

## East Tennessee State University Digital Commons @ East Tennessee State University

---

ETSU Faculty Works

Faculty Works

---

1-1-2015

# Integration of Rural Community Pharmacies into a Rural Family Medicine Practice-Based Research Network: A Descriptive Analysis

Nicholas E. Hagemeyer

East Tennessee State University, [hagemeyer@etsu.edu](mailto:hagemeyer@etsu.edu)

Sarah Blevins


Kyle Hagen

Emily Sorah

Richa Shah

*See next page for additional authors*

Follow this and additional works at: <https://dc.etsu.edu/etsu-works>

 Part of the [Health Services Research Commons](#), and the [Pharmacy and Pharmaceutical Sciences Commons](#)

---

### Citation Information

Hagemeyer, Nicholas E.; Blevins, Sarah; Hagen, Kyle; Sorah, Emily; Shah, Richa; and Ferris, Kelly. 2015. Integration of Rural Community Pharmacies into a Rural Family Medicine Practice-Based Research Network: A Descriptive Analysis. *Innovations in Pharmacy*. Vol.6(3). <https://doi.org/10.24926/iip.v6i3.398>

This Article is brought to you for free and open access by the Faculty Works at Digital Commons @ East Tennessee State University. It has been accepted for inclusion in ETSU Faculty Works by an authorized administrator of Digital Commons @ East Tennessee State University. For more information, please contact [digilib@etsu.edu](mailto:digilib@etsu.edu).

---

# Integration of Rural Community Pharmacies into a Rural Family Medicine Practice-Based Research Network: A Descriptive Analysis

## **Copyright Statement**

© The Authors. This document was originally published in *Innovations in Pharmacy*.

## **Creator(s)**

Nicholas E. Hagemeyer, Sarah Blevins, Kyle Hagen, Emily Sorah, Richa Shah, and Kelly Ferris

2015

# Integration of Rural Community Pharmacies into a Rural Family Medicine Practice-Based Research Network: A Descriptive Analysis

Nicholas E. Hagemeyer

Sarah R. Blevins

Kyle S. Hagen

Emily L. Sorah

Richa S. Shah

*See next page for additional authors*

Follow this and additional works at: <http://pubs.lib.umn.edu/innovations>

## Recommended Citation

Hagemeyer NE, Blevins SR, Hagen KS, et al. Integration of Rural Community Pharmacies into a Rural Family Medicine Practice-Based Research Network: A Descriptive Analysis. *Inov Pharm*. 2015;6(3): Article 216. <http://pubs.lib.umn.edu/innovations/vol6/iss3/12>

*INNOVATIONS in pharmacy* is published by the University of Minnesota Libraries Publishing.

---

# Integration of Rural Community Pharmacies into a Rural Family Medicine Practice-Based Research Network: A Descriptive Analysis

## **Authors**

Nicholas E. Hagemeyer, Sarah R. Blevins, Kyle S. Hagen, Emily L. Sorah, Richa S. Shah, and Kelly M. Ferris

## Integration of Rural Community Pharmacies into a Rural Family Medicine Practice-Based Research Network: A Descriptive Analysis

Nicholas E Hagemeyer, PharmD, PhD<sup>1</sup>; Sarah R. Blevins, MS, PharmD Candidate<sup>2</sup>; Kyle S. Hagen, PharmD<sup>2\*</sup>; Emily L. Sorah, PharmD<sup>2\*</sup>; Richa S. Shah, PharmD Candidate<sup>2</sup>; and Kelly M. Ferris, PharmD Candidate<sup>2</sup>

<sup>1</sup>: Department of Pharmacy Practice, East Tennessee State University, Johnson City, TN

<sup>2</sup>: Gatton College of Pharmacy, East Tennessee State University, Johnson City, TN

\*Drs. Hagen and Sorah were enrolled in the pharmacy professional program during conduction of this study.

**Keywords:** Practice-Based Research Network; Community Pharmacy; Interprofessional; Rural

**Funding Source:** N/A: This project was not supported by any external funding source.

**Acknowledgments:** The authors express appreciation to Dr. Robert Pack for his critical review of the manuscript.

### Abstract

*Purpose:* Practice-based research networks (PBRN) seek to shorten the gap between research and application in primary patient care settings. Inclusion of community pharmacies in primary care PBRNs is relatively unexplored. Such a PBRN model could improve care coordination and community-based research, especially in rural and underserved areas. The objectives of this study were to: 1) evaluate rural Appalachian community pharmacy key informants' perceptions of PBRNs and practice-based research; 2) explore key informants' perceptions of perceived applicability of practice-based research domains; and 3) explore pharmacy key informant interest in PBRN participation.

*Methods:* The sample consisted of community pharmacies within city limits of all Appalachian Research Network (AppNET) PBRN communities in South Central Appalachia. A descriptive, cross-sectional, questionnaire-based study was conducted from November 2013 to February 2014. Bivariate and multivariate analyses were conducted to examine associations between key informant and practice characteristics, and PBRN interest and perceptions.

*Findings:* A 47.8% response rate was obtained. Most key informants (88%) were very or somewhat interested in participating in AppNET. Enrichment of patient care (82.8%), improved relationships with providers in the community (75.9%), and professional development opportunities (69.0%) were perceived by more than two-thirds of respondents to be very beneficial outcomes of PBRN participation. Respondents ranked time constraints (63%) and workflow disruptions (20%) as the biggest barriers to PBRN participation.

*Conclusion:* Key informants in rural Appalachian community pharmacies indicated interest in PBRN participation. Integration of community pharmacies into existing rural PBRNs could advance community level care coordination and promote improved health outcomes in rural and underserved areas.

### Introduction

The United States Department of Health and Human Services' Agency for Healthcare Research and Quality (AHRQ) defines a practice-based research network (PBRN) as a "group of ambulatory practices devoted principally to the primary care of patients, and affiliated in their mission to investigate questions related to community-based practice and to

improve the quality of primary care".<sup>1</sup> PBRNs seek to shorten the gap between research and application and foster adoption of evidence-based findings in primary patient care settings.<sup>2</sup> Importantly, evidence suggests when research is integrated within primary care practices, the practice constituents are more likely to incorporate research findings in to their day-to-day activities.<sup>3</sup> PBRN participation engages health care professionals in practice-specific quality improvement efforts and is associated with multiple positive real and perceived practice outcomes, including, but not limited to, increased job satisfaction,<sup>4</sup> practice improvements,<sup>5,6</sup> and decreased intellectual isolation.<sup>7</sup>

**Corresponding Author:** Nicholas E Hagemeyer, PharmD, PhD  
ETSU Gatton College of Pharmacy  
Department of Pharmacy Practice  
Box 70657; Johnson City, TN 37614  
Office: 423-439-6239; Fax: 423-439-6784  
Email: [hagemeyer@etsu.edu](mailto:hagemeyer@etsu.edu)

The Appalachian Research Network (AppNET), a family medicine PBRN, was established in 2009 by the East Tennessee State University (ETSU) Department of Family Medicine. Funding for AppNET was first provided by the Health Resources and Services Administration (HRSA) through a mechanism designed to grow PBRN resources in underserved areas (Grant # D54HP20673). AppNET's mission is to conduct and support practice-based research to improve the quality of rural primary care delivered in the region, and work toward the goal of eliminating health disparities in South Central Appalachia. AppNET research efforts to date have focused in the areas of electronic health record clinic-based quality improvement and prescription drug abuse-related perceptions of clinicians; two topics that are applicable to and could be of interest to community pharmacists.

AppNET is comprised of 17 family medicine clinics in 16 rural Northeast Tennessee, Southwest Virginia, and Western North Carolina communities. Several AppNET counties are designated as distressed or at risk by the Appalachian Regional Commission (ARC).<sup>8</sup> This area of Appalachia has a higher rate of chronic disease and a higher proportion of individuals with disabilities compared to the nation as a whole and exceeds the national death rate for heart disease, cancer, stroke, diabetes, and chronic obstructive pulmonary disease.<sup>9</sup> Moreover, the area is comprised of many rural counties with designated medically underserved areas/populations and primary care health professions shortage areas.<sup>8,10</sup>

Pharmacists are accessible health care providers in many rural communities and are a logical cohort to engage in rural interprofessional research. The role of community pharmacies in the delivery of health care in rural settings is well established.<sup>11-15</sup> Rural pharmacists not only provide prescription dispensing services but also provide many non-dispensing services such as immunizations, disease state management, medication therapy management (MTM), and services to local community health care organizations (e.g., long-term care facilities).<sup>16,17</sup> Recent methodologically rigorous research highlights positive patient outcomes achieved through community pharmacist patient care activities.<sup>18-20</sup>

An interprofessional team of health care providers and researchers within ETSU's Academic Health Sciences Center seeks to expand AppNET into an interprofessional, rural PBRN that supports AppNET's mission, facilitates rural, interprofessional practice-based research, and improves the

care of patients in and around these communities. Whereas pharmacists can and do participate in some types of interprofessional and interdisciplinary PBRNs (e.g., mixed PBRNs, family medicine PBRNs), a review of AHRQ PBRN descriptions reveals minimal incorporation of community pharmacists or pharmacies into PBRN activities. Studies that evaluate community pharmacists' perceptions of PBRNs or similar research networks have established wide variation in interest. Carr and colleagues<sup>21</sup> noted that over 83% of independent community pharmacists surveyed in Kentucky were interested or very interested in PBRN participation. Seel et al.<sup>22</sup> found that 49.1% of surveyed community pharmacists in Indiana were somewhat or very interested in PBRN participation. A 2011 study noted about 60% of community pharmacists in the Montreal, Quebec geographic area indicated interest in PBRN participation.<sup>23</sup> Barriers to PBRN participation commonly mentioned by pharmacists in these studies included time constraints, lack of research experience, and a lack of funding to conduct research.<sup>21,22,24</sup>

The objectives of this study were to: 1) evaluate rural Appalachian community pharmacy key informants' perceptions of PBRNs and practice-based research; 2) explore key informants' perceptions of perceived applicability of practice-based research domains; and 3) explore interest in AppNET participation among community pharmacy key informants.

To our knowledge this is the first study that examines perceptions of feasibility and need for integration of community pharmacies, essential service providers in rural settings, into an interprofessional, rural PBRN.

## Methods

### Sample

State-specific health professions licensing directories and web search tools were used to identify all pharmacies within the city limits of communities containing at least one AppNET-affiliated clinic. Two research assistants independently compiled community pharmacy information to ensure the sampling frame was complete. A total of 67 operational community pharmacies comprised the sampling frame. Researchers contacted each community pharmacy via telephone to describe the study and obtain contact information for one key informant at each pharmacy.

Key informants were recruited in three waves across a 3-month timeframe. The first and second paper-based survey mailings were separated by 14 days. Each mailing included a personalized cover letter, a brief description of PBRNs as

defined by AHRQ and a brief description of the AppNET PBRN. In addition to the survey instrument, the mailings also included a one-page frequently asked questions and answers document about PBRNs and a stamped return envelope. Approximately 90 days after the second paper-based mailing was sent, non-respondents received a follow-up phone call from the researchers to tailor the delivery mechanism (e.g., facsimile, email, mail) of the third request for study participation. A third request was made thereafter that was specific to contact preferences. The follow-up phone call and subsequent survey instrument delivery were delayed in order to obtain an IRB modification to the study protocol and thereafter minimize non-response that might be associated with end-of-year holidays and beginning-of-year pharmacy volume. No incentive was provided to key informants for study participation.

#### *Instrumentation*

Guided by previously published pharmacy-specific survey instruments,<sup>21,22</sup> a 3-page, 50-item survey instrument was developed to capture information across five domains: 1) key informant and pharmacy demographic characteristics (e.g., age, gender, years licensed, weekly prescription volume); 2) service provision status within the key informant's pharmacy (e.g., compounding, health screenings, immunizations, MTM); 3) perceptions of research conduction in a community pharmacy; 4) benefits of and barriers to participation in a PBRN; and 5) overall interest in PBRN participation. The survey instrument included items that elicited perceptions about interest in health information technology (HIT) and prescription drug abuse research; two topics of interest to PBRN researchers and clinicians. Five community pharmacists pilot tested survey instrument items for clarity and relevance. Minor wording changes and addition of research domains resulted from pilot testing. Key informants responded to survey items using constructed response, categorical, and 5-point Likert response scales. The survey instrument is provided in Appendix 1.

#### *Statistical Analysis*

All data were summarized in Microsoft Excel and imported into IBM SPSS version 20 for statistical analysis. An *a priori* level of significance was set at  $\alpha=0.05$ . Descriptive statistics were examined for all items. Fisher's exact test was used to examine relationships between dichotomous key informant perceptions and practice setting type. Mann-Whitney and Kruskal-Wallis tests were employed to examine differences in perceptions across gender and practice setting type, respectively. Spearman correlations were used to examine relationships between perceived interest in PBRN

participation and continuous demographic variables (age, number of prescriptions filled per week, number of full-time equivalent pharmacists and pharmacy technicians employed). Prior to instrument administration, IRB approval was granted by East Tennessee State University.

#### **Results**

Table 1 presents the characteristics of key informants and sample pharmacies. Overall, 32 key informants returned the completed survey resulting in a 47.8% response rate. A majority (78%) of independent pharmacy key informants were pharmacy owners whereas all chain and discount/supermarket pharmacy key informants were pharmacists in charge. Respondents were mostly male (66%), had been licensed an average of 19.8 ( $\pm 14.7$ ) years, and were on average 44.8 ( $\pm 13.7$ ) years old. Independent pharmacies were overrepresented in the analysis (60% of key informants vs. 45% of all AppNET pharmacies). Respondents' pharmacies employed, on average, 2.2 full-time equivalent (FTE) pharmacists and filled an average of 1623.8 ( $\pm 800.2$ ) prescriptions per week. Almost all pharmacies provided MTM services (86.2%) and immunizations (80.0%) (Table 2). Over half of pharmacies provided compounding (66.7%), health screenings (53.3%), and disease state management (51.7%) services.

A majority of respondents were very (37.5%) or somewhat (50.0%) interested in participating in AppNET. While interest did not vary significantly across a majority of key informant and pharmacy characteristics, there was a moderate negative correlation between number of full time pharmacists employed in a pharmacy and PBRN interest ( $r=-0.53$ ;  $p=0.006$ ). Sixty-three percent and 20% of respondents ranked time constraints and workflow disruptions as the biggest barrier to PBRN participation, respectively (Figure 1). Differences in rankings were not statistically significantly different across key informant or pharmacy setting characteristics.

Most respondents agreed or strongly agreed that participating in a research network would positively impact quality of patient care (82.7%), improve patient perceptions of the care they receive (75.8%), and improve employee perceptions of their work (75.8%) (Table 3). However, most key informants either responded neutrally (48.3%) or disagreed (24.1%) with the statement that they have enough knowledge about PBRNs to determine if participation in one is a good idea. Statistically significant differences in perceptions of PBRN participation were not noted across key informant and practice setting characteristics.

When considering potential research topic applicability to their practice settings, over two-thirds of key informants indicated that medication therapy management (MTM) research (79.3%), medication adherence research (75.9%), reimbursement/third party research (72.4%), prescription drug abuse research (69.0%), and workflow related research (69.0%) were very applicable to their practices (Table 4). Independent pharmacy key informants indicated that health information technology research ( $p = 0.008$ ) and reimbursement/third party research ( $p = 0.028$ ) were more applicable to their settings as compared to key informants working in other pharmacy settings. No other differences in research applicability were noted across respondent or practice setting characteristics.

Enrichment of patient care (82.8%), improved relationships with providers in the community (75.9%), and professional development opportunities (69.0%) were perceived by more than two-thirds of respondents to be very beneficial outcomes of PBRN participation (Table 4). Independent pharmacy respondents perceived an enhanced relationship with the study institution to be a more beneficial outcome as compared to respondents in other practice settings ( $p = 0.041$ ). No other differences in perceived PBRN participation benefits were noted across respondent or practice setting characteristics.

### Discussion

To our knowledge, this is the first study to explore feasibility of PBRN participation in rural community pharmacies and integration of community pharmacies into an already established rural PBRN. Similar to the Carr et al. and Seel et al. studies, we found that most pharmacy key informants were somewhat or very interested in participating in a PBRN.<sup>21,22</sup> However, we also noted that nearly three-fourths of respondents indicated they lacked sufficient knowledge about PBRNs to make an informed decision whether or not their pharmacy's participation in a PBRN is a good idea. This finding perhaps highlights the gap between research and practice and the complexity inherent in evaluating opportunity costs/gains associated with patient care and business/practice decisions. Many respondents felt that PBRN participation would improve patient care and improve their professional relationships within the community. Considering obstacles faced by rural pharmacies, and independent pharmacies in particular, the dissonance in wanting to improve patient care and wanting to participate in the PBRN, but being cautious in decision-making is perhaps to be expected.<sup>13</sup> Respondents indicated time constraints and workflow interruptions were the biggest barriers to PBRN

participation. Whereas time commitment and workflow disruption could be considered project dependent, research is warranted to quantify the return on investment, or lack thereof, associated with PBRN participation, including intangible factors that are difficult to assess (e.g., patient care enrichment, pharmacy-prescriber relationships). Overall, increased information about PBRNs and the potential costs and benefits resulting from participation from the community pharmacy perspective are needed based on key informant responses.

Carr et al noted that over 95% of surveyed pharmacists perceived compensation to be necessary for PBRN participation.<sup>21</sup> Exploration of financial incentives necessary for participating in AppNET was not examined directly in our study, but nearly two-thirds of respondents indicated increased revenue as a very beneficial aspect of PBRN participation. Considering that a large percentage of respondents represented rural independent pharmacies, particular attention should be given to beneficial financial outcomes of PBRN participation, including potential revenue increases (e.g., revenues associated with implementation of study-supported services, increases in prescription volume associated with medication adherence projects) and financial incentives for participation.

More than 90% of key informants indicated all proposed research domains were somewhat or very applicable to their practices. Importantly, several of the domains included in the survey instrument were directly applicable to improving health outcomes in the region. For example, medication adherence research and improvement could positively impact multiple disease states, including cardiovascular disease, diabetes, chronic obstructive pulmonary disease, and other ambulatory care sensitive conditions that are prevalent in rural Appalachia and likely managed by primary care providers within AppNET communities.<sup>25</sup> Whereas formal integration of community pharmacies into AppNET has yet to be realized, focus group studies specific to interprofessional prescription drug abuse communication have successfully been conducted with AppNET prescribers and pharmacists.

Consistent with previous literature on health services provided by rural community pharmacies, pharmacies represented by key informants provided multiple services that have been shown to improve health care delivery within their communities. Conducting research on those services offered by a majority of community pharmacies (e.g., MTM, health screenings) could perhaps facilitate transition into



practice-based research with minimal impact on time constraints and workflow concerns. Likewise, research on services being considered by community pharmacies could also promote the utility of practice-based research, facilitate PBRN participation, and inform decision-making regarding service provision.

Whereas PBRNs have historically placed emphasis on research engagement, some PBRNs have integrated an additional “R” into the PBRN acronym by providing resources to participating practices. For example, the Oklahoma Physicians Resource/Research Network (OKPRN) mentions peer learning and shared resources in its mission statement.<sup>26</sup> As pharmacies are recruited to AppNET membership, the potential resources that PBRN staff, including practice enhancement assistants, could provide to members should also be considered. Research domains of interest to key informants, in particular, could guide resource development. Our interprofessional research specific to prescription drug abuse within AppNET communities supports the need for resource development and dissemination. To our knowledge, current pharmacy-specific PBRNs do not emphasize resource provision to their members.

Recruitment of community pharmacies into AppNET will create a unique, interprofessional PBRN. The rural, underserved environment in which study pharmacies are located, geographic distance between communities, and geographic distance of pharmacies from the research institution will create challenges in integrating community pharmacies into AppNET. Yet, AppNET expansion, and integration of community pharmacies in to primary care PBRNs generally, presents an opportunity to conduct multifaceted, interdisciplinary research to solve community-specific health problems and promote evidence-based interprofessional patient care. Rural and underserved communities could realize increased return on investment through resource sharing and interprofessional, community-based research collaboration associated with PBRN participation. Further research is warranted to develop PBRN enrollment mechanisms that minimize barriers to participation of community pharmacies in practice-based research.

### Limitations

There are several limitations to our study that deserve mention. First, after employing three recruitment waves, including one telephone call to community pharmacies, a response rate of 47.8% was obtained. It is hypothesized that non-responders would be more likely to be uninterested in

PBRN participation as compared to respondents. However, non-response bias analyses indicated no statistically significant differences in PBRN interest between key informants who responded to the first wave and those who responded to subsequent contact attempts. Overall, a larger percentage of independent pharmacy key informants participated in the study as compared to key informants in non-independently owned pharmacies (60% vs. 38%). However, no differences were noted in practice setting characteristics across early and late responders. Our small sample size also limits statistical power to detect a difference where differences in perceptions indeed exist. The extent to which the key informant who responded to the survey has the ability to make the decision to participate in AppNET is unknown. In particular, respondents who are employed in non-independently owned pharmacies may have limited influence on participation. Finally, the potential for social desirability bias should be considered as the respondents were aware the team administering the survey instrument was research-focused.

### Conclusion

A large majority of key informants in rural Appalachian community pharmacies indicated interest in participating in an established primary care PBRN. Respondents noted several positive perceptions of PBRN participation, including improved quality of patient care, and improved employee perceptions of their work. Multiple research domains were of interest, including projects currently being conducted with AppNET prescribers, and multiple perceived benefits of PBRN participation were noted. The interest in AppNET expressed by community pharmacists is an exciting first step towards integrating this cohort into the PBRN. Ultimately, the development of PBRNs that include and employ community pharmacies could positively advance community level care coordination and promote improved health outcomes in rural and underserved areas.

### References

1. Agency for Healthcare Research and Quality. Primary Care Practice-Based Research Networks: PBRN Registry. 2014; <http://pbrn.ahrq.gov/pbrn-registry>. Accessed October 24, 2014.
2. Mold JW, Peterson KA. Primary care practice-based research networks: working at the interface between research and quality improvement. *Annals of Family Medicine*. 2005;3(Suppl 1):S12-S20.

3. Yawn BP, Pace W, Dietrich A, et al. Practice benefit from participating in a practice-based research network study of postpartum depression: a national research network (NRN) report. *Journal of the American Board of Family Medicine*. 2010;23(455-464).
4. Armour C, Brillant M, Krass I. Pharmacists' Views on Involvement in Pharmacy Practice Research: Strategies for Facilitating Participation. *Pharmacy Practice*. 2007;5:59-66.
5. Rhyne R, Sussman AL, Fernald D, Weller N, Daniels E, Williams RL. Reports of persistent change in the clinical encounter following research participation: a report from the Primary Care Multiethnic Network (PRIME Net). *Journal of the American Board of Family Medicine*. 2011;24:496-502.
6. Fox CH, Swanson A, Kahn LS, Glaser K, Murray BM. Improving chronic kidney disease care in primary care practices: an upstate New York practice-based research network (UNYNET) study. *Journal of the American Board of Family Medicine*. 2008;21:522-530.
7. Sinclair-Lian N, Rhyne RL, Alexander SH, Williams RL. Practice-based research network membership is associated with retention of clinicians in underserved communities: a Research Involving Outpatient Settings Network (RIOS Net) study. *Journal of the American Board of Family Medicine*. 2008;21:353-355.
8. Appalachian Regional Commission. County Economic Status and Distressed Areas in Appalachia. 2014; [http://www.arc.gov/appalachian\\_region/CountyEconomicStatusandDistressedAreasinAppalachia.asp](http://www.arc.gov/appalachian_region/CountyEconomicStatusandDistressedAreasinAppalachia.asp). Accessed October 24, 2014.
9. Halverson JA, Ma L, Harner EJ. *An Analysis of Disparities in Health Status and Access to Health Care in the Appalachian Region*. Washington, DC;2004.
10. US Department of Health and Human Services. Shortage Designation: Health Professional Shortage Areas & Medically Underserved Areas/Populations. 2014; <http://www.hrsa.gov/shortage/>. Accessed November 14, 2014.
11. Klepser D, Lampman M, Radford A, Richardson I, Rutledge S. *Workforce issues among sole community pharmacies (Findings Brief)*. North Carolina Rural Health Research and Policy Analysis Center & RUPRI Center for Rural Health Policy Analysis;2009.
12. Radford A, Richardson I, Mason M, Rutledge S. *The key role of sole community pharmacists in their local health care delivery systems (Findings Brief)*. North Carolina Rural Health Research and Policy Analysis Center & RUPRI Center for Rural Health Policy Analysis;2009.
13. Todd K, Westfall K, Doucette B, Ullrich F, Mueller K. *Causes and consequences of rural pharmacy closures: A multi-case study (Policy Brief 2013-11)*. Iowa City, IA: RUPRI Center for Rural Health Policy Analysis;2013.
14. Weigel P, Ullrich F, Mueller K. *Demographic and economic characteristics associated with sole county pharmacy closures, 2006-2010 (Policy Brief 2013-15)*. Iowa City, IA: RUPRI Center for Rural Health Policy Analysis;2013.
15. Knapp KK, Paavola FG, Maine LL, Sorofman B, Politzer RM. Availability of primary care providers and pharmacists in the United States. *Journal of the American Pharmacists Association*. 1999;39:127-135.
16. Radford A, Slifkin R, King J, Lampman M, Richardson I, Rutledge S. The relationship between the financial status of sole community independent pharmacies and their broader involvement with other rural providers. *J. Rural Health*. 2011;27:176-183.
17. Gadkari AS, Mott DA, Kreling DH, Bonnarens JK. Pharmacy characteristics associated with the provision of drug therapy services in nonmetropolitan community pharmacies. *J. Rural Health*. 2009;25:290-295.
18. McAlister FA, Majumdar SR, Padwal RS, et al. Case management for blood pressure and lipid level control after minor stroke: PREVENTION randomized controlled trial. *CMAJ*. 2014;186(8):577-584.
19. Ho PM, Lambert-Kerzner A, Carey EP, et al. Multifaceted intervention to improve medication adherence and secondary prevention measures after acute coronary syndrome hospital discharge: a randomized clinical trial. *JAMA Intern Med*. 2014;174(2):186-193.
20. Tannenbaum C, Martin P, Tamblyn R, Benedetti A, Ahmed S. Reduction of inappropriate benzodiazepine prescriptions among older adults through direct patient education: the EMPOWER cluster randomized trial. *JAMA Intern Med*. 2014;174(6):890-898.

21. Carr MB, Divine H, Hanna C, Freeman PR, Blumenschein K. Independent community pharmacist interest in participating in community pharmacy research networks. *Journal of the American Pharmacists Association*. 2011;51(6):727-733.
22. Seel LV, Hultgren KE, Snyder ME. Establishing the Medication Safety Research Network of Indiana (Rx-SafeNet): Perspectives of community pharmacy employees. *Innovations in Pharmacy*. 2012;3(2):Article 79.
23. Hébert J, Laliberté MC, Berbiche D, Martin E, Lalonde L. The willingness of community pharmacists to participate in a practice-based research network. *Canadian Pharmacists Journal*. 2013;146(1):47-54.
24. Schommer JC. *Establishing pharmacist practice-based research networks: APhA Foundation White Paper*. Washington, DC;2010.
25. AHRQ Quality Indicators - Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions. Rockville, MD: Agency for Healthcare Research and Quality;2001.
26. Oklahoma Physicians Resource/Research Network. Oklahoma Physicians Resource/Research Network (OKPRN) 2014; <http://www.okprn.org/>. Accessed November 14, 2014.

**Table 1. Pharmacy key informant demographic and practice setting characteristics (N=32).<sup>a</sup>**

Variable	Numeric Value
Gender, No. (%)	
Female	11 (34.4)
Male	21 (65.6)
Setting, No. (%)	
Chain	10 (31.3)
Independent	18 (56.3)
Supermarket/discount store	4 (12.5)
Respondent position/title	
Owner	14 (43.8)
Pharmacist in charge	15 (46.9)
Staff pharmacist	1 (3.1)
Other	2 (6.3)
Age, Mean (SD)	44.8 (13.7)
Years licensed as pharmacist, Mean (SD)	19.8 (14.7)
Years affiliated with current pharmacy, Mean (SD)	16.7 (13.9)
Prescriptions filled per week, Mean (SD)	1623.8 (800.2)
Pharmacist full time equivalents in setting, Mean (SD)	2.2 (0.9)
Technician full time equivalents in setting, Mean (SD)	3.6 (1.8)
Pharmacy students precepted annually in setting, Mean (SD)	2.9 (5.1)

<sup>a</sup>: Totals do not always add to 32 due to missing data

**Table 2. Pharmacy patient care service characteristics (N = 30).<sup>a</sup>**

Service	Response, No. (%)		
	Provide	Do Not Provide	Considering Providing
Medication Therapy Management (MTM)	25 (86.2)	3 (10.3)	1 (3.4)
Immunizations	24 (80.0)	3 (10.0)	3 (10.0)
Compounding	20 (66.7)	9 (30.0)	1 (3.3)
Health Screenings	16 (53.3)	8 (26.7)	6 (20.0)
Disease State Management	15 (51.7)	10 (34.5)	4 (13.8)
Delivery	12 (40.0)	13 (43.3)	5 (16.7)
Tailored Medication Packaging	10 (33.3)	16 (53.3)	4 (13.3)
Durable Medical Equipment (DME)	9 (30.0)	18 (60.0)	3 (10.0)

<sup>a</sup>: Totals do not always add to 30 due to missing data

**Table 3. Pharmacists' perceptions of participating in a practice-based research network (PBRN) (N=29).**

Item	Responses, No. (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Research can be conducted in the community pharmacy setting	0 (0)	2 (7.1)	2 (7.1)	14 (50.0)	10 (35.7)
Participation in a research network could positively impact the quality of care my patients receive	0 (0)	1 (3.4)	4 (13.8)	17 (58.6)	7 (24.1)
Participation in a research network could improve my patients' perceptions of the care they receive	0 (0)	0 (0)	7 (24.1)	13 (44.8)	9 (31.0)
Participation in a research network could positively impact my employees' perceptions of their work	0 (0)	1 (3.4)	6 (20.7)	13 (44.8)	9 (31.0)
Participation in a research network could inform the business decisions I make in my pharmacy	0 (0)	1 (3.4)	10 (34.5)	14 (48.3)	4 (13.8)
I know enough about PBRNs to make an informed decision whether or not my pharmacy's participation in a PBRN is a good idea	2 (6.9)	5 (17.2)	14 (48.3)	7 (24.1)	1 (3.4)

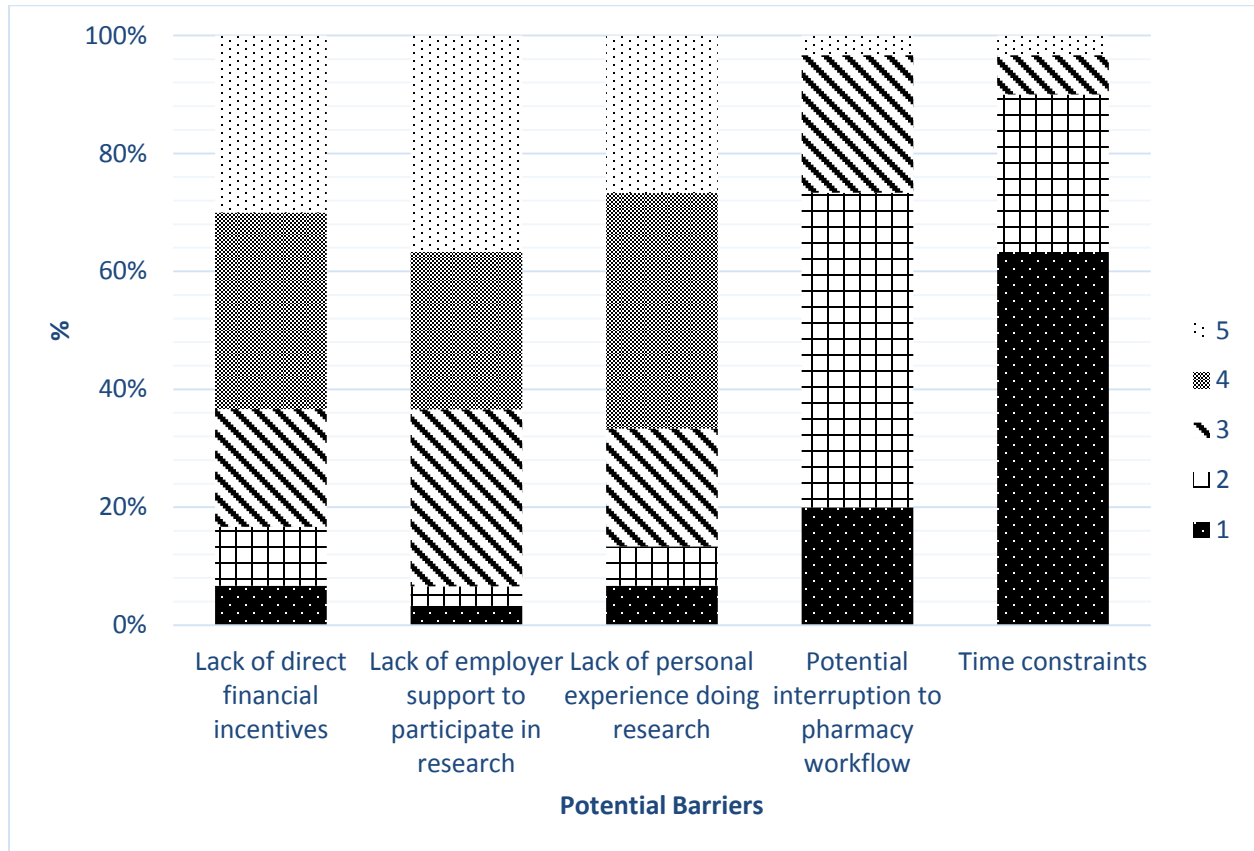
**Table 4. Perceived applicability of research domains and perceived benefit of potential PBRN participation outcomes (N=29).**

Research domain	Response, No. (%)		
	Not at all applicable	Somewhat applicable	Very applicable
Medication therapy management	1 (3.4)	5 (17.2)	23 (79.3)
Medication adherence	0 (0)	7 (24.1)	22 (75.9)
Reimbursement/third party	0 (0)	8 (27.6)	21 (72.4)
Prescription drug abuse	0 (0)	9 (31.0)	20 (69.0)
Workflow	0 (0)	9 (31.0)	20 (69.0)
Patient satisfaction	0 (0)	10 (34.5)	19 (65.5)
Medication safety	0 (0)	15 (51.7)	14 (48.3)
Value-added services	1 (3.4)	13 (44.8)	15 (46.9)
Health information technology	2 (6.9)	15 (51.7)	12 (41.4)

Perceived benefit domain	Response, No. (%)		
	Not at all beneficial	Somewhat beneficial	Very beneficial
Enrichment of patient care	0 (0)	5 (17.2)	24 (82.8)
Improved relationships with providers in the community	0 (0)	7 (24.1)	22 (75.9)
Professional development opportunities	1 (3.4)	8 (27.6)	20 (69.0)
Enhancement of the pharmacy “image”	0 (0)	10 (34.5)	19 (65.5)
Increased revenue	2 (6.9)	9 (31.0)	18 (62.1)
Access to pharmacy-specific data and reports	0 (0)	13 (44.8)	16 (55.2)
Enhanced relationship with ETSU <sup>a</sup>	1 (3.4)	14 (48.3)	14 (48.3)

<sup>a</sup>: ETSU = East Tennessee State University



**Figure 1.** Key informant rankings of barriers to practice-based research network participation (1 = biggest barrier; 5 = smallest barrier).

**SECTION 1: PHARMACIST INFORMATION**

For how many years have you been affiliated with this pharmacy?

\_\_\_\_\_ year(s)

For how many years have you been a licensed pharmacist?

\_\_\_\_\_ year(s)

What is your age?

\_\_\_\_\_ years

Which of the following best describes your position or title?

- Staff pharmacist
- Pharmacist-in-charge (PIC)
- Owner
- Other (please specify) \_\_\_\_\_

Please indicate your gender:

- Female
- Male

**SECTION 2: PHARMACY INFORMATION**

What is the name of your pharmacy?

In what town/city is your pharmacy located?

Please indicate whether your pharmacy currently provides, does not provide, or is considering providing each of the following patient care services:

- Compounding  
 Provide                       Do Not Provide                       Considering Providing
- Delivery  
 Provide                       Do Not Provide                       Considering Providing
- Disease State Management  
 Provide                       Do Not Provide                       Considering Providing
- Durable Medical Equipment (DME)  
 Provide                       Do Not Provide                       Considering Providing
- Health Screenings  
 Provide                       Do Not Provide                       Considering Providing
- Immunizations  
 Provide                       Do Not Provide                       Considering Providing
- Medication Therapy Management (MTM)  
 Provide                       Do Not Provide                       Considering Providing
- Tailored Medication Packaging  
 Provide                       Do Not Provide                       Considering Providing

On average, how many prescriptions does your pharmacy fill per week?

\_\_\_\_\_ prescriptions per week

How many full-time equivalent (FTE) pharmacists does your pharmacy employ?

\_\_\_\_\_ FTEs for pharmacists

How many full-time equivalent (FTE) certified pharmacy technicians does your pharmacy employ?

\_\_\_\_\_ FTEs for certified technicians

On average, how many pharmacy students does your pharmacy precept annually?

\_\_\_\_\_ students

(Please continue to next page)



### SECTION 3: PERCEPTIONS OF COMMUNITY PHARMACY AND RESEARCH

On a scale of 1 (strongly disagree) to 5 (strongly agree), please indicate the extent to which you disagree/agree with each of the following statements.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Please circle one number for each item					
Research can be conducted in the community pharmacy setting	1	2	3	4	5
Participation in a research network could positively impact the quality of care my patients receive	1	2	3	4	5
Participation in a research network could improve my patients' perceptions of the care they receive	1	2	3	4	5
Participation in a research network could positively impact my employees' perceptions of their work	1	2	3	4	5
Participation in a research network could inform the business decisions I make in my pharmacy	1	2	3	4	5
I know enough about PBRNs to make an informed decision whether or not my pharmacy's participation in a PBRN is a good idea	1	2	3	4	5

### SECTION 4: PBRN PARTICIPATION

Listed below are 5 potential barriers to participation in a PBRN. Using each number only once, **please rank order the factors from 1 (biggest barrier) to 5 (smallest barrier)** as you perceive them in your practice setting.

- \_\_\_\_\_ Time constraints
- \_\_\_\_\_ Lack of direct financial incentives
- \_\_\_\_\_ Lack of personal experience doing research
- \_\_\_\_\_ Lack of employer support to participate in research
- \_\_\_\_\_ Potential interruption of pharmacy workflow

**Please indicate the extent to which you think each of the following PBRN research topics is applicable to your community pharmacy practice setting.**

– Health information technology research	<input type="checkbox"/> Not at all applicable	<input type="checkbox"/> Somewhat applicable	<input type="checkbox"/> Very applicable
– Medication adherence research	<input type="checkbox"/> Not at all applicable	<input type="checkbox"/> Somewhat applicable	<input type="checkbox"/> Very applicable
– Medication safety research	<input type="checkbox"/> Not at all applicable	<input type="checkbox"/> Somewhat applicable	<input type="checkbox"/> Very applicable
– Medication therapy management (MTM) research	<input type="checkbox"/> Not at all applicable	<input type="checkbox"/> Somewhat applicable	<input type="checkbox"/> Very applicable
– Patient satisfaction research	<input type="checkbox"/> Not at all applicable	<input type="checkbox"/> Somewhat applicable	<input type="checkbox"/> Very applicable
– Prescription drug abuse research	<input type="checkbox"/> Not at all applicable	<input type="checkbox"/> Somewhat applicable	<input type="checkbox"/> Very applicable
– Reimbursement/third party-related research	<input type="checkbox"/> Not at all applicable	<input type="checkbox"/> Somewhat applicable	<input type="checkbox"/> Very applicable

(Please continue to next page)

**Please indicate the extent to which you think each of the following PBRN research topics is applicable to your community pharmacy practice setting.**

- Value-added services research  
 Not at all applicable       Somewhat applicable       Very applicable
- Workflow-related research  
 Not at all applicable       Somewhat applicable       Very applicable
- Other (please specify) \_\_\_\_\_  
 Not at all applicable       Somewhat applicable       Very applicable

**Please indicate the extent to which you perceive each of the following outcomes of PBRN participation to be beneficial to your pharmacy.**

- Access to pharmacy-specific data and reports  
 Not at all beneficial       Somewhat beneficial       Very beneficial
- Enhanced relationship with East Tennessee State University  
 Not at all beneficial       Somewhat beneficial       Very beneficial
- Enhancement of the pharmacy "image"  
 Not at all beneficial       Somewhat beneficial       Very beneficial
- Enrichment of patient care  
 Not at all beneficial       Somewhat beneficial       Very beneficial
- Improved relationships with providers in the community  
 Not at all beneficial       Somewhat beneficial       Very beneficial
- Increased revenue  
 Not at all beneficial       Somewhat beneficial       Very beneficial
- Professional development opportunities  
 Not at all beneficial       Somewhat beneficial       Very beneficial
- Other (please specify) \_\_\_\_\_  
 Not at all beneficial       Somewhat beneficial       Very beneficial

Based on the information provided, how would you describe your interest in participating in the AppNET PBRN with providers and other pharmacies in your area?

- I am very interested
- I am somewhat interested
- I am not interested

What additional information would you like to know about the AppNET PBRN?

---

---

---

If your pharmacy is interested in participating in the PBRN or has questions about participation, please provide the name and contact information for the primary contact person at your pharmacy to whom future communication should be directed.

Name: \_\_\_\_\_

Email: \_\_\_\_\_

Telephone number: \_\_\_\_\_

Preferred contact method:     Email     Telephone

**Thank you for your thoughts!**