

WELCOME

Dear Rural Health Research Conference Participants:

Welcome to our first Marshall University Rural Health Research Conference. We hope you'll enjoy and benefit from the conference presentations, as well as the poster presentations. This conference is a collaborative effort of the Robert C. Byrd Center for Rural Health, the West Virginia Higher Education Policy Commission and the Appalachian Clinical and Translational Research Institute.

We believe that one way to increase interest in rural practice is to immerse residents, students and fellows in rural and underserved communities. We have created opportunities for this by encouraging research in those rural areas. Funding for these projects is from the Higher Education Policy Commission, Rural Health Initiative grants. The purpose is to support students, residents and fellows with funds for the development of research projects which could enhance interest in rural health care, assist in the development of effective health promotion and disease prevention programs, enhance wellness, and increase the involvement of underserved areas of the state in the educational process.

The conference highlights relevant topics of interest and best practices. We hope that you leave this conference enthused and ready to tackle the challenges that face us in rural health. We want to thank our funder, the Higher Education Policy Commission, for their support. We hope that the result of their efforts is an outstanding program full of timely and relevant research and learning opportunities.

We hope you'll take full advantage of the conference speaker sessions and poster presentations. We truly believe that working together we will be successful in making West Virginia an even better and healthier place to live.

Sincerely,

*The Robert C. Byrd Center for Rural Health
Appalachian Clinical and Translational Research Institute*

The program will consist of a series of oral presentations highlighting basic and clinical rural research performed by School of Medicine students, residents and fellows. Please use pages 3 through 18, to locate presenters, their abstracts, presentation times and location of presentation. The Rural Health Initiative Grant funding has provided for several research projects that are still in progress. Those projects are listed on page 19.

The Joan C. Edwards School of Medicine summer research stipend program provides support to any first year medical student interested in working on a research project in the summer following completion of the first year of medical school. The program has grown significantly over time thanks to the support of the Dean and faculty of the Joan C. Edwards School of Medicine.

Keynote Speaker

Robert Walker, MD

Dr. Robert Walker is a Diplomate with the American Board of Family Medicine and with the American Board of Preventive Medicine in Occupational Medicine. He also is certified in Geriatrics. Since 2008, Dr. Walker has served as the Vice Chancellor for Health Sciences at the West Virginia Higher Education Policy Commission. In this capacity, he oversees rural health education programs across the state and works closely with the state's three academic health centers. In addition, Dr. Walker maintains an active practice at Lincoln Primary Care Center, a federally qualified health center located in Hamlin, West Virginia. Dr. Walker worked for many years at Marshall University and held positions including Executive Vice Dean, Chief and Program Director of Family Practice, Chief, Division of Rural Health Research, Professor and Chairman, Department of Family and Community Health, and Associate Dean for Clinical Affairs.

Dr. Walker has received the following recognitions:

- "Outstanding Contribution to Medical Education" Award by First Graduating Class of Marshall University School of Medicine, 1981
- "Most Influential Faculty Member for Marshall University School of Medicine," awarded by the Class of 1985
- "Professor of the Year for West Virginia of 1989"
- "Family Doc Award" by West Virginia Chapter, American Academy of Family Practice, 1998
- "Outstanding Rural Physician Award" (Initial Year of Award) by West Virginia Medical Association, 1996
- "Citizen of the Year," B.P.O. Elks, 1994
- University of Florida Wall of Fame, 1995
- "Martin Luther King Day Community Award," 1993
- "Distinguished West Virginian Award," by the Honorable Gaston Caperton, Governor, 1996
- "Distinguished Educator of the Year" for the Nation for Rural Health, National Rural Health Association, May 2000
- "One of the 55 Best Things in West Virginia," City of Huntington Wall of Fame, 2004

He also has served as:

- Trustee, Claude Worthington Benedum Foundation; 2008 – present
- Executive Committee, Board of Directors, and Chairman of Quality Assurance, Credentialing, and Patient Safety Committee, West Virginia University Hospitals, d.b.a. Ruby Memorial (West Virginia's largest hospital); 2009– present
- Chairman, Governor's Task Force on Medical Education and Health Care Delivery; 1990
- Trustee, Family Medicine Foundation of West Virginia; 1987-present
- Commissioned Officer in U.S. Public Health Service, rural practice site, Hamlin, WV, Rank: Surgeon; 1975-1977
- Rural Health Care Advisory Panel, Advisory to the United States Congress, Office of Technology Assessment, 1988-1990

LIST OF PRESENTERS ABSTRACTS

Aljoudi, Haytham	13
Cottrell, Jesse N	9
Cottrell, Jesse N	17
Guzzo, Regina	8
Hamilton, Allison	11
Hayes, Rebecca M	7
Irivbogbe, Osareme	15
Jessie, Ashley	16
Layne, Jessica	14
Poole, Daniel	18
Qazi, Zane N.	6
Sangani, Pooja	12
Scott, Kelly	10

RURAL HEALTH RESEARCH DAY PRESENTATIONS

OCTOBER 31, 2014

Questions and answers encouraged throughout all sessions.

8:30AM Welcome

8:35AM Opening Remarks Jennifer T. Plymale, Director, Center for Rural Health

Time	Name/Abstract Title	Department
8:45AM	Dr. Zain N. Qazi Effect of Anecdotal Evidence on Teen Perception of Texting and Driving	Departments of Orthopaedic Surgery and Psychiatry
8:57AM	Dr. Rebecca M. Hayes The Effects of a Brief Physical Activity Program on Elementary School Students' Physical Fitness	Department of Pediatrics
9:09AM	Dr. Gina Guzzo Compliance of Diabetic Patients with Personal Contact Follow-up	Department of Family Medicine
9:21AM	Dr. Jesse N. Cottrell Urban and Rural Differences in Prenatal Exposure to Essential and Toxic Elements	Department of Obstetrics and Gynecology
9:33AM	Kelly Scott, MS4 Improving Rural Bone Health and Minimizing Fracture Risk in West Virginia: The World Health Organization FRAX Assessment Tool	Department of Orthopaedic Surgery
9:45AM	BREAK/POSTER PRESENTATIONS 9:30-10:45	
9:57AM	Dr. Allison Hamilton Level of Buprenorphine Measured in Samples of Umbilical Cord Tissue as an Independent Risk Factor for Neonatal Abstinence Syndrome.	Department of Obstetrics and Gynecology

10:09AM	Pooja Sangani, MS2	Department of Ophthalmology
	Motivations for Follow-up Ophthalmic Care in a Transient Population	

10:21AM	Dr. Haytham Aljoudi	Departments of Cardiology and Internal Medicine
	20-HETE and circulating endothelial cells, a unique vascular profile related to CVD in morbidly obese Appalachian women.	

10:33AM	Jessica Layne, MS4	Department of Family Medicine
	Mobile Medical Outreach to the Homeless: Barriers to Care	

10:45AM	Dr. Osareme Irivbogbe	Departments of Cardiology and Internal Medicine
	The existence of a strong correlation between leptin, TNFa levels and BMI in morbidly obese Appalachian females	

10:57AM	Dr. Ashley Jessie	Department of Internal Medicine
	Perceptions of End of Life Care and Code Status	

11:09AM	Dr. Jesse Cottrell	Department of Obstetrics and Gynecology
	Comparison of Urban and Rural Umbilical Cord Thyroid Hormone Levels and Examination of a Correlation with Serum Cadmium or Lead	

11:21AM	Dr. Daniel Poole	Department of Family Medicine
	Impact of a Longitudinal Training Experience in a Free Clinic on Practice and Academic Outcomes of Graduates of a Family Medicine Residency	

11:33PM	Dr. Robert Walker	Keynote Speaker
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12:00PM	Conclusion/Lunch (Boxed Lunch Provided)	
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Effect of Anecdotal Evidence on Teen Perception of Texting and Driving

Franklin D. Shuler, MD, PhD, Timothy Wilson-Byrne, MD, Tracy LeGrow, PsyD, Zain N. Qazi, MD

Department of Orthopaedic Surgery, Department of Psychiatry

Texting while driving has emerged as a significant risky behavior among teens in the US.

Motor vehicle collisions (MVC) constitute a major proportion of teen deaths. While the incidence of teen drinking and driving has declined, the mortality for teens due to MVC's has not decreased. Teen texting and driving has concurrently increased over the past 20 years.

West Virginia is the second most rural state in the country with 64% of the population living in communities of less than 2,500 people; rural drivers are 2x more likely to suffer mortality in MVC's.

Objective: Quantify whether personal narratives and graphic evidence from motor vehicle collisions (MVC) caused by teen texting while driving can alter risk and behavior perception over simple verbal warning reminders.

Rural high school students are identified and given a short lecture from a victim involved in a TWD motor vehicle accident. Using a 20 question/ 5 min survey we assess the effects of anecdotal narrative on teen behavior and perception immediately after and 3 three months from the time of the presentation.

We have collected preliminary data based on the initial sites at which we administered the survey. The pre -lecture survey (n=217) provided insight about the rural teens' perceptions of texting and driving. We are continuing to receive and process the post -lecture data (currently n=74), but the statistically significant ($p<0.05$) variables are as follows.

The anecdotal lecture had a significant effect on teens' perceptions about the danger of texting and driving as compared to a standardized lecture. The anecdotal lecture group also found texting and driving to be as dangerous as drinking and driving, while the standardized lecture had less of an effect on this perception. Finally, the anecdotal lecture may have an impact on the tendency of students to wear seatbelts all of the time.

The Effects of a Brief Physical Activity Program on Elementary School Students' Physical Fitness

Rebecca M. Hayes, MD ,Lauren M. Thompson, MD, Todd Gress, MD, Lesley Cottrell, PhD, Isabel Pino, MD, Christine L. Gilkerson, MD, Susan L. Flesher, MD
Department of Pediatrics

Many school-based programs have been implemented to try to reduce the high prevalence of childhood obesity in the United States. Our objective was to test whether a program adding six minutes of exercise to the school day could increase elementary school students' physical fitness.

Three elementary schools from a rural, eastern state were recruited to participate in a 12-week non-randomized controlled trial. Two intervention groups were instructed to increase children's activity by six minutes daily. This initiative was led by the school principal in one group; individual classroom teachers led the initiative in the other intervention group. The third group was a control condition. Intervention success was defined by changes in student fitness (i.e., number of 75-foot laps completed in two minutes and after-exercise heart rate).

The principal of the school-wide group reported compliance with the program 4.5 days per week while teachers in the classroom-based group reported compliance just 1.7 days per week. The school-wide group had a significant increase in the number of 75-foot laps completed after intervention (+0.61 laps) and a significant decrease in after-exercise heart rate (-37.4 beats per minute) as compared to the control group. The classroom -based group experienced no change in laps or after exercise heart rate compared to control.

Our findings demonstrate that a six-minute increase in activity during the school day can produce a significant improvement in student fitness. Embedding administrative support of school -based interventions like this can have a positive impact on the program delivery and completion.

Compliance of Diabetic Patients with Personal Contact Follow-up

Gina Guzzo, MD, Kate Proffit, MD, Kevin McCann, MD
Department of Family Medicine

Purpose: To determine if random follow up phone calls provided to uncontrolled diabetic patients improved the hemoglobin A 1C value more than standard care.

Design: This was a prospective, randomized and blinded study.

Setting: Outpatient family medicine practice in rural West Virginia.

Methods: All diabetic patients with a hemoglobin A1C value above 8.0 uncovered at their primary care visit and who did not meet exclusion criteria were offered the chance to participate. Each participant was randomized. The intervention group received a random phone call to ask about their home glucose readings in addition to the standard care that the control group received. The primary care provider was blinded to the subject groups.

Results: There were 10 subjects in the experimental group and 9 subjects in the control group who were able to complete the study. The mean baseline hemoglobin A1C value was 9.08 for the experimental group and 10.11 for the control group. The mean follow up hemoglobin A1C was 8.61 for the experimental group and 9.925 for the control group. The mean change in hemoglobin A1C was -0.47 for the experimental group and -0.18 for the control group. The results were analyzed using a t -test and found to not be statistically significant. The statistically estimated sample size needed to detect the change in hemoglobin A1C is 37 subjects in each group.

There have been numerous studies looking at phone intervention in diabetics. This is the only study that we are aware of that has looked at just a single phone call and looked at a rural Appalachian population. If confirmed in a larger study group this could lead to a simple low cost intervention in a high risk group.

Urban and Rural Differences in Prenatal Exposure to Essential and Toxic Elements

Jesse N. Cottrell, MD, Brenda L. Mitchell, MD, Anne M. Silvis, PhD, Monica A. Valentovic, PhD
Department of Obstetrics and Gynecology, Department of Pharmacology, Physiology, and Toxicology

Excess or inadequate levels of inorganic ions can induce acute and long-term irreversible dysfunction. The fetus and placenta are particularly vulnerable to toxins due to immaturity of the blood-brain-barrier and diminished biotransformation enzyme activity. Our hypothesis is that newborns from rural areas are exposed to different levels of essential and toxic elements than their urban counterparts. This study has considerable significance as there have been no studies conducted in the United States comparing urban and rural exposure to metals in umbilical cord blood.

A comparative cross-sectional study was conducted on 172 patients, 79 rural and 93 urban. Rural and urban locations were based on Rural-Urban Commuting Area Codes. Cord blood was collected at the time of delivery, between April 2013-February 2014, and analyzed for 20 inorganic elements. Comparisons and p-values were by one-way ANOVA.

Significant differences were found between rural and urban samples for four elements: Arsenic ($p=.03$) and Magnesium ($p=.04$) were higher in rural samples, copper ($p=.03$) and molybdenum ($p=.004$) were higher in urban samples. No difference between groups occurred for: barium, cadmium, calcium, cobalt, lead, lithium, manganese, mercury, selenium, strontium, or zinc. Barium was higher than the recommended level in both rural and urban samples. All samples were devoid of platinum, silver, thallium or uranium. Nickel was detected in 3 of 172 samples; all used tap water during pregnancy. There were no significant differences of inorganic ions found comparing those who drank tap ($n=155$) and well water ($n=12$).

Rural areas of Appalachia have a higher incidence of birth defects than the general population. Our study showed significant differences in copper, magnesium, and molybdenum, as well as the toxic metal arsenic. Further study is needed to determine if there is a causal link between specific birth defects and prenatal exposure to these elements.

Improving Rural Bone Health and Minimizing Fracture Risk in West Virginia: The World Health Organization FRAX Assessment Tool

Kelly Scott, MS4, Timothy Wilson-Byrne, MD, Linda Morgan, RN, Franklin D. Shuler, MD, PhD
Department of Orthopaedic Surgery

Health promotion and disease prevention for the elderly population is a major challenge facing West Virginia. There is currently no validated phone-screening tool to identify individuals at greatest risk of fracture. The FRAX tool can be used as a phone -screening tool to evaluate the 10-year probability of bone fracture risk.

Patients were pre-screened for known risk factors for osteoporosis. A patient list was generated via Allscripts EMR based on ICD -9 codes, >65F, >70M, 2°osteoporosis, chronic steroid use, previous fracture. Patients were contacted by phone and FRAX was used to generate the 10-year probability of bone fracture risk. The patient was notified and recommended for a free DEXA scan at Byrd Clinical Center on a set date in June or August 2013.

The total number of patients was 45. The positive predictive value is 92%, negative predictive value is 100%. Sensitivity is 100% and specificity is 91%.

The FRAX phone-screening tool has demonstrated its ability to identify a population at risk and can be used to minimize the risk of fracture.

Level of Buprenorphine Measured in Samples of Umbilical Cord Tissue as an Independent Risk Factor for Neonatal Abstinence Syndrome.

Allison Hamilton, MD, Ryan Stone, MD, David Chaffin, MD, David Jude, MD, Anne Silvis, PhD
Department of Obstetrics and Gynecology

We have seen an increase in the use of buprenorphine for the treatment of the opiate dependent in our obstetrical community. Thus, further knowledge of the fetal effects of buprenorphine given to mothers may be useful in future management of the opiate addicted mother. This was a prospective study to determine if the level of buprenorphine measured in samples of cord tissue is an independent risk factor for neonatal abstinence syndrome.

At the time of vaginal or cesarean delivery, 45 samples of cord tissue were collected from infants' cord whose mothers were treated with a known buprenorphine dose for their opiate addiction. These samples were stored in a sub 80 degree freezer until sent for bulk analysis of levels of buprenorphine and norbuprenorphine. The results of this analysis were then compared to maternal dose of buprenorphine, days in neonatal intensive care unit, and neonatal abstinence scores.

NAS scores do not correlate with dose, NICU day did not correlate with dose, NICU days did not correlate with NAS, Norbuprenorphine level and NAS showed a trend but no correlation ($p=0.06$, r squared 0.09), norbuprenorphine level and NICU days showed trend but no correlation ($p=0.08$, r squared 0.08). Maternal dose at the time of delivery was well correlated with cord tissue levels ($p<0.005$).

The results of this study probably indicate a combination of differences in metabolism in babies and the lack of objectivity in the NAS scoring.

Motivations for Follow-up Ophthalmic Care in a Transient Population

Pooja Sangani, MS2, Sarah Slocum, MS4, Russ Richardson, MD, Russell Fry, MD
Department of Ophthalmology, Marshall University, Joan C. Edwards School of Medicine
Department of Ophthalmology, West Virginia University School of Medicine

The economic impact of visual impairment is significant, and encompasses lost productivity in addition to direct and indirect medical costs. From the basis of the Marshall Medical Outreach, which treats a mostly transient and homeless population, we instituted a follow-up ophthalmic and refraction clinic to investigate rates of follow-up care, comorbidities, and motivations for seeking care. 99% of our patients attended a second follow-up visit, whereas only 35% had previously followed-up after diagnosis. Patients cited lack of cost as the most important motivating factor. Our efforts to provide care within monetary and geographical reach of our patients can help decrease morbidity, mortality, and rates of unemployment, among other benefits.

20-HETE and circulating endothelial cells, a unique vascular profile related to CVD in morbidly obese Appalachian women.

Haytham Aljoudi, MD, Robert Touchon, MD, Ellen Thompson, MD, Nader Abraham, PhD
Departments of Cardiology and Internal Medicine

A high BMI increases levels of metabolic syndrome biomarkers. Vascular dysfunction is persistent in the development of atherosclerosis and determined by the levels of inflammatory markers, circulating endothelial cells (CEC), 20-HETE (a powerful vasoconstrictor) and serum adiponectin levels. We have previously described the presence of a marked increase in CEC in both humans and mice with hypertension, obesity and diabetes. We hypothesize that subjects with high BMI would present with increased levels of CEC and 20-HETE concomitant with a marked reduction in serum adiponectin.

Serum levels of adiponectin and 20-HETE were measured in female of Appalachian subjects. The effect of 20-HETE on 3T3 adipogenesis was also measured. Mature CEC were isolated from peripheral blood using anti -CD146-coated immunomagnetic Dynabeads™.

Subjects with a BMI between 45 to 72, had elevated CECs (mean 79, range 49-116 cells/ml of peripheral blood) as compared to (mean 29, range 21-46, $p < 0.05$) subjects with BMI of 32-46 and in non-obese subjects with BMI of 17-32, (mean 3, range 2-9). Lipidomic analysis revealed females with high BMI (50-72) displayed a significant increase in the CYP-derived 20-HETE when compared to subject with lower BMI (32-45) ($p = 0.005$). Treatment of 3T3 cells with 20-HETE decreased serum adiponectin levels and increased TNF α and adipogenesis by 38% and 76%, respectively ($p < 0.05$). These results implicate both 20-HETE and oxidative stress as factors in the pathogenesis of BMI-related diseases in individuals with a high BMI.

Increased BMI in Appalachian females is associated with an increase in CEC levels and an increase in 20-HETE expression and a decrease in adiponectin in peripheral blood. This represents a novel mechanism by which individuals with high BMI are sensitive to the development of atherogenesis and vascular dysfunction.

Mobile Medical Outreach to the Homeless: Barriers to Care

Jessica Layne, MS4, Mathew Curry, MD, Caleb Huff, MD, Deanna Jones, MD, Charles Clements, MD
Department of Family Medicine

The Marshall Medical Outreach (MMO) is a mobile clinic providing medical care to the local homeless population. Our research aimed to determine the barriers MMO patients face in accessing medical care. Additionally, patient compliance to follow up recommendations made while at the outreach was investigated. Specifically, the influence of a reminder phone call on patient adherence was analyzed. Our hope was that answering these inquiries would allow us to better serve and understand our patients.

An anonymous survey of the patients served over a four month time span was used as one method of obtaining results. For the second half of the project, patients who provided a telephone number were randomly assigned to two groups. The first group received a telephone reminder while the second group did not. These groups were then compared using a T -test to assess adherence.

Out of the 119 patients seen over four months of research 85 patients completed the survey. The majority (70%) neglected to seek care when medically necessary, with transportation cited as the most common barrier. Nearly the same portion of patients have access to some form of health care (72%). Other barriers noted in the survey included feelings of distrust (15.3%) or being unwelcome (16.5%). The reminder call showed no significant difference in patient adherence to their follow up appointments ($p= 0.22$).

Interestingly, the majority of MMO patients have access to health care, yet almost the same percentage failed to seek care when they believed it was necessary. Indicating that providing insurance is not enough. Instead, doctors should view the dilemma as a multifaceted social issue with an equally multifaceted solution. The study also indicated that reminding patients is not the best solution to increase adherence in this population. Instead other major factors eluded by the survey should be emphasized.

The existence of a strong correlation between leptin, TNF α levels and BMI in morbidly obese Appalachian females

Osareme Irivbogbe, MD, Rameez Sayyed, MD, Ellen Thompson, MD, Nader Abraham, PhD

Departments of Cardiology and Internal Medicine

Although BMI contributes to increased levels of adipokines, such as leptin, and tumor necrosis factor (TNF α) and to a decrease in adiponectin, few studies have examined the association between leptin, TNF α and body mass index (BMI) in Appalachian females.

A total of 74 subjects from the Appalachian region were examined for the effect of BMI on the levels of leptin, TNF α , and adiponectin. Patients without overt cardiovascular disease were included. Linear regression analysis was used to analyze for changes in the relationship between BMI, leptin, TNF α and adiponectin. Nonlinear regression was used to determine the odds ratio and confidence intervals.

Serum TNF α and leptin levels were significantly increased in subjects with an increased BMI of 45-72 (9.9pg/ml \pm 0.56 and 7.7pg/ml \pm 0.6 respectively; $p < 0.05$), compared to subjects with a BMI of 20-32. This was paralleled by increased levels of leptin, TNF α and IL-6. IL-6 was elevated in subjects with a BMI of 45-72 (4.83pg/ml \pm 0.40; $p < 0.02$). IL-6 was increased to a greater extent than leptin. In contrast, adiponectin levels were decreased ($p < 0.05$) in subjects with a BMI of $> 45-72$ (6.63ng/ml \pm 0.5; $p < 0.05$), compared to subjects with a BMI of 20-32 (14.43ng/ml \pm 0.32).

Our study demonstrates for the first time the unique inflammatory biomarkers profile in morbidly obese females, even before diagnosis of coronary disease, highlighting the possible pathogenic potentials and opens the door for potential use of these biomarkers as a prognostic tool and a therapeutic target that can ameliorate obesity induced cardiovascular dysfunction.

Perceptions of End of Life Care and Code Status

Ashley Jessie, MD, William Nitardy, MD

Department of Internal Medicine

Advanced care planning is a popular topic as the generation of baby boomers age, however over the last few decades we have made little to no advancement in documenting and executing patients end-of-life care preferences. We set out to identify and assess patient and internal medicine resident perceptions of end of life care and code status in our own resident continuity clinic in a rural area of West Virginia.

This was accomplished by administering anonymous surveys prior to their regularly scheduled routine visit with their primary care physician.

Analysis revealed that a large number of patients had no advanced directives (63%), no medical power of attorney (61%), had not discussed their wishes with their doctor (78%), and a surprising amount of patients did not even know the meaning of do not resuscitate (31%).

It appears there is a deficit in training currently for internal medicine residents in the area of advanced care planning with patients, and further investigations should be made into the most appropriate and effective forms of education to increase physician comfort and compliance with initiating these topics.

Comparison of Urban and Rural Umbilical Cord Thyroid Hormone Levels and Examination of a Correlation with Serum Cadmium or Lead

Jesse Cottrell, MD, Monica A. Valentovic, PhD, Anne Silvis, PhD, Brenda Mitchell, MD
Department of Pharmacology, Physiology and Toxicology, Department of Obstetrics and Gynecology

Newborn screening for thyroid hormone levels is important for maintaining proper development. Recent publications suggest that metals can modify thyroid hormone status. This study evaluated whether thyroid hormone levels were different between urban and rural newborns. This study examined whether a correlation existed between TSH and cadmium or lead.

A comparative cross-sectional study was conducted on 134 patients, 67 rural and 67 urban. Rural and urban locations were based on Rural-Urban Commuting Area Codes, determined by the U.S. Census tracts using measures of population density, urbanization, and daily commuting. Cord blood was collected at the time of delivery and analyzed for thyroid stimulating hormone (TSH) levels, total and free thyroxine (T4), total and free triiodothyronine (T3) and T3 uptake. Patients also identified whether tap or well water was ingested. Blood was also analyzed for metals including cadmium and lead.

Total T4 levels were similar between Urban and Rural groups ($p=0.789$); free T4 was not different between Urban and rural groups ($p=0.136$). Both total and free T3 levels were comparable between urban and rural newborns as the p value for total T3 was $p=0.698$ and free was $p=0.571$. TSH levels were almost identical between urban (8.55 ± 0.78) and rural 8.533 ± 0.684 mIU/L ($p=0.983$). T3 uptake was higher ($p=0.041$) for the rural compared to urban. Lead and cadmium have been implicated to alter TSH levels but no correlation was found in our study.

TSH, T4 and T3 levels were similar between urban and rural newborns. TSH levels were within the normal range for TSH. There was no correlation of blood cadmium or lead with TSH levels in all samples tested. Rural newborns had higher T3 uptake than the urban group. Future studies will be needed to evaluate the mechanism for higher T3 uptake levels in the rural group.

Impact of a Longitudinal Training Experience in a Free Clinic on Practice and Academic Outcomes of Graduates of a Family Medicine Residency

Daniel Poole, MD, Stephen Petraney, MD, and Todd Gress, MD

Departments of Family Medicine and Internal Medicine

Each residency program in the country has its own unique characteristics. One of the unique features of MUSOM family medicine residency is the longstanding association that it has with Ebenezer Medical Outreach (EMO), a local free clinic. Family Medicine residents have the option to do part of their continuity ambulatory care experience during their second and third years of residency in this office. The purpose of this paper is to see if family medicine residents who participated in the free clinic experience during their training were more likely than non-participants to subsequently practice in an area of need. Our focus was mainly on graduates who have practiced in underserved areas and community health centers.

Our project began with compiling data regarding graduates of our residency program. The graduates were identified as participants and non-participants in the free clinic. Data regarding their subsequent/current employment was obtained. We also searched literature databases to find any studies similar to our research. We did not find any studies like ours, but did find significant information regarding free clinics. Following the review of the literature, we began to analyze the data that had been compiled and assessed it from several different angles.

During the study period of 1991 to 2013, 44 family medicine residents participated in the Ebenezer Medical Clinic experience. During the same time period there were 160 family medicine residents who did not practice at the Ebenezer Clinic. Preliminary results indicate that participants of EMO during residency were almost twice as likely to continue their practice of medicine in an underserved area of medicine.

Family medicine residents who chose to participate in a free clinic experience during their graduate medical training were almost twice as likely to subsequently provide care in underserved communities after graduation.

RESEARCH IN PROGRESS

The Rural Health Initiative Grant funding has provided for several research projects that are still in progress. These projects will be presented at a future Rural Health Research Conference.

Evaluating Buprenorphine Metabolism in Opiate-Addicted Mothers and Fetal Tissue as a Predictor of Neonatal Abstinence Syndrome in Rural Appalachia

Allison Roy, MD, David Chaffin, MD, Lauren Waugh, MD, Anne Silvis, PhD
Department of Obstetrics and Gynecology

Exploring physician decision-making in acute care inter-hospital transfers from rural WV hospitals

Artina Lane, MD, Freddie Vaughan, MD, Karah Cloxton, MD, Katherine Rector, MS4, Dilip Nair, MD
Department of Family Medicine

Development of Phone Application for Rural Congestive Heart Failure Patients in a Rural Setting

Rebecca Hayes, MD, Christopher Fine, MS4, George Yousef, MD, Christine Gilkerson, MD
Department of Internal Medicine

“Know Your Numbers” to Lower Cardiac Risk

David Francke, MD, Hayden Ansinelli, MS1, Mohit Harsh, MS1, Ellen Thompson, MD
Department Of Cardiology

Effect of Ankle Brachial Index (ABI) Measurement on Risk Factor Modification

Faisal Hayat, MD, Robert C. Touchon, MD, Melissa Lester, DO
Department of Cardiology

Food environment, food security and obesity in a rural West Virginian population

Lauren Burgunder MS2, Isabel Pino, MD
Department of Pediatrics

Endothelial dysfunction in diabetes

Arifa Khokar, MD, Ryan Stone, MD, Anne Silvis, PhD, Nalini Santanam, PhD
Department of Obstetrics and Gynecology

Placental ADRB1 mRNA as a Potential Predictor of Outcome and Possible Therapeutic Target in High Risk Pregnancies

Jared Brownfield, MD, Ryan Stone, MD, Anne Silvis, PhD
Department of Obstetrics and Gynecology

MS1 Summer Stipend Projects JCESOM 2014

<u>Mentor Name</u>	<u>Title</u>	<u>Assigned Students</u>
Abraham NG, PhD	Role of Oxidative Stress on Obesity -Mediated Metabolic Syndrome	Eamonn Maher, MS2
Amit Dwivedi, MD	1)Clinical and MR Imaging Assessments in Patients with Intermittent Claudication Following Injection of Bone Marrow Derived ALDH Bright Cells 2)Zilver Vena venous stent study	Pritee Taxak, MS2
Anne M. Silvis, PhD	Evaluation of risk factors during pregnancy for long term cardiovascular disease in the female rural Appalachian population	Kasey Stickler, MS2, Morgan Stickler, MS2
Anne M. Silvis, PhD	Determining pregnancy outcomes of chronic hypertensive obstetric patients delivering at Cabell Huntington Hospital	Abigail Smith,MS2, Troy Wallace, MS2
Anthony M. Alberico, MD	Project Design for a Clinical Trial of Spinal Cord Stimulation for Peripheral Vascular Disease (Departments of Neurosurgery and Cardiology)	Justin Chuang, MS2
Dilip Nair, MD	A survey of residents' exposure to qualitative research at U.S. family medicine residency programs	Max Randall, MS2, Justin Godby, MS2
Franklin Shuler, MD, PhD	Orthopaedics review paper	Michael Clarke, MS2, Corey Hamilton, MS2, Thomas Melvin, MS2, Matt Meriweather, MS2, Vivian Minkemeyer, MS2, Matthew Burton, MS2, Daniel Kahn, MS2, Andrew Prusack, MS2, Michael Andryka, MS2, Yusif Mohammed, MS2
Elmer M. Price, PhD	Modeling Neurogenesis in the Mammalian Brain	Joshua Kim, MS2
Harvey Pass, MD	Role of lymphovascular invasion in lung cancer	Mobeen Farooq, MS2
Jennie Yoost, MD	Exposure to community violence and teen pregnancy	Hilary Cornell, MS2
Jennie Yoost, MD	HPV vaccine use among mentally limited adolescents	Amanda Stratton, MS2
Lynne Goebel, MD	Patient satisfaction with the Medicare Wellness Visit	Maria Espiridion, MS2
Lynne Goebel, MD	A pilot study of contingency management plus 5 A's versus contingency management alone for smoking cessation in pregnancy	Jacob Miller, MS2
Maria Serrat, PhD	Temperature enhanced bone elongation in skeletal growth plates	Nathaniel Crow, MS2, Aaron Heaberlin, MS2
Monica Valentovic, PhD	Examination of Human Umbilical Cord Blood samples for polyaromatic hydrocarbon DNA adducts	Lawrence Harbrecht, MS2

<u>Mentor Name</u>	<u>Title</u>	<u>Assigned Students</u>
Monica Valentovic, PhD	Examination of renal injury biomarkers following cancer chemotherapy exposure to human kidney cells.	Jason Childress, MS2
Nancy B. Norton, MD and Maurice A. Mufson, MD	A retrospective chart review of patients with culture-proven Streptococcus pneumoniae pneumonia to determine if the infection altered their lifespan.	Oluwdamilare Ajayi, MS2
Pier Paolo Claudio, MD, PhD	Targeted erythro magneto-based therapy in prostate cancer	Christopher Murphy, MS2
Pier Paolo Claudio, MD, PhD	Chemosensitivity assay for tumors	Frank Fofie, MS2, Ryan Carroll, MS2
Pier Paolo Claudio, MD, PhD	Autologous bone implant for repair of non-union fractures	Jean-Luc Weiner, MS2, Dustin Elswick, MS2
Piyali Dasgupta, PhD	Combinatorial Activity of camptothecin and capsaicin in human SCLC	Cody Stover, MS2
Piyali Dasgupta, PhD	Anti-angiogenic activity of nicotinic receptor antagonists	Rebecca Creel, MS2
Prasanna Santhanam, MD	Meta-analysis of Tyrosine Kinase Inhibitors in Differentiated Thyroid Cancer	Kent Hess, MS2, Danny Justice, MS2
Richard M Niles, PhD	West Virginia Cancer Genomics Network	Adam Davis, MS2
Robert Touchon, MD	Biomarkers in Diastolic Heart Failure	Adolph Paola, MS2, Laura Hunt, MS2
Susan Flesher, MD	Who are you? A W.A.Y. to help parents of hospitalized children recognize the participants in their hospital care, and know their roles	Kelsey Cowen, MS2, Lawrence Harbrecht, MS2
Todd Gress, MD	Meta-analysis of Technology-based Interventions to Improve Self-care in Diabetes Mellitus	Matt LaRoe, MS2, Divya Vangala, MS2, Matthew Thompson, MS2
W. Jeff Elias, MD	Functional neuromodulation using transcranial focused ultrasound	Erika Maynard, MS2
Noel W. Solomons, MD	Application of osmetry to issues of human hydration: Measurements in breast milk and urine	Laura Scieszka, MS2, Lauren Burgunder, MS2
Haythem Aljoudi, MD	Predictive Value of Serum IL-10 Level in Patients with Heart Failure Subsequent to Acute Myocardial Infarction.	Joseph Wilson, MS2
Russell Fry, II, MD	TBA	Pooja Sangani, MS2