blot protocol (sarcoplasmic/endoplasmic reticulum calcium ATPase, SERCA 1:500, myosin light chain, MLC 1:500, myosin phosphatase targeting subunit, MYPT 1:1000 and Actin 1:4000).

Results: At the end of the diet study, ob/ob mice weighed 2-fold more than lean controls, and the genistein-fed ob/ob mice weighed 12% less (n=27, P<0.05) than ob/ob controls (n=17), attributed to a 19% (P<0.05) loss in abdominal fat pad weight. This genistein-mediated weight loss in the ob/ob mice was associated with a trend towards rescued serum glucose levels (from 467±16 to
389±38 mg/dL, n=11-12) and a complete amelioration of serum triglyceride levels to lean control levels (from 258±25 to 94±7 mg/dL, n=13-14). Contractility was not different between the groups. Inner circular smooth muscle (ICSM) thickness was significantly less (21%, n=9, P<0.05) in ob/ob mice compared to controls (n=6). However, there was no diabetic-associated change in jejunum total smooth muscle wall thickness, or depth of outer longitudinal smooth muscle. Preliminary data suggests no diabetic-related changes in expression of SERCA, MLC or MYPT-1. Acetylcholine receptors were decreased in ob/ob mice (41%, n=9, P<0.05) compared to leans (n=10), and genistein-diet reversed this back to lean levels.

**Conclusions:** Our data illustrates that ob/ob mice have decreased AChR, and a thinner ICSM layer. Genistein treatment reverses the AChR density in the absence of modifications to the ICSM thickness. Furthermore, genistein decreased body weight with concomitant loss of abdominal adipose tissue and some reversal of glucose levels. This suggests that genistein may reduce the pathogenesis of diabetes-associated intestinal dysfunction and overall phenotype.

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**Impact of Medical Mission Trips on Cultural, Spiritual, and Socioeconomic Understanding**

**Primary Authors:** Breanna Goldner, OMS II; **Secondary Authors:** Hanna Lurye, OMS II; Michael Schmidt

**Lake Erie College of Osteopathic Medicine**

**Abstract:** **Hypothesis:** By participating in medical mission trips, medical students will gain a better understanding of cultural, spiritual, and socioeconomic differences. Additionally, they will gain consideration in how these aspects can impact a patient’s medical care, and will return with more confidence in addressing these factors in their future medical practice.

**Materials and Methods:** Approximately 45 students from the Lake Erie College of Osteopathic Medicine traveled to either Vietnam, Peru, Uganda, or Costa Rica for 1-2 weeks between May and July of 2015. The students were asked to complete an anonymous online pre- and post-survey to assess their understanding of cultural, spiritual, and socioeconomic issues that are currently present in the medical field. Confidence in taking history and physical skills before and after their trips was also measured. There were 28 responses to the pre-survey and 30 responses to the post-survey.

**Results:** The majority of respondents were between the ages of 22-30, and more than 63% had never participated in an international medical mission. When comfort in scenarios regarding a patient’s cultural/spiritual background were assessed, 96% of responders felt mildly to very comfortable discussing treatment options and concerns with a patient of a different cultural or spiritual background, which increased from 83% pre-trip. More specifically, there was a 31% post-trip increase in students that felt very comfortable performing these actions. There was a 29% post-trip increase in students that felt comfortable building trust and mutual respect with a non-English speaking patient, and a 15% post-trip increase in students that felt mildly to very comfortable accommodating families with different gender roles than their own. After assessing understanding of socioeconomic factors, 60% of responders felt very capable of identifying valid reasons for medical non-adherence due to a patient’s socioeconomic status after going on the mission, a rise from 22% pre-trip. Approximately 43% of students felt that they completely understood the limitations a patient’s socioeconomic status can have on his/her healthcare, which grew from 11% pre-trip. When asked how difficult it would be to show empathy to a patient of a different socioeconomic status, 70% of responders post-trip felt that it would be very easy, an increase from 52% pre-trip.

**Conclusion:** These findings emphasize the importance of international medical mission trips for the preclinical years of osteopathic medical training. These trips build clinical skills, while giving medical students the opportunity to be exposed to and understand the cultural, spiritual, and socioeconomic
Impact of international medical mission trips on medical students and the development of their diagnostic skills.
Primary Author: Natalia Kuklich, OMS II; Secondary Authors: Tricia Kim, OMS II; Alan Zats, OMS II
Lake Erie College of Osteopathic Medicine

Background: International medical mission trips provide opportunities for 1st and 2nd year medical students to gain exposure to diseases that are prevalent in third world countries. Early experiences will allow students to gain knowledge of illnesses to prepare them for clinical rotations. Lake Erie College of Osteopathic Medicine medical students went to Peru with the opportunity to diagnostically identify diseases and pathogens based on their knowledge gained from first year medical school.

Hypothesis: The goal of this research is to determine the effect of international medical mission trips on student diagnostic skills. It is our hypothesis that exposure to medical conditions not prevalent in the United States will increase students' confidence in diagnostic abilities leading into clinical years.

Methods: 18 first year medical students went on a 2-week medical mission trip to Peru in May/June 2015 via the International Medical Society Club at LECOM. The students received two surveys, one before they left for their trip (Pre-Survey) and one when they returned to the U.S. (Post-Survey). The post survey was developed once students returned from the mission trip and addressed their ability to identify pathogens seen during the trip and their comfort level to make diagnoses.

Results: When asked how comfortable students were in making a list of differential diagnoses, 17% said 25% confident, 50% said 50%, 33% said 75%. When asked how comfortable they felt in identifying the following organisms: bacteria – 6% reported 25%, 44% were 50%, 39% were 75%, 11% were 100%; virus – same as bacteria; parasites – 39% were 25%, 33% were 50%, 28% were 75%.

In the post survey, results for making a list of differentials: 24% were 50%, 65% were 75%, 12% were 100%. In identifying the following: bacteria – 30% were 50%, 65% were 75%, 6% were 100%; virus – 6% were 25%, 41% were 50%, 47% were 75%, 6% were 100%; parasite - 6% were 0%, 6% were 25%, 18% were 50%, 47% were 75%, 24% were 100%.

Data analysis: When comparing the surveys, majority of students felt more confident making a list of differential diagnoses on their patient based on the presenting symptoms after completion of the medical mission trip. Also, students felt more comfortable in identifying pathogens at the conclusion of the trip.

Conclusion: Following the medical mission trip, most of the students were found to be more comfortable in identifying various pathogens, which facilitated their ability to make diagnoses. Therefore, medical mission trips are a worthwhile tool in helping develop diagnostic skills in the preclinical years of medical education

A comparison between Fried Frailty Score and Serum Albumin Levels in Taiwanese Patients with ESRD on Hemodialysis
Primary Author: Christopher Lin, OMS II; Secondary Authors: Audreyandra Imansjah, OMS II; Athena Lin, PhD, Yin-Cheng Chen, MD, Xinzhuang District, New Taipei City, Taiwan
Touro University College of Osteopathic Medicine—California
Abstract: **Background:** According to the U.S. Renal Data System, the prevalence of ESRD is the highest in Taiwan, followed by Japan and the U.S. Considering the health burden in ESRD patients who receive life-time hemodialysis and the financial burden for patients and countries, it is of great interest for clinicians to effectively assess treatment options for better use of limited resources. Studies have shown that hypoalbuminemia to be an independent predictor of mortality in dialysis patients. In this study, we explored the validity of Fried Frailty Score as an additional prognostic factor in determining mortality and quality of life in ESRD patients undergoing hemodialysis, through comparing its relation to serum albumin level. It is anticipated that results obtained from this study will help lead to more effective management of ESRD patients.

**Hypothesis:** We hypothesize that the Fried Frailty Score would inversely correlate with plasma albumin level in ESRD patients undergoing hemodialysis.

**Materials and Method:** We surveyed and calculated the Fried Frailty Score for 151 hemodialysis patients at TIHTC Hospital using 5 criteria established by Fried: unintentional weight loss, weakness, slow walking speed, low physical activity, and self-reported exhaustion. We obtained data for age, sex, serum albumin, hemodialysis start date, and comorbidities.

**Results:** 60 patients were evaluated with a score of 0, 38 with 1, 18 with 2, 15 with 3, 18 with 4, and 2 with 5. The average albumin level for those with a score of 0 is 3.56 ± 0.28, 1 is 3.51 ± 0.40, 2 is 3.29 ± 0.35, 3 is 3.03 ± 0.56, 4 is 3.07 ± 0.34, and 5 is 3.00 ± 0.20. There is a clear decline in number of patients with normal albumin levels as frailty score increases. The ratio of those with normal albumin to those with hypoalbuminemia for a frailty score of 0 is 1.73, 1 is 1.31, 2 is 0.5, 3 is 0.27, 4 is 0.13, and 5 is 0.

**Conclusion:** The data shows that as Fried Frailty Score increases, the level of serum albumin decreases in ESRD patients undergoing hemodialysis at TIHTC Hospital. This finding strongly suggests that the Score has powerful prognostic value in the outcome of ESRD patients. It does not only determine mortality, but also describe the quality of life of patients. Such information can further assist the medical team in providing effective interventions, as well as influence patient’s decision in choosing the treatment modality, such as peritoneal dialysis, renal transplantation, or starting hospice.

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**Health Care Provision and Access to Medical Care in a Sample of Rural Ecuadorians with Chronic Illness**

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**NovaSoutheastern University College of Osteopathic Medicine**

**Hypothesis:** In Ecuador chronic illness now becoming a national health priority. However, health interventions tailored specifically to rural and low-literacy populations are lacking. Elucidation of chronic conditions such as diabetes and heart disease in medically underserved areas of Ecuador has yet to be investigated. We also know that South American nations overall are experiencing increases in chronic illnesses and that there is an expanding need for improved management of these conditions. The primary goal of this study was to investigate health care provision and access to medical care in a small sample of rural Ecuadorians living with chronic illness.

**Materials and Methods:** A cross-sectional, correlational study was conducted to gather information pertaining to self-reports of chronic illness, health care provision and access to care in rural Ecuador. A convenience sample of 31 patients aged 18 and older currently taking medications
for chronic illness who received medical care during a university-based medical outreach trip completed an anonymous pen-and-paper questionnaire. The survey collected data on perception of personal health status and access to medical care. The survey, offered in Spanish, took approximately 20 minutes to complete. Descriptive analysis was conducted using SPSS statistical software. This study was approved by the researchers’ university’s Institutional Review Board.

**Results:** The majority ($n=29; 93.5\%$) of the participants reported a net income of less than $5,000 per year and 84% reported having less than a high school education. Sixty-five percent of participants rated their health as fair or poor. The most commonly reported conditions were diabetes, hypertension, high cholesterol, and heart disease; 45.2% ($n=14$) participants reported having multimorbid chronic conditions. Nearly one-fifth ($n=6; 19.4\%$) had no health care provider and reported there was no clinic or hospital to go to for their chronic conditions. Fifty-five percent ($n=17$) reported it was hard or very hard to get medication refills on time, and 58.1% ($n=19$) reported they sometimes or often put off getting refills because they were unable to get to the pharmacy.

**Conclusion:** This is the first study to our knowledge that has explored the access to care for chronic conditions in Ecuadorians living in rural, medically underserved areas. Data from this study will hopefully bring light to an unmet public health concern in areas of the world where access to medical care is limited or nonexistent.

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**Age, Cavitation and Platelet Count as Potential Markers of Patient Vitality in Non-Drug-Resistant Tuberculosis at the Taipei Hospital in Taiwan**

**Primary Co-Authors:** Daisy Young, OMS II; Patrick Hsu, OMS II; **Secondary Authors:** Michael Lee, OMS II, Audreyandra Imansjah, OMS II, and Eureka Wu, OMS II, Athena Lin, PhD, Taiwan International Healthcare Training Center, Pulmonology Department, Chief of Department Dr. Lin Chen Chien

Touro University California, Global Health Program, Taiwan Director

**Abstract:** Hypothesis: It is hypothesized that comorbidities and complete blood count can be indicators of patient vitality.

**Materials & Methods:** All admitted patients in 2011 with non-drug resistant TB were examined. Only patients that completed treatment or had expired (the primary endpoints) were selected for a total of 63 patients. Baseline and endpoint biochemistry data and X-ray analyses were collected.

**Results:** Of the patients, 68% were male and 32% were female. Of the males, 67% completed treatment and 33% expired compared to the 86% and 14% of females. Males had a higher incidence of TB 68.25% and higher mortality 76.92%, (p=0.15) than females. Age had a significant impact on prognosis. The mean age of the Completed Treatment (CT) group (51.76±20.94) was younger than the mean age of the Deceased (D) group (75.9±12.7), (p<0.001). The incidence of cavitation upon admittance was 15.86%. The CT group had a higher incidence (14.7%) of cavities than the D group (12.5%), (p=0.67). Of those with cavities in the CT group, 71% were under the age of 50, compared with 0% in the D group (p=0.105). In the D group, 31.25% had diabetes compared to 27.66% in the CT group, (p=0.784). In the D group, 25% had hypertension compared to 19.15% in the CT group, (p=0.62). The incidence of patients with diabetes and hypertension was higher in the D group versus the CT group, 18.75% and 10.63%, respectively (p=0.40). Patients with both diabetes and hypertension had a 1.88 greater mortality risk than those with diabetes alone. Those with diabetes in the D group had a 19.1% decrease from baseline values compared to a 14.38% decline in the CT group ($t= -0.36, p=0.985$).

**Discussion:** Results from this preliminary study suggest that male gender and cavitation in those under 50 are prognostic factors for patient survival. In the D group, most patients expired without
cavities and were older. In contrast, in the CT group 71% of those with cavitation were under 50 years old. This is intriguing because cavities are usually present in secondary tuberculosis. Additional studies should be done to validate this preliminary observation, understand why the prevalence of cavities was higher in the younger population, and parse out the relationship between the pathophysiology of cavitary lesions and mortality. Although there was a larger decrease in platelet levels in the D group compared to the CT group, the relationship was not significant given the limitations in sample size and platelet data collection. A larger scale study is needed to determine the prognostic role of platelet levels.

Conclusion: This pilot study helps provide insight on how treatment can be personalized. By appreciating the characteristics of tuberculosis and their impact on the body’s inherent ability to regulate itself, further reduction in the health burden of TB in Taiwan and the international community is anticipated.*Authors contributed equally.

Comparison and Contrast of Diagnosis Methods between OMM and TCM, the counterpart of OMM in the Eastern World

Primary Author: Eureka Wu, OMS II; Secondary Author: Ming-Chu Chen, CME, Taipei Hospital, Department of Health, Taiwan, Athena Lin, PhD, Touro University COM

Touro University College of Osteopathic Medicine – California

Abstract: Background: Treating the body as a whole and promoting self-healing are two fundamental principles shared by OMM and Traditional Chinese Medicine (TCM). While OMM employs Osteopathic Manipulative Techniques (OMT) by manipulating articulatory, myofacial, and musculoskeletal barriers, TCM combines various modalities such as Tui-na, a push and pull technique, acupuncture, qigong, and Chinese herbal medicine to provide treatments. More importantly, accurate and efficient diagnoses have to be made to ensure effective treatments. We will be comparing and contrasting how OMM and TCM are used firsthand to diagnose patients at initial assessments. With the existing challenges in both the OMM and TCM world, this study is anticipated to benefit those who actively seek for improvement in their diagnostic skills.

Hypothesis: It is hypothesized that, by comparing and contrasting the diagnostic methods utilized in OMM and TCM, physicians will gain insights into improving their diagnostic skills.

Methods: Through the TUCOM Global Health Program, I, a second year medical student, spent one week in summer 2015, with the TCM department in Taipei hospital where I observed closely how TCM doctors diagnose patients and discussed with physicians who had been practicing TCM for decades.

Results: Below is a table depicting the diagnostic methods for both OMM and TCM:

<table>
<thead>
<tr>
<th>OMM</th>
<th>TCM</th>
</tr>
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<tbody>
<tr>
<td>T: tissue texture change</td>
<td>Looking/observation</td>
</tr>
<tr>
<td>A: asymmetry</td>
<td>Listening and smelling</td>
</tr>
<tr>
<td>R: altered range of motion</td>
<td>Asking</td>
</tr>
<tr>
<td>T: tenderness</td>
<td>Pulse/palpation</td>
</tr>
</tbody>
</table>

Looking: starts when patient walks in the door. Note gait, speech and appearances and presentations of patient’s facial features as well as their body movements.

Listening: sound of voice, types of coughing, speech coherence and breathing pattern.

Smelling: body odor and smell of breath when one talks.

Asking: pertinent history taking of patient’s past medical conditions, as well as related family
history.

Pulse/palpation: Aside from feeling for the strength and rate of the pulse, the physician feels for two things mainly; 1) balance inside body as a whole and 2) state and function of individual organs. It is being done by placing index, middle and ring fingers along the radial artery at around the wrist area using different amount of forces: superficial, middle and deep.

Conclusion: TCM and OMM share the same goal of assisting the body to achieve its own state of balance. Although it is the generation where technological equipment can assist in the diagnosis making process, those fundamental skills of history taking, observation and thorough palpation are necessary to make diagnosis, more importantly in urgent situations when those technology are not around. Both of the diagnostic techniques for OMM and TCM require constant practice and focus. With continuous refining of our diagnostic skills, we hope to incorporate and apply basic principles of OMM in order to help patients achieve balance in their health.

A case study on an unusual presentation of intracardiac thrombus in a patient with metastatic breast cancer at TIHTC Taipei Hospital
Primary Authors: Audreyandra Imansjah, OMS II; Vicki Hsieh, OMS II; Wei Yuan Chen; Athena Lin, PhD
Touro University College of Osteopathic Medicine—California

Abstract: Introduction: Cancer is the #1 killer in Taiwan since 1982. It has been shown that thrombosis represents the 2nd most frequent cause of death in cancer patients. The goal of the case study is to gain insights into an unusual presentation of a migrating thrombus, due to possible hypercoagulation from a metastasizing cancer. There have been no published studies regarding a presentation of intracardiac thrombus in a patient with metastatic breast cancer. A 62-year-old woman with a history of left breast cancer and leptomeningeal metastasis was admitted to Taipei Hospital’s emergency department for complaints of intermittent involuntary movement for days as well as conscious change noted the evening prior to admission. After imaging, laboratory work-up, and admission, patient was diagnosed with seizure attack and electrolyte imbalance and was discharged after several days when electrolyte levels were normal. Upon discharge, patient had a syncopal episode and collapsed. Her consciousness recovered gradually after several minutes. She was immediately readmitted and work up was performed to find cause for syncope.

Investigation: Upon first emergency department admission, brain computed tomography was taken. Electrocardiogram, chest x-ray, laboratory workup, and electroencephalogram were performed. Upon second admission, similar tests were repeated. Cardiac enzymes were checked and cardiac echogram was performed. In addition, cardiac computed tomography and D-dimer tests were placed. Blood gas values were also obtained. Cardiac enzymes showed a high level of troponin, D-dimer was elevated. Electrocardiogram revealed the presence of a right bundle branch block. Echocardiogram revealed an organized 2.65 x1.2cm thrombus floating in the right atrium of the heart.

Diagnosis: The resulting diagnoses for this patient were 1) migrating thrombus, 2) conscious loss due to obstruction of blood flow by right atrial tumor, and 3) cardiogenic shock.

Treatment/Management: An emergent cardiac embolectomy was performed to stabilize the patient’s condition. However, when the right atrium of the heart was opened to perform the
embolectomy, the thrombus had already exited the heart and became lodged at the left main pulmonary artery. The main thrombus was removed and the patient was monitored for stable recovery. The patient was continued on prednisolone and given saline and cetalin injections, amiodarone, ranitidine, rasitol, and cofarin.

**Discussion:** It is rare to see an intracardiac thrombus in patients with metastatic breast cancer, as usually it passes through the pulmonary trunk and into the lungs by the time the patients are admitted into the hospital. Cancer is the leading cause of death in Taiwan. This case report stresses the importance of ruling out cardiogenic problems, such as a migrating thrombus, while evaluating for conscious change and syncope of a patient with a history of metastatic cancer.

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**Low Colorectal Screening Rate Contributes to the Symptomatic Late Stage Colorectal Cancer Incidence in Patients Received in Taipei Hospital**

**Primary Authors:** Vicki Hsieh, OMS II; Chien Ming Chen; Wendy Zhou; Athena Lin, PhD
Touro University College of Osteopathic Medicine—California

**Abstract:** **Background:** For the sixth consecutive year, colorectal cancer (CRC) remains the most prevalent cancer amongst Taiwanese males and the second most prevalent amongst Taiwanese women. According to the World Health Organization (WHO), prevention is the most cost-effective, long-term control strategy for cancer. However, very few studies have been published to address the popularity or acceptance of CRC screening by the Taiwanese people and its impact on the CRC prognosis. To help better understand the incidence and improve prognosis of CRC in Taiwan, this retrospective study is aimed at investigating the role of CRC screening in the frequency of CRC incidence and prognosis in patients at the Taipei Hospital. It is anticipated that results obtained from this study will help raise the awareness and strengthen the CRC screening program.

**Hypothesis:** It is hypothesized that low adherence rate of CRC screenings contributes to the symptomatic CRC incidence and a higher ratio of late-stage to early-stage colorectal cancers in Taipei Hospital.

**Materials/Methods:** Data was collected from 76 patients diagnosed with CRC during the years 2013-2015 at the Taipei Hospital. Data was obtained by reviewing charts of patients diagnosed with CRC acquired from the Taipei Hospital and recording down data relating to cancer severity, method of diagnosis, and screening frequency in these patients.

**Results:** Out of the 76 cases of confirmed CRC, 70 patients were above the age cutoff (age ≥ 50 years old) for CRC screening recommendation. Of the 70 patients, only 8.6% of patients (n=6) were diagnosed through regular immunological fecal occult blood test (iFOBT) CRC screenings. The other 64 patients were diagnosed during patient visits due to CRC-related symptoms (n=57), found during work-ups of non-related problems (n=3), or had no recorded method of diagnosis (n=4). Patients who were symptomatic at the time of diagnosis typically had later stage cancers (Stage 2 or higher) than those who had been screened through the iFOBT test (p=0.0004). Of those who were symptomatic and had metastasis information available (n=45), 57.8% of patients had CRC that had spread to regional lymph nodes or distant organ metastatic sites at the time of diagnosis.

**Discussion/Conclusion:** This study suggests that a majority of colorectal cancer patients do not go through regular CRC screening and that most CRC cases are caught during advanced, symptomatic stages at the Taipei Hospital. Overall, a focus of Taiwan’s CRC screening program should be to improve participation in its screening program. The strategy should include evaluating main modality of screenings used (iFOBT vs. total colonoscopy), frequency of screenings (biennial
in Taiwan), cultural sensitivities (fear of cancer diagnoses in Taiwan), and lack of patient education that may affect a person’s choice to participate in a CRC screening.

Clinical and Surgical Implications of EGFR Mutations in Non-Small Cell Lung Cancer

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Abstract: Hypothesis: The epidermal growth factor receptor (EGFR) is a type of receptor tyrosine kinase that is significant in non-small cell lung cancer (NSCLC). Exon 19 and 21 EGFR mutations are associated with a high response to targeted therapy. While the role of EGFR mutations in treatment response to tyrosine kinase inhibitors is well accepted, little is known about the incidence of EGFR mutations in Taiwan. Lung cancer continues to be the most common cause of cancer death in Taiwan. Thus, it is essential to explore the clinical and surgical implications of EGFR mutations in NSCLC. This study was designed to test the hypotheses that specific EGFR exon mutations would be prevalent in NSCLC patients at Taipei Hospital in Taiwan, and that there would be a correlation between specific exon mutations and lung tumor locations.

Materials & Methods: This retrospective cohort study utilized data from the Taiwan International Healthcare Training Center (TIHTC) of Taipei Hospital. NSCLC cases were selected from all lung cancer cases at TIHTC. Patients must have been screened for EGFR mutations, received targeted therapy of erlotinib or gefitinib from Taipei Hospital, and received chest x-rays and/or CT scans before and after starting treatment. The frequencies of EGFR mutations in NSCLC patients from TIHTC were compared with frequencies from previous studies in Asia. Imaging of chest X-rays and CT scans were reviewed to determine tumor location site.

Results & Conclusion: The study population included 4 categories: no EGFR mutation (n=4), exon 19 in frame deletion (n=4), exon 20 in frame insertion (n=1), and exon 21 L858R mutation (n=2). The frequencies of these mutations were 36.4%, 9.1%, and 18.2% for exon 19, 20, and 21 mutations respectively, as compared to existing findings of 48%, 9.2%, and 43% respectively. Thus, in terms of EGFR mutations in NSCLC, the incidence rates in Taiwan corroborate data found in existing literature. Interestingly, in examining the relationship between EGFR mutations and location of the tumors, exon 19 was associated with right-sided tumors, and exon 21 with left-sided tumors; 75% of exon 19 mutations were associated with tumors in the right lung. There is insufficient evidence about tumor site location and the impact on outcomes, and this needs to be further explored as it may have significant implications for surgical outcomes similar to the impact of mutation associations with targeted therapy. This study has provided an informative perspective on Taiwan’s EGFR mutation frequencies, as analysis of data from Taiwan specifically has not been previously conducted. This study emphasizes the importance of considering EGFR mutation associations for treatment outcomes, and how it is essential to further explore if there are implications for surgical outcomes as well. Future studies should continue exploring whether EGFR mutations can be used to predict tumor site location, and whether this has a direct impact on outcomes for surgical treatment of NSCLC tumors.

Characteristics of Comorbidities in Taiwanese Patients who are Infected with Multi-Drug Resistant Tuberculosis
Abstract: Introduction: Multi-drug resistant tuberculosis (MDRTB) counts 3.5% of new tuberculosis (TB) cases globally and is a major public health problem with potential global threats. Patients with comorbidities such as hypertension, diabetes mellitus, and cancer, further complicate the already complex treatment of MDRTB as physicians need to evaluate drug interactions and other toxicities for the patient. Studies have shown that MDRTB patients with comorbidities have poorer treatment outcomes. There is a need to raise awareness for the development of favorable treatment regimens and patient outcomes among comorbid patients infected with MDRTB, especially since TB is the most serious communicable disease in Taiwan. To help establish effective treatment regimens for MDRTB with comorbidities, this study is aimed at evaluating clinical characteristics in MDRTB patients received at TIHTC Taipei Hospital, Taiwan.

Methods: As a retrospective study, data for 26 patients with MDRTB from the years 2009 to 2014 was gathered from the TIHTC Taipei Hospital. The independent variables in the data included age, drug treatment regimen, drug sensitivities, and type as well as number of comorbidities. Statistical analysis was performed on the variables of age and the various comorbidities with the MDRTB patients.

Results: The sample (N=26) consisted of 16 males (61.5%) and 10 females (38.5%) and the mean age (±SD) of the patients with MDRTB was 58.3 ± 19.4 years. Patients with at least one comorbidity was 38.5% (N=10) and at least two comorbidities was 25.9% (N=7). 68.8% (N=11) of the males and 20.0% (N=2) of the females had at least one comorbidity in addition to the MDRTB infection. There were higher percentages of MDRTB patients presenting with hypertension, 23.1% (N=6), and cancer, 15.4% (N=4). Other comorbidities included diabetes mellitus, 11.5% (N=3), hepatitis B, 7.7% (N=2), anemia, 7.7% (N=2), and miscellaneous-grouped diseases, 38.5% (N=10). Out of the 10 patients with comorbidities, hypertension counts 60% (N=6).

Conclusion: WHO reports that in 2013, there were 97,000 patients beginning treatment for MDRTB, a threefold increase compared to 2009. This illustrates the importance of treating MDRTB and improving patient outcome for the overall progress of quality of care. This study suggests that patients infected with MDRTB and were treated in Taipei Hospital tend to have a higher probability of having comorbidities (38.5%), especially in males (68.8%) over females (20.0%). Among the MDRTB patients with comorbidities, hypertension counts 60%, suggesting that hypertension is likely to be the comorbidity in MDRTB patients received at Taipei Hospital. Many anti-hypertension drugs are associated with serious toxicities, which can complicate the management of MDRTB. It is thus necessary to establish favorable treatment regimens for MDRTB patients with hypertension.

Analyzing and defining the aspects of international medical outreach trips involving osteopathic medical students, residents, and physicians

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Abstract: Introduction: Every outreach trip is unique; however, there are similar organizational aspects throughout all international medical outreach trips. These aspects can largely determine trip efficacy as well as the overall experiences of the volunteers and patients. Important aspects include categories such as: housing, food, transportation, security, communication, translation, cultural
immersion, group activities, research, education, group size, and student to physician ratio. With these aspects in mind, we asked the research question: Which aspects are the most important for organizing a successful international medical outreach trip.

**Methods:** A research survey was developed to determine which aspects were considered to be the most important. This retrospective survey was designed to gather the observations and opinions of international medical outreach trip participants and organizers. The participant population included a total of 83 individuals. It was required that participants had either served on or helped organize an international medical outreach trip. The survey was administered using SurveyMonkey.com software and all participants digitally signed a research waiver. In the survey participants were asked to quantify the overall importance of each aspect, both individually and when compared to the other aspects listed.

**Data Analysis:** To analyze the data we added together the total number of times each aspect appeared on a participant’s top five answer choices. Next, we calculated answer percentages and ranked each aspect’s importance according to these percentages.

**Results:** The survey results showed that safety and security, communication, housing, food, and cultural immersion were the most important aspects, respectively. Thus, safety and security of the trip’s participants was found to be the most important aspect overall with a total of 81% ranking safety and security within their top five answer choices. Likewise, communication ranked second (78%), housing third (69%), food fourth (63%), and cultural immersion fifth (60%). Additionally, 55% of participants selected the ideal number of outreach trip participants to be between 10 and 20 individuals. Furthermore, 65% of participants in the survey selected either a 3:1 or 2:1 student to physician ratio to be the most favorable.

**Conclusion:** Survey results indicated that the most important aspect in organizing a successful international medical outreach trip was safety and security for the trip’s participants. Whether planning to organize a trip or simply trying to decide which trip to attend, one must ensure that the safety and security of trip participants is paramount. Research limitations included sample size (83). Plans for follow up research are to increase sample size and include additional aspects in the survey such as continuity of care for the population being served.

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**Carcinogenic biomarkers in the pediatric population exposed to Arsenic (As3) in drinking water**

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**Abstract: Background:** In many parts of the world, access to sanitary drinking water remains a concern. Such is the case in the Altiplano regions in south Peru, where it has been well documented that there exist toxic levels of arsenic (As3) - a natural element famous for its carcinogenic effects on multicellular life. Previous water studies in this area showed evidence that urine As3 levels in the pediatric population reached a level of 5 times the accepted dose as recommended by the WHO, and the As3 level in drinking water is up to 100 times the accepted levels of As3 as recommended by the WHO. The CDC formula for carcinogenic risk found that these children were 5 times more likely to develop cancer during their lifetime. A recent study suggests that even low levels of As3 increases concentration of Malondialdehyde (MDA), an indicator of oxidative stress to the kidney. The aim of this study was to identify the presence of a biomarker specific for renal damage in addition to urinary As levels in these children. Identifying MDA in the sample will indicate a correlation of As3 exposure in Peruvian children to their increased lifetime risk of cancer.
Research Method / Materials: Institutional Review Board (IRB) approval was obtained prior to data gathering. 17 patients between the ages of 5 and 17 from Puno, Peru, were included in this study. Each patient was asked to provide a sample of urine. This was then analyzed for MDA level, As3 level, and specific gravity.

Hypothesis: The hypothesis is that concentrations of MDA in the Peruvian pediatric population will positively correlate with the level of As3 in their urine.

Data Analysis: The data samples are analyzed with Microsoft Excel.

Results: The average MDA level measured in the urine per 17 randomly selected pediatric patients was 3.9 on the scale of 1 to 5. The average arsenic levels for the same 17 patients was 306 ug/L. The normal MDA levels and As3 levels in the urine should be <1 and <100 u/L respectively. The average As3 level for an MDA score of 3 (n=4) is 270, for an MDA score of 4 (n=7) is 315, and for an MDA score of 5 (n=5) is 292. The standard deviations are 91, 98, and 196 respectively. These data points with its respectively standard deviations provides for a significant trend. Based on these calculations, we assume that with a larger sample, our hypothesis will be supported. The specific gravity for each patient was also calculated, but was not found to be of any correlation to the As3 or MDA levels.

Conclusion: This research effectively demonstrates that a positive correlation exists between urine As3 toxicity and urine MDA levels. Future research will investigate the relationship between As3 exposure and risk of cancer in these patients. This research indicates that perhaps MDA is an efficient low cost marker for early identification of possible renal damage, and could be use as a screening tool for As3 induced renal damage in the future. This research also recommends that water filters be placed in Puno, Peru, for prevention of further arsenic toxicity in the pediatric population.

Evaluation of alcohol knowledge and consumption in Honduran children
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Abstract: Context: In order to produce well-rounded physicians, VCOM has established an international outreach site in Tegucigalpa, Honduras, to allow medical students to gain experience working with underprivileged populations. During the mission trips, teaching modules on living healthy lives and avoiding violence, alcohol abuse, and drugs were presented to school-aged children of Tegucigalpa.

Objective: The primary objective of the study was to determine if children with less knowledge about the consequences of alcohol were more likely to have consumed alcohol than those with more prior knowledge.

Methods: Honduran schoolchildren ranging from 8-14 years old participated in this study and were chosen based on a convenience sample. Any child who did not have a consent form signed by a parent was excluded from the study. Data was collected before and after an intervention teaching module on the negative effects of drug and alcohol abuse by using pre- and post-test assessments. A community survey distributed at the beginning of the session was used to understand the alcohol consumption habits of the children.

Outcomes: The primary outcome of the study was to determine if children with a lack of knowledge about the consequences of alcohol relating to social behavior and violence were more likely to have consumed alcohol in the past. The secondary outcome was to determine if the
educational intervention was effective in teaching the negative effects of alcohol related to social behavior and violence. A p value of 0.05 determined the level of significance.

**Results:** The primary outcome demonstrated a significant association between lack of knowledge about the risks associated with alcohol consumption and history of alcohol consumption as evidenced by a Pearson Chi-Square value of 21.505, p=0.000. For our secondary outcome concerning the effectiveness of the study’s intervention, it was found that the intervention was effective as shown by a paired t-test value of -3.317 as compared to the calculated 2-tailed critical value of 0.001.

**Conclusion:** The children who had consumed alcohol had less knowledge of the social and behavioral consequences of alcohol. The educational intervention increased the children’s knowledge about the harmful effects of alcohol on the body. The study was performed in underserved communities in an international setting, thus, additional studies are needed if the information is to be generalizable to other international or United States children due to the varying living conditions and social behaviors within various communities.

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**Thoracic and Rib Dysfunctions in Peruvian Patients Presenting With Respiratory Complaints.**

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**Institution:** Michigan State University College of Osteopathic Medicine

**Abstract:** For seven years the Michigan State University College of Osteopathic Medicine (MSUCOM) has undergone a medical elective to Peru to provide medical care to an underserved population. Due to the prevalence of somatic dysfunction observed over the previous years, students from MSUCOM surveyed Peruvian patients presenting with respiratory complaints. The goal was to diagnose structural thoracic and rib dysfunctions in an attempt to correlate somatic dysfunction with respiratory symptomatology. A retrospective study was conducted based on medical records. Patients presenting to the Santa Rosa clinic in Iquitos with the complaint of respiratory difficulty were studied. These complaints included cough, shortness of breath, difficulty breathing, and pain with deep inspiration. Medical students, under the guidance of licensed Osteopathic physicians, utilized palpatory skills to recognize tissue texture change, asymmetry, restriction of motion, and tenderness. Diagnosis of the thoracic region was recorded using classic Freyettes Type II: ERS or FRS dysfunctions of T1-T12. This study limited its scope to structural rib dysfunctions including anterior or posterior subluxation of ribs 2-12.

Subjects (n = 20) were surveyed, with 1 omitted, and OMT/OMM was provided after evaluation. A total of 104 dysfunctions were diagnosed for the 19 patients seen. They averaged 5.47 total dysfunctions per patient and 100% of the patients surveyed demonstrated rib dysfunction. Incidence of dysfunction was 3 per thoracic vertebrae and 2.47 per rib complex. The most common thoracic and rib dysfunctions diagnosed were FRS with 1.89 dysfunctions and posterior subluxations with 1.84 per patient. The vertebral segment and rib with the greatest incidence of dysfunction were T4 at 17.5% (n = 10) and rib 6 at 23.4% (n = 11).

Patients presenting with the complaint of pain with inspiration (n = 17) averaged 2.35 rib dysfunctions and 3.17 thoracic. Patients presenting with cough and pain with inspiration (n = 5)
averaged 2.8 rib and 3.6 thoracic dysfunctions each. 100% of the patients presenting with cough had posterior rib subluxations (n = 5). Finally, patients presenting with shortness of breath as their only respiratory complaint (n = 2) averaged 2 thoracic and 3.5 rib dysfunctions each.

Restriction of motion caused by somatic dysfunction plays a large role in the body’s ability to expand the chest and properly ventilate. The 2009 meta-analysis by Rosalba demonstrated how restrictions on the rib cage can inhibit diaphragm function in patients with hyperinflation caused by chronic respiratory conditions. Osteopathic research, including the 1984 study by Morlock and Beal, states that visceral-somatic respiratory dysfunction occurs primarily in the T2-T7 spinal segments. This research correlated with these two previous studies in demonstrating that restriction in the respiratory reflex area (T2-T7) can be associated with respiratory symptoms. The results of this study may lead to increased surveillance and assist in utilizing OMM as a treatment method to decrease respiratory complaints. Increased focus must be placed on treating the T4 and Rib 6 region. Further study must be conducted on treatment of thoracic and rib dysfunction using OMT to decrease the prevalence of respiratory complications.

Colorectal Cancer Prognosis and Post-Surgical Complications of CRC Patients in Taipei Hospital Correlated to Genetic Background of KRAS and EGFR

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Abstract: Introduction: CRC has been the leading cause of death in Taiwan for the past 31 years. Its progression is multifactorial and involves regulators such as KRAS. EGFR is often overexpressed but its role as a prognostic marker is unclear. Studies have shown codon 12 and 13 KRAS mutations are poor prognostic markers. This retrospective study aims to investigate the KRAS status and EGFR expression levels of CRC patients and analyze their relationships in prognosis and post-surgical complications. Hypothesis: This study aims to test the hypothesis that KRAS status and EGFR expression impact cancer stage. Surgery remains the main treatment for early stage CRC, and post-surgical complications remain a serious concern. We will also investigate the relationship of KRAS and EGFR and incidence of post-surgical complications of CRC patients.
Method: Data was collected from 32 patients diagnosed with CRC who received KRAS mutation screen and EGFR IHC stain during 2013-2015 at Taipei Hospital. Data was gathered through medical records obtained from the Records Office. The data includes KRAS status, EGFR expression levels, TNM cancer stage, and post-surgical complications. EGFR expression was provided as a percentage and was scored as 0 (<10%), 1 (11-25%), 2 (26-50%), 3 (51-75%), and 4 (>75%).
Results: Of the 32 CRC patients who received a KRAS screen and EGFR stain, 59% (n=19) were positive for KRAS mutation. 68% had a codon 12 mutation and 32% had a codon 13 mutation. 85% of patients with a codon 12 mutation (n=11) were diagnosed with late stage cancer. Interestingly, all patients with a codon 13 mutation were diagnosed with late stage cancer. 74% (n=14) of patients positive for KRAS mutation had no post-surgical complications while 70% (n=9) of patients wt for KRAS had post-surgical complications, which include UTI (n=4), anastomotic leak (n=4), and pneumonia (n=1). All patients positive for KRAS mutation showed positive EGFR staining. High EGFR levels with KRAS mutation showed more advanced CRC stages (p = 0.00000000111) while high EGFR levels with wt KRAS showed more early CRC stages.
Conclusion: This study suggests that KRAS status and EGFR expression levels can assess prognosis and post-surgical complication risks in CRC patients. Our result suggests that KRAS codon 13 mutation in Taiwanese patients is associated with poor clinical outcome. The correlation of high EGFR levels with wt KRAS showing less advanced CRC stages may provide more possibilities in treatment options. The correlation of high EGFR levels with KRAS mutation showing more advanced CRC stages poses future studies into looking at their dual effect on CRC prognosis. The higher occurrence of post-surgical complications in wt KRAS CRC patients is intriguing and should be further investigated in a larger scale study. If proven true, such finding can provide specific pre and post-operative care for CRC patients to help minimize occurrences.

Analysis of the Moche River for Presence of Heavy Metals and Other Contaminants
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Background: Heavy metals are natural to the earth’s crust however human activities have caused an excess of them in natural resources including freshwater. These excess metals are responsible for various health problems in people without access to clean water in developing countries, including kidney problems and developmental delays. A rise of human activities, such as mining and industry, has caused water, plant, and wildlife contamination in Peru’s Moche River. This study analyzed the water of the Moche River for the presence of heavy metals and other contaminants.

Methods: In order to identify toxic elements present in the Moche River, water samples were obtained from 19 locations defined by georeference, agriculture and mining activities, and proximity to small villages. Where there was a current, 250 mL samples were collected, numbered, and labeled with GPS coordinates. The samples were then analyzed for 25 different variables. The variables analyzed included various heavy metals, biochemical oxygen demand, pH, coliforms, and E. coli.

Results: The Moche River displayed elevated levels of arsenic, aluminum, cadmium, copper, iron, manganese, lead, and zinc in addition to coliforms and E. coli. The most elevated levels of aluminum, cadmium, iron, manganese, and zinc were all noted at the location of the Cementerio Bridge Km 71 (GPS: S07°59’42” W78°21’43”). The Moche Bridge (GPS: S08°08’21” W79°00’36”) had significantly higher levels of coliforms and E. coli, in addition to being contaminated with the heavy metals. In multiple samples there was an increased biochemical oxygen demand and many pH values were out of normal range, according to EPA values.

Discussion: Our investigation shows that the water from the Moche River is contaminated with heavy metals and other contaminants. The decreasing flora and fauna of the river can be attributed to the higher levels of oxygen demand and pH changes that were seen. Data from this analysis provides us with the groundwork for identifying the cause of water related health problems in the area. It is now possible to evaluate levels of these metals in the population surrounding the Moche River and assess the prevalence of health problems that result from them. Furthermore, the water from the river is also used to irrigate fields in the area. Future investigations will evaluate the levels of these heavy metals in agriculture native to the region, which if elevated, could be causing adverse health effects to consumers.
Determining the prevalence of childhood obesity in Iquitos, Peru

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Abstract: Hypothesis: Obesity is a growing problem worldwide. According to the World Health Organization worldwide obesity has more than doubled since 1980. In 2014, more than 1.9 billion adults were overweight, and of these, over 600 million, about 13% of the world’s adult population, were obese. Obesity is not a problem that begins in adulthood, however. WHO estimates that around 42 million children are overweight or obese worldwide, and many of these children will continue to be overweight or obese into adulthood. This study examines BMI trends in children in Iquitos, Peru to see how the obesity epidemic has affected children in this area of the world.

Materials and Methods: To assess the health of children in Iquitos, Peru; height, weight, arm circumference, and waist circumference were measured, and BMI and the associated Z-score were calculated following CDC and WHO guidelines. Parents accompanying their children were given a brief survey, which was used to obtain information about their children’s frequency of consumption of certain types of foods in addition to the types of activities that their child participated in throughout the day. Data was collected from 130 pediatric patients between the ages of 2 and 17 years old. Children were weighed to the nearest 0.1kg using a Tanita body scale while height was measured to the nearest 0.1cm using a Harpenden Anthropometer. In addition, arm and waist circumference measurements were taken to the nearest 0.1cm using a Gulick tape measure. To ensure that the measurements obtained followed the CDC guidelines, accepted standards of error for height, arm circumference, and waist circumference were 3mm, 1cm, and 1cm, respectively. BMI was calculated using the measured weight and an average of the measured heights. A z-score associated with BMI was then calculated using the software from the WHO website.

Results: The sample (n=130) consisted of 73 females (56.2%) and 57 males (43.8%). According to WHO standards, 29% of children (n=38) seen were classified as overweight/obese. 36% of females (n=26) and 23% of males (n=13) were classified as overweight/obese. Upon survey analysis, increased fruit consumption appeared to correlate with a more normal weight. All other survey responses regarding sweets, dairy, and vegetable consumption provided no substantial evidence that they had any impact on bodyweight.

Conclusion: The percentage of children in Iquitos, Peru that were classified as overweight/obese is slightly less than the results obtained from a similar study in 2014 (31.1%). In addition, there is a higher percentage of females versus males that were classified as overweight/obese this year when compared to 2014 (25.5% females, 35.8% males). While the factors leading to the variation of results between the two years are not entirely known, it is important to further educate children the importance of proper nutrition and physical activity to help limit or reduce the prevalence of
Introduction: During 2003 and 2004, both Brazil and Mexico implemented considerable public health and healthcare delivery reforms. In Brazil, the reforms during this period resulted in the polarization of healthcare into private and public health care services. In Mexico, a similar series of reforms aimed to incorporate healthcare services for all classes of the population, including federal and state funding for lower income patients. In addition to similar healthcare provisions and reforms, several similarities, in chronic illness rates, education levels, and socioeconomic status exist between the rural parts of Brazil and Mexico and were included in our study. The purpose of this study was to examine post-reform public health service use patterns and perceptions of a total sample of over 200 patients and over 35 health care workers in rural parts of Bragança, Santarem, and Belem, Brazil, and Yucatan, Mexico. By surveying and analyzing the prevalence and incidence of chronic and infectious diseases, we expected to gain a better understanding of disease prevention and management priorities for osteopathic medicine interventions.

Methods: IRB approval was first received to conduct this survey study at the study sites in both countries. A total of 95 (58 female, 36 male; Mean age = 42.89 years) patients were surveyed at Saint Antonio Hospital, a community health clinic in Bragança, and at a rural clinic along the Amazon River in Belem. A total of 114 (61 female, 53 male; Mean age = 47.14 years) patients were surveyed at O’Horan Hospital in Yucatan, Mexico. The 14-item surveys inquire about patients’ socio-demographic characteristics, health conditions and reasons for seeking healthcare. Data collectors helped patients complete surveys by asking patients questions regarding their diagnosis; symptoms, disease management practices, and how often they had sought medical care in the past. Patients’ age, gender, marital status, education, disease symptoms, and responses to questions mentioned in the survey were recorded and analyzed. Data collectors also interviewed health care workers regarding their relationships between healthcare officials and patients. 25 healthcare workers were surveyed in Brazil about their views on the health care system. The translation of collected data obtained from healthcare workers in Mexico is still ongoing.

Results: The most prevalent health conditions in Brazil were hypertension (43%) and type II diabetes (31%). 31% of patients had other chronic conditions, out of which 10% were HIV positive and 10% reported thyroid disease. Approximately 56% of the healthcare workers surveyed in Brazil agreed that insufficient supply of medications was a major healthcare impediment, and 28% reported that lack of medical staff was also a significant problem. All healthcare workers reported that there were perceived stigmas associated with providing care for lower-income patients, 24% reported stigmas with having HIV, and 40% with other infectious diseases such as leprosy and hepatitis. Of the surveyed healthcare workers, 24% reported efforts to help end stigmas within the Brazilian society. Another major healthcare impediment reported by 72% of health care workers was a lack of transportation across rivers that prevented their access to many rural populations. Gender bias in seeking healthcare was another health disparity; 61% of patients surveyed in Brazil were middle-aged women. Two healthcare workers also mentioned issues of gender bias within their healthcare system as well.
The most prevalent health conditions in Mexico were abdominal conditions (28%), type II diabetes (14%), and alcohol-related conditions (10%). Reported abdominal conditions include nephrolithiasis, cholecystitis and cholelithiasis, upper and lower gastrointestinal bleeds, and gastroenteritis. The presenters are currently running a series of inferential tests comparing sample subgroups (e.g. Brazil vs. Mexico, male vs. female, etc.) for significance, with these results also reported.

**Discussion:** It is notable that most of the diseases reported in this study were frequently preventable if lower-income populations had been provided preventative healthcare services, education, and timely medications. Osteopathic manipulative medicine (OMM) has been demonstrated to often enhance the healthcare provided in such situations, specifically for hypertension, as studies show that OMM reduces systolic blood pressure after one year of treatment. Training osteopathic physicians to provide improved dietary and risk counseling may also improve patient compliance to provider recommendations. These types of interventions could achieve improvements in other major diseases as well. In Brazil, women seek health care significantly more often than men in all socio-economic sectors - especially among the poor. The results indicate that utilization of primary care healthcare remains low for many poor communities, despite free healthcare. More research and testing health education initiatives to address these factors are needed in both rural Brazil and Mexico. Future study directions by this project team will include collection of similar survey data in rural North America settings, in addition to conducting further comparative analyses of data from multiple rural settings in different countries.

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**Progress in OMM/OPP Student Education: Establishing Osteopathic Medicine in Peru**

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For the fourth consecutive year, the Michigan State University College of Osteopathic Medicine (MSUCOM) has given presentations on Osteopathic Principles and Practices (OPP) and Osteopathic Manipulative Medicine (OMM) to students in Peru. The presentations and workshops have proven to be successful at educating and raising awareness amongst Peruvian populations regarding Osteopathic philosophies and clinical practices. After four sessions of presentations and workshops, performed over the 4 year period, we hypothesized that attendees of the workshop performed in 2015 would enter with a greater initial understanding of OPP and OMM, as indicated by an elevated level of performance on a Likert scale assessment.

In total 5 presentations have been given by MSUCOM students to Peruvian health care professionals. The two in August 2012, two in August, 2013, and one in 2014, were previously described in separate abstracts. This year, a workshop was conducted at Universidad Cesar Vallejo in August, the same location as the 2014 presentation, and the participants consisted primarily of Peruvian Nursing and pre-health students. A before and after survey involving open-ended questions and five Likert scale type questions were used to assess agreement with OPP values and awareness of OMM. The effectiveness of the workshops, along with the overall improvement in student knowledge regarding OMM and OPP, was assessed using a paired t-test analysis of the Likert scale questions from the before surveys from 2012, 2014, and 2015. Surveys that were incomplete were omitted from the aggregate study but all of surveys with a response to question four were used.
An aggregate score of the five numerical Leikert scale questions on the before survey had a mean of 19.53 in 2012 (n=49), a mean of 20.68 in 2014 (n=47), and a mean of 23.34 in 2015 (n=16). The maximum score was 25. The change in the mean between 2012 and 2014 was 1.15 (p=0.0217), the change between 2014 and 2015 was 2.66 (p=0.015), and the change between 2012 and 2015 was 3.81 (p=0.0075). The before and after segments were then evaluated for the 2015 surveys, and no statistical difference was found in the overall OPP/OMM knowledge of students in attendance (p>0.25).

After statistical analysis, we conclude that the Peruvian participants entered the OMM/OPP presentation and workshop with a higher baseline knowledge than in years prior, indicating that the annual OPP/OMM seminars have resulted in an increasing level of understanding regarding Osteopathic principles and clinical skills, as indicated by the statistically significant differences in the Leikert evaluation. With continued development of the workshops and presentations, we may continue to see an increasing level of baseline knowledge amongst our participants, which indicates progress in educating the Peruvian population in Osteopathic medical practices. We hope to use this continued education to foster OMM into Peruvian healthcare practices, and establish OMM as a routine component to the Peruvian standard of care. The lack of statistically significant differences between before and after OPP/OMM knowledge may be contributed to confounding variables. This year we had a different presenter than previous years and relied on a single speaker rather than multiple speakers. Data was also limited by the lack of responses. However, we remain optimistic as more Peruvian health professionals indicate their desire to practice OMM/OPP, and as more patients request additional treatment after finding the therapy curative.


Patient Demographics and Clinical Findings during a Medical Mission Trip in Rural Nepal

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Background: Nepal’s healthcare system has progressed from only 33 hospitals in 1950 to 2597 health posts in underserved areas in 1996 (McKay, 2003). However, there are still many challenges faced by the Nepalese healthcare system. After the April 2015 Nepal Earthquake, there is now an
even greater interest in understanding the role of temporary health clinics in developing countries. The scarcity of epidemiological studies on rural populations in Nepal can make preparation for humanitarian efforts difficult (Pambos, 2012).

**Objective:** To explore the demographic and clinical findings of a medical mission trip to Jhor, Nepal in an effort to contribute to the future planning of medical missions in rural Nepalese communities.

**Methods:** Investigators performed a chart review of patient information sheets completed by medical staff and then a follow up analysis of patient demographics and medical findings.

**Results:** A total of 361 patients were documented with a mean age of 46.24, ranging from 1.5 to 81 years old, with 36.9% males and 63.1% females. The most common presenting medical problem was non-low back musculoskeletal pain (27.22%). The subsequent leading problems were headache (11.25%), infectious disease (11.25%), GERD (10.16%), neurologic disease (8.16%), non-GERD GI disease (7.44%), chest pain (6.17%), gynecologic disease (6.17%), and COPD (4.72%). The most common medications prescribed were for treatment of GERD (25.62%), which included ranitidine and omeprazole. The second most common type of medications prescribed were pain relievers (18.59%) which included diclofenac and paracetamol. Antimicrobials (12.50%), vitamins (7.19%), antihistamines and albuterol (7.03%) were also regularly required. Eighty-seven referrals were made for services that were not available in the clinic including lab tests (20.45%), x-rays and imaging (14.77%), pregnancy test (3.41%), stool sample (3.41%), ECG (3.41%) and other services (13.64%). Patients were also referred to specialists with ophthalmology consisting of 19.32%, ENT 4.55%, gynecology 4.55%, surgery 4.55%, and dermatology 3.41%.

**Conclusion:** Despite the advances made by the Nepalese health system in the last 50 years, there remains a significant underserved population in the rural regions. Many of the most commonly encountered medical problems represent treatable conditions that remain undertreated in these regions. In particular, we found that there is an unmet need for female health care, ENT physicians, and ophthalmologists. When planning future medical trips, organizations should consider bringing adequate quantities of the most common drugs seen in this study including acid reducers, NSAIDs, and antimicrobials along with the recruitment of necessary specialists.

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**Prevalence of Dermatological Disorders in Peru**

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**Abstract:** In “Skin diseases of the Peruvian Amazonia,” Gutierrez EL, et al found that treatable infectious and parasitic dermatological diseases were the most common types of dermatologic disorder found (Gutierrez EL, et al, 2010). Treating these disorders is important, as many of these conditions can lead to secondary infections, ulcerations, hair loss, permanent skin malformations, nerve damage, malignant conditions, metastasis and even death. As there is a dire shortage of physicians in the Peruvian Amazon, a study was created in 2015 to determine the prevalence of each dermatologic disease in the area. This information will be provided to future physicians travelling to this region to aid in determining the quantity and types of medications needed to best treat the population.

In August of 2015, Michigan State University College of Osteopathic Medicine students and physicians worked side by side to provide medical care to the people in the Amazonian city of
Iquitos, Peru and in four villages along the Amazon River, many of whom were seeing a physician for the first time. Out of approximately 2,400 patients treated in clinic, 620 (~ 26%) were determined to have a dermatological diagnosis. All patients seen in clinic were screened by physicians, who asked about any new, old, or recurrent skin conditions. Inclusion criteria were patients of any age, sex, or race with any treatable dermatological pathology. Exclusion criteria were women with gynecological related skin pathologies. These diagnoses were confirmed clinically by attending physicians in the specialties of Pediatrics, General Medicine, Podiatry, ENT, Obstetrics/Gynecology, and Dermatology. All of the data from the trip was collected and analyzed along with images and the respective treatments for each condition.

620 patients including men, women, children to the elderly, and patients of any race with a treatable dermatological pathology were included in this study. Tinea Pedis was the most common pathology reported, encompassing 11% of the total dermatological cases diagnosed. Tinea Corporis, Seborrheic Dermatitis, Contact Dermatitis and Tinea Versicolor each amounted to 4%. Arthropod Assault and Solar Lentigo each made up 3% of the dermatologic diagnoses. Of all of the dermatological maladies, fungal infections accounted for 33.36% of every diagnosis, 27.99% were auto-immune, 7.45% were due to UV radiation exposure, and 2.8% were parasitic infections.

This research will be utilized by MSUCOM and DOCARE International Medical Outreach Organization to inform future healthcare providers regarding how to best serve this population. Future volunteers can use this information to improve healthcare delivery and expand to the data each year to get an even better representation of the prevalence for each condition.

**Barriers to Prevention and Treatment of Iron-Deficiency Anemia in Iquitos, Peru**

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**Background:** Iron-deficiency anemia has historically been a problem in Iquitos, Peru, leading to government intervention to provide supplementation to children. Anemia is troublesome because it can impact growth and development leading to fatigue, poor coordination, late language development, and delayed motor milestones. Nonetheless, iron-deficiency anemia still affects many children in Iquitos. This study evaluates the social aspects for the persistence of anemia.

**Methods:** To identify the presence of anemia, blood samples were obtained (Hemocue Hb 201) from 58 children ages 1-10 in Iquitos, Peru. Parents of these children completed surveys regarding their history of anemia and relevant knowledge/behaviors. The data of anemic versus non-anemic children who had ever received professional education regarding anemia treatment/prevention (or “intervention”) were compared.

**Results:** Of the 58 children, 36 (62%) were anemic. 27 (46.5%) had received an anemia intervention in the past. Differences in anemia prevalence between the intervention and non-intervention groups were not significant (p=0.18). 72% (n=34) reported that it was >6 months since their children received supplementation, but 74% (n=39) lived close to a clinic where they are able to obtain refills. 32% (n=17) understand that iron-rich foods can prevent anemia, and 25.5% (n=14) currently feed their children fish as a staple in their diet. 89% (n=50) of parents are "very concerned" about prevention and could identify ≥1 symptom of anemia. 85% (48/56) of parents were "very willing" to
improve their child's diet, but 43% (n=22) do not have access to different foods and 25% (n=13) do not know how to prevent anemia.

**Discussion:** There is no apparent difference between the intervention and non-intervention groups in terms of the presence of anemia, thus the current intervention does not seem to be effective. The data indicate that parents have knowledge about the importance of prevention, but neither feel confident enough nor know how to execute sustainable change when they do not have iron supplementation on hand. A revised intervention to consider in the future might teach parents how to use accessible foods to increase their children's daily iron intake.

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**Prevalence of glaucoma and intraocular pressure distribution in Western Peru.**

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**Abstract:**

**Background:** According to the World Health Organization, Glaucoma is the second leading cause of blindness worldwide. It is a progressive optic neuropathy that ultimately leads to irreversible blindness. Pain is usually absent in the course of the disease and visual field defects are often ignored by patients. In developing nations such as Peru where there is poor access to healthcare, glaucoma and other risk factors for glaucoma including high blood pressure and diabetes, may go undiagnosed for most of the patient's life. In order to assess the needs of Iquitos and surrounding Amazon villages for prevention of blindness from glaucoma, a simple random sample of the population was screened. A total of 41 people over the age of 40 were screened. 32 of these individuals had a known history or suspected history of diabetes and/or hypertension. Intraocular pressure was measured using applanation tonometry and distribution among this sample was analyzed. We hypothesize that patients with diabetes and/or hypertension will have increased intraocular pressure when compared to those patients without these comorbidities.

**Methods:** Setting of the study took place at Santa Rosa Regional Army Hospital in Iquitos, Peru and surrounding Amazon villages. Screening population included over 40 years of age with a history of or suspicion of diabetes and/or high blood pressure who were never diagnosed with glaucoma. Measurements included visual acuity, peripheral visual fields, red light reflex, presence of afferent pupillary defect, and intraocular pressure. A total of 41 individuals ages 44-87 were screened, which include 32 diabetics/hypertensives and 9 healthy controls. The outcome compares both groups and measures the proportion of glaucoma suspects based on IOP greater than or equal to 22.

**Results:** 3/32 unhealthy patients screened were suspect for glaucoma with an average IOP 57.67mmHg including one patient with a positive afferent pupillary defect and all 3 with diminished peripheral visual fields. The average IOP of the diabetic/hypertensive group including the glaucoma suspects was 19.88mmHg whereas the healthy control group was 14.06mmHg. The diabetic/hypertensive group had a statistically significant higher average IOP over the healthy control group with a p-value of .03 (confidence 97%). Even when excluding these 3 glaucoma suspects, average IOP for the diabetic/hypertensive group is 15.51mmHg which is statistically still higher than the healthy control group with a p-value of .06. 6/32 patients had a history of Diabetes and 28/32 patients for hypertension. The average age of the 41 participants screened was 63 years old with a range of 44-87.

**Discussion:** Data from this study shows that those with a history of or suspicion of diabetes and/or hypertension have increased risk of developing ocular hypertension. When comparing to
another study which evaluates the distribution of over 5,000 measurements of Latino IOP in the Los Angeles area, we find that these Latinos had an average IOP of 14.5mmHg. Those Latinos with a history of diabetes (1,416) had an average IOP of 15.2mmHg and those with high blood pressure (2,318) with an average of 15.0mmHg. Our study suggests that the diabetic/hypertensive population of Iquitos and surrounding villages with average IOP of 15.51mmHg are more susceptible to higher levels of intraocular pressure and have higher risk of developing optic nerve damage and irreversible vision loss associated with glaucoma. We can apply these results to other international populations in the underdeveloped world as they are likely to have increased undiagnosed comorbidities leading to ocular hypertension. Screening these patients would catch glaucoma at its early stages before permanent retinal damage. In continuing this study in the future, we would like to screen a larger population size and in addition dilate the pupil with inspection of optic nerve and retina health.

Violence prevention knowledge and violence exposure in children in Honduras
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Abstract: Context: Sixty percent of people in Tegucigalpa are living below the poverty line. Urbanization combined with poverty and other social issues leads to a high incidence of violence within Tegucigalpa. Youth violence has been on the rise in Tegucigalpa since the 1990s. An educational intervention and cross-sectional study of violence prevention knowledge was conducted to determine if exposure to violence at a young age predisposes children to respond negatively to violence scenario based questions. These questions were part of a more inclusive environmental survey.

Objectives: The primary objective was to compare children exposed to violence in the past year with those not pre-exposed to violence. The secondary objective was to compare the entire sample based on improvement with pre- and post-tests.

Methods: Background and violence exposure information was collected on children aged 8-14 years with an environmental survey. We gave four situational based pre-and post-test questions that evaluated how much each participant knew about how to respond to violent. Then an intervention was conducted in the form of a teaching module. Statistical significance was set a priori at 0.05.

Results: The group of children who were predisposed to violence scored an average of 79.5% on the pre-test, while the non-predisposed group scored an average of 83.7%. A two-tailed t-test was performed to compare the two groups. According to the environmental survey those who were bullied in and out of school were more likely have lower scores on the pre- and post-test questions about violence than those who were not bullied (P value of less than 0.04). However, the results were not significantly different when comparing the pre-test scores between those who had been in fights and those who had not. A paired t-test was performed to compare the pre- and post-tests in response to the educational intervention. The participants improved their pre- and post-test scores significantly with a P value of less than 0.001.

Conclusion: Children who were predisposed to violence were likely to score lower on the pre-test than those children who were not predisposed. Of the children who were predisposed to violence, the children who were bullied in or out of school also scored lower on the pre-test. The children who had been in a fight did not show a statistically significant difference compared to those who had not been in a fight during the past year. After the educational intervention the children’s scores
from the pre- and post-tests indicated that the children learned from the event (P=0.05). Further investigations should utilize the additional questions on the environmental survey regarding personal safety to enhance our understanding of how children in Tegucigalpa respond to personal violence. Also, more consideration is needed to appropriately word questions to accommodate children’s different comprehension levels.

Determination of weaning foods and the relationship to gastrointestinal parasitic infections in children in Honduras

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Abstract: In our previous study on the prevalence of gastrointestinal parasites in children from Verón, a rural city of the Dominican Republic, 128 fecal samples of children ranging from 2-15 years were examined and 127 were positive for one or more parasites. Percent infection rates were 43.8% for Ascaris lumbricoides, 8.5% for Enterobius vermicularis, 21.1% for Entamoeba histolytica, and 22.7% for Giardia duodenalis, and with 7.8% of the children examined having double infections. Hypothesis: High infection rates of gastrointestinal parasitic diseases in children in the Punta Cana-Bávaro-Verón-Macao municipal district and similar Latin American and Caribbean communities may be attenuated by understanding the types and preparation methods of solid foods and other beverages introduced at weaning. Presently, there are no published reports on weaning foods in Tegucigalpa, Honduras. Methods and Materials: In this study in an underserved community a convenience sample of mothers with children visiting a medical clinic were interviewed. A survey instrument was prepared in English and Spanish and distributed for participants to complete independently or with interpreter assistance to determine: breastfeeding practices, age at which weaning took place from breast milk or formula, commonly used weaning foods, weaning food preparation and parasite treatment in children. Data was entered into Qualtrics, a software survey tool and Pearson Chi-square, Fisher’s exact test and t-tests examined associations of interest regarding breastfeeding, weaning foods and parasite infections. Statistical analysis were performed using SPSS, version 22 with significance set, a priori, p =0.05. Results: Valid responses were received from 169 mothers who had a total of 513 children. The women had an average 3.31 ± 1.9 children, ranging from 1 to 10. Most mothers (42%) reported breastfeeding their children for at least six months. The average age at weaning was 2.1±1.8 year, the maximum was 13 years. The majority added other liquids, primarily water, at 6 months and solid foods from 4-6 months. There was no difference between breastfed and non-breast fed infants and parasite treatment (P<0.05). This information was correlated with transmission cycles for known parasitic diseases in children in the area. Conclusions: Further study includes expanding the study to El Salvador and the Dominican Republic, determining additional factors contributing to parasitic infection of weaning foods, developing a plan of action to reduce gastrointestinal parasite infections and designing programs to promote breast feeding and safe food preparation of weaning foods.