Implementation of performance metrics to assess pharmacists' activities in ambulatory care clinics

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Purpose. The development and implementation of performance metrics for assessing the impact of pharmacists' activities in ambulatory care clinics are described.

Summary. Ambulatory care clinic pharmacists within an integrated health system were surveyed to ascertain baseline practices for documenting and tracking performance metrics. Through literature review and meetings with various stakeholders, priorities for metric development were identified; measures of care quality, financial impact, and patient experience were developed. To measure the quality of care, pharmacists' interventions at five ambulatory care clinics within the health system were assessed. Correlation of pharmacist interventions with estimated cost avoidance provided a measure of financial impact. Surveys were distributed at the end of clinic visits to measure satisfaction with the patient care experience. An electronic system for metric documentation and automated tabulation of data on quality and financial impact was built. In a 12-week pilot program conducted at three clinic sites, the metrics were used to assess pharmacists' activities. A total of 764 interventions were documented (a mean of 24 accepted recommendations per pharmacist full-time equivalent each week), resulting in estimated cost avoidance of more than $40,000; survey results indicated high patient satisfaction with the services provided by pharmacists. Biweekly report auditing and solicitation of feedback guided metric refinement and further training of pharmacists. Tools and procedures were established for future metric expansion.

Conclusion. Development and implementation of performance metrics resulted in successful capture and characterization of pharmacists' activities and their impact on patient care in three ambulatory care clinics.

Keywords: ambulatory care, clinical pharmacy, cost savings, patient satisfaction, pharmaceutical services, pharmacists

Am J Health-Syst Pharm. 2017; 74:e76-82

Growth of pharmacists' services in ambulatory care settings currently has strong national support from nonpharmacy groups and pharmacy organizations.[1-3] Pharmacists serve as an integral resource as accountable care organizations emphasize preventive care and pay-for-performance systems and organizations like the Agency for Healthcare Research and Quality and the Centers for Medicare and Medicaid Services encourage innovations to improve the quality of patient care.[1,2,4,5] Pharmacists' services help institutions achieve performance metrics and protect reimbursement for interdisciplinary stakeholders.[1-5] Within the profession of pharmacy, ASHP advocates for evolution of the pharmacist's role through the Practice Advancement Initiative and initiatives such as the annual Ambulatory Care Summit.[6,7] A variety of recommendations that have emerged from the summit specifically articulate that ambulatory care pharmacists should develop and implement performance metrics for their services.[6]

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DOI 10.2146/ajhp150698

Various types of metrics can be measured to gauge the impact that pharmacists' services have on patient care. Studies have evaluated direct clinical outcomes by calculating hospitalization or disease exacerbation rates.[5,8-11] Clinical outcomes have been assessed indirectly via metrics evaluating measures of improved patient care such as laboratory values within a goal range, intervention rates, compliance with guideline recommendations, and patient medication adherence.[5,9-17] Efficiency and satisfaction scores have also been used to illustrate pharmacists' impact.[9,10,18]

Some studies have demonstrated significant improvements in adverse event rates,[12] intervention rates,[16] clinical outcomes,[15] hospitalization rates,[8] and readmission rates[5] with the addition of a pharmacist to the patient care team; others have been unable to demonstrate significant differences in adherence,[9] hospital admissions,[11] laboratory values,[9] or satisfaction[9] due to low levels of evidence or study limitations. There is a need for more prospective, large, controlled studies to provide evidence of the effects of pharmacist involvement in patient care.

Background

Using metrics to assess pharmacists' services is valuable to validate current practices and justify expansion into new clinical service areas. Metrics can be used to evaluate the responsibilities of pharmacists. The information gathered can reinforce the value of existing services, identify the patient populations served, and illustrate areas for improvement and growth.

Problem

Pharmacists provide services at 11 of the 159 clinics within the not-for-profit, integrated Aurora Health Care system. In settings with a pharmacist presence, some metrics had been used, prior to the project described here, to capture the effects of pharmacists' services; however, this entailed time- and labor-intensive manual data collection. Additionally, administrators observed that each site used different metrics and applied them inconsistently. Organizational expectations had not been established, so pharmacists independently evaluated metrics based on clinic-specific needs. As a result, the individualized nature of the metrics in use was a barrier to generalization across the various primary care and specialty ambulatory care settings in the system, including anticoagulation, family practice, internal medicine, heart failure, mental health, and oncology clinics and services.

The objective of the project was to develop standard metrics and automated electronic methods for their collection in order to evaluate pharmacists' activities and impact in ambulatory care clinics. The system's institutional review board determined that the project did not constitute human subject research and was exempt from further oversight.

KEY POINTS

- Interventions, estimated cost avoidance, and patient satisfaction were chosen as focal points for metric development.
- Discussion with interdisciplinary stakeholders, assessment of institutional values, and consideration of the capabilities of the electronic health record system guided the metrics development process.
- Performance metrics describing pharmacists' activities and their impact on patient care in ambulatory care clinics were implemented.
- Specific clinical outcome metrics may be too limited in generalizability for uniform use in a large health system.

Analysis and resolution

Assessment. Pharmacists at five representative ambulatory care clinic sites were surveyed to establish baseline practices. Numbers of days and hours of pharmacist time spent providing clinic services, as well as the pharmacist services provided, the number and characteristics of patients served, methods for patient enrollment, types of outcomes already measured, and methods for measuring outcomes, were collected.

Responses to the survey indicated variable practices in the clinics at baseline. One pharmacist reported working with less than 5 patients per day in one clinic, while a pharmacist reported working with 15 or more patients per day in another clinic. The other three clinics' pharmacists reported seeing 5–10 patients per day. The numbers and characteristics of patients served by the pharmacists at the clinics varied, but the pharmacists fulfilled similar overall types of responsibilities, including patient education and assessment, drug information and provider education, and changes to medication therapy via either collaborative practice agreements or recommendations to providers.

One clinic did not have any performance metrics in place; the other four ran reports on the clinical outcomes most applicable to their practice sites (e.g., achievement of blood pressure goals, smoking cessation, change in low-density lipoprotein cholesterol level), tallied formal interventions, or conducted patient satisfaction surveys. Most of the documentation and tracking were completed manually.

Metric selection. Performance metrics for the project were identified through literature review and meetings with system stakeholders. Leaders in the areas of ambulatory care pharmacy, family medicine, and continuous quality improvement considered clinical outcomes, qualifications for increased reimbursement, and patient satisfaction as high-impact priorities. These key areas also aligned with the health system's three high-

value areas of integrated care: measurable quality, responsible resource management, and patient experience.

The number of interventions completed by clinic pharmacists was selected as a representation of the impact pharmacists have on improving the quality of patient care. Interventions were expressed in relation to the number of pharmacist full-time equivalents (FTEs). The ratio of interventions to FTEs served as a measure of how efficiently pharmacists use their time, with more efficient work resulting in more interventions per FTE.

As a measure of financial benefit, interventions were associated with estimated cost avoidance. Conservative values were calculated by averaging cost avoidance values available in the literature. Articles were retrieved through a search of publications posted on PubMed from 2000 to early 2015 using search terms including the following: *cost avoidance, cost effectiveness, documentation, economic, impact, interventions, pharmacist, pharmacy,* and *recommendations*. The search was narrowed to articles citing distinct cost avoidance numbers for different types of interventions.

The interventions and associated cost avoidance values were determined as follows: addition of a medication, $92.95 (range, $7.66–$190.00),[19,20] adverse drug event detection, $276.12 (range, $0–$697.00),[17,19,21] allergy detection or clarification, $187.37 (range, $20.00–$468.86),[17,19,20] discontinuation of a medication, $80.24 (range, $22.97–$176.00),[17,19] dosage form change, $63.88 (range, $15.31–$109.00),[19,20] dose change, $82.25 (range, $22.97–$376.00),[17,19-21] drug information or therapy consultation, $47.89 (range, $0–$190.00),[17,19,20] medication change, $40.88 (range, $22.97–$74.67),[19,20] medication reconciliation, $30.12 (range, $7.66–$57.00),[19] and patient education, $35.21 (range, $7.66–$86.08).[19,20] The referenced data sources expressed the assorted figures as costs avoided by either the patient or the institution. Some studies considered only direct drug costs,[21] while others included estimates of additional healthcare visit costs.[17,19-21]

To assess pharmacists' impact on patient experiences, a standard patient satisfaction survey was created to gauge patient perceptions of care. Patients were asked to fill out a survey if they completed either a pharmacist-specific clinic visit or an office visit with a physician during which a pharmacist provided patient consultation for at least 10 minutes. Shorter consultations with a pharmacist during a physician office visit were excluded from the analysis because the time spent with the pharmacist was considered inadequate to allow for accurate assessment and feedback.

Patients were given the survey to fill out and turn in to the receptionist as they left the clinic. Patients completed the survey while not under direct supervision of the pharmacist to facilitate open and honest feedback. The anonymous survey posed five questions and included an optional comments section. Patients answered the questions about the consultation using a 5-point Likert scale (appendix).

Metric automation. Once the metrics were chosen, the information technology team created an electronic metric documentation system with automated tabulation for the quality and financial metrics. An existing tool for documenting interventions was used within the electronic health record (EHR). The intervention documentation template supplied standard fields to expedite and standardize entries. Information technology personnel built the desired options within each field to customize the documentation process for the purposes of clinic metrics development.

To differentiate their medication therapy management (MTM) interventions from unrelated entries made by inpatient or specialty pharmacists for other projects and reporting purposes, ambulatory care clinic pharmacists selected a placeholder titled "RPh MTM: Interventions." Subcategories for the interventions allowed characterization of the types of activities pharmacists performed and correlation with the financial algorithm metrics. The categories were as follows: addition of a medication, adverse drug event detection, allergy detection or clarification, discontinuation of a medication, dose change, dosage form change, drug information or therapy consultation, medication change, medication reconciliation, and patient education. For every intervention, pharmacists designated the status as either "open" (if follow-up was pending) or "closed" (if the intervention was completed).

Additional features within the EHR facilitated follow-up on open interventions. An icon or tally of open interventions appeared in a column that could be added to pharmacists' daily lists of scheduled patients. The indicator served as a tool for workflow prioritization or as notice of opportunities to bring previous recommendations to the attention of the provider again.

Changes to the patient's medication list triggered a message to the pharmacist within the EHR when an intervention remained open. The messages facilitated correlation of physician action at a later date on previous recommendations by signaling to the pharmacist that a change was made. Because, due to the pace and frequency of follow-up in ambulatory care clinics, days to weeks can pass before a patient's next appointment, this capability was desirable for capturing accepted recommendations that might otherwise have been missed.

A report was built within the EHR to selectively tabulate ambulatory care clinic pharmacists' interventions by aggregating all of the entries marked with the "RPh MTM: Interventions" indicator. The report totaled the interventions automatically and allowed queries by date range, pharmacist, intervention type, or physician response. The information could be exported to a spreadsheet application to allow for more manipulation and analysis. The report could be shared with individual users or made publicly

available to any user with login credentials for the EHR.

Metric implementation. Once the metric documentation system was established, a total of five pharmacists at two family medicine clinics and one internal medicine clinic were trained in documentation processes. Contact information for the project lead was provided as a resource for troubleshooting issues that might arise and for answering questions not addressed in the available procedure reference document.

The pharmacists at the three clinic sites incorporated the metrics processes into their practices for a pilot period (November 17, 2014–February 8, 2015). A report of the interventions was audited for consistency of documentation every two weeks. Suggestions, questions, and anecdotal experiences were also solicited from the pharmacists. Individualized feedback was provided to each pharmacist. Updates, tips, and frequently asked questions were e-mailed to the group once every two weeks.

The pilot period provided a snapshot of the information the newly applied metrics could capture. It provided substantive data about pharmacists' impact in the three clinics. In regard to the quality arm of the metrics, a total of 764 interventions were accepted over the 12-week pilot period at the three clinics. Pharmacist staffing averaged 2.6 FTEs during the pilot period, resulting in a mean of 24 accepted interventions per FTE each week. Using the mean cost calculations, it was estimated that more than $40,000 in expenses were avoided due to pharmacists' interventions in the three clinics during the 12-week pilot period (Table 1). In the same period, 52 patient satisfaction surveys were completed. All five of the questions elicited responses of "very good" or "excellent" on 92–94% of completed surveys. The two lowest Likert scale responses ("poor" and "fair") were never selected. Ten survey respondents wrote free-text comments, which were all positive. In a noteworthy response to the anonymous survey, one patient independently addressed the goal of capturing the impact of pharmacists:

> [The pharmacist] has taken more time to explain the way insulin and other medications work, in a way no other doctor or nurse ever took to explain. It has made me more aware of the way those medications work, and therefore has made them more effective . . . . She has made my experience with the medical world bearable. . . . She has made the most impact in my care.

Metric refinement. Metric collection enhancements were made based on observations during the pilot period. One adjustment concerned the messages generated by changes to patient medication lists. The alerts were modified to trigger only once per patient visit. It was determined that when a patient was hospitalized, the medication reconciliations collected during admission and discharge would trigger messages for every drug even if the orders were not changed. By condensing the number of messages generated, the time spent filtering through extraneous messages was reduced.

A second change was the addition of a data-entry field in the intervention documentation. By categorizing interventions as "accepted," "denied," "provider to review," or "documentation," pharmacists could more clearly identify provider responses to recommendations. Accepted or denied interventions were viewed as completed and were tallied accordingly. "Provider to review" interventions were deemed incomplete pending provider follow-up to address the recommendations. Entries marked as "documentation" indicated identified issues for which a pharmacist had not yet had the opportunity to make recommendations to the provider; this categorization provided an alert mechanism for pharmacists who desired reminders for themselves. Therefore, the "documentation" category was used to track interventions that were incomplete and thus to be excluded from the report results. Once further action was taken on an incomplete or pending intervention, the applicable category was updated to indicate the corresponding provider response and current status of the intervention.

Another change was related to the patient satisfaction surveys. The surveys were translated into Spanish and Hmong to minimize the language barrier for two of the clinics' largest non-English-speaking patient populations.

Discussion

Pharmacists are key players on interprofessional teams, which, pursuant to the Affordable Care Act, are charged with providing integrated, safe, and high-quality patient care.[22] Within those teams, the ASHP Ambulatory Care Summit recommendations advised, "pharmacists who provide ambulatory care services, working interprofessionally, should contribute to developing, incorporating, and validating metrics for ambulatory care pharmacists' services."[6] Accordingly, the project described here implemented metrics focused on interventions, estimated cost avoidance, and patient satisfaction to assess pharmacists' activities in ambulatory care clinics. Due to the diverse patient populations served by a large health system such as ours, the selection of standardized metrics related to patient outcomes was challenging. Discussions with interdisciplinary stakeholders, assessment of institutional values, and consideration of EHR capabilities guided development of the most fitting metrics.

With encouraging results obtained during the 12-week pilot period, the metrics and associated processes remain in place. Interventions are documented on a continuous basis, while the reporting interval has been extended from bimonthly (i.e., every 2 weeks) to monthly. The frequency of patient surveying has been altered from continuous to intermittent to minimize survey fatigue among patients who

Table 1. Estimated Cost Avoidance Resulting From Pharmacist Interventions During 12-Week Pilot Project[a]

Intervention Type	No. Interventions	Cost Avoidance per Intervention ($)	Overall Cost Avoidance ($)
Addition of medication	58	92.95	5,391.10
Adverse drug event detection	0	276.12	. . .[b]
Allergy detection or clarification	3	187.37	562.11
Medication change	32	40.88	1,308.16
Discontinuation of a medication	33	80.24	2,647.92
Dosage form change	15	63.88	958.20
Dose change	128	82.25	10,528.00
Drug information or therapy consultation	152	47.89	7,279.28
Medication reconciliation	135	30.12	4,066.20
Patient education	208	35.21	7,323.68
Total	764	. . .	40,064.65

[a]Weekly pharmacist staffing at the three clinics involved in the pilot project averaged 2.6 full-time equivalents.
[b]Not applicable.

have regular short-term follow-up appointments. Surveys are disseminated for periods of 30–60 days, depending on the clinic-specific volume of qualifying patients, to sample patient satisfaction several times throughout the year. Plans for sharing of survey findings with the involved ambulatory care pharmacists, other pharmacists within the health system, system pharmacy leadership, and interdisciplinary providers are in development.

The clinics that used the metrics during the pilot period have continued with metric utilization. Three more clinics within the health system have begun using the metrics, and further expansion is expected. As more clinics begin using the metrics, the time investments required for implementation of the new processes and for training of personnel will need to be considered. Survey templates and an instructional document including tips and frequently asked questions have been provided as references to pharmacists and clinics not directly involved in the project and to administrators for future dissemination. While the pilot-clinic pharmacists are now familiar with the processes, pharmacists new to the metrics may require additional education.

The time investment required for logging of interventions has also been a concern. Overwhelmingly, the pilot-clinic pharmacists expressed pleasant surprise at the speed and ease of the documentation process. Unless users choose to provide extra narrative for their own future reference, documentation of each intervention takes only seconds. The process may also provide advantageous streamlining, as previous, more cumbersome processes may be replaced.

Investigating the triggered messages regarding medication changes requires time spent away from the usual pharmacy workflow. Because the notifications can arise at any time, separate chart review is often necessary to distinguish modifications relevant to pending interventions from unrelated actions. Depending on the recency of the intervention and the responsible pharmacist's familiarity with the patient involved, the number of minutes required for assessment of medication messages can differ.

While the metrics were designed to be universally applicable across clinic sites, only 5 of the 11 clinics in the health system with a pharmacist presence were surveyed to ascertain baseline practices, and only 3 of the 11 clinics initially pilot-tested the metrics. The exclusion of some clinics could have introduced selection bias.

Additionally, the individual measures chosen for assessment have shortcomings. Clinical outcomes were not measured within the quality metric due to the lack of generalizability across all types of clinics and patients. Outcomes such as asthma exacerbation rate, International Normalized Ratio, glycosylated hemoglobin level, and pain score may be highly pertinent at some sites and rarely relevant at others, depending on the patient population served at each particular clinic. Instead, the types of interventions targeted were chosen to correspond with actions pharmacists take to alter patient care that are applicable across all sites. Clinics were encouraged to continue to report relevant clinical outcomes and contribute to state healthcare quality-improvement initiatives in which data on such outcomes are compiled.

Within the quality metric, interventions were tabulated and associated with each clinic's pharmacist FTE count, but the utility of the number of interventions per FTE was undefined. The collected data on interventions per FTE cannot be compared with an external benchmark for ambulatory care interventions because one has not yet been established. However, the number of interventions per FTE can be used as an internal benchmark to create goals for improvement and to anticipate roles at new sites.

The selection of pharmacist FTEs as the measure of input for the qual-

ity metric may not allow for the capture of some downstream effects of pharmacists' services in clinics. As pharmacists provide education for other practitioners, they may trigger subsequent changes to patient care that might not occur otherwise. Thus, while a specific educational intervention by a pharmacist might be documented only once, its impact on patient care may become much greater than initially realized as the targeted clinical scenario is repeated multiple times; an underestimation of impact, as depicted by the quality metric, may result.

Alternately, it is possible that pharmacists recommended changes that providers were already planning to implement. Avoidance of documenting interventions unless pharmacists prompt consideration of changes themselves or are significantly involved in decision-making minimizes the potential for inflation of the intervention count.

Ideally, interventions would be captured automatically in the EHR without necessitating pharmacist action to enter documentation or to determine physician follow-up on recommendations. The capability for completely automatic collection would save pharmacists time and allow for retrospective data collection in clinics where metrics have not been used previously. In the absence of automated intervention recognition, the selection of metrics and options for data capture are limited by the currently available functions within the EHR. Technological innovations should be regularly assessed to take advantage of enhancements as they are developed.

Estimated cost avoidance is another component of the metrics that is not well established in the literature. The calculations provide imprecise, conservative averages that have not been validated. The resulting values reflect only costs avoided. Dollars earned through MTM reimbursement claims are distinct and supplementary to the cost avoidance figures. Likewise, changes in overall clinic income were not analyzed. Redistribution of some disease state management duties to pharmacists may have freed physician time for additional office visits, but the clinic payment structures were not included in the cost avoidance figures incorporated into the calculations. Future analyses might explore effects on clinic income and workflow streamlining through physician satisfaction and productivity metrics before and after pharmacists' services are implemented in clinics newly incorporating a pharmacist.

Cost avoidance was not compared with the expense of an FTE pharmacist. The cost avoidance calculations were not meant to justify the entirety of a pharmacist's corresponding salary. The financial metric was intended to estimate minimum cost savings to avoid contention over the generalizability of higher values that, while accurate, have the potential to be unrealistic or overestimate savings in other settings. More extensive data collection and precise calculations will be needed in future studies in order to develop a more exact and comprehensive system.

In contrast to the electronic data collection and tabulation of the quality and financial metrics, the patient experience metric remained a manual, paper assessment that had not been validated in previous studies. The survey was not digitized due to anticipation of greater nonresponse bias resulting from requesting patient completion of an online survey at home; however, such bias can still occur if patients are asked to complete a satisfaction survey by hand. The total number of surveys disseminated in relation to the number completed was not tracked. Optimization of the patient experience metric could incorporate assessment of response rate and the potential for nonresponse bias. Providing patients with access to electronic devices in the clinics could serve to improve response rates and automate survey collection, but additional infrastructure would be required. Pursuit of resources to supply a computer terminal or tablet computer to each clinic is a direction that could be explored to enhance the patient experience metric and minimize manual tabulation.

Conclusion

Development and implementation of performance metrics resulted in successful capture and characterization of pharmacists' activities and their impact on patient care in three ambulatory care clinics.

Disclosures

The authors have declared no potential conflicts of interest.

Previous affiliations

At the time of the project, Dr. Schmidt was affiliated with Aurora Health Care Metro Inc., Milwaukee, WI.

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Appendix—Patient satisfaction survey used during pilot project

Satisfaction Survey: Pharmacist Services

Each of the following questions relates to your meeting with the pharmacist. Please answer each question to the best of your ability.

Please place an "X" in the box that corresponds to your answer to each question using the scale: poor, fair, good, very good, and excellent.

	Poor	Fair	Good	Very Good	Excellent
1. How would you rate your overall satisfaction with your meeting with the pharmacist today?					
2. How would you rate your satisfaction with the information the pharmacist provided you about your medications?					
3. How would you rate your satisfaction with the pharmacist's answers to your questions?					
4. How would you rate your satisfaction with how clearly the pharmacist provided explanations?					
5. To what degree did the pharmacist's involvement enhance your care experience today?					

Additional comments (optional):