

2017-2018 RURAL GRANTS

A comparison of vitamin D3 levels and its effect on fracture healing between the rural and urban pediatric population of West Virginia.

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Mentor: Viorel Raducan, MD

Vitamin D is known to have a major impact on bone health and its turnover. We can consume it in dietary form; it's also synthesized in skin through sun light activation. Liver and kidney are two main organs needed for conversion of this vitamin into its active form. This vitamin is essential to calcium absorption in gastrointestinal tract. It increases blood calcium levels that can be used for bone matrix deposition and construction. Deficiency in this vitamin has been shown to be a risk factor for osteoporotic fractures that happen mainly in geriatric population. Decrease in this vitamin will lead to non-adequate absorption of calcium and hence an imbalanced calcium homeostasis. This will further lead to increase in osteoclastic cell activity to re-store the balance (increase blood calcium levels). As a result weaker bones with lower mineral density, and higher chance for fracture. There are many new studies emerging that indicate fracture due to deficiency of vitamin D in pediatric patients whom still have their growth plates open. This deficiency has been shown to be a risk factor for increased fracture rate as well as an important factor for delayed healing. It was interesting that Karpiński M et al found vitamin D to be an independent risk factor since they found levels to be elevated in their patients rather than decreased; with further analysis, they found this was due to the polymorphism in receptors for vitamin D. Many studies support improved healing of bone in patients who suffered a fracture and had deficiency of vitamin D as well. There's ample amount of data that show vitamin D is needed in patients with deficiency to prevent fractures.

Current protocols in place for Cabell Huntington Hospital indicate finding blood vitamin D levels in geriatric or pediatric patients with suspicion of abnormal bone growth or metabolic bone disease, and geriatrics during their admission for non-traumatic hip fracture. If they are found to be deficient, 50,000 IU vitamin D is prescribed for 7-8 days post-op. As of now there are no protocols in place to evaluate pediatric patients with fractures for vitamin D levels. According to Robinson C. et al, West Virginia has one of the highest vitamin D deficiencies amongst pediatric population in the nation. We would like to conduct a study in order to find if patients under 18 years' old who present with any extremity fracture, suffer from an underlying vitamin D deficiency. We will be using two facilities, one in urban and one in rural setting in order to assess pediatric fracture healing in patients with vitamin D deficiency. Deficiency of vitamin D has never been thought of as a risk factor for pediatric population in the past. Results from this study are very important on whether or not establishing a standardized vitamin D level check in pediatric population by their primary care givers. If proven that vitamin D deficiency does in fact delay bone healing in pediatric population, by establishing grounds for diagnosing and managing these patients, many fractures can be prevented, patients who suffer fractures could have faster healing and as a result a substantially lower cost of treatment and management on healthcare system.

A Comparative Analysis of Opioid Use Disorder (OUD) Interventions of Pregnant Women with Depression.

Will Lester, MS1; Lacy Andrews

Mentors: Todd Davies, PhD; Joy Butcher-Winfrey, PsyD; Marianna Linz, PhD

The opioid epidemic is a primary public health issue facing rural West Virginia and this issue is compounded by the medically underserved nature of the area. The primary focus of this project will be to study the effectiveness of Medication Assisted Treatment (MAT) on pregnant women with depression in resource poor rural areas. The study population will be recruited from Tug River Health Clinics, an FQHC operating in McDowell County. Data will be collected from screening indices designed to assess maternal psychiatric condition, family stability indices, and other measures related to maternal program success and infant withdrawal over four visits. The four visits will occur at intake, 12 weeks following program enrollment, 6 weeks post-partum, and 3 months post-partum. The information will be compiled in an attempt to assess the practicality and effectiveness of a culturally sensitive MAT approach that is responsive to the needs of resource poor rural communities.

A Retrospective Study of the Impact of the WV State Fireworks Law Upon A Major Teaching Hospital and in Rural WV Emergency Departments

Jason Brown, MD, PGY-3; Rahman Barry, MD PGY-3; Andrew Vernadi, MD, PGY-5

Mentors: Farid Mozaffari, MD; Mitch Charles, MD

With the 2016 change in the West Virginia (WV) fireworks laws, consumers are now able to buy fireworks that are more powerful. This study will examine whether the change in the type of fireworks that consumers are now able to purchase in the State of West Virginia has resulted in more fireworks related injuries presenting to emergency departments. Specifically, we will specifically examine the firework related injuries reported to Emergency Departments during the ten-year period of 2007- 2017 to the following WV hospitals: Cabell Huntington Hospital in Huntington, Pleasant Valley Hospital in Point Pleasant, and Logan General Hospital in Logan. The second component of this study will focus on providing rural first responders with continuing education for initial management and triage of blast and burn injuries associated with fireworks. We will use the exciting technology of 3D printing to simulate high fidelity of medical simulation of wounds commonly firework injuries for the wound management and triage training session.

A Retrospective Analysis of the Difficulties of Establishing an MAT Program in Rural West Virginia

Will Lester, MS2; Lacey Andrews

Mentors: Todd Davies, PhD; Joy Burcher-Winfrey, PsyD; Marianna Linz, PhD

The opioid epidemic is a primary public health issue facing Rural West Virginia, and this issue is compounded by the medically underserved nature of the area. The primary focus of this project is to identify the difficulties of starting and

maintaining a medicine assisted treatment (MAT) program in rural, resource-poor areas. MAT programs at Marshall and Valley Health Systems in Huntington, West Virginia have developed into sustainable clinical models. In this study, the more complex logistics of MAT programs in rural, resource-poor areas will be evaluated. This will be a retrospective study of all participants in an MAT program that follows American Society of Addiction Medicine (ASAM) guidelines. The population for this study will be acquired from the Tug River Health Clinic in McDowell County, West Virginia, and from Marshall Health's MARC program. Data will be collected through Electronic Health Records from Tug River Health Clinic and the Marshall Health MARC program. There will also be a series of interviews with Tug River Health Clinic staff and MARC program staff, as well as program observations to assess the logistics of both MAT programs. The information will be compiled in an attempt to assess the practicality and effectiveness of a culturally sensitive MAT approach that is responsive to the needs of resource-poor rural communities. The preliminary data from this project will also be used to apply for an additional grant to facilitate a prospective study for this population.

Impairment of Smell and Taste in Rural, Community-Dwelling Elders

Jenna Barbour, MS4; Jordan Ratcliffe

Mentors: Robert Walker, MD; Mike Grome, PA-C; Adam Franks, MD

The "Oldest-Old," those age 85 and older, is the fastest growing age group in West Virginia and in the United States. Frailty is a critical concept in this age group. "Frailty" has been defined as clinical syndrome associated with weight loss, fatigue, weakness, slow walking speed, and physical inactivity. Frail elders are unable to adequately respond to physical and psychological stress and the syndrome has been found to be predictive of falls, worsening mobility, hospitalization, and death. Recently, there has been an increased interest in impairment or loss of the sense of smell (anosmia) and taste (dysgeusia), especially in the advanced elderly. Olfaction plays a significant role in our detection of the aroma and flavor of foods. It is also responsible for our awareness of fragrances in the environment. Disruption of the experience of a pleasant sensory exposure can sometimes cause depression. Patients may no longer look forward to eating and drinking, and they often refuse to go out to dinner and associate with friends. Important nutritional deficiencies can lead to marked weight loss, a key feature of frailty. This project intends to test consenting community-dwelling oldest-old subjects for impairment or loss of sense of taste and smell.

Nutritional Literacy and Application in Rural West Virginia Parents and Children

Madison Griffis, MS1; Allison Thompson, MS1

Mentors: Adrienne Mays, MD; Adam Franks, MD

Childhood obesity rates continue to rise in West Virginia. Obesity and related medical conditions increase the morbidity and mortality of our patients. Obesity is multifactorial, but is related to caloric intake and nutritional choices. Nutritional education may be provided to children and parents at routine visits with their primary care providers, school programs, and other sources. Although nutrition is important to the health of our patients it is not clear if parents are

implementing the nutritional education that they have received. We are not aware of the parents' perceived barriers to previous recommendations.

The attitudes of physicians and teachers have been routinely evaluated. The attitudes of rural elementary school students and parents regarding nutrition and implementation of recommendations are not known at this time. We propose that a qualitative analysis be performed on the parents and children in rural WV. The study will be two fold. The initial information obtained will include surveys completed by the elementary aged student and parent to assess their access to, attitude of, and application of current nutritional recommendations. After this data is obtained it will be analyzed. An intervention will be designed. After the intervention has been completed we will recollect surveys from the participating children. We are hoping to identify a modifiable barrier to implementing nutritional recommendations. Once identified, we hope that a tailored intervention will increase the compliance of parents and children in rural WV. We also hope that this compliance would results in a decrease in childhood obesity rates.

Loneliness and Isolation among the Rural, Community-Dwelling Oldest-Old

Courtney Wellman, MD, PGY-1; Yuto Nakafuto, MS4

Mentors: Robert Walker, MD; Mike Grome, PA-C; Adam Franks, MD

The "Oldest-Old," those age 85 and older, is the fastest growing age group in West Virginia. The medical literature suggests that this group is more isolated and has more limited access to health care than their younger counterparts. Advanced elders living in rural areas are even more disadvantaged. Factors potentially contributing to isolation and loneliness include physical immobility, remote location, living alone, and two or more chronic disease conditions. The identification and weighing of factors contributing to loneliness and isolation among West Virginia's rural, community-dwelling Oldest-Old are critical in designing programs to prevent hospitalization, long term care admission, and improve quality of life in this rapidly expanding age group.

Rural versus Urban Physician and Health Care Providers Burnout: Is there a Difference?

Jessica Hale, MD, PGY-1; Farzad Amiri, MD, PGY-5

Mentor: Farzid Mozaffari, MD

The delivery of safe and high quality patient care on a consistent and sustainable basis can only be rendered if the patient care team is well. With the cost of physician burnout adding more than \$3.4 billion annually to the U.S. health care system, the focus of health and well-being of health care providers has gained attention by many accrediting bodies associated with health care. The recent call for monitoring the well-being of ALL health care team members in the clinical learning environment is leading us to examine other factors associated with a Team's well-being. Limited research currently exists upon whether the practice location (rural versus urban) impacts well-being of the health care provider team. To measure this, we will survey the well-being of health care providers in the Huntington, WV area and

compare to those who practice at the rural hospitals of Pleasant Valley Hospital in Pt. Pleasant and Logan General Hospital in Logan. For definition purposes, we will define health care team as being physicians, nurses, nurse practitioners, family nurse practitioners and other mid-level providers. We will kick off the survey by presenting a Grand Rounds lecture to the Cabell, Mason, and Logan Counties Medical Societies. Survey results will be shared with the 3 locations by a sponsored "Lunch Time General Staff Meeting".