

2012

Establishing the Medication Safety Research Network of Indiana (Rx-SafeNet): Perspectives of Community Pharmacy Employees

Lindsey V. Seel

Kyle E. Hultgren

Margie E. Snyder

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

Recommended Citation

Seel LV, Hultgren KE, Snyder ME. Establishing the Medication Safety Research Network of Indiana (Rx-SafeNet): Perspectives of Community Pharmacy Employees. *Inov Pharm*. 2012;3(2): Article 79. <http://pubs.lib.umn.edu/innovations/vol3/iss2/6>

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

Establishing the Medication Safety Research Network of Indiana (Rx-SafeNet): Perspectives of Community Pharmacy Employees

Lindsey V. Seel, B.A., Pharm.D. Candidate 2013¹; Kyle E. Hultgren, Pharm.D.^{1,2}; and Margie E. Snyder, Pharm.D., M.P.H.^{1,2}

¹ Purdue University College of Pharmacy, West Lafayette, IN

² Purdue University College of Pharmacy Center for Medication Safety Advancement, Indianapolis, IN

Financial Disclosure Statement: Dr. Snyder's effort was supported in part by KL2RR025760 (A. Shekhar, PI). The Center for Medication Safety Advancement and Rx-SafeNet were founded with funding from a Lilly Endowment Grant.

Conflict of Interest Disclosure Statement: The authors declare no conflicts of interests or financial interests in any product or service mentioned in this article, including grants, employments, gifts, stock, holdings, or honoraria.

Acknowledgments: The authors would like to thank all of the individuals that assisted with reviewing and pilot-testing the survey questions, along with Mark Sharp for technical assistance in creating the online survey. We would also like to thank Dr. Mick Murray for advice on statistical analyses, Drs. Karen Hudmon and Caitly Frail and Ms. Brenda Hudson for their critical reviews of earlier drafts of this paper, and Dr. Matthew Hoch for his assistance in preparing this manuscript.

Previous Presentations: Poster presented at the 2010 American College of Clinical Pharmacy Annual Meeting in Austin, TX.

Keywords: practice-based research networks, research, pharmacy practice, medication safety, community pharmacy

Abstract

The objective of this cross-sectional survey was to determine community pharmacy employee research project priorities and assess interest levels, barriers, and facilitators to joining a new community pharmacy practice-based research network (PBRN) and use this information in subsequent PBRN development. One hundred forty pharmacists and 40 support staff responded. The majority (72%) of respondents were somewhat interested or needed more information to determine their level of interest in joining a PBRN; 15% were very interested. While all research topics were regarded as important, dispensing errors were rated as the most important. Time constraints were considered the greatest barrier to participation. Greater knowledge of medication safety, enrichment of patient care, and improved patient and provider relationships were considered important reasons for joining a PBRN. Responses indicated favorable interest levels and project support from potential network members, though education and awareness campaigns are needed to enhance community pharmacy employee understanding of and involvement in research and PBRNs, specifically the Medication Safety Research Network of Indiana (Rx-SafeNet), a new network administered by the Purdue University College of Pharmacy. While the generalizability of survey results is limited, they were useful in determining policies and procedures of the new network. Surveying all employees involved in the future PBRN during the network development process is a unique approach to developing these types of networks in the U.S. Understanding support staff perspectives is important considering the critical role they play in project implementation and operations. Emerging PBRNs from any discipline may benefit from considering adding this step to their development.

Introduction

In pursuit of expanding medication safety research and practice models that enhance safety, the Purdue University College of Pharmacy launched the Center for Medication Safety Advancement (CMSA)¹ in March 2010. One specific area of focus for CMSA is the advancement of community pharmacy through the development of innovative practice models. To facilitate this, CMSA serves as the administrative unit for a new community pharmacy practice-based research network (PBRN), the Medication Safety Research Network of

Indiana (Rx-SafeNet).² Rx-SafeNet's mission is to "improve medication safety and advance community pharmacy practice in Indiana through the conduct and dissemination of collaborative, patient-centered, practice-based research."

To enhance the development of Rx-SafeNet, we examined network planning strategies from published literature³⁻⁷ and used this existing literature to develop a survey administered to future Rx-SafeNet participants (i.e., community pharmacy employees including pharmacists, technicians, students etc.).

The purpose of the survey was primarily to explore employee perceptions and experiences about research, network participation, and project topics, and use this information in subsequent network planning. It was also the hope of the study authors to help create network "ownership" among

Corresponding Author: Margie E. Snyder, Pharm.D., M.P.H.
W7555 Myers Building, Wishard Health Services
1001 W. 10th Street, Indianapolis, IN 46202
Tel: (317) 613-2315 x 338, Fax: (317) 613-2316
snyderme@purdue.edu

community pharmacy stakeholders in the state by inviting survey respondents to vote on the official name of the new PBRN. It was never the intention of survey results to truly characterize the opinions of all Indiana pharmacy employees, but instead, to provide insight and direction in the unique development of a statewide community pharmacy PBRN.

In designing the survey, we specifically considered the work of Bakken et al. and others³⁻⁵ in developing response options for perceived barriers and facilitators. Our approach to the timing of the survey—shortly before member recruitment—is similar to the approach used by Gibson et al. in starting a new physician PBRN in New York⁸ and to Carr et al. in considering interest in a community pharmacy network in Kentucky.⁹ However, in both of those cases only the clinician (i.e., physician or pharmacist) was surveyed. Like us, Seston et al. described the development of a community pharmacy PBRN and surveyed all pharmacy employees throughout its development.⁴ We believe this approach is desirable as all employees in a pharmacy may contribute to PBRN projects and the success of their implementation. Furthermore, understanding any differences in perspectives between pharmacists and other staff on PBRN issues may highlight opportunities to follow up specifically with one group or another to meet their needs. However, the network they describe is located in the U.K., where pharmacy regulations and practice norms may differ. To our knowledge, our developmental approach describes the first survey in U.S. PBRN literature to consider the perspectives of all types of employees of a network pharmacy and use these data to influence policies and procedures of the new PBRN. This paper will describe the methods and results of the survey, and show how such an approach can influence a network's development as well as be predictive of the needs and interests of future members. In this way, the following information can be seen as one, innovative, step in the larger establishment of Rx-SafeNet (see Snyder, et al. for additional details regarding the network's formation)¹⁰ which can be drawn upon to provide a unique developmental model for a variety of PBRNs.

Methods

All community pharmacists and staff aged 18 years or older working in Indiana during March-May 2010 were eligible for survey participation. Membership in Rx-SafeNet occurs at the pharmacy level. However, the decision to join and success of resulting projects may be influenced by all staff members. Therefore, we set out to capture opinions from any willing community pharmacy employee.

Survey Instrument Development

As described above, items were written to encompass issues previously identified in the literature as significant for the development of PBRNs³⁻⁵ with an emphasis on issues relevant to the formation of Rx-SafeNet in particular.

The first section of items consisted of closed-ended and partially closed-ended questions that obtained basic information about the respondent's position in the pharmacy and the pharmacy itself (e.g., pharmacy type as chain, independent, etc.). The second domain of items, primarily closed-ended questions, characterized respondents' previous training and experience pertaining to research and PBRNs. The third group asked respondents to rate the level of importance (on a scale from 1= not at all important to 10= very important) of medication safety research topics, along with reasons to potentially participate or not participate in the PBRN, and to indicate their current level of interest in the PBRN. This section also included open-ended items for respondents to add any additional topics or reasons they could identify for participating or not. Additionally, this section included items asking respondents to select the most interesting topic and most important potential reasons for either participating or not. Also in this section, one item invited participants to vote on the official name of the new PBRN. This approach was taken to foster ownership among Indiana community pharmacy employees, and subsequently, the inaugural network members. The final group of items assessed basic demographic information.

A draft was reviewed by the Purdue College of Pharmacy Ambulatory Care Research Committee. Furthermore, limited pilot testing was performed with colleagues (both a pharmacist and two technicians) in community pharmacy to assess questionnaire content. Finally, brief pilots of the online survey were performed to ensure functionality. The final web-based survey (Appendices A and B; only difference was minor differences in demographics requested from pharmacists versus staff) was administered using the Qualtrics™ software program.

Recruitment Strategies

All community pharmacies in Indiana (n= 1125) were sent an initial mailing, addressed to the pharmacist-in-charge as identified by the list obtained from the Indiana Professional Licensing Agency, consisting of a cover letter (which included a description of PBRNs and examples), a research participant information sheet, and five small cards with the survey URL printed on them. The cards were to be distributed to other pharmacy employees. Three follow-up mailings occurred at approximately 1-week intervals.

Additionally, information about the study (and survey URL) was sent to members of the Medication Safety Partnership of Indiana (MSPI), a group of approximately 20 Indiana pharmacy stakeholders interested in medication safety. MSPI members were asked to share the study information and URL with colleagues in community pharmacy in order to encourage study participation.

The study protocol was approved by the Purdue University Institutional Review Board. Participants received no compensation and indicated their eligibility and consent by accessing and completing the survey.

Data Analysis

Descriptive statistics were computed to summarize survey responses. For potential reasons for joining/not joining the PBRN, we also compared pharmacist ratings versus support staff, individuals with research experience versus without, differences by type, location, and prescription volume of pharmacy, and differences by level of current interest in the PBRN. For the ratings of potential research topics, we compared pharmacists versus support staff and differences by type and location of pharmacy, and by level of current interest in the PBRN. Finally, we compared respondent overall interest level in the PBRN by sex, age, pharmacists versus support staff, pharmacy location, type, and prescription volume, whether the individual has past research experience, and by whether the pharmacist has additional certifications or offers additional patient care services. Comparisons were made using nonparametric or parametric tests, as appropriate. Pertinent findings are presented below.

A p-value of < 0.05 was considered statistically significant for all omnibus analyses. When appropriate, follow-up pairwise comparisons were made, and a p-value of < 0.01 was considered statistically significant for post-hoc analyses.

Results

Sample

The online survey was accessed 187 times, and useable data were acquired from 180 respondents. One hundred forty pharmacists completed the survey (Table 1), along with 40 support staff (Table 2). The number of unique pharmacies represented by survey respondents is unknown.

Respondents represented 53 of the 92 Indiana counties (n=178 responses to this question). Survey responses were evenly distributed between community pharmacy types (i.e., chain, independent, etc.). Most pharmacist respondents were either pharmacy managers and/or owners, and the majority of non-pharmacist respondents were technicians. Among pharmacist respondents, few possessed advanced degrees or certifications with the exception of immunization

certification. The provision of patient care services was more common and primarily included medication therapy management (i.e., service in which a patient's medication regimen is reviewed by a pharmacist), immunizations, and services to long-term care facilities.

Anticipated Barriers to Participation in the PBRN

Rated on a scale from 1 to 10 (1= not at all important to 10= very important), time constraints (median rating= 8), lack of research experience (median rating= 6), and difficulty recruiting patients (median rating= 6) were the highest rated perceived barriers, overall; 59.1% chose "time constraints" as the most important reason to not participate. Comparing the importance of barriers between groups of respondents (Table 3) revealed that pharmacists considered time constraints a more important barrier than did support staff. Across PBRN interest levels, we found significant differences in ratings of time constraints, lack of research experience, community distrust of research, and staff turnover. Pair-wise comparisons, significant at $p < 0.01$, found that individuals very interested in the PBRN rated time constraints, lack of research experience, and staff turnover lower than did those who were not interested. Across pharmacy types, the only difference in reasons for not participating was perceived unwillingness of employer to participate ($p = 0.009$); pair-wise comparisons demonstrated that respondents from independent pharmacies rated this barrier lower than did respondents from chain pharmacies (median ratings of 4 vs 6.5, $p = 0.008$) and mass merchandiser/grocery pharmacies (median ratings 4 vs 7, $p = 0.002$). We found no differences in ratings of barriers by pharmacy location or prescription volume.

Anticipated Facilitators to Participation in the PBRN

Enrichment of patient care, improved relationships with patients/providers, and greater medication safety knowledge were the highest-rated potential reasons for participating (Table 3); overall, 40.1% of respondents indicated that "enrichment of patient care" was the most important reason for PBRN participation.

Support staff rated the potential for monetary compensation and greater medication safety knowledge higher than did pharmacists. In general, pair-wise comparisons found that the potential for improved job satisfaction, opportunities for professional development, networking opportunities, enrichment of patient care, and enhanced relationship with the College of Pharmacy were rated higher by individuals expressing a greater interest in the PBRN (p -values < 0.01). Furthermore, there were no differences in ratings of facilitators across pharmacy type, location, prescription

volume, or whether respondents reported experience with research in the past.

Examples of additional reasons to participate that were written in by respondents included addressing narcotics and controlled medication issues, enhancing compliance and understanding in patients, and “increasing business opportunities by filling unmet needs.”

Respondent Interest in PBRN Participation

More than one-third of respondents (n=64, 38.3%) indicated that they would need more information to decide how interested they were in PBRN participation; 57 respondents (34.1%) were somewhat interested, 25 (15%) were very interested, and 21 (12.6%) were not interested. Support staff were more likely than pharmacists to want additional information before deciding how interested they are in the network (59% of support staff wanted more information vs. 32% of pharmacists, p=0.017).

Potential PBRN Research Topics

Respondents' ratings of perceived importance for potential PBRN research topics (focused on issues related to medication safety) are shown in Table 4. All research topics provided were rated as important (i.e. a median rating of 8 or above) however, dispensing errors were rated as the most important area of study. The only rating difference among groups was for the rating of medication reconciliation by PBRN interest level (p= 0.045). Pair-wise comparisons indicated that respondents who were very interested in the PBRN rated the importance of medication reconciliation higher than did those not interested. The top three topics selected by respondents as being the most interesting projects to be involved with were dispensing errors (27.7%), health information technology (24.1%), and patient education/medication therapy management (20.5%).

Discussion

Most respondents were either somewhat interested in joining the PBRN or wanted more information, with pharmacists tending to be more interested than support staff in joining the network. An overall high level of interest was not unexpected and may indicate a degree of response bias as those at least somewhat interested in research and/or PBRNs were probably more likely to participate in the survey. Our findings highlighted an overall lack of research experience and exposure to PBRNs by respondents. In order to address the need to better inform our potential members about PBRNs, Rx-SafeNet leadership initially held two webinars along with four live information sessions in cities throughout Indiana after the completion of the survey. As part of these outreach sessions, “FAQs” were presented, using survey findings to assist in preparing responses.

Because Rx-SafeNet's membership is at the pharmacy level (as opposed to recruiting individual practitioners), it is important to educate and involve all pharmacy staff members in ongoing educational activities. To date, our information sessions have primarily reached pharmacists, but, considering the results of this survey, Rx-SafeNet plans to pursue educational/outreach venues specific to support staff as more pharmacies enter the network. This is especially important as we found that support staff were more hesitant to express interest in network participation without more information.

Limited past research experience of survey respondents points to a need for attention to the development of solid training programs. Sufficient training will help our membership receive the greatest benefit from participating in the network and aligns with recommendations from the literature.⁵ Rx-SafeNet recently completed data collection for its first research project which, in terms of exploring network procedures, is thought of as a pilot, with participation of a single pharmacy. The staff at the pharmacy involved received research training in the form of online Collaborative Institutional Training Initiative (CITI) modules (as required based on specific study activities), as well as on-site training by Rx-SafeNet leadership. Project site employees will continue to be trained using these methods, but future implementation of a standard research training program may be useful (and is under development) to complement these efforts, similar to the one developed by the American Academy of Family Physicians National Research Network.⁶ Respondents rated every proposed research topic as important, suggesting they value medication safety research. This indirectly shows support for the mission of Rx-SafeNet. The project interests of actual network members will partially be discerned through our approach to project selection; pharmacies are contacted with project ideas submitted to network leadership and only those ideas with sufficient interest from members are pursued. Although “dispensing errors” received the highest overall rating, it is not yet known to what extent this topic will be pursued as, to date, only one related project idea has been submitted. We may see greater emphasis on this topic as we have more project ideas submitted from member pharmacies, instead of students, faculty, and/or residents and outside investigators. (The originators of the ideas submitted to date.)

Having a clear understanding of what potential members of Rx-SafeNet consider to be the greatest participation facilitators and barriers provided a strong foundation for development of network policies and procedures that highlight and diminish those features respectively. As would be expected, individuals who were very interested in the

PBRN generally rated participation facilitators higher and barriers lower than those less interested. The highest rated reasons to participate included the potential for improved relationships with patients and other providers, enrichment of patient care, and greater knowledge of medication safety practices. The importance clinicians placed on engaging in research that enhances knowledge and improves care closely aligns with the results of similar surveys,^{3,8,11} and the discussion by Mold and Peterson regarding the integration of quality improvement and research efforts in PBRN efforts¹² and should be on the foremost thoughts of all PBRNs. The commitment of network members to improving patient care will aid in our ability to translate what is discovered from research into practice.

Time constraints (even if provided compensation) were shown to be one of the largest perceived barriers to participation. This highlights the competing demands for practitioners' time in community pharmacies and has been cited as a barrier to PBRN participation previously.^{3,11, 13-14} Therefore, Rx-SafeNet would be remiss not to alleviate the time pressures of conducting research by integrating it well into daily tasks. Every project is reviewed by a Project Review Team, currently comprised of College of Pharmacy faculty, so that protocols will be designed to accomplish this goal. Similar review panels are employed by other networks.^{15,16} In its first project, Rx-SafeNet employed additional creative measures to facilitate project implementation into the unique work environment of community pharmacy. The limited concern over staff turnover was somewhat surprising, and in contrast to other studies,⁴ but bodes well for the network if members have a stable workforce.

Limitations

The majority of respondents were pharmacy managers and owners. We had a low response overall, although we are unable to calculate a true response rate without knowledge of the denominator (i.e. the total number of employees exposed to the survey). However, the goal of this work was to gather opinions relevant to the formation of the new PBRN. Therefore, although interest can't be extrapolated to all Indiana community pharmacy employees, we feel responses were still useful in predicting the needs and desires of future members as they were probably more likely to respond. Additionally, limitations exist around using a web-based format for the survey as some pharmacies may only have limited internet access, thereby requiring study participants to access the survey elsewhere. This could have impacted our response.

Conclusion

Founders of the Medication Safety Research Network of Indiana administered a survey to community pharmacy employees prior to network launch to assess research interests and barriers/facilitators to joining a PBRN. This survey, as one step in a multi-faceted approach to network establishment, has served as one of the cornerstones that network leadership believe will aid in the longevity and productivity of the network. While there are limitations to the generalizability of our results, individuals developing community pharmacy PBRNs, and other networks that involve both clinicians and non-clinicians, may benefit from considering this survey approach early in network formation.

References

1. Purdue University College of Pharmacy. Center for Medication Safety Advancement. Available at: <http://www.pharmacy.purdue.edu/cmsa>. Accessed April 18, 2012.
2. Purdue University College of Pharmacy. Medication Safety Research Network of Indiana (Rx-SafeNet). Available at: <http://www.pharmacy.purdue.edu/rx-safenet>. Accessed April 18, 2012.
3. Bakken S, Lantigua RA, Busacca LV, et al. Barriers, enablers, and incentives for research participation: a report from the Ambulatory Care Research Network (ACRN). *J Am Board Fam Med*. 2009;22(4):436-45.
4. Seston E, Hassell K, Cantrill J, et al. Experiences of establishing and maintaining a community pharmacy research network. *Prim Health Care Res Dev*. 2003;4:245-55.
5. Lipowski, EE. Pharmacy practice-based research networks: why, what, who and how. *J Am Pharm Assoc*. 2008;48(2):142-52.
6. Graham DG, Spano MS, Stewart TV, et al. Strategies for planning and launching PBRN research studies: a project for the Academy of Family Physicians National Research Network (AAFP NRN). *J Am Board Fam Med*. 2007;20(2):220-8.
7. Kuo GM, Steinbauer JR, Spann SJ. Conducting medication safety research projects in a primary care physician practice-based research network. *J Am Pharm Assoc*. 2008; 48(2):163-70.
8. Gibson K, Szilagyi P, Swanger CM, et al. Physician perspectives on incentives to participate in practice-based research: a greater Rochester practice-based research network (GR-PBRN) study. *J Am Board Fam Med*. 2010;23(4):452-4.
9. Carr MB, Divine H, Hanna C, et al. Independent community pharmacist interest in participating in community pharmacy research networks. *J Am Pharm Assoc*. 2011;51:727-33.

10. Snyder ME, Frail CK, Seel LV, et al. Experience developing a community pharmacy practice-based research network. *Innov Pharm*. 2012;3(2): Article 78.
11. Saini B, Brillant M, Filipovska J, et al. Factors influencing Australian community pharmacists' willingness to participate in research projects- an exploratory study. *Int J Pharm Pract*. 2006;14:179-88.
12. 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:S12.
13. Schommer JC. Establishing pharmacist practice-based research networks: APhA Foundation white paper. Available at: http://www.pharmacist.com/AM/Template.cfm?Section=Professional_Advancement&Template=/CM/ContentDisplay.cfm&ContentID=23796. Accessed April 26, 2011.
14. Rosenbloom K, Taylor K, Harding G. Community pharmacists' attitudes towards research. *Int J Pharm Pract*. 2000;8:103-10.
15. Iowa Research Network. IRENE organizational chart. Available at: <http://www.uihealthcare.com/depts/med/familymedicine/research/irene/orgchart.pdf>. Accessed December 23, 2010.
16. Longe RL, Taylor AT, Wade WE, et al. Enhancing outcomes research: the experience of a community pharmacist research network. *Dis Manag Health Out*. 1999;6:261-8.

Table 1. Characteristics of Pharmacist Respondents*

Characteristic		Results
Male sex, n (%)		66 (51.6)
Age, mean (range)		44.9 (24-73)
Years as RPh, mean (range)		20.8 (0-49)
Pharmacy degree received, n (%)	B.S. PharmD B.S. and PharmD	94 (72.9) 33 (25.6) 2 (1.6)
Type of pharmacy where employed, n (%)	Independent retail/community Chain retail/community Mass merchant or grocery store retail/community Hospital/health-system outpatient pharmacy Other	41 (29.3) 38 (27.1) 41 (29.3) 12 (8.6) 8 (5.7)
Position within pharmacy, n (%)	Pharmacist manager and/or owner Full-time staff pharmacist Part-time staff pharmacist Floater/temporary staff pharmacist	118 (84.3) 18 (12.9) 4 (2.9) 0 (0)
Location of pharmacy where employed, n (%)	Urban/inner city (> 50,000 people) City (10,000-50,000 people) Town (< 10,000 people)	44 (31.4) 61 (43.6) 35 (25)
Approximate # of prescriptions filled per week, n (%)	< 1000 1000-2500 > 2500	66 (47.5) 64 (46) 9 (6.5)
Completed residency, n (%)	PGY-1 PGY-2 Both PGY-1 and PGY-2	2 (1.6) 0 (0) 0 (0)
Additional certifications obtained, n (%)	Board Certified Pharmacotherapy Specialist (BCPS) APhA Immunization Certificate Program Certified Diabetes Educator (CDE) APhA Lipids Management Certificate Program APhA Medication Therapy Management Certificate Program Certified Geriatrics Pharmacist (CGP) Other	0 (0) 49 (38.6) 4 (3.1) 6 (4.7) 3 (2.4) 2 (1.6) 11 (8.7)
Additional services offered at pharmacy, n (%)	Medication Therapy Management Immunizations Long-term Care consulting or prescriptions Disease State Management Other	43 (34.1) 56 (44.4) 17 (13.5) 10 (7.9) 8 (6.3)
Completion of formal research training program, n (%)	Research Fellowship M.S. with focus in research Doctorate with focus in research	0 (0) 1 (0.7) 2 (1.4)
Completion of working with human subjects certification program, n (%)	Yes No Doesn't know	3 (2.1) 134 (95.7) 3 (2.1)
Experience with research activities, n (%)	Serving as Principal Investigator/Project Leader Collecting data Analyzing data Writing up research results	7 (5) 33 (23.7) 20 (14.4) 18 (12.9)
Past experience with PBRNs, n (%)	Current member Not current member but member of PBRN in the past Never a member of a PBRN	0 (0) 2 (1.4) 138 (98.6)

*Total n= 140, some respondents did not answer every question.

Table 2. Characteristics of Support Staff Respondents*

Characteristic	Results	
Male sex, n (%)	8 (21.1)	
Age, mean (range)	37.4 (20-63)	
Highest education received, n (%)	High school diploma/GED Some college 2-Year college degree (Associates) 4-Year college degree (Bachelors) Other	9 (23.7) 15 (39.5) 4 (10.5) 4 (10.5) 6 (15.8)
Type of pharmacy where employed, n (%)	Independent retail/community Chain retail/community Mass merchant or grocery store retail/community Hospital/health-system outpatient pharmacy Other	13 (32.5) 17 (42.5) 5 (12.5) 0 (0) 5 (12.5)
Position within pharmacy, n (%)	Pharmacy technician Pharmacy clerk Student pharmacy intern Other (compounding technician)	33 (82.5) 2 (5) 4 (10) 1 (2.5)
Location of pharmacy where employed, n (%)	Town (< 10,000 people) City (10,000-50,000 people) Urban/inner City (> 50,000 people)	3 (7.5) 28 (70) 9 (22.5)
Completion of formal research training program, n (%)	Research fellowship M.S. with focus in research Doctorate with focus in research	0 (0) 0 (0) 0 (0)
Completion of working with human subjects certification program, n (%)	Yes No Doesn't know	1 (2.5) 38 (95) 1 (2.5)
Experience with research activities, n (%)	Serving as Principal Investigator/Project Leader Collecting data Analyzing data Writing up research results	1 (2.6) 5 (12.8) 5 (12.8) 6 (15.4)
Past experience with PBRNs, n (%)	Current member Not current member but member of PBRN in the past Never a member of a PBRN	0 (0) 0 (0) 40 (100)

*Total n= 40, some respondents did not answer every question.

Table 3. Respondent Ratings (Median, Interquartile Range) of Reasons to Participate or Not Participate, by Position in Pharmacy and Interest in PBRN

Potential Reasons to Participate, Median (Interquartile range) [†]	Position in Pharmacy			Level of Interest*				
	Pharmacist n= 140 [‡]	Support Staff n= 40 [‡]	p-value	V	SW	Not	NMI	p-value
Enhanced Job Satisfaction	8 (6-9)	7.5 (5.75-10)	0.876	9 (8-9)	8 (6-10)	5 (4-7.75)	7 (6-9)	0.001
Opportunities for professional development	6 (4-8)	6 (4.75-8)	0.838	9 (6-9.5)	6 (3-8)	5 (2-5)	6 (5-8)	< 0.001
Enhancement of the pharmacy's "image"	8 (6-9)	8 (6-10)	0.835	9 (7-10)	8 (6-9)	6 (4.5-9)	8 (7-10)	0.092
Monetary compensation	6 (4-7.75)	7 (5-9)	0.021	6 (5-8)	5 (3-7)	5 (3-7)	6 (5-8)	0.047
Opportunity to network with peers	7 (5-8)	6.5 (5-9)	0.873	8 (7-9)	7 (5-8)	5 (3-6.75)	7 (6-9)	< 0.001
Improved relationships with patients and other health care providers	9 (7-9)	9 (8-10)	0.200	9 (8-10)	9 (8-9)	7 (5.25-9)	9 (8-10)	0.036
Enrichment of patient care	9 (8-10)	9 (8-10)	0.612	10 (9-10)	9 (8-10)	8 (7-10)	9 (8-10)	0.032
Enhanced relationship with Purdue College of Pharmacy	7 (5-8.5)	6.5 (3.75-8)	0.569	9 (7-9)	7 (5-8)	5 (2-6)	6 (4-8)	< 0.001
Greater knowledge of medication safety practices	9 (7-10)	9.5 (7.75-10)	0.047	9 (8-10)	9 (7-10)	8 (6-9)	9 (7-10)	0.235
Opportunity for continuing education credit	8 (6-9)	8 (6-10)	0.639	8 (7-9)	7 (6-9)	6 (5-8.75)	8 (6-10)	0.092
Potential Reasons to Not Participate, Median (Interquartile range)								
Time constraints (even if provided with compensation)	8 (6-9.5)	7 (5-8)	<0.001	6 (3.5-8)	8 (5.25-9)	8 (7.5-10)	8 (7-9)	0.014
Lack of personal experience doing research	6 (4-8)	6 (3-9)	0.896	3.5 (2-6)	6 (4.75-8)	8.5 (6.25-10)	7 (4-9)	<0.001
Employer unwillingness to participate	5 (2-8)	5 (3-7.75)	0.781	3.5 (1-6)	5.5 (2-8)	7 (5-9)	5.5 (3-8)	0.062
Difficulty in recruiting patient participation	7 (5-8)	6 (4-7)	0.058	5 (3.5-7.5)	7 (4-8)	7 (5.25-8.75)	6 (5-8)	0.274
High percentage of patients that speak English as second language	2 (1-5)	4 (1-7)	0.095	1 (1-4)	2 (1-5)	2 (1-5)	3 (1-6)	0.176
Community distrust of research	3 (1-5)	3.5 (1-6)	0.537	1 (1-3)	3 (1.75-6)	3.5 (1-6.25)	3.5 (1-6)	0.009
Staff Turnover	2 (1-5)	3 (1-5)	0.670	1 (1-2)	3 (1-5)	3 (1-6.5)	3 (1-5)	0.009

*V= Very Interested; SW= Somewhat Interested; Not= Not Interested; NMI= Needs additional information to determine level of interest

[†]Rated on scale of 1= Not at all important to 10= Very important

Table 4. Respondent Ratings (Median, Interquartile Range) of the Importance of Selected Medication Safety Research Areas*

Research Topic, median (interquartile range)	Results [†]
Dispensing errors	10 (9-10)
Relationship between health information technology and medication safety	9 (8-10)
Medication reconciliation	9 (8-10)
Medical literacy and medication safety	9 (7.25-10)
Patient education/medication therapy management and adverse drug events	8 (7-10)
Economic impact of medication safety effort	8 (6-10)

*Total n= 180, some respondents did not answer every question

[†]Rated on scale of 1= Not at all important to 10= Very important

Appendix 1. Pharmacist Survey Questions**The first few questions will help us to learn a little about the pharmacy where you work.**

1. How would you describe the pharmacy where you work?
 - a. Independent Retail/Community Pharmacy
 - b. Chain Retail/Community Pharmacy (e.g., Walgreens, CVS, Rite Aid, etc)
 - c. Mass merchant or Grocery Store Pharmacy (e.g., Target, Wal-Mart, Costco, Marsh, Kroger, etc)
 - d. Outpatient Pharmacy owned or managed by Hospital/Health-System (e.g., Clarian Health Prescription Centers)
 - e. Other _____
2. What is your position in the Pharmacy?
 - a. Pharmacist
 - b. Not a pharmacist
3. Which of the following **best** describes your position in the pharmacy?
 - a. Staff Pharmacist (floater and/or temporary)
 - b. Staff Pharmacist (part-time)
 - c. Staff Pharmacist (full-time)
 - d. Pharmacist Manager and/or Owner
4. What is the location of your pharmacy?
 - a. Town (less than 10,000 people)
 - b. City (between 10,000 and 50,000)
 - c. Urban/Inner City (> 50,000 people)
5. What Indiana county is your pharmacy located in?
6. Approximately how many prescriptions are dispensed at your pharmacy **per week**?
 - a. < 1000
 - b. 1000-2500
 - c. >2500

The next group of questions will help us to learn more about your past experiences with research.

7. Have you completed any formal research training program? Please mark all that you have completed.
 - a. A Research Fellowship
 - b. A Master's Degree with a focus in research
 - c. A Doctoral Degree with a focus in research
 - d. I have not completed a formal research training program.
8. Have you completed a certification program that enables you to conduct research involving human subjects?
 - a. Yes
 - b. No
 - c. I don't know
9. Which of the following research activities do you have experience with? Please mark all that apply.
 - a. Serving as the project leader/principal investigator
 - b. Collecting data for a research project (includes administering surveys, reviewing patient records, etc.)
 - c. Analyzing research data
 - d. Writing up the results of a research project
 - e. I do not have experience with any of the above activities.
10. Are you currently a member of a practice-based research network (PBRN)?

- a. Yes, I am currently a member
 - i. What PBRN are you a member of? _____
- b. No, but I was a member of a PBRN in the past
 - i. What PBRN did you belong to? _____
- c. No, I have never been a member of a PBRN

The next group of questions will help us to know your opinions and ideas about the practice-based research network (PBRN) being developed here in Indiana.

11. Please indicate how important you feel each of the following medication safety topics are as potential issues for the PBRN to study. **1= Not at all important to 10= very important.**
 - a. The relationship between health information technology (e.g., e-prescribing, electronic health records, etc.) and medication safety
 - b. Patient medical literacy (e.g. the ability to read, comprehend and then apply medical information) as related to medication safety
 - c. Medication Reconciliation (i.e., assessing the agreement between medications prescribed and those being used by the patient.)
 - d. Minimizing dispensing errors
 - e. Patient education and Medication Therapy Management (MTM) as a mechanism for preventing, detecting and managing adverse drug events (ADEs)
 - f. The economic impact of medication safety efforts
12. Are there **any additional important medication safety topics** not included above?
 - a. Additional topics include: _____
 - b. I can think of no additional topics.
13. Please select the topic that would be the **most interesting to you as a research project** to get involved in.
 - a. The relationship between health information technology (e.g., e-prescribing, electronic health records, etc.) and medication safety
 - b. Patient medical literacy (i.e., the ability to read, comprehend and then apply medical information) as related to medication safety
 - c. Medication Reconciliation (i.e., assessing the agreement between medications prescribed and those being used by the patient.)
 - d. Minimizing dispensing errors
 - e. Patient education and Medication Therapy Management (MTM) as a mechanism for preventing, detecting and managing adverse drug events (ADEs)
 - f. The economic impact of medication safety efforts
 - g. Other _____
14. Please rate the importance of each of the following as reasons for participating in the new Indiana community pharmacy PBRN. **1= Not at all important to 10= very important.**
 - a. Enhanced job satisfaction
 - b. Opportunities for professional development (e.g. the chance to conduct and publish research)
 - c. Enhancement of the overall "image" of the pharmacy
 - d. Monetary compensation provided to the pharmacy for participating in research efforts
 - e. Opportunity to network with peers from other community pharmacies
 - f. Improved relationship with patients and other health care providers in your community
 - g. Enrichment of care provided to patients
 - h. Enhanced relationship with Purdue University School of Pharmacy and Pharmaceutical Sciences
 - i. Greater knowledge of medication safety practices
 - j. Opportunity for continuing education credit
 - k.
15. Are there **any additional important reasons** for participating that were not included above?

- a. Additional reasons include: _____
- b. I can think of no additional reasons.
16. Which of the following would you view as the **most important reason** for participating in the new Indiana community pharmacy PBRN?
- Enhanced job satisfaction
 - Opportunities for professional development (e.g. the chance to conduct and publish research)
 - Enhancement of the overall “image” of the pharmacy
 - Monetary compensation provided to the pharmacy for participating in research efforts
 - Opportunity to network with peers from other community pharmacies
 - Improved relationship with patients and other health care providers in your community
 - Enrichment of care provided to patients
 - Enhanced relationship with Purdue University School of Pharmacy and Pharmaceutical Sciences
 - Greater knowledge of medication safety practices
 - Opportunity for continuing education credit
 - Other _____
17. Please rate the importance of each of the following as reasons for **NOT** participating in the new Indiana community pharmacy PBRN. **1= Not at all important to 10= very important.**
- Time constraints (even if provided with compensation)
 - Lack of personal experience doing research
 - Employer unwillingness to participate
 - Difficulty in recruiting patient participation
 - High percentage of patients that speak English as a second language
 - Community distrust of research
 - Staff turnover
18. Are there any **additional important reasons for NOT participating** that were not included above?
- Additional reasons include: _____
 - I can think of no additional reasons.
19. Which of the following would you view as the **most important reason** for **NOT** participating in the new Indiana community pharmacy PBRN?
- Time constraints (even if provided with compensation)
 - Lack of personal experience doing research
 - Employer unwillingness to participate
 - Difficulty in recruiting patient participation
 - High percentage of patients that speak English as a second language
 - Community distrust of research
 - Staff turnover
 - Other _____
20. How would you describe your interest in participating in a state-wide community pharmacy PBRN?
- I am very interested in participating in the community pharmacy practice-based research network.
 - I am somewhat interested in participating in the community pharmacy practice-based research network.
 - I am not interested in participating in the community pharmacy practice-based research network.
 - I would need more information in order to decide how interested I am in participating in the community pharmacy practice-based research network.

Finally, the last few questions will gather some basic background information.

21. What is your sex?
- Male
 - Female
22. What is your age?
- _____
23. How many years have you been a registered pharmacist?
- _____
24. Which pharmacy degree did you receive?
- Bachelors Degree in pharmacy (B.S.)
 - Doctor of Pharmacy (Pharm.D)
 - Both a Bachelors Degree in Pharmacy and a Pharm.D
25. Have you completed a residency program? Please check all that you have completed.
- Post-graduate Year 1 (PGY-1) Residency
 - Post-graduate Year 2 (PGY-2) Residency
 - Both a PGY-1 and PGY-2 Residency
 - I have not completed a residency program.
26. What further certifications do you possess? Check all that apply.
- Pharmacotherapy specialist (BCPS)
 - Immunization delivery (APhA certificate program)
 - Diabetes Educator(CDE)
 - Lipids Management (APhA certificate program)
 - Medication Therapy Management (APhA certificate program)
 - Geriatrics Pharmacist (CGP)
 - Other _____
 - None
27. What additional services do you offer? Please check all that apply.
- Medication Therapy Management (by appointment, can be either for Medicare Part D or non-Medicare patients)
 - Immunizations
 - Consultant and/or prescription services for nursing homes or long-term care facilities
 - Disease state management (e.g. Diabetes or Anticoagulation Clinic)
 - Other _____
 - None

Appendix 2. Support Staff Survey Questions

The first few questions will help us to learn a little about the pharmacy where you work.

1. How would you describe the pharmacy where you work?
 - a. Independent Retail/Community Pharmacy
 - b. Chain Retail/Community Pharmacy (e.g., Walgreens, CVS, Rite Aid, etc)
 - c. Mass merchant or Grocery Store Pharmacy (e.g., Target, Wal-Mart, Costco, Marsh, Kroger, etc)
 - d. Outpatient Pharmacy owned or managed by Hospital/Health-System (e.g., Clarian Health Prescription Centers)
 - e. Other _____
2. What is your position in the Pharmacy?
 - a. Pharmacist
 - b. Not a pharmacist
3. Which of the following **best** describes your position in the pharmacy?
 - a. Pharmacy Technician
 - b. Pharmacy Clerk
 - c. Student Pharmacy Intern
 - d. Other _____
4. What is the location of your pharmacy?
 - a. Town (less than 10,000 people)
 - b. City (between 10,000 and 50,000)
 - c. Urban/Inner City (> 50,000 people)
5. What Indiana county is your pharmacy located in?

The next group of questions will help us to learn more about your past experiences with research.

6. Have you completed any formal research training program? Please mark all that you have completed.
 - a. A Research Fellowship
 - b. A Master's Degree with a focus in research
 - c. A Doctoral Degree with a focus in research
 - d. I have not completed a formal research training program.
7. Have you completed a certification program that enables you to conduct research involving human subjects?
 - a. Yes
 - b. No
 - c. I don't know
8. Which of the following research activities do you have experience with? Please mark all that apply.
 - a. Serving as the project leader/principal investigator
 - b. Collecting data for a research project (includes administering surveys, reviewing patient records, etc.)
 - c. Analyzing research data
 - d. Writing up the results of a research project
 - e. I do not have experience with any of the above activities.
9. Are you currently a member of a practice-based research network (PBRN)?
 - a. Yes, I am currently a member
 - i. What PBRN are you a member of? _____
 - b. No, but I was a member of a PBRN in the past

- i. What PBRN did you belong to? _____
- c. No, I have never been a member of a PBRN

The next group of questions will help us to know your opinions and ideas about the practice-based research network (PBRN) being developed here in Indiana.

10. Please indicate how important you feel each of the following medication safety topics are as potential issues for the PBRN to study. **1= Not at all important to 10= very important.**
- a. The relationship between health information technology (e.g., e-prescribing, electronic health records, etc.) and medication safety
 - b. Patient medical literacy (i.e., the ability to read, comprehend and then apply medical information) as related to medication safety
 - c. Medication Reconciliation (i.e., assessing the agreement between medications prescribed and those being used by the patient.)
 - d. Minimizing dispensing errors
 - e. Patient education and Medication Therapy Management (MTM) as a mechanism for preventing, detecting and managing adverse drug events (ADEs)
 - f. The economic impact of medication safety efforts
11. Are there **any additional important medication safety topics** not included above?
- a. Additional topics include: _____
 - b. I can think of no additional topics.
12. Please select the topic that would be the **most interesting to you as a research project** to get involved in.
- a. The relationship between health information technology (e.g., e-prescribing, electronic health records, etc.) and medication safety
 - b. Patient medical literacy (e.g. the ability to read, comprehend and then apply medical information) as related to medication safety
 - c. Medication Reconciliation (i.e., assessing the agreement between medications prescribed and those being used by the patient.)
 - d. Minimizing dispensing errors
 - e. Patient education and Medication Therapy Management (MTM) as a mechanism for preventing, detecting and managing adverse drug events (ADEs)
 - f. The economic impact of medication safety efforts
 - g. Other _____
13. Please rate the importance of each of the following as reasons for participating in the new Indiana community pharmacy PBRN. **1= Not at all important to 10= very important.**
- a. Enhanced job satisfaction
 - b. Opportunities for professional development (e.g. the chance to conduct and publish research)
 - c. Enhancement of the overall "image" of the pharmacy
 - d. Monetary compensation provided to the pharmacy for participating in research efforts
 - e. Opportunity to network with peers from other community pharmacies
 - f. Improved relationship with patients and other health care providers in your community
 - g. Enrichment of care provided to patients
 - h. Enhanced relationship with Purdue University School of Pharmacy and Pharmaceutical Sciences
 - i. Greater knowledge of medication safety practices
 - j. Opportunity for continuing education credit
14. Are there **any additional important reasons** for participating that were not included above (question 13)?
- a. _____
 - b. I can think of no additional reasons.

15. Which of the following would you view as the **most important reason** for participating in the new Indiana community pharmacy PBRN?
- Enhanced job satisfaction
 - Opportunities for professional development (e.g. the chance to conduct and publish research)
 - Enhancement of the overall “image” of the pharmacy
 - Monetary compensation provided to the pharmacy for participating in research efforts
 - Opportunity to network with peers from other community pharmacies
 - Improved relationship with patients and other health care providers in your community
 - Enrichment of care provided to patients
 - Enhanced relationship with Purdue University School of Pharmacy and Pharmaceutical Sciences
 - Greater knowledge of medication safety practices
 - Opportunity for continuing education credit
 - Other _____
16. Please rate the importance of each of the following as reasons for NOT participating in the new Indiana community pharmacy PBRN. **1= Not at all important to 10= very important.**
- Time constraints (even if provided with compensation)
 - Lack of personal experience doing research
 - Employer unwillingness to participate
 - Difficulty in recruiting patient participation
 - High percentage of patients that speak English as a second language
 - Community distrust of research
 - Staff turnover
17. Are there any **additional important reasons for NOT participating** that were not included above (question 15)?
- _____
 - I can think of no additional reasons.
18. Which of the following would you view as the **most important reason** for **NOT** participating in the new Indiana community pharmacy PBRN?
- Time constraints (even if provided with compensation)
 - Lack of personal experience doing research
 - Employer unwillingness to participate
 - Difficulty in recruiting patient participation
 - High percentage of patients that speak English as a second language
 - Community distrust of research
 - Staff turnover
 - Other _____
19. How would you describe your interest in participating in a state-wide community pharmacy PBRN?
- I am very interested in participating in the community pharmacy practice-based research network.
 - I am somewhat interested in participating in the community pharmacy practice-based research network.
 - I am not interested in participating in the community pharmacy practice-based research network.
 - I would need more information in order to decide how interested I am in participating in the community pharmacy practice-based research network.

Finally, the last few questions will gather some basic background information.

20. What is your sex?
- Male
 - Female

21. What is your age?
- a. _____
22. What is the greatest level of education you have received?
- a. High School Diploma/GED
 - b. Some college
 - c. 2 year college degree (Associates)
 - d. 4 year college degree (BA, BS)
 - e. Other _____