

Impact and Trends of Novel Nicotine Delivery Systems in Rural Appalachian Youth

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Background: It is well known that tobacco use remains the leading cause of preventable deaths in the United States adults. In 2016, cigarette use West Virginia was up to 24.8%, which is nearly 65% higher than the national average. In addition, West Virginia carries a high rate of adults dying from cancer-related issues associated with cigarette use and overdoses from opioids. While many tobacco cessation and prevention strategies have been established for the adolescent population, United States teens are now more likely to try a new method of smoking, called “vaping” or “juuling,” which is performed using an electronic novel nicotine system (ENDS.) These are handheld vaporizers that release liquid containing of high levels of nicotine, but without the coughing or unpleasant taste typically associated with using traditional cigarettes. The vapor is virtually invisible and consumers can choose from a variety of flavors such as strawberries and cream or cinnamon. Despite advertisements claiming that vaping is a healthier alternative to traditional cigarettes, there is limited research on its effect on adolescent lung development. Adolescent vaping has been associated with both a tendency to try other drugs as well as an increased risk of addiction. Considering West Virginia’s previously stated statistics, more research is needed to assess possible correlations. **Objectives:** The goal of this grant proposal is two-fold: 1) Identify the characteristics, behaviors and perceptions of nicotine and tobacco use in adolescents from urban vs rural settings, with particular focus on vaping using electronic novel nicotine systems, and 2) Determine if vaping has short or long-term effects on adolescent lung function and development. **Methods/Study Design:** Urban areas will be represented by the middle and high school students of Cabell County in West Virginia and rural areas by Mason County in West Virginia. For the first part of the study we worked with the Board of Education on a local and state level to create an electronic survey via REDCAP. Surveys will voluntary, confidential and performed by students while school after providing parental consent. Results of the survey will provide data on student demographics, current vs. prior substance or tobacco abuse, high risk behaviors, social stressors, socioeconomic status, and knowledge or concern regarding the effects of vaping. Schools will receive a visa gift card to be used for school expenses if their participation rate is $\leq 80\%$. Our goal is 60%. For the second part of the study we plan on utilizing spirometry and expired carbon dioxide levels of the students to assess changes in pulmonary status. Subsequent educational interventions will be provided based on results of survey. **Conclusions/Future goals:** At this time we have a sent draft of our survey through REDCAP. We are awaiting official approval from the state BOE before we can establish parental consent and subsequent administration of the survey (anticipate survey completion by December 2018.) If accepted for this grant, we can find more ways to educate our adolescent population early to help create healthier adults in West Virginia. Our research team is unique in that we have utilized a multidisciplinary approach to our research and education goals by including local and state Boards of Education, as well as representation by both Marshall’s Surgical and Pediatric residencies. Not only does this allow for a wider breath of knowledge, insight and expertise but also provides us with multiple avenues for both community and medical outreach in West Virginia.

Rural vs. Urban Postoperative Gynecologic Surgery Pain Control: Is there a Difference in Routine Opioid Prescription Practice and Patient Use?

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While the current opioid epidemic has plagued the entire United States, the State of West Virginia has experienced one of the highest drug-overdose death rates in the nation. Additionally, West Virginia also ranks in the top 10 for the highest rate of prescriptions given out for high-dose opioids and extended – release opioids, both of which are targets for abusers.¹ To that end, gynecologists within the State of West Virginia are confronted with a significant challenge to the management of patients with post-operative gynecologic surgery pain. Pain control amongst the opioid addicted patient can be especially challenging. While most urban academic centers are seeking to address this challenge, rural gynecologists are for the most part practicing the routine practice for pain management for major and minor gynecologic procedures. This is especially concerning since as many as 80% of those who are currently addicted to opioids is estimated to have begun their addiction with prescription pain medications.²

¹ Business Insider “Here’s why the opioid epidemic is so bad in West Virginia — the state with the highest overdose rate in the US” Harrison Jacobs, May 1, 2016. <https://www.businessinsider.com/why-the-opioid-epidemic-is-so-bad-in-west-virginia-2016-4>

² National Rural Health Association, *Treating the Rural Opioid Epidemic, Executive Summary*. https://www.ruralhealthweb.org/NRHA/media/Emerge_NRHA/Advocacy/Policy%20documents/Treating-the-Rural-Opioid-Epidemic_Feb-2017_NRHA-Policy-Paper.pdf

A Comparative Analysis of the Relationship Between Patient Malnutrition and Opioid Use Disorder in Rural West Virginia

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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. Opioid Use Disorders (OUD) takes root in small communities and spread rapidly due to the intimacy of the group structure that can act to pressure individuals into trying substances and can act as triggers for relapse during recovery periods. OUD can increase the long-term risk of health complications including malnutrition, metabolic disorders that compromise nutrition, and poor mental health. Studies have shown that there is a considerable overlap in the biopsychological processes underlying eating habits and substance abuse. Eating habits and substance abuse for instance, share the same reward, salience, and motivation neurologic pathways. Thus, malnutrition can lead to serious health issues, complicating OUD treatment even further. While most population reports on vitamin D deficiency report 23-26% inadequacy, preliminary data has revealed that 86.7% of the MAT patient population at the rural clinic presented as vitamin D deficient with 24.4% of the population identified as deficient in B-group vitamins (National rate of vitamin B deficiency is estimated at 9% by the USDA). We anticipate that we will demonstrate a connection between nutrition and medication assisted treatment outcomes.

Office Based Spirometry Evaluation of Community Dwelling Oldest-Old

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Mentors: Robert Walker, MD, Nick Chongswatdi, MD

Chronic obstructive pulmonary disease is one of the most common and treatable diseases. It is the 4th leading cause of death worldwide increasing the importance of diagnosing and appropriate treatment. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) has set the standard for the diagnosis of COPD with Spirometry. Many offices use spirometry to help diagnosis and determine treatment similar to blood pressure cuffs and hypertension. An FEV1/FVC ratio less than .70 on simple spirometry gives the diagnosis of COPD, which can then be classified into mild, moderate, severe, and very severe based on predicted FEV1 value. The CDC Calculator has a 75 year age limit when producing predicted values. Many feel that using the Lower Limit of Normal (LLN) is more specific than the GOLD criteria, which may under diagnose the young and over diagnose the elderly. One study suggests the GOLD criteria should be lowered to FEV1/FVC ratio to 0.65 for the elderly. Another supports the 0.70 criteria and demonstrates a normal LLN actually had symptoms and complications from COPD in the elderly. Spirometry is still a useful tool in diagnosis COPD, but further studies need to focus on the elderly population to help improve diagnosing and proper use of medications.

This study intends to assemble a representative group of community-dwelling elders living in a defined area in southern West Virginia (Lincoln, Logan, MacDowell, Mingo and Wayne counties). This group will be representative of their counterparts throughout southwestern West Virginia in terms of age, sex, and living arrangement (alone, with a spouse, with others). The goal of this project is to explore the utility of office-based spirometry and measure the clinically relevant pulmonary information of this largely untested population.

Written Action Plans: Improving the Process and Communication Between Schools, Parents, and Physicians

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Mentor: Meagan Shepherd, MD

Many children currently enrolled in school today are affected by asthma, life threatening allergies, or both. Current recommendations encourage every child with asthma or food allergies to have a written action plan regarding emergent treatment if a child were to develop symptoms at home or at school. West Virginia currently requires the county boards of education to have a policy allowing medication administration at schools. Students are allowed to have a rescue inhaler or auto-injectable epinephrine if they have a written statement from their physician, and authorization from their guardian. There is no standardized form for these plans. We aim to look at the different action plan processes that schools use in urban versus rural counties in West Virginia, as well as school employees' knowledge of these plans, and ability to follow through with them. We will send a questionnaire to surrounding counties in order to obtain this information and then see how we can improve upon this process. Our long-term goal is to

create a system that would be more efficient for parents, physicians, and schools that could perhaps be a model at the state level.

Quality of Life in Rural Appalachian Women After Mastectomy for Breast Cancer and Barriers to Breast Reconstruction

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Mentors: Peter Ray, MD, David Denning, MD, Mary Legenza, MD

For West Virginia women, breast cancer is still the second most common cause of cancer deaths. Although breast cancer mortality declined 39% in the United States from 1999 to 2015, according to the Susan G. Komen Foundation, it still remains a great health concern to West Virginia women. As a direct result of improved survival outcomes, breast cancer is increasingly perceived as a chronic disease. With this decline in mortality, it is time to focus on ensuring a health-related quality of life and body image perception for women who survive breast cancer. Recent surgical breakthroughs have provided women with more options than ever before including a less invasive breast-conserving treatment. However, despite the surgical technology breakthroughs, the emotion impact of undergoing a mastectomy remains the one consistent factor.

While immediate or delayed breast reconstruction after a mastectomy may enable women to preserve body image and quality of life, only 40 percent of American women currently opt for the breast reconstruction. Barriers to post-mastectomy breast reconstruction in the United States and especially rural areas still exist. Few prospective psychological studies have also been published to focus on long-term effects of health-related quality of life in women post-mastectomy. A medical literature search revealed that even less psychological studies exist to compare urban with rural patients with regard to women's post-mastectomy expectations, anxiety/depressive symptoms, and perceptions on body image and sexuality after surgery.

Assessing Chronic Disease in Rural West Virginia

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Mentor: Kathleen O'Hanlon, MD

The Cleveland Clinic has described six aspects of health that can help prevent chronic disease. These include: BP < 130/85, BMI 21 to 29.9, FBS < 107 or a1c < 6.4, LDL < 100, avoidance of nicotine, and "Stress Management". This study aims to determine the extent that the rural people of West Virginia are meeting these goals. A self-reported questionnaire will be distributed to a rural clinic in West Virginia and used to screen patients for these six aspects. It is our goal to assess the level of chronic disease in rural West Virginia in order to better direct focus towards those areas where failings are identified.