



2016

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Recommended Citation

Pack, Robert P.; Hagaman, Angela; Warfield, Sara; Gray, Jeffry A.; Tudiver, Fred; Alamian, Arsham; and Hagemeyer, Nicholas E. (2016) "Interprofessional Research, Training and Outreach: The ETSU Prescription Drug Abuse/Misuse Working Group," *International Journal of Health Sciences Education*, 3(2). Available at: <https://dc.etsu.edu/ijhse/vol3/iss2/5>

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Interprofessional Research, Training and Outreach: The ETSU Prescription Drug Abuse/Misuse Working Group

Authors

Robert P. Pack, Angela Hagaman, Sara Warfield, Jeffrey A. Gray, Fred Tudiver, Arsham Alamian, and Nicholas E. Hagemeyer

Prescription drug abuse is defined as the use of prescription opioids without a prescription or use only for the experience or feeling they cause (Substance Abuse and Mental Health Services Administration, 2014). Prescription drug abuse/misuse (PDA/M), in particular the abuse of prescription opioid (PO) medications, has reached epidemic proportions in the United States (Centers for Disease Control and Prevention [CDC], 2011). Substance Abuse and Mental Health Services Administration (2014) data indicate that there are over 4.5 million past month non-medical users of prescription opioid medications in the U.S. alone.

Overdose death has quadrupled since 1999, much of which is a result of prescription drug abuse (Chen, Hedegaard, & Warner, 2013). On average 83 opioid medications were prescribed per 100 people in the U.S. in 2012 (Paulozzi, Mack, & Hockenberry, 2014). The state of Tennessee is disproportionately struggling with the prescription drug abuse epidemic and has the second highest oral (PO) prescribing rate per capita (Paulozzi et al.). In addition, Tennessee experienced a 250% increase in PO-related overdose deaths from 2001 to 2010, accounting for 7% of prescription drug overdose deaths nationally despite comprising only 2.3% of the nation's population (CDC, 2011; Tennessee Department of Health Safety Subcabinet Working Group, 2012).

Neonatal Abstinence Syndrome (NAS), a condition resulting from intrauterine exposure to maternal prescription drugs, has also reached epidemic proportions in the Northeast region of Tennessee; in particular, this region accounts for a disproportionate incidence of babies born with NAS statewide with a rate of 41.6 per 1,000 live births versus the state rate of 11.6 per 1,000 live births (Tennessee Department of Health, Division of Family Health and Wellness, 2013). The geographic placement of East Tennessee State University (ETSU) and its Academic Health Sciences Center (AHSC) in this high PDA/M prevalence location allowed for ready engagement on the problem.

ETSU is a regional public university located in this Northeast part of the state with the highest prevalence of PO prescribing, misuse and its resultant outcomes, addiction, overdose and NAS. ETSU is a Carnegie-designated Doctoral Research University with a comprehensive AHSC that is a member of the Association of Academic Health Centers (AAHC).

In the past few years, a team of interprofessional scientists at ETSU has come together to address the problem of prescription drug abuse. Since then, they have been successful in grant writing, publication, public education, and are attempting to impact policy through their work. The purpose of this manuscript is to describe the experience of creating and maintaining this highly interprofessional research team, with the aim of encouraging purposeful cultivation of similar interprofessional teams to address significant public health needs.

Working Group History

In spring 2012, three ETSU researchers, four university administrators, and one community health care professional met to discuss the PDA/M problem and the role ETSU could play in addressing community and regional needs. Challenged and energized by the encounter, the researchers resolved to meet frequently to identify priority areas for research activities. From the first meeting, the group knew that the complexity of the problem would require interprofessional collaboration, community partnerships, teamwork, and an integrated training model that included

faculty and student interaction. The group sought out other individuals who shared interest in PDA/M, including other ETSU faculty and staff, and anti-drug coalitions in the region. Monthly meetings were scheduled and held on ETSU’s campus. By the end of 2012, the Working Group invitation list grew to more than 20 scholars, clinicians, students and community partners working in prevention, treatment, or other related settings. In the first year, roughly 7-10 members would attend the meetings. By the end of 2012, the list had grown to more than 90, with approximately 30-35 members attending each meeting. The group developed organically. A formal systematic approach to engaging new members was never employed. Members learned of the group and joined based on their personal or professional interest in the problem, and those who stay engaged were frequently mapped onto new research proposals or community interventions. The Working Group continues to grow and sustains a high level of productivity due in part to the informal nature of the monthly meetings that allow scholars, students, and community members to brainstorm new research questions, discuss community issues, and implement effective interventions simultaneously. In 2015 the group began alternating monthly meetings between the university campus and partner agencies settings in order to maintain the vital connection to the community. Figure 1 below shows the diversity of the group by primary discipline and represents the total number of members in the PDAM Working Group by discipline.

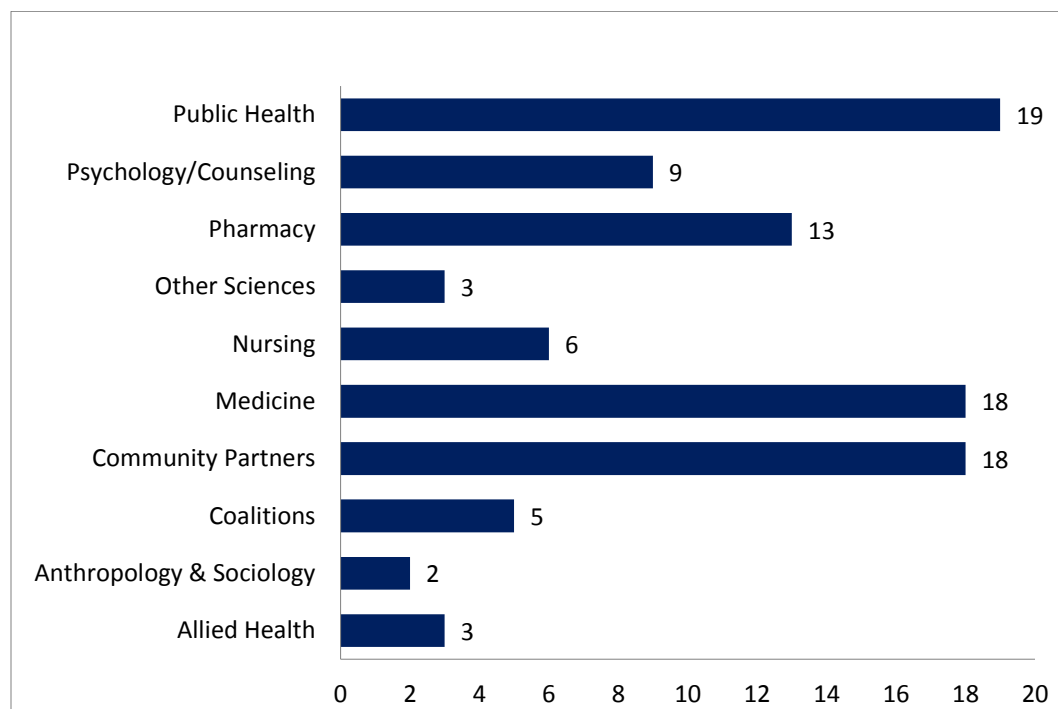


Figure 1. Prescription Drug Abuse Working Group Membership

The PDA/M Working Group continues to meet monthly and is now comprised of a remarkable list of gifted scholars and invested community partners. The list includes nationally known speakers, advocates, public health practice leaders, community residents, former addicts and scholars.

The meetings usually open with a partner update that takes half or more of the meeting time. By beginning with this step the group provides an informal milieu that allows for connections to be made between projects and partners. Dozens of new activities and projects have been initiated in these meetings and the consistency of the meeting staff and time has provided the mechanism to keep track of projects and updates.

Early on, the group identified the need for consistent research, education and practice on the topic and set a goal to gather the internal and external resources to ultimately create a Center for Prescription Drug Abuse Prevention and Treatment at ETSU. Recognizing the need for consistent financial support the group immediately began searching for a federally funded mechanism for infrastructure development.

The concerted effort of this group resulted in the formal submission of a large-scale National Institute on Drug Abuse (NIDA) proposal that was funded on the first attempt in 2013. The grant established the ETSU Diversity-promoting Institutions Drug Abuse Research Program (ETSU-DIDARP) called *Interprofessional Communication to Reduce Prescription Drug Abuse in Appalachia*. The program supports training and mentorship of students and faculty while executing three prescription drug abuse research projects. The projects are focused on interprofessional communication by prescribers, dispensers and patients to reduce PDA/M and a focused effort to increase the volume of prescription drugs that are taken to pill “drop-boxes” for incineration by law enforcement authorities.

The DIDARP team represents a subset of the larger PDA/M Working Group. In fact, they are funded to create research infrastructure for this topic, while executing the three projects mentioned above. To nurture collaborative interprofessional research, the ETSU-DIDARP research team has conducted fortnightly research team meetings since beginning in 2013. All investigators, graduate students, fellows, and project staff attend each meeting. During these meetings project/programmatic discussions enhance scientific knowledge and application by linking relevant research information to the practical issues faced by the research team. By sharing project updates and discussing any project-specific issues in real-time with the entire team, the team attempts to mitigate isolation while strengthening the cohesiveness of the research team, addressing an Interprofessional Education Collaborative (IPEC) competency in a practical and hands-on manner (Interprofessional Education Collaborative Expert Panel, 2011). These discussions provide opportunity for all team members to develop a common knowledge base, generate research ideas, and collaborate across disciplines, thereby stimulating innovative thinking regarding both substance abuse and PDA/M in the Appalachian region.

In June of 2014, Drs. Nick Hagemeyer and Ivy Click received funding from the TN Department of Health to further examine Neonatal Abstinence Syndrome (NAS). For this research project, Drs. Click and Hagemeyer target four different groups: pharmacists, primary care physicians, pain management clinic physicians and those prescribing buprenorphine, a drug commonly used to treat opioid addiction. Hagemeyer and Click are examining how physicians talk to patients about the risks of NAS, particularly female patients who are in their childbearing years.

Since the very first proposal, the team has worked diligently on developing new ideas and products. Their work has spawned policy analysis, evaluation activities, field placements for

graduate students, movie nights on campus and countless new activities. A few quantifiable measures are the number of publications, grant proposals and their interprofessional nature.

Seven PDA/M related manuscripts have been published in peer-reviewed journals during the last four years. The manuscripts are analogous to the composition of the working group in that they are published in journals that cross multiple disciplines.

- Prescription disposal practices: A 2-year ecological study of drug drop box donations in Appalachia. *American Journal of Public Health*. 2015.
- Factors associated with provision of addiction treatment information by community pharmacists. *Journal of Substance Abuse Treatment*. 2014.
- Theoretical exploration of Tennessee community pharmacists' perceptions regarding opioid pain reliever abuse communication. *Research in Social & Administrative Pharmacy*. 2014
- Prescription drug abuse: A comparison of prescriber and pharmacist perspectives. *Drug Abuse: Substance Use & Misuse*. 2013.
- Prescription drug abuse and DEA-sanctioned drug take-back events: Characteristics and outcomes in rural Appalachia. *Archives of Internal Medicine*. 2012.
- Prescription drug abuse communication: A qualitative analysis of prescriber and pharmacist perceptions and behaviors. *Research in Social and Administrative Pharmacy*. 2015.
- Correlates of prescription opioid legitimacy estimations among community pharmacists in Tennessee. *Health Education and Behavior*. (Under Review).

Furthermore, the team has submitted sixteen new prescription drug-related research proposals, seven of which have been funded with one currently under review. The PDA/M Working Group and DIDARP team also host a monthly Accreditation Council for Continuing Medical Education (ACCME) Accredited Grand Rounds series during the academic year and present research findings at a number of regional and national events. In total, working group members have presented at more than 35 invited events, including presentations to legislative committees of the Tennessee House and Senate. In 2013 the team hosted the Appalachian Regional Summit on Prescription Drug Abuse which convened experts from across central Appalachia and included speakers from the White House Office of National Drug Control Policy and the Drug Enforcement Agency.

Community outreach and education efforts are central to the mission of the team and collaborative partnerships have resulted in the development of a funded anti-drug coalition in Carter County, TN, a regional Naloxone Training and Access task force, and a workforce initiative aimed at engaging local business and industry in the adoption of comprehensive prevention programs and policies. In March of 2016, the culmination of these products both academic and collaborative resulted in formal approval for the ETSU Center for Prescription Drug Abuse Prevention and Treatment by the Tennessee Board of Regents. A description of the academic environment that contributed to the momentum of the PDA/M Working Group and development of the Center follows, as components may be replicable specifically when collaborative effort is required to address an urgent health concern.

The Working Group has become a fertile landscape for the development of research and implementation of evidenced-based strategies in the surrounding communities. As funding opportunities arise, personnel are selected based on research track record, readiness for the research effort, content expertise, and PDA/M interest. Team members must be willing to substantively contribute to the application process and provide scientifically valid and professional input. Students are mapped on to these studies as well, according to their area of interest and aptitude for the subject matter.

The group maintains a website and consistently updates social media outlets to share funding opportunities, research progress and outcomes, training opportunities, and related legislation. The group's website is www.etsu.edu/cph/pdam.

Institutional and Regional Research Initiatives

Interprofessional education (IPE) is at the heart of the student and faculty experience at ETSU. The Interprofessional Education & Research Committee (IPERC) operates at the Academic Health Sciences Center (AHSC) level and is charged with assuring a path for interprofessional competency attainment by all AHSC graduate and professional students, a goal supported by the AHSC Deans and the Vice President for Health Affairs. Given cultural and regional barriers to health care, IPE is a necessity to address regional health disparities.

The ETSU-DIDARP team has built much of its work around the Appalachian Research Network or AppNET. AppNET is a Health Services and Resources Administration (HRSA)-funded, rural Appalachian Practice-Based Research Network (PBRN), and the framework from which we conduct most ETSU-DIDARP projects. AppNET is housed within the ETSU College of Medicine and currently has 20 clinic groups with approximately more than 100 physicians and 32 mid-level providers actively participating in AppNET activities. Presently, AppNET has several research efforts that involve working with member clinics on their medication reconciliation process to reduce adverse medication events; developing an automated clinic data mapping system that will provide clinics with quality improvement data; and determining the factors that are associated with the prescribing of control medications. One goal of the ETSU-DIDARP project is to expand AppNET infrastructure to include community pharmacies and local health departments in the region. This development is necessary to facilitate collaborative project activities that would not be possible without this infrastructure. Furthermore, this expansion maximizes the potential of past and future investments in the regional PBRN infrastructure.

Interprofessional Stakeholders

Regional health care providers and community stakeholders have been at the forefront of a grassroots effort to “do something” about PDA/M in Northeast Tennessee. ETSU has a rich tradition of community-based engagement with health issues, perhaps more so when compared to other institutions given the relatively small cities and rural culture of the area. As an example of community support, the team has partnered with primary care clinics, pediatrics clinics, pain management clinics, pharmacies, regional substance abuse coalitions and health departments. The Working Group includes several clinical care providers of both abstinence-oriented and medication-assisted substance abuse treatment.

Importantly, one key stakeholder is the Tennessee Commissioner for Health, John Dreyzehner, MD, MPH, a national expert on prescriber efforts to mitigate harm from PDA/M and NAS. He was instrumental in creating legislation to mandate prescriber and pharmacist use of the Tennessee Controlled Substance Monitoring Database (CSMD). The law, signed by the Governor in April 2012, took effect in January 2013. Commissioner Dreyzehner was also instrumental in helping Governor Bill Haslam to develop a 25-point State of Tennessee strategy to reduce PDA/M and is responsible for implementing more than half of the items on the plan. Dr. Dreyzehner is on the External Advisory Board of the DIDARP Program and consults with the leadership of the PDA/M Working Group team as needed.

ETSU students are similarly invested and interested in PDA/M research. Many have not only been exposed to PDA/M problems in classroom settings, they or their families have lived it. Students have lost loved ones to prescription drug overdoses, become addicted to prescription drugs themselves, or have experienced the community-level impact of PDA/M. Graduate and professional students are conducting PDA/M research with ETSU-DIDARP personnel and many are taking their knowledge to the regional communities. As an example, Gatton College of Pharmacy and Quillen College of Medicine students established a Generation Rx team that makes PDA/M presentations to local high school and junior high students. To date, the Generation Rx group, under the direction of Dr. Sarah Melton, has reached over 2,000 students. This group has also developed an AHSC-supported provider toolkit specific to PDA/M. Within the College of Pharmacy, over 40 future pharmacists (nearly 20% of eligible students) are choosing to take research electives every semester; several of which are related to substance abuse. One of the team members has shared her mother's story of painkiller addiction on National Public Radio and frequently tours with her mother, a recovering pain medication addict, to educate the public. Finally, it should be noted that several students in public health are working with the authors of this work on PDA/M topics for their dissertation or capstone projects.

In order to foster continued professional development, faculty, students and staff are invited to participate in multidisciplinary PDA/M Journal Club and ACCME Accredited Grand Rounds activities on a monthly basis. These events expose members of the team to multidisciplinary research projects that have been conducted and published by research peers across the country, which allows for cross-pollination between research disciplines and encourages innovative discussions regarding substance abuse/misuse in the Appalachian region. These sessions are expected to enrich both current and future research within the AHSC.

The PDA/M Working Group and the ETSU-DIDARP team have established a milieu for successful conduct of research on campus via its meeting, grand rounds and journal club efforts. The team has also engaged in several measures to increase interprofessional research capacity on campus. Below, two examples of that capacity are offered: the faculty development series and the detailed student assessment.

Faculty Development for Interprofessional PDA/M Research

Academic and continuing educational coursework is fundamental for the faculty who are formally participating in the program as investigators or staff. Options for training depend on the course of study for the students and the specific learning objectives for the faculty. A set of

courses and training activities was established for the faculty and students enrolled in the program. Current and to-be-developed courses used by the team for training of the participants are found in Table 1. The Working Group will participate in the development of additional courses based on research competency needs.

Table 1. Courses and Training available for Faculty and Students

| Course: | Description: | Resource: |
|-------------------------------------|---|--|
| Risk Behavior Epidemiology | An introduction to the epidemiology of risk behaviors and the application of risk behavior research including concepts/theory of health/risk behavior, major risk behaviors, determinants of risk behaviors, risk behavior and the health care delivery system, and the future of risk behavior research. | EPID course number to be determined |
| Grant Writing | Instruction in grant writing, including the development of a long-term research agenda, the identification of funding sources for research, advance planning for grant proposals, and an introduction to writing grant proposals. Emphasizes refinement of writing skills, development of an organizational vision, budget development, and budget justification, goal-setting and political realities. | Faculty: GRAD 7820 & GRAD 7830 Students: ELPA 6955 |
| Evidence-Based Public Health | Provides skills for using best practices and other evidence-based methods as components of a systematic approach to finding effective interventions to community health challenges in diverse populations. | COBH 6250 |
| Communication Theory | Examines the study of traditional, modern, and emerging communication theories as analytical tools to understand how communication operates in a variety of settings. | SPCH 5330 |
| Interdisciplinary Research | An introduction to the nature and value of interdisciplinary study. Literature, scientific theory, critical theory, and/or social science, historical, and philosophical constructs may be brought to bear on the study of interdisciplinarity. | MALS 5100 |
| Alcohol and Drug Abuse | A basic understanding of alcohol and drug abuse. Various classifications of drugs, specific abuse symptomatology, specific causes of drug abuse, characteristics of high-risk groups, various treatment models, preventative efforts, and regulations controlling the use of drugs in society are examined. | SOWK 5367 |

| | | |
|--|---|-----------|
| Substance Abuse and Addiction in Appalachia | An integrated study of the history, physical, sociocultural, and psychological effects of substance abuse and the underlying disease of addiction. Place and social determinants of health are explored as causes of addiction in Appalachia. Expert panelists are used. | PMPR 7118 |
| Non-Medicinal Drug Use | Topics centered around the use of drugs for non-medicinal purposes, discussion on the continuum of legitimate versus non-legitimate drug use, or medical versus non-medical use. The major focus of the subject material pertains to issues of drug abuse, particularly in Appalachia and other rural environments. | PMSC 7203 |

Student Development for Interprofessional PDA/M Research

Students are integral to the success of the research program as the team strives to develop a cadre of experts to carry on PDA/M research. The team is intentional in creating an environment that engages students from diverse backgrounds in regional PDA/M prevention efforts, creates interest in PDA/M research careers, and provides mentoring that is fruitful and constructive.

Undergraduate student development consists primarily of research shadowing and volunteer opportunities with project researchers and staff. Undergraduate students are paired with graduate students conducting PDA/M research activities, forming a mentor/protégé relationship. Dr. Hagemeyer participated in the development and implementation of a graduate student/pre-pharmacy student mentor/mentee program during his graduate education (Kiersma et al., 2012), and a similar process is employed at ETSU to expose undergraduate students to research through informal mentoring activities. At the discretion of ETSU-DIDARP faculty members, undergraduate students may be given additional research responsibilities (e.g., data entry and analysis and research proposal development).

Graduate students and fellows are essential members of the research team and actively participate in team meetings and monthly PDA/M Working Group meetings. Their development plan is based on core research competencies promulgated by the National Postdoctoral Association (NPA). NPA competencies include:

- 1) discipline-specific conceptual knowledge;
- 2) research skill development;
- 3) communication skill development;
- 4) professionalism;
- 5) leadership and management skill development; and
- 6) responsible conduct of research (National Postdoctoral Association Core Competencies Committee, 2009).

Development activities can be divided into three core areas: graduate-level coursework, mentoring, and experiences gained through active participation in team research. Students serve

as research assistants for the program, spending on average 80 hours monthly gaining hands-on PDA/M research experience. Graduate students routinely present journal club articles to the team and solicit input from team members regarding proposed graduate student research projects. Mentoring takes place at the advisor level as well as at the project team level. The strong collaborative relationships within the project team and PDA/M Working Group promote interdisciplinary mentoring relationships. For example, College of Public Health graduate students have developed mentor/protégée relationships with College of Medicine and College of Pharmacy faculty members. Doctor of Pharmacy (PharmD) students develop PDA/M research skills through participation in research electives with program faculty members. Dual-degree (MD/MPH, PharmD/MPH) students participate in DIDARP activities through completion of research electives or through extracurricular participation in research activities as deemed appropriate by team researchers. Professional student experiences include mentor-guided research training.

The ETSU-DIDARP Program provides funding for Community Pharmacy Research Fellows. The fellows' development is similar to graduate training in the College of Public Health and is designed to provide a strong foundation in research skills development. In addition to graduate-level coursework and participation in program research activities, the fellows focus on applying PDA/M research concepts in pharmacy practice settings. Fellows actively participate in research team and PDA/M Working Group meetings, enroll in the MPH program and complete activities and coursework as described below. Presentation of team project research at national meetings is an expectation of fellows.

The rubric for the formative DIDARP was developed from the NPA core competencies, and is utilized to assess graduate student research skill development annually. Students self-assess their progress and external assessments are conducted by primary research advisors. The ETSU-DIDARP program represents a model for mentoring that is frequent, nurturing, consistent and focused on academic products.

Congruent with the theme of mentoring, the team supports internal peer review for manuscripts and grant proposals. Internal peer review serves to increase competitiveness of proposals and papers that are reviewed. Planning for the process in terms of time forces the principal investigator to prepare early and give them time to make corrections when pointed out by peer reviewers. Sophisticated research universities regularly peer review their products before submission and this infrastructure is crucial to develop at our university.

Infrastructure Development for Interprofessional PDA/M Research

As a historically strong health sciences teaching university with deep roots in clinical care, community partnerships and rural health, the infrastructure for research activities has been a second priority, until recently. In order to compete at the national level for research funding, several issues can be addressed alongside this interprofessional PDA/M prevention effort.

It is important that the university develops research infrastructure to support long-term strategic initiatives to improve health. The formation of interprofessional research centers is an essential step in the framework of research development. Prior to the establishment of the Center for Prescription Drug Abuse Prevention and Treatment the university had only one research center

for health. ETSU recently celebrated its 100th anniversary and shortly thereafter began the visioning process for 2037 through establishment of the Committee for 125 (www.etsu.edu/125). One of the subcommittees developed a plan for research growth as one of the greatest opportunities and necessities for the university in the coming quarter century.

In 2013, the ETSU president formed an ad-hoc committee to develop a strategic plan to grow research at the university. The recommendations are consistent with the visioning for 125. Interprofessional research is a cornerstone of the plan.

Discussion

The overarching goal of the newly established Center for Prescription Drug Abuse Prevention and Treatment is to strengthen research infrastructure and foster research career development on multiple levels. Accomplishment of these goals will establish multiple lines of PDA/M-related research. The results of this work could transform the career paths of many of our junior faculty and undergraduate, professional, and graduate students. Moreover, with high quality, nationally competitive research being conducted at ETSU that is focused on PDA/M, the team has the potential to bend the curve on the problem, beginning in the region and impacting the work in the state and nation.

We feel strongly that ETSU should be one of the major hubs for prescription drug abuse research in Appalachia. We aim for our work to attract additional researchers to ETSU and therefore positively impact the number and quality of researchers focused on the topic. Our local substance abuse prevention coalitions are strong partners of the team and we anticipate increased collaboration with state and regional substance abuse coalitions, Tennessee's Controlled Substance Monitoring Database Advisory Council, Tennessee Department of Health, and other regional stakeholders.

Conclusion

The AHSC at East Tennessee State University has a highly trained, interprofessional faculty that serves the region and is committed to combating prescription drug abuse and misuse in Appalachia. PDA/M is a national problem and one for which control measures are urgently needed. The collective impact that has been achieved by bringing together scholars and community leaders in a collaborative and supportive institutional environment can be replicated. Center staff are currently engaged in establishing a formal partnership with Mountain States Health Alliance, a regional health care system, to create a comprehensive, not for profit, opioid treatment program that will ultimately help fund Center prevention initiatives across the region. This clinical component of the newly established Center will also allow for ongoing research to support continued infrastructure development and attract extramural funding. Looking forward, the team plans to convene interested universities across central Appalachia to begin a conversation about how we might work together on a systematic and concerted plan to address this problem at each point along the continuum of disease.

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