

Characterization of Population Health Management Activities and Barriers of Wisconsin Pharmacists

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The improvement of health data technology has led to the creation and use of datasets within health systems. These datasets allow health care providers to proactively target evidence-based interventions within their patient populations, a method known as population health management (PHM).¹ As the responsibilities of pharmacists grow in the clinical management of disease states, the use of PHM may help expand pharmacist scopes of care in an efficient and impactful manner.^{2,3}

Examples of PHM activities that pharmacists perform vary based on practice setting. Community-based pharmacists may perform adherence monitoring, deprescribing initiatives, or screening of cardiovascular risk and statin appropriateness. For example, patients over age 70 on aspirin for primary prevention could be flagged for a risk and benefit discussion with the community pharmacist. Inpatient pharmacists may perform antimicrobial stewardship, where a pharmacist has a list of patients who have been prescribed broad-spectrum antibiotics when susceptibility tests indicate the ability to narrow the spectrum. Finally, clinic-based pharmacists may focus their efforts on medication management for patients with poorly controlled chronic diseases—for example, identifying patients with type 2 diabetes and heart failure with reduced ejection fraction who are not prescribed a sodium-glucose cotransporter 2 inhibitor. Leveraging PHM strategies may allow for identification of the highest-need patients who may need additional attention and help alleviate some of the burden from primary care providers.⁴

Emphasizing the importance of pharmacist-led PHM services, the 2021 American Society of Health System Pharmacist Foundation Pharmacy Forecast

Abstract

As the clinical responsibilities of pharmacists grow, the use of population health management (PHM) activities may enhance the efficient and impactful provision of patient care. Characterization of current pharmacy practice trends regarding PHM may identify pharmacist roles, explore perceived barriers, and guide future expectations. The primary objective of this study is to characterize the frequency in which Wisconsin pharmacists perform PHM. Secondary objectives include identifying the percent of pharmacists incorporating pharmacy learners in PHM and identifying barriers for incorporation of PHM. This mixed-methods exploratory study used an investigator-developed survey. All active Wisconsin pharmacists within Pharmacy Practice Enhancement and Action Research Link (PearlRx) were provided the survey to investigate the frequency, type, and incorporation of PHM activities into daily practice, barriers, as well as inclusion of pharmacy learners. Survey participants had the option to partake in a follow-up 30-minute semi-structured interview. Fifty-four pharmacists voluntarily completed the survey, of which 40 (75%) perform PHM activities using, on average, 10% of their allotted practice time and 27 (50%) incorporate learners. Identified barriers include lack of time, the need for stakeholder support from outside the pharmacy profession, and lack of awareness. Ideas to overcome barriers included increasing collaborative efforts on interdisciplinary teams, development of practice resources, and establishing the value of PHM activities return on investment for stakeholders. Training of current and future pharmacists on the basic processes of PHM and health information technology resources is needed. Wisconsin pharmacists are in an early adoption phase of incorporating PHM into practice.

recommends that systems “define the roles of pharmacist in ambulatory and population health management.”⁵ Moreover, pharmacists who adopt PHM principles may be well positioned to address the Quintuple Aim, which modified the Institute for Healthcare Improvement’s Triple Aim.^{1,6-8} The Quintuple Aim involves improving patient access to care and quality of care, while potentially reducing per capita health care costs, improving the work lives of health care providers, and addressing health equity. Pharmacists who incorporate PHM may find specific patients who lack

access to care or who are not meeting metrics of high-quality care. At the same time, PHM could limit extraneous visits where clinical interventions do not exist. Additionally, PHM provides an opportunity to evaluate populations for inequity of care related to medication optimization.^{7,8}

Even with the recognized benefits and strategic priorities related to the use of PHM and data analytics, the current state of adoption of PHM principles within pharmacy practices is unknown. Therefore, we aim to characterize current pharmacy practice trends regarding PHM, which may

identify pharmacists' roles, explore perceived barriers, and guide future expectations.

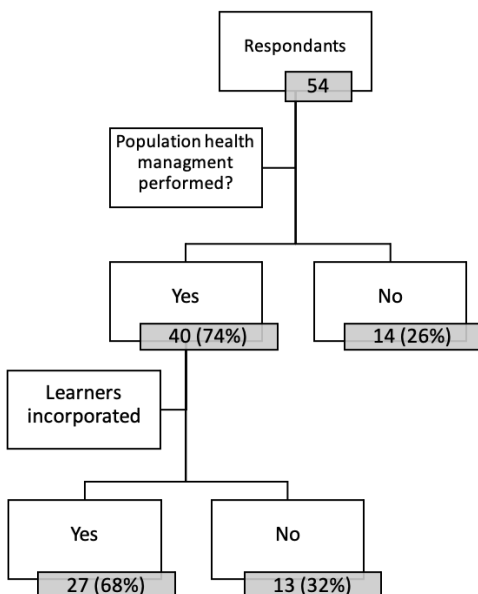
Methods

This mixed-methods exploratory study used an investigator-developed survey. The primary objective of this study is to characterize the frequency with which Wisconsin pharmacists perform population health management. Secondary objectives include identifying the percent of pharmacists incorporating pharmacy learners in PHM and identifying barriers for the incorporation of PHM into practice.

Participants

All active Wisconsin pharmacists within Pharmacy Practice Enhancement and Action Research Link (PearlRx) were provided the survey via an email for voluntary completion with submission of the survey interpreted as informed consent to participate. There were two reminder emails spaced out in monthly intervals. PearlRx is a network of pharmacists, technicians, and students across the state of Wisconsin, and at the time of this study consisted of 535 actively practicing pharmacists who were eligible to complete the survey. PearlRx members voluntarily join with the goal to promote and conduct collaborative, patient-centered research across all pharmacy settings.

FIGURE 1. Consort Diagram Participant Responses



Study Design

The survey was open for participant responses from January 2021 to March 2021. The survey tool consisted of 19 questions including: eight multiple-choice questions, one slider scale, two Likert matrixes, and two short-answer sections. Data collected included demographics as well as frequency, type, and incorporation of PHM principles into daily practice, as well as the inclusion of pharmacy learners. Participants were asked to identify possible barriers to the implementation of PHM activities at their site. The survey was reviewed by a research committee and piloted by two pharmacists prior to distribution.

Following the completion of the survey, participants had the option to indicate interest to participants in a virtual, one-on-one, 30-minute semi-structured recorded interview with study investigators to provide additional perspective. Interviews were completed in July of 2021 with participants randomly selected, and each interview consisted of eight identical open-ended questions with the ability for investigators to ask follow-up questions when appropriate.

Data Analysis

Survey responses were analyzed with descriptive statistics and summary analysis for open response data. Summary analysis was performed through transcription of the interviewee's recorded verbal responses into written format. Data was then evaluated with attention to repeated phrases and concepts, and similar ideas were grouped together.

This research was approved by the Medical College of Wisconsin institutional review board. This study was conducted in collaboration with PearlRx of Wisconsin, a statewide pharmacist practice-based research network, which is in part supported by the Clinical and Translational Science Award (CTSA) program, the National Institute of Health (NIH) National Center for Advancing Translational Sciences (NCATS), grant UL1TR002373, and the Pharmacy Society of Wisconsin.

Results

A total of 54 pharmacists voluntarily completed the survey. Forty respondents (75%) performed PHM activities in their practice, of which 27 (68%) incorporated

TABLE 1. Demographics Of Participants who perform population health management (n=40)

Characteristic	Response, N (%)
Practice Area	
Academia	6 (15)
Ambulatory Care	8 (20)
Community-Large Chain	0 (0)
Community Independent	7 (17.5)
Hospital Inpatient	10 (25)
Hospital Administration	3 (7.5)
Hospital Outpatient	2 (5)
Industry	1 (2.5)
Long Term Care	1 (2.5)
Managed Care	2 (5)
Clinical Experience	
Less than 2 years	2 (5)
2-5 years	9 (22.5)
6-10 years	7 (17.5)
11-15 years	7 (17.5)
16-20 years	7 (17.5)
20+ years	8 (20)
Precepting Experience	
IPPE Student	28 (70)
APPE Student	33 (82.5)
PGY1 Resident	26 (65)
PGY2 Resident	12 (30)
Student Intern or Technicians	16 (40)
Population Density	
Rural, non-metro (>2,500 people)	4 (10)
Rural, metro (2,500 – 50,000 people)	7 (17.5)
Urban (>50,000 people)	29 (72.5)
Region in Wisconsin	
Northern	2 (5)
Northeast	2 (5)
South Central	15 (37.5)
Southeast	15 (37.5)
West Central	6 (15)
Abbreviations: introductory pharmacy practice experience (IPPE), advanced pharmacy practice experience (APPE), post-graduate year 1 (PGY1), post-graduate year 2 (PGY2)	

pharmacy learners (Figure 1). Stratification of respondents into population density and practice site showed that most respondents who perform PHM work in areas with higher population density (Table 1). Across all practice areas, respondents reported that similar PHM tasks are being performed. Most respondents identified that the largest barrier to completion of PHM activities was lack of time allotted (71%) with an average allotment of 0.1 of a pharmacist's full time equivalent (FTE) dedicated to performing

PHM activities. Based on the design of the survey, this was the smallest possible increment of FTE available to choose on the survey (Table 2).

As learners progress from introductory to advanced pharmacy practice experiences (APPE) and continue to post-graduate residencies, the PHM tasks delegated to them by practicing pharmacists shifted from an observatory to an active role (Figure 2). For example, respondents shared that students on introductory pharmacy practice experiences (IPPE) most commonly shadowed pharmacists (70%) or performed health record screens or medication histories (45%), while 75% of respondents have APPE students perform and document PHM encounters. Limitations to the ability to incorporate learners within PHM activities include lack of time in the pharmacist workload (66%) and need for training learners on the processes (57%), as reported by respondents (Table 2).

A total of four interviews were conducted with pharmacists and a summary analysis revealed the perceived benefits of PHM to include increasing access to care and meeting the needs of the population

TABLE 2. Pharmacists Perceived Barriers for Implementation of PHM at Site (n=40)

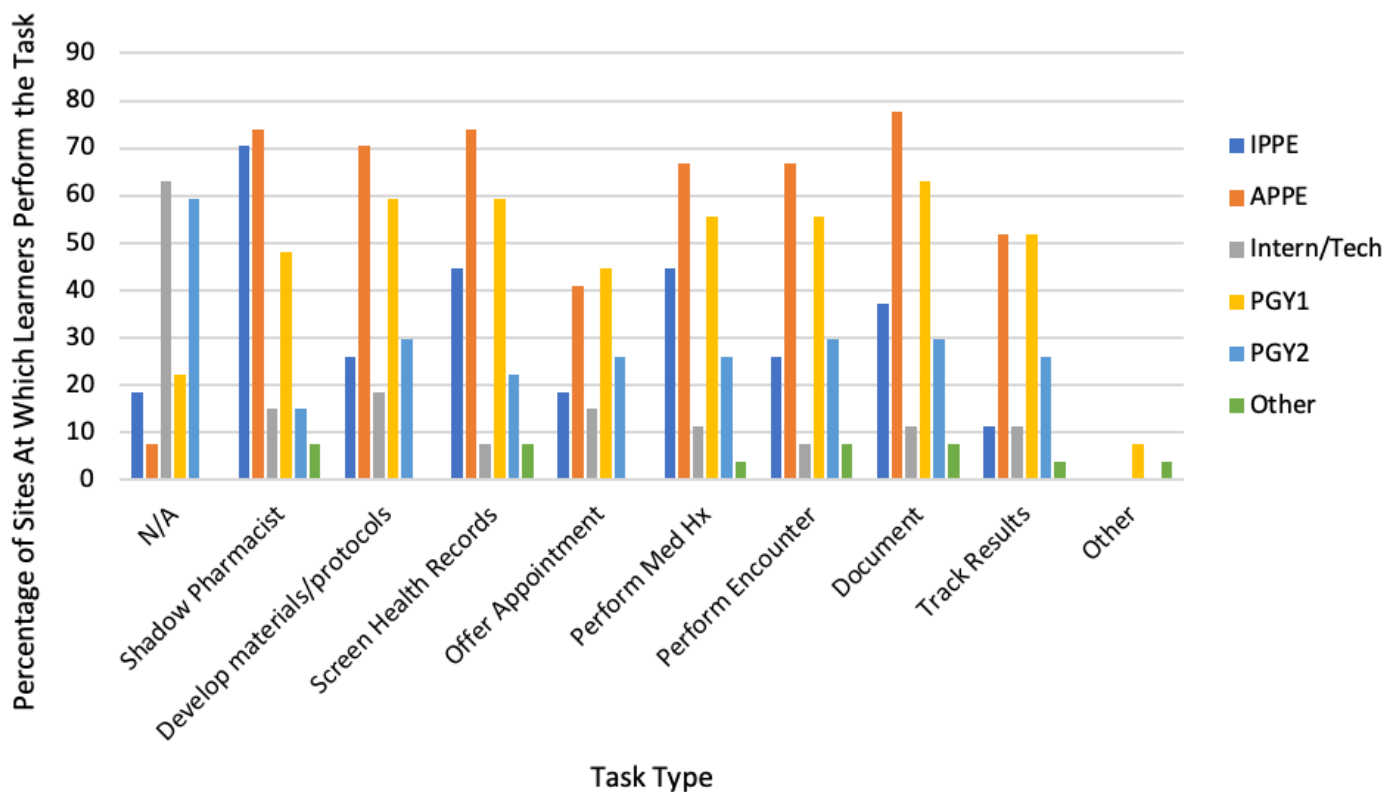
<i>In pharmacist practice</i>		<i>To incorporate pharmacy learners</i>	
Lack of time	71%	Workload at site with lack of time	66%
Lack of training on how to perform Population Health Management	34%	Training the learner for the logistical process	57%
Ability to identify populations or metrics to target	29%	Clinical readiness of the learner	49%
Lack of administration support	29%	Time and schedule of the learner (job, school, exams, breaks)	49%
Lack of provider engagement	18%	Lack of pharmacy learners at your site	29%
Lack of perceived benefit	18%	Level of interest of the learner	17%
Lack of interest	13%		

with specialized services (Table 3). While each pharmacist was involved in some form of PHM activities, none had achieved their perception of the ideal role in terms of scope or access. In general, interviewees agreed with survey findings that APPE students and residents could handle the higher-level functions to conduct activities with more independence compared to IPPE students.

Interviewees identified workload

capacity as a barrier for incorporating PHM activities, especially in the community setting where COVID vaccinations were taking priority. The summary analysis highlighted additional barriers to focus on, including stakeholder support from outside the pharmacy profession, advocacy, support from statewide institutions, and increasing awareness and communication. One specific point that stood out was the need

FIGURE 2. Type of Population Health Management Tasks performed by Level of Learner (n=27)



Abbreviations: introductory pharmacy practice experience (IPPE), advanced pharmacy practice experience (APPE), post-graduate year 1 (PGY1), post-graduate year 2 (PGY2)

to frame these activities as a cooperative effort and not as a pharmacist attempting to supersede the scope of another provider. Ideas to overcome some of these barriers included increasing collaborative efforts on interdisciplinary teams; development of resources (education, grant funding, outcome metrics, and electronic health record access in community pharmacies);

and establishing the value of PHM activities to prove there is a return on investment for stakeholders.

Discussion

This exploratory study found that most respondents are incorporating some PHM activities within their practice and that half of respondents incorporate learners. The

key barriers for future growth include time allocation, training of learners, and advocacy for interdisciplinary stakeholder support. Ideas to overcome these barriers were identified and focus mainly on resource development and establishing the financial value of PHM to gain the support of stakeholders more easily.

To date, multiple systematic reviews and

TABLE 3. Summary Analysis of Pharmacist Interviews

Focus Area	Pharmacist Ideas
Definition of PHM	<ul style="list-style-type: none"> Resources directed towards a group based on data to help meet goals Identification of a patient population in need of a specialized service Providing access in a user-friendly way Improved access to care outside of a physical setting
Current Involvement at Practice Site	<ul style="list-style-type: none"> Identification of patients outside of goal, onboarding to the program, collaborate until control established and can self-manage Optimization of prescribing for patients to lower adverse events, increase quality, and provide naloxone for patients in need Statistics determine group for additional resources which is expedited by collaborative practice agreements Help patients who have been diagnosed by a provider to manage their disease state which will reduce cost expenditure
Ideal role at practice site	<ul style="list-style-type: none"> Prioritization of specialized tasks such as medication management and tasks that are unable to be completed by our health care colleagues due to time constraints or lack of training Need to be well integrated, trusted, and supported team members when currently defining the purpose and duties of a pharmacist may be blurry to some health care peers To be able to provide services within one setting to be accessible for the patient which can be accomplished with CPA
Learner involvement	<ul style="list-style-type: none"> Students provide valuable benefit by carrying an increasing amount of the workload independently Students assist in reminder calls and improving workflow and documentation Student's knowledge of technology can assist with communicating services APPE students are primarily involved in tasks due to the higher-level work required
Current barriers	<ul style="list-style-type: none"> Support from stakeholders outside the pharmacy profession especially if identified services overlap with another team member Advocacy work internally and externally in the state to be included equally in opportunities and discussions with providers Current barriers are defining the process to perform population health management Raising awareness and increasing participation is not competition, but rather a cooperative effort to increase pharmacist roles Barriers are two-fold in obtaining CPAs to provide services and communication that of the services that are available Capacity is a concern as the pharmacist to patient ratio and pharmacist to provider ratio is far from ideal Focus on COVID vaccinations leaves little time to focus on providing additional services Due to the cost saving nature of the activity, expending money, training people, and including pharmacists is a barrier
Ideas to overcome barriers	<ul style="list-style-type: none"> Current barriers are overcome by interdisciplinary meetings, flexible staffing, and fostering familiarity Resources needed are education of technicians and medical assistants to support pharmacist workload to facilitate prioritization Value/necessity of pharmacists to complete focused PHM needs to be established to prove return on investment Obtaining the resources needed to prove the worth can be started with grants or stakeholders outside of pharmacy Metrics to establish return on investment for a service that is cost avoidant need to be defined to prove quality from not only a patient perspective but also a payer perspective Metrics are needed to prove a positive financial outlook and need to focus on underserved and expensive disease states Connecting with uninsured or underinsured patients can be done via PSW platform to perform CMM
Future thoughts	<ul style="list-style-type: none"> Plans include increasing pharmacist areas of focus, expanding patient populations, and allowing PHM to become its own discipline Future goals are expanding focus areas and providing more community outreach and education Plans involve improving patient access by completing medication reviews in the pharmacy and providing home services PHM has a demonstrated need which can be implemented with the assistance of technicians and students to avoid introducing gaps in care and inequalities Plans involve creating a partnership to solve the lack of resources problem which will allow expansion of focus areas to underserved areas like med adherence and rural opioid stewardship
<p><i>Abbreviations: advanced pharmacy practice experience (APPE), Pharmacy Society of Wisconsin (PSW), collaborative practice agreement (CPA), comprehensive medication management (CMM), population health management (PHM).</i></p>	

meta-analyses demonstrated positive clinical outcomes of pharmacist involvement within the management of a variety of chronic disease states.⁹⁻¹³ The benefits were consistent whether interventions occurred in person or via telehealth.^{11,14} Beginning with the Ashville Project in 2003 and expanding since then, economic analysis of pharmacist chronic disease management shows positive returns when exploring both cost avoidance and return on investment, with the Hickory Project showing a return on investment of almost 5 to 1.¹⁵⁻²⁰ Since traditional pharmacist services have not been billable activities, PHM activities targeting value-based metrics have been used to show positive results through cost avoidance and meeting clinical outcome metrics for value-based payments.²¹⁻²⁴ However, with provider status becoming more widespread for pharmacists at the state level and recently being signed into law in the State of Wisconsin, the possibility of revenue streams may further enhance the possible return on investment.

When comparing PHM to more traditional chronic disease management, the economics for pharmacist return on investment might be even higher. In

fact, a return on investment of 12.4 to 1 was demonstrated when incorporating technology-guided PHM for pharmacists within a Medicaid population.²⁵ Additionally, pharmacists leveraging PHM have been shown to maximize value through education, population-level data analysis, and medication management within accountable care organizations.²⁶ This pre-existing literature supporting PHM activities could be leveraged by pharmacists, such as those interviewed in this study, to support proposals to stakeholders for increasing future allocation of resources. Furthermore, systems-based care and population health is one of the competency domains highlighted by the American College of Clinical Pharmacists' competencies, which signify the need to develop PHM compared to traditional chronic disease management models.²⁷

Even with these positive findings, barriers identified within this study and described within the PHM literature will need to be addressed for pharmacists to be able to consistently incorporate PHM into normal practice. Commonly identified PHM barriers include the lack of health information technology infrastructure,

especially in the community setting; lack of formal billing codes; lack of formal training; and a need for outreach, scheduling, and maintaining patient appointments.^{28,29} Currently, most pharmacist-led PHM examples occur within health systems or in models consistent with patient-centered medical homes.^{22, 24,30-32} The concentration in these settings is likely due to access limitations in the community pharmacy setting. However, PHM achievements in community-based pharmacy settings exist and need to be further optimized within the health care system.^{29,33}

Given the limited resource of time, pharmacists have utilized pharmacy learners (i.e., students or residents) or technicians to perform PHM activities and act as a pharmacist extender.³⁴⁻³⁶ The ability of student pharmacists to describe and develop population-based care is considered an essential skill for practice by the Accreditation Council for Pharmacy Education.³⁷ Furthermore, the Center for Advancement of Pharmacy Education suggests that pharmacy students should "participate in population health management by evaluating and adjusting interventions to maximize health."³⁸



Whether woven into an introductory or advanced experiential rotation or during post-graduation training, learners who perform PHM mutually benefit via trainee education while adding to pharmacists' workload capacity.³⁴⁻³⁶

Literature is supportive of pharmacist disease state management and highlights the benefit of targeted use of PHM to further increase cost effectiveness. To advance resources provided to pharmacists, the existing data needs to be collected and organized for frontline pharmacists, so they have the tools necessary to market to their stakeholders. By leveraging existing literature, hopefully the pharmacy profession can move beyond the requirement of additional pilot studies demonstrating the clinical and economic benefits of pharmacists' services. Instead, it should become a priority for pharmacists to focus on the implementation science for establishment of resources to train and carry out PHM activities, as well as utilization of pharmacy organization networks to build consistent health information technology infrastructure.

Given this study is the first characterization of how pharmacists have incorporated PHM into their workflow, it provides a starting point for further exploration. Utilization of the PearlRx network allowed for a statewide distribution of the survey to mitigate regional bias. Furthermore, the analysis recognized barriers and identified targeted solutions.

This study was limited by the low response rate of participants due to the voluntary nature of the survey without the use of incentives. While PearlRx membership includes pharmacists statewide with a self-identified interest to potentially participate in research, it consists of only a fraction of all practicing Wisconsin pharmacists. Moreover, some participants failed to complete the survey after starting, which may have led to a self-selection bias. For example, pharmacists who incorporate PHM into practice may be more likely to take the time to respond, which could lead to their overrepresentation.

Information gained from this study highlights the need for formalized training within pharmacy education to conduct PHM. Potential future considerations include the creation and dissemination of a PHM and data analytics elective course

for pharmacy students. Additionally, development of training tools, resources, and advocacy on a state-wide level to assist pharmacist expansion into PHM may be necessary. To achieve these goals, it is essential to create partnerships with pharmacists in all practice settings and across pharmacy organizations. This could allow for the removal of barriers, such as gaining access to electronic health records. Furthermore, the collection and dissemination of prior studies exploring financial considerations, such as return on investment for PHM activities, can empower frontline pharmacists to advocate for the expansion of dedicated time and resources. Finally, future studies should explore how recent laws in the State of Wisconsin surrounding provider status for the Medicaid population may strengthen the sustainability of PHM activities.

Conclusion

Most pharmacists are performing PHM activities and include a pharmacy learner in the process. However, an opportunity exists to increase the portion of time dedicated to PHM tasks in current practice. Furthermore, there is a need for training of current and future pharmacists on the basic processes of PHM and health information technology resources. Overall, Wisconsin pharmacists are in an early adoption phase of incorporating PHM into practice.

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