Integrating Patient Safety and Clinical Pharmacy Services Into the Care of a High-Risk, Ambulatory Population: A Collaborative Approach

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Columns: Lincoln Community Health Center participated in a Health Resources and Services Administration-sponsored Patient Safety and Clinical Pharmacy Services Collaborative aimed at facilitating integration of pharmacy services proven to enhance patient safety into care provided to high-risk, ambulatory population.

Methods: The Collaborative used the Plan-Do-Study-Act (PDSA) cycle of learning from the Model for Improvement endorsed by the Institute for Healthcare Improvement to guide changes. Outcomes targeted for improvement included medication reconciliation, obesity screening and follow-up planning, adverse drug events (patient safety), and delivery of clinical pharmacy services.

Results: Primary changes that resulted from conducting 54 PDSA cycles of learning included enhanced data access, centralized medication access through formulary expansion, implemented a medication reconciliation guideline, designated a single point of accountability in the pharmacy, improved efficiency, staff performed nontraditional roles, extended the existing adverse drug event program, and improved communication.

Conclusions: Changes made to integrate patient safety and clinical pharmacy services into the care of a high-risk, ambulatory population not only improved all targeted outcomes but also helped establish Lincoln Community Health Center as the patient’s medical home.

Key Words: drug safety, adverse drug event, medication reconciliation, health services accessibility, minority health, health-care disparities

Medications play a significant role in the management and prevention of chronic diseases. Nearly half of all Americans live with a chronic condition, with almost half of those having multiple chronic conditions. Based on 2005 data, two-thirds of the U.S. population received at least one prescription per year, and close to 40% received 4 or more prescription medications. Unfortunately, serious shortcomings exist within the current U.S. health-care system related to the provision of safe and effective medication management, as evidenced by the U.S. spending more than $177 billion in 2000 on drug-related illness and death in ambulatory care settings alone. With increasing medication complexity, especially among patients with chronic conditions, others in health-care view pharmacists as key to interacting directly with patients, caregivers, and prescribers to minimize medication errors and enhance patient safety.

An important factor contributing to the development of chronic conditions such as hypertension, diabetes, cardiovascular disease, and certain cancers is obesity. Since 1980, obesity rates in the U.S. for adults doubled, exceeding 30% in most sex and age groups. Between 1987 and 2001, diseases associated with obesity accounted for 27% of the increases in medical costs. Experts predict a steady rise in the number of people with chronic conditions, including those caused by obesity, for the next 30 years. As obesity and related chronic conditions rise, medication use and associated risks may also rise, furthering the need for strategies to promote safe medication use.

To facilitate integration of pharmacy practices proven to enhance patient safety, Health Resources and Services Administration (HRSA)—sponsored the Patient Safety and Clinical Pharmacy Services Collaborative (henceforth referred to as the Collaborative or HRSA-sponsored Collaborative.) The Collaborative aimed to ensure that patient care delivered by safety-net organizations and their community-based partners met the highest standards of safety by integrating evidence-based clinical pharmacy services into the care and management of high-risk, high-cost, complex patients. The collaborative set a transformational goal to put in place, across multiple health-care partners, a service delivery system for high-risk patients to produce 3 results including integration of clinical pharmacy services, improved patient safety, and improved patient health outcomes.

The Lincoln Community Health Center (LCHC) Pharmacy spearheaded a multidisciplinary team to participate in the HRSA-sponsored Collaborative. This paper describes the process followed and outcomes achieved from participating in the Collaborative and integrating LCHC pharmacy services into a high-risk, ambulatory population.

Setting

The Lincoln Community Health Center is a federally qualified community health center providing accessible, affordable, comprehensive outpatient primary health-care services to the medically underserved in Durham, North Carolina, and surrounding areas. In 2009, the U.S. Census Bureau estimated that the population in Durham County was 269,706, with 45.3% white non-Hispanic, 37.2% African American, and 12.2% Hispanic. Ten clinics comprised LCHC at the time of the Collaborative including 2 off-site community clinics; a clinic at a homeless shelter; an HIV early intervention clinic at the local health department; a clinic in a local high school; and in-house clinics including adult medicine, pediatrics, behavioral health, obstetrics and gynecology (OB/GYN), and dental. The Lincoln Community Health Center served over 38,000 patients in 2009, with 86% at
poverty level or below and 80% uninsured. The majority of LCHC patients were African American (52%), followed by Hispanic (34%), Caucasian (6%), and other (8%).

Duke University Health System’s Durham Regional Hospital operated LCHC pharmacy to provide in-kind pharmaceutical services to LCHC patients. The pharmacy relied heavily on select patient assistance programs available through pharmaceutical manufacturers and the 340B Drug Pricing Program administered by the HRSA Office of Pharmacy Affairs to provide patients with no or low-cost medications. The 340B Drug Pricing Program allowed certain federally funded grantees and other safety-net health-care providers to purchase medications at significantly reduced prices.

METHODS

Health Resources and Services Administration–sponsored Collaborative participants agreed to implement best practices related to patient safety and clinical pharmacy services. A tool, called the Patient Safety and Clinical Pharmacy Services Collaborative (PSPC) Change Package, described the best practices by detailing 5 major strategies used by organizations that provide leading-edge patient safety and clinical pharmacy services. These 5 strategies included leadership commitment, measurable improvement, integrated care delivery, safe medication use systems, and patient-centered care. Designed as an evolving document, the current version of the PSPC Change Package resides on the HRSA Web site (www.HRSA.gov).

To test the PSPC Change Package, HRSA assembled teams of community-based practitioners through formation of the Patient Safety and Clinical Pharmacy Services Collaborative. The Collaborative aimed to put in place the leading strategies, as detailed in the PSPC Change Package, which enabled a community health-care team to deliver safe care and optimal outcomes across the care continuum.

Population of Focus

Each team participating in the Collaborative selected a high-risk population to target for the initiative. The LCHC team focused on providing patient safety and clinical pharmacy services to patients enrolled in Project Access of Durham County (PADC). PADC, formed in July 2008, is a nonprofit organization that links low-income, uninsured Durham County residents in need of specialty care into a local network of community and hospital specialists, laboratories, pharmacies (primarily LCHC pharmacy), and hospitals that donate their services. PADC arose from joint efforts of community organizations in Durham that recognized the need for improved healthcare for the low-income, uninsured population in the County. These organizations convened local stakeholders to commit to designing and implementing a local program. PADC based its system on the original Project Access model developed in Buncombe County, North Carolina in 1995, whereby physicians voluntarily accepted a certain number of uninsured patients in their practice each year. PADC received funding from the County and private foundations, with all medical care and services donated.

Although many Project Access programs focus on providing primary care to medically underserved, PADC aimed to expand the availability of specialty care and medications prescribed by a specialist to low-income individuals already in the LCHC primary care system. Therefore, to qualify for PADC participation, patients had to receive primary care services through LCHC and obtain a referral to visit a specialist from their LCHC primary care provider (PCP). Before PADC, LCHC patients in need of care from a specialist received uncoordinated specialty services on a limited basis. Additionally, regulations prohibited patients from filling prescriptions written by non-LCHC providers (i.e., community or hospital-based specialists) at the LCHC pharmacy, and many medications commonly prescribed by a specialist were not available on formulary.

LCHC Team Participating in the Collaborative

The LCHC Pharmacy Director served as team leader. Other members from LCHC included the Chief of Adult Medicine, a clinical pharmacist, the CEO and Medical Director, the Director of Nursing, and the Pharmacy Technician Supervisor. Additional core team members included the Executive Director of PADC, a pharmacy school professor, and administrators from 2 local nonprofit agencies. The team also collaborated with Duke-affiliated and community-based specialty physicians, Duke Hospital’s outpatient pharmacy, and personnel from Local Access to Coordinated Healthcare (LATCH), a Duke University Health System funded organization that uses a culturally and linguistically competent integrated system of care for assisting Durham County’s uninsured. Team participation by a diverse group of community leaders proved important to securing leadership commitment for the LCHC team to participate in the Collaborative.

Measures Tracked by the LCHC Team

Each of the 68 teams in the HRSA-sponsored Collaborative evaluated improvement in 3 areas: health outcomes, patient safety (adverse drug events or ADEs), and clinical pharmacy services. The LCHC team selected 2 health measures for improvement: medication reconciliation (verification and documentation) and obesity (screening and follow-up plan documentation). Medication reconciliation was defined by HRSA as the percentage of patients with written documentation of current medications with dosages. A comprehensive medication list included prescription drugs, over-the-counter (OTC) products, herbas, and vitamin/mineral/dietary supplements with dosages verified by the patient or authorized representative.

The obesity measure consisted of 2 parts including screening for obesity and documentation of a follow-up plan for those meeting the criteria for obesity. The screening part of the measure evaluated the percentage of patients with a documented body mass index (BMI) within the last 12 months. The follow-up planning part of the measure assessed the percentage of obese patients (adult = BMI greater than 30 kg/m²; child = BMI greater than 95th percentile) that had an obesity discussion and follow-up plan documented in their medical record.

All collaborative teams tracked adverse drug events (ADEs) and potential adverse drug events (pADEs) as measures for patient safety. The ADE measure was defined as the percentage of ADEs detected in the population of focus that received clinical pharmacy services during the measurement month. The pADE measure was defined as the percentage of pADEs detected in the population of focus that received clinical pharmacy services during the measurement month.

Lastly, the clinical pharmacy services measures, also tracked by all PSPC Collaborative teams, consisted of evaluating the frequency and intensity of ten HRSA-defined areas of clinical pharmacy services. Measurement of each of the 10 services used a 10-point scale with 0 meaning “no services provided at this time” and 10 meaning “offered, fully implemented, provided to all or most PADC patients.” The measure was a subjective rating of the integration of the clinical pharmacy services provided within the health-care system. It was expected that the clinical pharmacy services measure would increase over the course of the Collaborative as these services became integrated into the health-care system.
Process for Improvement

The Collaborative used a series of 4 learning sessions with each session followed by a 3-month action period as its process for facilitating change. After each learning session, teams returned to their practice sites and applied the fast-paced, iterative model for improvement endorsed by the Institute for Healthcare Improvement to improve the outcomes selected for their target population. The model uses a Plan-Do-Study-Act (PDSA) cycle of learning to guide the test of change by collecting and analyzing data (Plan), making changes to close the gaps (Do), evaluating the effectiveness of each change (Study), and implementing next steps based on the results (Act). Knowledge acquired from a PDSA cycle-guided subsequent PDSA cycles and tests of change, consistent with the Model for Improvement. Teams shared their experiences and progress during action periods via monthly conference calls and at subsequent learning sessions.

Changes Made to Integrate Clinical Pharmacy Services

The LCHC team conducted 54 PDSA cycles between July 2008 and December 2009 to guide changes and facilitate integration of patient safety and clinical pharmacy services into care provided to the PAD patients. Table 1 outlines the process of care for PAD patients that resulted.

Changes fell into one of the 5 major strategies listed in the PSPC Change Package. All changes had to fit into current workflow and adhere to regulations unique to a community health center. Importantly, applying the PDSA cycle helped plan and test changes using a rapid performance improvement technique. Thus, the primary purpose of data collection was to guide next steps in the improvement process. While presented in a linear fashion, several changes occurred simultaneously, often with an impact on multiple outcomes.

Enhanced Data Access

First, the team worked to determine what data were available from different proprietary sources including the LCHC pharmacy system, the LCHC electronic health record (EHR), the system used by PAD and LATCH, and systems used by Duke University Hospital and Durham Regional Hospital. Pharmacy staff at LCHC received increased access to the EHR and hospital systems and new access to the PAD and LATCH system. Enhancements to data access and collection procedures continued throughout participation in the Collaborative.

Centralized Medication Access Through Formulary Expansion

Second, LCHC Pharmacy centralized medication access by expanding its formulary to include medications prescribed by specialists and specific to the needs of PAD patients. Formulary expansion entailed a comparison of the LCHC formulary to those of other Project Access programs operating in the state. The Lincoln Community Health Center pharmacy staff also surveyed PCPs and specialists for recommendations on formulary additions. Pharmacists compiled the recommended specialty medications and evaluated those medications for formulary inclusion by considering evidence-based literature, safety data, acquisition cost through the 340B program, and ease of obtaining higher priced medications through a manufacturer’s patient assistance program. Deciding ahead of time from which source to obtain medications—through the 340B program or a patient assistance program—proved critical to ensuring program sustainability. A PAD medical sub-committee and the LCHC Pharmacy and Therapeutics (P&T) Committee approved formulary additions before implementation.

After using the formulary for 6 months, the team made adjustments in response to prescribing patterns, physician feedback, and the frequency of medication acquisition by patients from an outside pharmacy. Before adding medications to the formulary, the pharmacy staff evaluated therapeutic alternatives to prescribed products and the cost of obtaining the medication using 340B pricing. Other aspects considered included safety, clinical evidence, and frequency of prescribing. Again, both the PAD medical committee and the LCHC P&T Committee approved all formulary additions. Minor adjustments to the formulary occurred throughout collaborative participation, as needed. A recent publication described the formulary process used by the LCHC team in greater detail.12

<table>
<thead>
<tr>
<th>TABLE 1. Outline of the Steps Followed to Integrate Patient Safety and Clinical Pharmacy Services into Care Provided LCHC Patients in Need of Specialty Care</th>
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<tbody>
<tr>
<td>1. PCP refers LCHC patient in need of specialty care to PADC</td>
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<td>2. PADC screens patient for eligibility to visit specialist</td>
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<td>3. Patient visits specialist approved by PADC</td>
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<td>4. Patient presents prescription written by specialist to the LCHC pharmacy technician designated as a single point of contact for PADC patients</td>
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<tr>
<td>5. The designated LCHC pharmacy technician performs the following activities:</td>
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<tr>
<td>• Verifies patient’s referral to specialist approved by PADC by accessing the PADC database</td>
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<tr>
<td>• Verifies that the new prescription written by specialist is available on LCHC formulary. Forwards prescriptions for nonformulary medications to the pharmacist for consultation with the specialist</td>
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<td>• Prints copy of patient’s medication list</td>
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<td>• Reconciles medication list with patient including OTC products, herbs, and supplements</td>
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<tr>
<td>• Provides patient with copy of reconciled medication list</td>
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<tr>
<td>• Reviews EHR for documentation of BMI in past 12 months. If BMI missing or not within past 12 months, then weighs and measures the patient and calculates BMI for entry in EHR</td>
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<tr>
<td>• If BMI &gt; 30 for adult or &gt; 95th percentile for child, reviews booklet titled “BMI and Your Health” with patient. Discusses resources available at LCHC to support weight loss. Documents follow-up plan in EHR</td>
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<tr>
<td>• Completes CPS Checklist form to document the number of CPS performed with patient and the level of intensity for each using a 10-point scale</td>
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<tr>
<td>• Sends a copy of prescription(s) written by a specialist and copy of reconciled medication list to the patient’s PCP. PCP or designated clinic staff enters new prescription(s) and other medication updates into patient’s EHR</td>
</tr>
<tr>
<td>6.Processes prescription using standard LCHC pharmacy systems and procedures including screening for drug duplications, allergies, contraindications, errors, and other standard safety checks</td>
</tr>
<tr>
<td>7. Pharmacist counsels patient on new specialty prescription and encourages patient to report ADEs using central phone line. PAD case manager contacts patient after visit to the specialist to coordinate care back to the PCP</td>
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LCHC indicates Lincoln Community Health Center; PCP, primary care provider; PADC, Project Access of Durham County; OTC, over-the-counter; EHR, electronic health record; BMI, body mass index; CPS, clinical pharmacy services; ADEs, adverse drug events.
Implemented a Medication Reconciliation Guideline

Third, pharmacy staff set out to establish a consistent process for conducting medication reconciliation. To start, pharmacy staff determined the percentage of patients able to provide a medication list when asked. The Chief of Adult Medicine then wrote and implemented policies and procedures stating that patients treated in the adult medicine clinic would receive a reconciled medication list, with the nurse or physician responsible for entering medications in the EHR and giving patients an updated medication list. The document did not provide specific information on how to conduct medication reconciliation. A subgroup of LCHC team members—including a pharmacist, pharmacy technician, nurse, and the Chief of Adult Medicine—formed to test the procedures by collecting data on a single day from patients seen in the adult medicine clinic by the Chief of Adult Medicine. After the initial test period, the subgroup huddled and made minor changes to the procedures based on the experience. This approach allowed quick identification of system barriers to conducting medication reconciliation. The revised procedures were evaluated on a second day with adult medicine patients of two physicians. Experiences from these tests were incorporated into the final medication reconciliation policies and procedures for use in the adult medicine clinic. The LCHC team subgroup then shared the adult medicine policies and procedures with other LCHC clinics, with encouragement for each clinic to write and adopt their own policies and procedures for medication reconciliation.

Subsequent assessments on the percentage of patients possessing a medication list showed little, if any, improvement. Likewise, there was no improvement in the number of clinics adopting their own policies and procedures. In response, LCHC pharmacists developed a medication reconciliation guideline detailing best practices and based on information from the Joint Commission’s National Patient Safety Goal 8 and several prominent organizations.13–15 The guideline described the four steps of medication reconciliation—verification, clarification, reconciliation, and transmission—and specified roles and responsibilities for all involved in the process including nurses, physicians, pharmacy technicians, and pharmacists. After approval by the P&T Committee, pharmacists shared the guideline with each LCHC clinic and asked clinic leaders to use the guideline as the basis for creating clinic-specific policies and procedures for conducting medication reconciliation. A copy of the guideline resided on the LCHC intranet site for easy access.

Designated a Single Point of Accountability

Fourth, the team hired a bilingual person experienced in working on health service projects to serve as a single point of accountability within the LCHC Pharmacy. The Lincoln Community Health Center pharmacy and PADC jointly funded the position. The new hire received on-site pharmacy training, registered with the N.C. Board of Pharmacy, and eventually earned national certification as a pharmacy technician. This technician screened all outside prescriptions presented by PADC patients to LCHC Pharmacy to ensure that the prescription(s) resulted from an authorized specialty referral. The technician’s ability to access the PADC database and verify PCP referral to the specialist eliminated the need for a previously time-consuming, burdensome procedure that required a PCP to cosign prescriptions written by specialists in order to verify referral. The technician was responsible for processing all specialty prescriptions for PADC patients, printing the patient’s current medication list contained in the EHR and reviewing it with the patient, and completing documentation to obtain medications through a patient assistance program, when necessary. The technician updated the medication list based on information provided by the patient, making corrections and adding new specialty medications as well as OTC and herbal products. In the Latino population, the technician inquired about products purchased at tiendas (stores serving the Latino population and a common source of medications). The pharmacy technician gave an updated medication list to the patient and a copy of each new prescription written by a specialist to the patient’s PCP. Although not perfect, the PCP maintained responsibility for entering new medication data into the patient’s EHR. Ready access to the EHR in the pharmacy and workflow issues related to the use of multiple computer systems made entry of specialty prescriptions by pharmacists impractical. However, sending the information to the PCP for data entry facilitated communication and allowed the PCP to review medications prescribed by the specialist and make immediate changes, if necessary.

Improved Efficiency

Fifth, LCHC pharmacy improved efficiency by implementing an electronic tracking system for medications obtained through patient assistance programs. Pharmacy staff evaluated 6 software programs designed to streamline paperwork and tracking associated with these programs, making medication reconciliation easier. Pharmacy staff gained additional efficiency by implementing a simple, paper form to track and facilitate consistent delivery of clinical pharmacy services. The pharmacy technician completed the form for each PADC patient. The form, which captured information for all ten areas of clinical pharmacy services, proved vital to overall management and evaluation of changes made by the LCHC team.

Performed Nontraditional Roles

Sixth, both pharmacy staff and case managers performed nontraditional roles. The pharmacy technician helped address obesity in the PADC population by obtaining weight and height measurements from patients picking up prescriptions if information in the EHR was outdated or missing. The technician used the data to calculate the patient’s BMI, with subsequent EHR documentation. Those with a BMI greater than 30 received a weight management brochure from the technician. LCHC pharmacists previously developed the brochure, in English and Spanish, and tested it with patients. In the pretest, patients expressed sensitivity to the word “obesity,” prompting the brochure and discussions to focus on “BMI and Your Health.” The technician counseled obese patients and informed them about existing weight management services including on-site nutrition counseling, diabetes education, a patient walking club, or other available services, with follow-up planning documented in the patient’s EHR.

PADC case managers working at LATCH took on the role of addressing issues related to medication use as part of providing disease management services to PADC patients. PADC case managers contacted patients after their specialist visit to ensure the patient filled newly prescribed medications and understood information received from the specialist. For patients with 2 or more chronic conditions, of which, one was uncontrolled, case managers provided education, referral back to the PCP, and appropriate follow-up.

Extended Existing ADE Program

Seventh, LCHC pharmacy extended its existing ADE program to include reporting of ADEs and pADEs in PADC patients, even if the event occurred while the patient received care from...
a specialist outside of LCHC. Pharmacy staff promoted the use of an existing central telephone system for PADC patients to self-report ADEs. Staff also encouraged PCPs to use existing ADE templates that resided on the EHR to report ADEs or pADEs. Additionally, the Medication Error Reporting, Tracking and Prevention Committee, a subcommittee of the P&T Committee, reviewed ADE and pADE data quarterly to identify and implement system changes, as needed.

Pharmacists also expanded mandatory counseling to all PADC patients filling a new specialty prescription. Pharmacists applied the teach back method during counseling sessions in patients with complex regimens and/or medication devices by asking patients to restate the information provided during the sessions. This practice contributed to patient safety by verifying patient understanding and correcting misinformation before dispensing.

**Improved Communication**

Finally, the LCHC team used an intranet site to enhance communication of safe medication practices and policies. Pharmacy staff consolidated a list of high alert medications into a single resource guide that included look-alike/sound-alike drugs, drugs with a narrow therapeutic index, drugs requiring laboratory monitoring, drugs requiring an indication on the prescription, and hazardous medications. The pharmacy posted this resource document, along with pharmacy policies and procedures and patient education brochures, on the intranet site.

**Other Changes**

Additional changes occurred to address special or unanticipated circumstances such as developing a process for obtaining compounded medications from outside pharmacies, managing starter dose vouchers provided through patient assistance programs, and providing services to PADC patients at the homeless shelter.

**RESULTS**

Between July 2008 and December 2009, 715 specialists and 1725 patients participated in PADC, during which 320 patients had prescriptions processed at LCHC pharmacy. The majority of patient participants were female (60%), aged 45 to 64 years (53%), African American (53%), or Hispanic (30%). On average, PADC patients received just more than 5 prescriptions each month. Integration of patient safety and clinical pharmacy services led to improvement in all targeted outcomes. Table 2 links each measure with the changes contributing to the improvements, with most changes impacting multiple measures.

**Medication Reconciliation**

Figure 1 shows the percent of PADC patients that possessed written documentation of current, reconciled medications, including prescription, over-the-counter, and herbal products from November 2008 to November 2009. Baseline assessment revealed that 0% to 20% of PADC patients possessed a comprehensive medication list, depending on clinic site and sampling technique. Patients of the adult medicine clinic more often had a reconciled medication list compared to patients of other clinics, likely due to the Chief of Adult Medicine participating as a LCHC team member and providing high-level support for the initiative. Designating a single point of accountability for the pharmacy and centralizing medication access were the most impactful changes that increased the number of PADC patients with a reconciled medication list to 100% (Fig. 1). The large spike in the percentage of patients with written documentation of a reconciled medication list noted between May 2009 and July 2009 was due to the hiring and training of the pharmacy technician whom assumed responsibility for serving as the single point of accountability for PADC patients. Distribution of the detailed medication reconciliation data was critical to ongoing monitoring and quality improvement initiatives.

**TABLE 2. Changes Made by the LCHC Collaborative Team Listed According to the Measures Tracked**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Changes Contributing to Outcome Improvements</th>
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<tbody>
<tr>
<td>Medication Reconciliation</td>
<td>• Designated a single point of accountability in the pharmacy for PADC population</td>
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<tr>
<td></td>
<td>• Centralized medication access through formulary expansion</td>
</tr>
<tr>
<td></td>
<td>• Instituted a medication reconciliation guideline</td>
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<tr>
<td></td>
<td>• Enhanced data access by pharmacy staff</td>
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<tr>
<td></td>
<td>• Consistently communicated new medications to PCP</td>
</tr>
<tr>
<td></td>
<td>• Implemented electronic tracking of drugs obtained through patient assistance programs</td>
</tr>
<tr>
<td>Obesity</td>
<td>• Designated a single point of accountability in the pharmacy for PADC population</td>
</tr>
<tr>
<td></td>
<td>• Used pharmacy technician to screen and counsel obese patients</td>
</tr>
<tr>
<td></td>
<td>• Conducted pretest of obesity educational brochure</td>
</tr>
<tr>
<td></td>
<td>• Enhanced data access by pharmacy staff</td>
</tr>
<tr>
<td>Patient Safety (ADE and potential ADE)</td>
<td>• Referred obese patients to existing weight management resources</td>
</tr>
<tr>
<td></td>
<td>• Expanded existing patient safety practices to specialty medications for PADC population including medication screening, ADE self-reporting, and mandatory counseling</td>
</tr>
<tr>
<td>Clinical Pharmacy Services</td>
<td>• Provided easy access to safe medication practice information on intranet site</td>
</tr>
<tr>
<td></td>
<td>• Consistently communicated new medications prescribed by specialists to PCP</td>
</tr>
<tr>
<td></td>
<td>• Enhanced data access by pharmacy staff</td>
</tr>
<tr>
<td></td>
<td>• Centralized medication access through formulary expansion</td>
</tr>
<tr>
<td></td>
<td>• Tested and modified prescription label</td>
</tr>
<tr>
<td></td>
<td>• Designated a single point of accountability for PADC population in the pharmacy</td>
</tr>
<tr>
<td></td>
<td>• Collaborated with PADC case managers to inquire about medication use as part of disease management services</td>
</tr>
<tr>
<td></td>
<td>• Enhanced data access by pharmacy staff</td>
</tr>
<tr>
<td></td>
<td>• Used clinical pharmacy services tracking form</td>
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</table>

LCHC indicates Lincoln Community Health Center; PADC, Project Access of Durham County; PCP, primary care provider; ADE, adverse drug event.
guideline, led to 8 of 10 clinics approving medication reconciliation policies and procedures. Specific challenges for providing accurate medication lists included the prescribing of short-term medications (i.e., antibiotics or pain relievers), delivery of the prescription to the pharmacy by a method other than the patient (i.e., by a nurse, caregiver, or facsimile machine), and the prescribing of nonformulary medications requiring pharmacist consultation with the specialist.

Obesity

Patients with a current BMI documented in the EHR rose from 75% at baseline to 100% over the course of Collaborative participation between November 2008 and September 2009 (Fig. 2A). Likewise, documentation of obesity follow-up planning during this period increased from 0% at baseline to 100% (Fig. 2B). The large improvements in obesity screening and follow-up planning observed between May 2009 and July 2009 were again due to the hiring and training of the pharmacy technician who assumed responsibility for serving as the single point of accountability for PADC patients.

Patient Safety

From November 1, 2008, to November 30, 2009, LCHC pharmacy dispensed 201,289 total prescriptions with 1093 of those prescribed by a specialist for PADC patients. Application of existing ADE-prevention practices likely contributed to only 2 ADEs and 2 pADEs being reported in the PADC population during Collaborative participation.

Clinical Pharmacy Services

Figure 3 details the subjective frequency and intensity ratings of ten Clinical Pharmacy Services (CPS) provided by LCHC Pharmacy staff as assessed in November 2008 and September 2009. Recall a rating of “0” meant no services were provided at that time, and a “10” rating indicated the CPS was offered, fully implemented, provided to all or most PADC patients. Before Collaborative participation, LCHC Pharmacy provided 8 of the 10 clinical pharmacy services at a level less than 10 based on subjective assessment. Through Collaborative participation, LCHC Pharmacy initiated 2 additional services—preventative care programs (i.e., obesity screening and follow-up planning) and disease state management—affirmation to using pharmacy staff and case managers in nontraditional roles. Based on pharmacy staff assessment, 5 of the 10 services reached an intensity level of 10, with 4 other services reaching an intensity level of 9. A look at pharmacy interventions during July 2009 revealed that the majority of pharmacist time was spent evaluating the need for therapeutic substitution of nonformulary medications or obtaining a nonformulary specialty medication. Overall, nonformulary prescribing was low, occurring more often in PADC patients compared with non-PADC patients (5% vs. 0.7%) and required double the amount of time spent by a pharmacist for intervention.

DISCUSSION

Changes made through execution of the PDSA cycles helped integrate clinical pharmacy services into care provided the PADC population and improve all targeted outcomes. Although not the primary intention, the changes helped establish LCHC as the patient’s medical home. The concept of a medical home is consistent with the push to provide patient-centered health care and supports the movement to establish community pharmacists as primary care pharmacists.

At the end of Collaborative participation, all PADC patients received a reconciled medication list. Pharmacists and other medical providers use medication reconciliation as a strategy to enhance patient safety and reduce the risk of adverse drug events. Performing medication reconciliation at every transition in care or medication change helps avoid errors such as omissions, duplications, dosing, or drug interactions. Two keys to success with medication reconciliation included designating a single point of accountability in the pharmacy and centralizing medication access. The use of a bilingual pharmacy technician as the point of accountability helped limit administrative costs while meeting patient needs. Centralizing medication access assisted pharmacists in screening for drug interactions, adverse drug events, and drug duplication, with several drug misadventures prevented as a result. With expanded access to
multiple data systems, pharmacy staff could more efficiently clarify medication orders, review medication changes made during hospitalizations, communicate with providers using the EHR messaging system, and verify specialist referrals. If a medication was not available through LCHC Pharmacy, the pharmacy staff facilitated coordination services with Duke Hospital outpatient pharmacy or another pharmacy or referred the patient to PADC case managers for further assistance. Additionally, LCHC Pharmacy ensured that the patient’s PCP received a copy of all prescriptions written for PADC patients for documentation in the EHR. This feedback to the PCP may help improve a challenge identified by other researchers of clinicians not updating the medication list by making it easier to know what medications were prescribed by specialists and updating the EHR accordingly.

Several measures improved because both pharmacy staff and LCHC partners performed tasks that fell outside their traditional roles. Documentation of BMI and obesity follow-up plans increased by using a pharmacy technician to calculate BMI, counsel patients, and refer obese patients for further support. Because pharmacy staff may encounter patients taking medications for obesity-related chronic conditions more frequently than other health professionals, others working to tackle obesity may wish to consider what roles community-based pharmacy staff could play in addressing barriers to obesity management. Likewise, working with community-based case managers to inquire about medication use as part of disease management services helped integrate clinical pharmacy services into the care provided PADC patients and allowed case managers to address medication concerns including access-related issues or misunderstandings.

ADEs and pADEs seemed low in the PADC population most likely because of existing medication safety systems at LCHC Pharmacy. Underreporting of ADEs and pADEs remained a possibility. A nonpunitive environment exists at LCHC that supports physicians, pharmacy staff, and other medical providers in reporting ADEs and pADEs. Every quarter, staff evaluates ADE and pADE situations and implements appropriate interventions aimed at improving medication safety. Incorporating the PADC population into this medication safety system proved efficient and effective.

Participating in the Collaborative offered benefits directly to the LCHC team such as learning from other organizations and sharing data collection methods. For example, many organizations, including LCHC, struggled with establishing definitions for measurements and developing a system for documenting interventions. Therefore, the entire group worked to develop standardized definitions. LCHC also adopted the clinical pharmacy services tracking form from another team. Each team could also learn about unique aspects of other organizations and test any elements that fit their own situation.

Finally, Collaborative participation had a broader impact on the general patient population at LCHC. Implementing a medication reconciliation guideline helped improve the number of overall patients receiving a medication list. Having a bilingual pharmacy technician improved access to interpretation for Spanish-speaking patients using LCHC Pharmacy. Increased data access enhanced pharmacists’ ability to evaluate medication safety issues in all LCHC patients. Expansion of the formulary to include specialty medications improved access to specialty medications for other LCHC patients. Likewise, implementing electronic tracking of drugs obtained through patient assistance programs simplified access for the general LCHC population.

CONCLUSION

Participation in the HRSA-sponsored Collaborative assisted LCHC in improving health outcome measures while expanding patient safety and clinical pharmacy services to a high-risk, ambulatory population. Applying the PDSA cycle of learning provided a quick and systematic approach to testing and implementing changes. Changes made helped establish LCHC as the patient’s medical home while facilitating communication among multiple organizations and healthcare professionals working to provide care. Our efforts further support the view that pharmacists can work collaboratively to ensure the safe and effective use of medications and improve health outcomes.

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FIGURE 3. The change in level of service provided based on frequency and intensity for each of the ten clinical pharmacy services, measured in November 2008 and September 2009.
Technician Supervisor, Lincoln Community Health Center; Matthew Bouchard (At the time of the Collaborative, Mr. Bouchard served as a pharmacy technician and the Pharmacy Care Coordinator for PACD patients.); Mary Baldwin, RN, MPH (At the time of the Collaborative, Mrs. Baldwin served as Director of Nursing and Quality Assurance Coordinator, Lincoln Community Health Center.)

REFERENCES


