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Evaluating Implementation and Barriers to Sustainability of an Asthma Clinical Quality Improvement Project

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Abstract

Purpose and Objectives

Asthma is an important public health issue in Utah and quality asthma care is essential to addressing the burden of asthma. The purpose of this initiative was to evaluate clinical asthma quality improvement (QI) program delivery formats and identify barriers to sustaining QI processes.

Intervention Approach

The focus of the intervention was to improve clinical asthma care through reducing variation in clinician knowledge about recommended asthma care and facilitating process improvements in asthma care delivery using Academic Detailing (AD) and Learning Collaboratives (LC) QI delivery formats.

Evaluation Methods

A pre/post-test design was used to compare improvements between QI delivery formats in documentation of asthma control and asthma action plans in patient medical charts from baseline to 6-month post-intervention. Content analysis was used to analyze focus group data from a subset of clinics that provided feedback regarding the sustainability of implemented QI processes.

Results

Substantial improvements in the two asthma measures were achieved for both the AD and LC formats. The average percentage of patients with asthma control documentation increased from baseline (AD: 30.7%; LC: 35.2%) to 6 month follow-up (AD: 85.5%; LC: 70.6%). The average percentage of patients with documented AAPs increased from baseline (AD: 4.1 %; LC: 13.0%) to 6 month follow-up (AD: 62.1%; LC: 61.5%). Focus group data showed it became increasingly difficult to maintain QI processes over time due to cumbersome EHR systems and a lack of trained staff, ongoing support, and value seen in QI.

Conclusion

Both AD and LC QI delivery formats were effective in improving QI processes. To maintain QI processes long-term, the following areas should be addressed post-implementation: assistance in overcoming EHR barriers related to QI processes, ongoing training for clinic staff, assistance in building value seen in QI processes, and development of a plan for ongoing support specific to clinic needs.

Keywords

asthma, clinical quality improvement, evaluation

Introduction

Asthma is an important public health issue in Utah. Over nine percent (9.9%, N=225,203) of adults and 5.6% (N=52,146) of children in Utah had asthma as of 2019 (Utah Department of Health [UDOH], 2019). Effective patient and health care provider asthma management practices are needed to attain asthma control and avoid poor asthma outcomes (National Asthma Education and Prevention Program [NAEPP], 2007). Evidence from the Utah public health surveillance data suggests there is room for improvement in asthma care for children. Utah emergency department visits from 2005-2014 held steady at an age-adjusted rate of 25 visits per 10,000 population (UDOH, 2019). Given these statistics, it is important to consider implementing feasible interventions that have the potential to move the dial in a positive direction towards improved asthma management practices.

One point of asthma intervention is the medical clinic. Clinical assessment of asthma control and medication and documentation of these practices has been shown to improve asthma control and health outcomes (Gibson, 2000; Rege et al., 2020). Research has also shown that implementation and documentation of Asthma Action Plans (AAPs) into clinical practice is an effective way to improve asthma control (Akhter et al., 2017). Asthma control tests and AAPs are important components of asthma care because they assist in monitoring asthma over the long term to assess and manage control and adjust therapy, as suggested by the National Asthma Education and Prevention Program guidelines (NAEPP, 2007); therefore, practices create dynamic working documents or patient care tracking systems to help document, track, and measure these outcomes. These documents are tailored to each clinic and are usually created in an Excel spreadsheet. These data can be collected from hard copy forms or extracted from electronic health records (EHRs). These documents can be populated all at once or gradually and contain as much or as little information as desired. Some clinics are able to create patient documentation and tracking systems using their EHRs. In Utah, evidence suggests that more can be done to improve asthma management through the use of AAPs. For example, only 42% of children and between 19% and 26.6% of adults reported ever having received an AAP in Utah during 2015-2016 (UDOH, 2020).

There is a critical need to increase documentation of asthma care practices in clinics to improve quality care, especially in children (Rege et al., 2020). Clinical quality improvement (QI) projects have been shown to increase documentation of asthma measures leading to improvement in asthma care and outcomes (Weinberger et al., 2021; Rojanasarot et al., 2021). However, previous research has found that sustainability of asthma QI activities including documentation of asthma measures declines with time (Schechter et al., 2021). Little is known about the “why” or the barriers to sustainability of asthma clinical QI projects long-term.

The Utah Pediatric Partnership to Improve Healthcare Quality (UPIQ), with funds from the Utah Asthma Program (UAP), implemented a QI initiative consisting of two different educational formats—Academic Detailing and Learning Collaboratives—to assist clinics in

learning how to measure, document, and track progress toward better asthma patient care using clinical asthma measures. Academic Detailing (AD) is a well-known method of peer-to-peer educational outreach (United States Department of Health and Human Services Agency for Healthcare Research and Quality, 2013). In contrast, the Learning Collaborative (LC) method offers a collective learning approach as multiple practices across various health systems are learning collaboratively and simultaneously as well as actively applying QI principles (Institute for Healthcare Improvement [IHI], 2003). The LC format takes place as a group with multiple clinics that learn QI concepts and processes together, whereas, in the AD format, clinicians learn independently of a group, and the QI coach goes to each clinic separately to provide in-person education. In both formats, the QI coach provides the team with guidance, support, and monthly performance reports via email, phone, and in-person visits. The most notable differences between the two formats are delivery of content (e.g., one-on-one vs. group learning) and time related to facilitation of these formats.

The purpose of the initiative was two-fold. First, we wanted to evaluate the clinical asthma QI initiative delivery formats while also considering how one format might better meet stakeholder needs. Second, we wanted to understand barriers to maintaining QI improvements post implementation so that we could work to remove those barriers and ensure that the time and resources put into improving asthma clinical care was sustained.

An evaluation planning group was created and led by the UAP epidemiologist/program evaluator and included UAP and UPIQ staff. The group worked together to create and implement the evaluation plan using the Learning and Growing through Evaluation: State Asthma Program Evaluation Guide and Individual Evaluation Plan Outline (Centers for Disease Control [CDC], 2010). The plan included but was not limited to creating evaluation questions, measures, methods, criteria of success, and a plan for recommendation implementation. Overarching evaluation questions were: “Are the AD and LC formats comparable in producing intended outcomes?” and “To what extent have processes that were improved during the QI project been maintained after the project and what were barriers to maintenance?” Data was collected pre-, during, and post-implementation to determine if improvements in asthma measures were comparable between the two formats and to determine which format would best meet the needs of UPIQ. We also held focus groups with a subset of participating clinics 6 months to 2 years post implementation to provide insights on barriers to long-term sustainability.

Methods

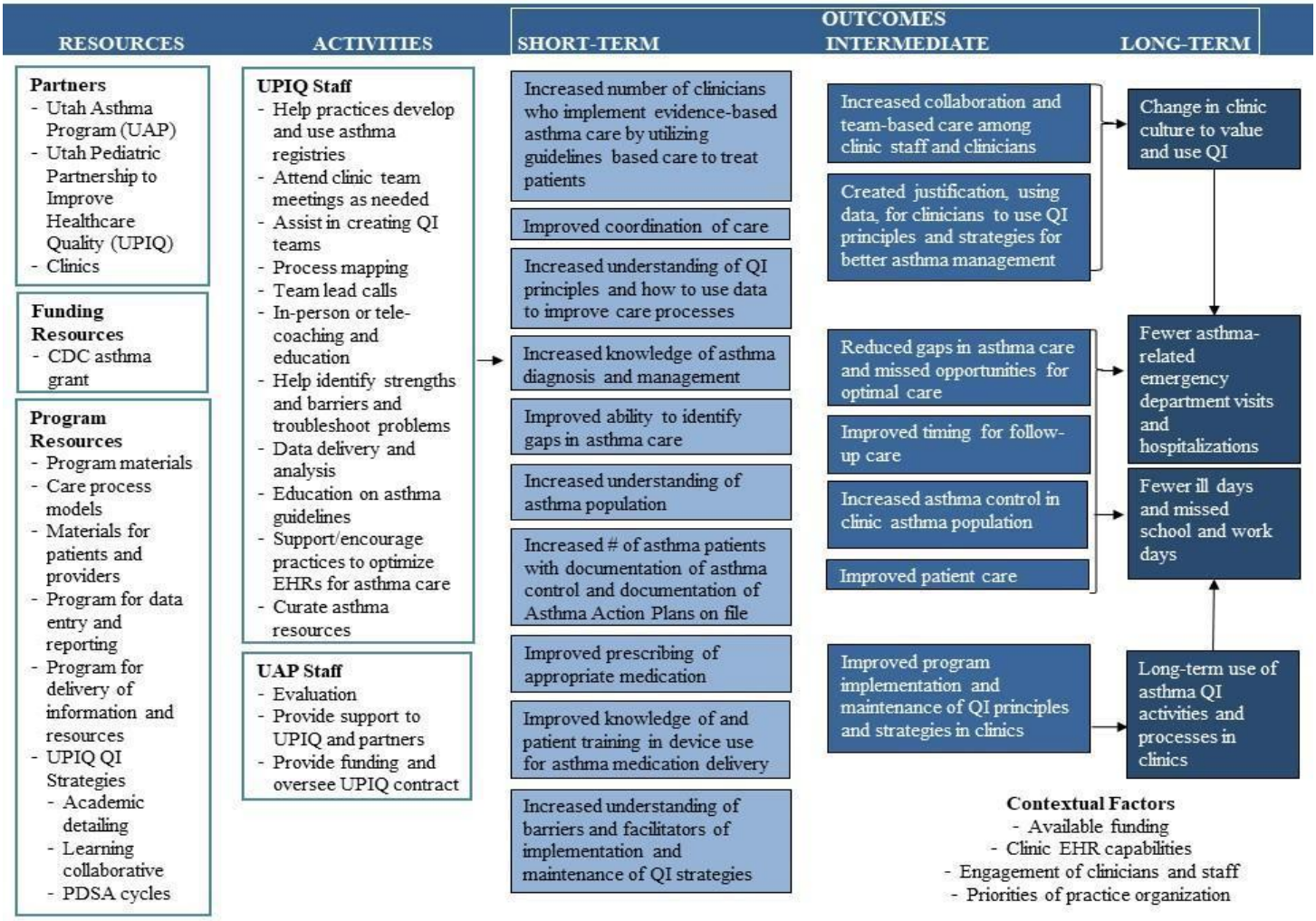
Intervention Approach

The UPIQ QI initiative focused on reducing variation in clinician knowledge about recommended asthma care and facilitating process improvements in asthma care delivery. The QI initiative addressed assumptions made in the logic model (**Fig 1**), which are

substantiated by previous research (Simoneau & Cloutier, 2019) about gaps between clinician knowledge and asthma care.

Figure 1

UPIQ and UAP Asthma Clinical Quality Improvement Program Logic Model



UPIQ attempted to reduce knowledge variation by providing educational webinars or in-person learning from pulmonary specialists about the nuances of asthma pathophysiology and recommended care as it pertains to the NAEPP guidelines. Clinicians and their care teams received educational interventions at the beginning of the QI initiative in order to ensure knowledge gaps were addressed prior to embarking on process changes. With the introduction of the QI specialist to the practice, each clinic established a QI team with roles and responsibilities. Once the QI team was established, the QI specialist facilitated problem identification through formal QI exercises including process mapping of asthma care delivery respective to each practice. Once problem identification was completed and QI teams understood how to measure for improvement, practices determined their own site-level intervention ideas and began tests of change.

The UPIQ QI initiative consisted of four phases for both delivery formats. The first phase was the Enrollment Phase in which primary care practices completed a registration form, support agreement, and practice expectations. The second phase was the Initial Engagement Phase which included a practice assessment to identify areas of improvement and do team building. The assessment included process mapping in order to understand current care processes within the clinic and identify areas in need of improvement. The third phase was the Implementation Phase where UPIQ utilized the Model for Improvement (IHI, 2023) which incorporates Plan-Do-Study-Act (PDSA) cycles to test changes on a small scale. Phase 4 was the Follow-up Phase which occurred 6-months after completion of the initiative. It included a reassessment of the practice's performance on measures previously evaluated and addressed any follow-up questions concerning sustainability of improvements achieved.

Sampling

Twelve clinics across Utah participated in the UPIQ QI initiative, in which three of the clinics implemented the AD approach, and nine clinics implemented the LC approach. These approaches were implemented at different times. The AD cohort was implemented in 2015-2016 and consisted of 11 monthly follow-ups and one 6-month post-project follow-up. The LC cohort was implemented in 2017 and consisted of 7 monthly follow-ups and one 6-month post-project follow-up.

Both groups of clinics were targeted for participation using surveillance data to identify those with a high burden of patients with poorly controlled asthma. Clinics were identified using All-Payer Claims Data to calculate National Quality Forum (NQF) 1800 (NQF, 2018). Clinics with a low NQF 1800 percentage were contacted for enrollment through emails and phone calls. Additionally, clinics were recruited using the Utah Chapter of American Pediatrics database to email a general announcement about the project and registration process. Any clinic that expressed interest in participation was included in the project.

The clinics implementing the AD approach varied widely in their characteristics and context. One clinic group was located in an urban area of Utah with a small percentage of minorities. The clinic group consisted of four pediatric clinics that serviced a relatively small asthma population, with 27 health care providers on staff (i.e., medical doctors, physician assistants, nurse practitioners, nurses, and medical assistants). The second clinic was located in a small rural area in southwest Utah. They served a large asthma population from adolescent group homes despite being a very small clinic with four staff (one medical doctor, one care coordinator, and two medical assistants). The third clinic was a large Federally Qualified Health Center, with several staff (two medical doctors, two Physician Assistants-Certified, one nurse practitioner, a clinic director, and several administrative staff) located in an urban part of Salt Lake County. They served a relatively large asthma population that also consisted of low socioeconomic status, vulnerable, and minority populations.

In the clinics implementing the LC approach, there were 10 primary care teams of 20 clinicians and multiple staff. The practices were from rural, suburban, and urban areas of Utah. The group also consisted of an FQHC and free clinics that serve vulnerable populations such as refugees and unhoused people. The characteristics of the clinics in the LC group were similar to those in the AD group.

Data Collection and Analysis

The initiative used a mixed method design and collected quantitative and qualitative data to determine if there were differences in outcomes between QI delivery formats and to understand barriers to QI process sustainability. Measures included pre- and post-test documentation of asthma control tests and AAPs as well as focus group content analysis of a subset of clinics.

Outcome measures collected across clinics included: (1) percent of patient encounters per month where asthma control is documented and (2) percent of patient encounters where there is an up-to-date asthma action plan on file. Data collection for these measures varied slightly between the AD and LC sites. For the AD clinics (N=3), all charts included in each phase of data collection were randomly selected from each clinic. Chart extraction occurred at 13 different time points—the team gathered baseline data (30 charts), data for each of the eleven months during the intervention (10 charts per month for nine months; 30 charts for the last month of the intervention), and data from six months post-intervention (30 charts). Chart extraction was also performed regularly for the LC sites. Specifically, charts (N=30) were randomly sampled for each clinician (N=20) at baseline and 10 charts were randomly selected per clinician (N=20) for each follow-up during the intervention period. At the 6-month post project follow-up each practice (N=10) sampled 30 charts. Fewer charts are sampled at the 6-month follow-up than at baseline because there was less time to collect data between the end of the intervention and the 6-month follow-up.

Three focus groups were conducted within the AD sites (one in each site) to learn more about the barriers and successes to maintaining QI processes. Each clinic focus group consisted of clinic personnel who directly or indirectly participated in the QI initiative activities. This included office administrative staff, doctors, physician assistants, and nurses. The number of participants per focus group ranged from 2-5. Two out of three focus groups were in person. The third focus group was held over the phone due to the long distance between the clinic and the Utah Department of Health. Each focus group was one hour long to accommodate the lunch break of the clinic staff. Lunch was provided free of charge for those participating in the in-person focus groups. The time from QI project completion to focus group participation ranged from 6 months to 2 years. Focus groups were not conducted with the LC group because the group was not finished with the project when the evaluation was conducted.

Focus group participants were provided the list of questions and reference materials to guide them during the discussion. The information was recorded using a USB flash drive voice

recorder, and the audio was uploaded and transcribed using a free web-based program. Participants were also given a survey that assessed the quality of the focus group. This information was used to assess the reliability of focus group information. Survey questions included:

- My point of view was adequately represented
- I had a chance to say everything I wanted to say
- I felt comfortable speaking my opinion
- The summary of questions and references was helpful

The answer response options included "Strongly Agree", "Agree", "Disagree", and "Strongly Disagree". The range of possible scores for each question was a minimum of 1 and a maximum of 4 with 1 representing "Strongly Disagree" and 4 representing "Strongly Agree" on the response scale. The average score was calculated for each question.

The focus group transcripts were analyzed for common themes using Krueger and Casey's framework (Krueger, 1994). The framework criteria included: consider the actual words used and their meaning, consider the context, consider the frequency and extensiveness of the comments, assess the intensity of the comments, assess internal consistency, assess the specificity of the responses, and look for big ideas or larger trends or concepts that emerge. The themes were coded using Bryman's Four Stages of Coding (Gibbs, 2010) which provided a methodology for coding data based on Krueger and Casey's seven criteria. Focus group data was analyzed and reported separately for each clinic due to differences in clinic context. Focus group data was also analyzed by evaluation questions to identify answers that were similar across clinics.

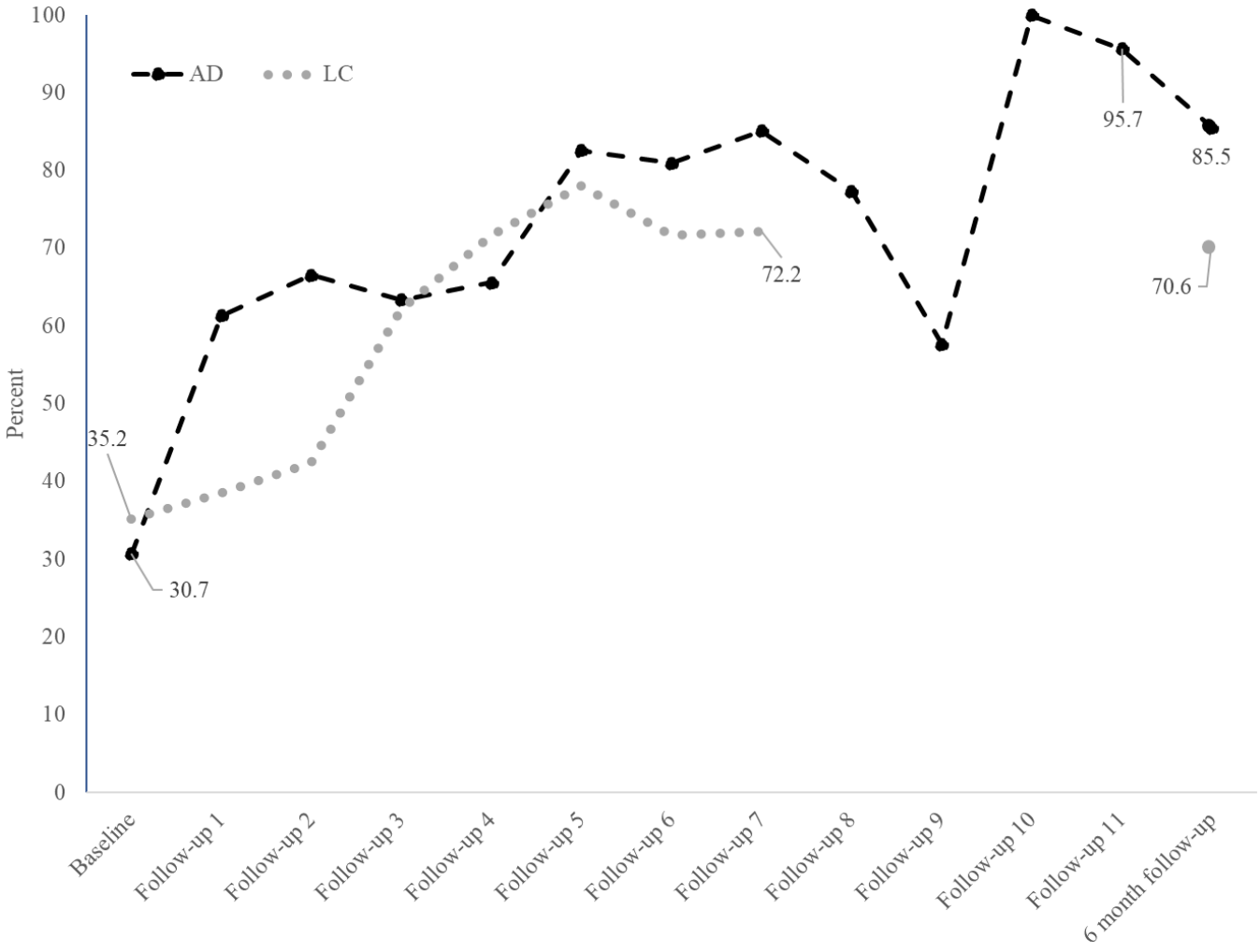
Results

Outcome Indicators

Participating practices achieved significant improvements in the measures from baseline performance to the end of the project and maintained those improvements to at least 6-months post project. Substantial improvements were achieved for both the AD and LC formats. The AD group had an average of 30.7% of patients with asthma control documentation at baseline which increased to 95.7% at the final follow-up in month 11 (**Fig 2**). This improvement was maintained at the 6-month post project follow-up with an average of 85.5% of patients with asthma control documentation (**Fig 2**). A large drop in improvement at follow-up in month 9 was due to one clinic reporting 0 patients with asthma control documentation (**Fig 2**). This happened because the clinic had only one patient with asthma during that month. The LC format had a baseline average of 35.2% of patients with asthma control documentation which increased to 72.2% at the final follow-up in month 7 (**Fig 2**). This improvement was maintained for the 6-month post project follow-up with an average of 70.6% of patients having asthma control documentation (**Fig 2**).

Figure 2

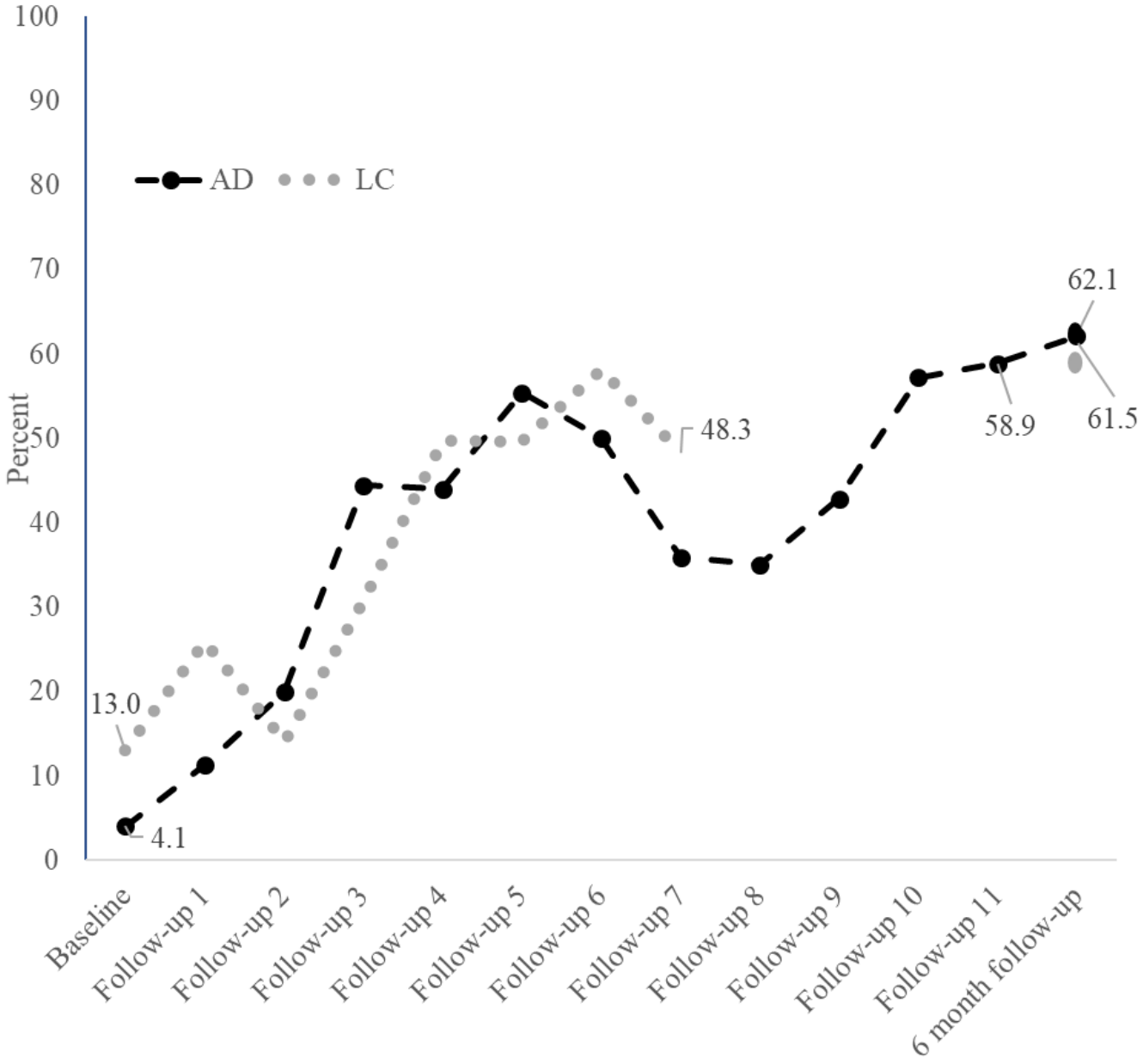
Average Percent of Patients with Asthma Control Documentation on File



For both the AD and LC formats, similar improvements were achieved for the AAP documentation measure. The AD group had an average of 4.1% of patients with AAP documentation at baseline which increased to 58.9% at the final follow-up in month 11 (**Fig 3**). This improvement increased slightly by the 6-month post project follow-up with an average of 62.1% of patients with AAP documentation (**Fig 3**). The LC format had a baseline average of 13.0% of patients with AAP documentation which increased to 48.3% at the final follow-up in month 7 (**Fig 3**). These gains also appeared to increase at the 6-month post project follow-up with an average of 61.5% of patients with AAP documentation (**Fig 3**).

Figure 3

Average Percent of Patients with an Asthma Action Plan on File



Focus Group Quality Assessment Survey Results

The results of the focus group quality assessment survey indicate that the focus groups produced reliable information because participants felt their opinions were heard and they were able to say everything they wanted to say (**Table 1**).

Table 1. *Average Scores for Focus Group Quality Assessment Survey*

Survey Question	**Average Score** (Based on a scale of 1-4)
My point of view was adequately represented	3.5
I had a chance to say everything I wanted to say	3.8
I felt comfortable speaking my opinion	3.8
The summary of questions and references was helpful	3.5

Maintaining QI Processes

All three AD clinics who participated in the focus groups reported they were still using one or more of the newly implemented QI processes. Clinics most commonly reported maintaining the following QI processes: completing the asthma control test, collecting and documenting data to track patient care, updating patient care tracking systems, and using data to inform patient care. The consistency and level of implementation for each process varied by clinic. All clinics were still using the asthma control test when the focus group took place—two clinics used it consistently with all providers, the third noted that only some of the providers still used the form. Two clinics were using the pre-visit form when the focus groups took place—one of these used an extensive pre-visit form that included asthma control level from last visit, status of AAP, and spirometry results, whereas the other clinic only used the spirometry results. With respect to patient tracking systems, one clinic did not update their system while the other clinic did updates only when the clinician had free time. This resulted in incomplete data. Both clinics used their systems to create patient lists, and one clinic used it more extensively to fill in pre-visit form information.

Some clinics continued to collect some measure data and use their patient tracking system. The extent to which each of these processes were maintained varied extensively. For instance, with respect to the measures, one clinic used data to "map current clinical processes and make adjustments," while another clinic collected data but did not use it for QI activities because they "don't have time to update and run the numbers." The third clinic did not collect any measure data post project except for the 6-month follow-up.

The degree to which the QI processes were being used 6-months post project depended on several factors including: value seen in the process, the functionality of EHR or patient tracking system used at the clinic, and the availability of trained staff.

Value of QI Processes and Activities. Participants from clinics where providers and staff saw greater value in QI processes more frequently reported that they were still using the UPIQ QI processes and activities post project. For instance, clinics completing the QI project for continuing education credits appeared to make use of the QI principles for a shorter time post project than those clinics participating for specific QI purposes. Regardless of the clinics' initial motivation for participating, if providers and staff saw value in QI activities during the

project, they were more likely to continue QI activities post project. For example, focus group participants reported that providers were more or less likely to continue updating AAPs based upon the extent to which they valued AAPs. Participants reported that the value in the asthma control test came from witnessing improved patient outcomes as well as benefiting from the efficiencies of improved workflow. Participants reported that they liked how the asthma control tests helped providers to be on the same page in terms of documenting care and providing evidence-based care across the practice.

Data presentations at monthly follow-ups from UPIQ staff created a space where clinic staff could monitor progress and identify areas of improvement. Data presentations demonstrated improvement in care and created a sense of accomplishment and value in activities among staff. Seeing the data "encouraged staff to work harder" and helped maintain and improve skills by "helping staff remember QI processes."

EHR Functionality. The ability to easily update AAPs and asthma control tests and enter and retrieve asthma data from EHRs for patient tracking systems influenced the extent to which clinics maintained these activities. In fact, the most commonly reported barrier to maintaining processes and measures was poor EHR functionality. Participants reported that EHRs are clunky, hard to work with, and create additional steps when transferring data from EHRs to the patient tracking systems or pre-visit forms. Clinics had a difficult time finding the forms they needed within the EHR and printing out AAPs. As one participant noted, "Our EHR has documents everywhere so when you want to pull data it's kind of hard, and it's hard to put that information in." Being unable to easily and efficiently use EHRs means that it takes staff precious time to find forms and input and export data as needed.

The EHR's incompatibility with the patient tracking system to transfer data in one seamless step was reported as a significant barrier to maintaining QI processes like tracking patient care. Using the EHR to capture patient data for the patient tracking system means that extra steps have to be taken to export the EHR data out of the EHR and then manually input the data into the patient tracking system. This takes too much time for clinics and requires a deep understanding of the EHR that many clinic staff do not have.

Availability of Trained Staff. Staff turnover, irregular staff trainings on asthma QI processes, and no designated QI staff affected the longevity of QI activities. This theme in many ways ties directly to the EHR functionality just noted—specifically, lack of trained staff was mentioned as a barrier to maintaining asthma measures because the process for pulling, inputting, and presenting data from EHRs can be time-consuming and complex. As one participant said, "Maintaining the measures requires a person who knows how to input data and use it to run reports."

Staff turnover was a problem in maintaining QI activities when staff who were trained during the original project left the clinic. There was no process in place to train new staff on asthma

QI processes, so when trained staff members left, many of the asthma QI processes stopped. Additionally, training new staff can be difficult because of "information overload." For clinics that do not have designated QI staff, it can be difficult to pass on knowledge when a staff member involved in asthma QI processes leaves.

Clinics that had a designated staff member in charge of QI processes were more successful in maintaining QI processes. This person was typically responsible for collecting and entering data into the patient tracking system as well as for preparing pre-visit forms including asthma control information from previous visits. They were also responsible for training new staff on QI processes, therefore "training was not an issue" in maintaining QI processes. In clinics where the designated QI person had other responsibilities, it was reported that incorporating asthma QI activities did not interfere with their current workload.

Conclusion

The QI processes implemented through the UPIQ initiative appear to hold promise for improving documentation of asthma control tests and AAPs, regardless of delivery format. UPIQ made the decision to adopt the LC format exclusively based on evaluation findings which showed comparable improvements in asthma measures between the two formats. From UPIQ's perspective, the LC approach was more efficient because it could be implemented with fewer resources like time spent traveling from clinic to clinic while also reaching more clinics by allowing more clinics to participate at one time. It should be noted that one-on-one help was available by request to clinics participating in the LC format. One evaluation improvement would be to collect systematic data regarding time and use of resources needed to implement the different QI delivery formats; this information was gathered informally through conversations at monthly partner meetings between UPIQ and the UAP.

Overall, the declines in documentation of asthma control from final follow-up to the 6-month follow-up for both LC and AD formats (LC: 72.2% to 70.6%; AD: 95.7% to 85.5%) were relatively small, indicating that processes which were improved during the QI project were mostly retained for at least 6 months after the project. However, as indicated in focus groups, maintaining these processes past 6 months became increasingly difficult due to cumbersome EHRs and a lack of trained staff, ongoing support, and value seen in QI. In line with previous research (Ragazzi et al., 2011), it was reported in the focus groups that ongoing support would be helpful for sustaining changes. Those looking to implement similar QI projects should consider how these findings might impact sustainability of their projects and create a plan with stakeholders to address these issues long-term to ensure that efforts to improve asthma care and outcomes are sustained. Additionally, focus group participants indicated that follow-up content should be tailored to each clinic in terms of frequency and needs; however, common themes related to useful follow-up content included trainings to help maintain and grow staff knowledge about QI processes, help with improving EHR technology and staff

capacity to use EHRs, help with building buy-in and support for QI processes from clinic staff and leadership, and helping clinics to use their data for ongoing QI activities.

Perhaps one of the most significant but not surprising findings was that clinics that valued QI as part of their clinic infrastructure were more likely to be successful in maintaining processes. For instance, cumbersome EHR systems made the use and documentation of AAPs challenging. However, clinic staff who valued the AAP as an important tool in asthma self-management were able to overcome EHR challenges as was shown in the uptick in the number of AAPs documented 6 months after the project ended, which coincided with children returning to school in the fall. This finding illustrates that clinicians were continuing to utilize QI processes after the project ended because they valued AAPs despite the challenges of the EHR. If long-term follow-up with all clinics who complete QI projects is not possible, it would be best to focus on those who do not value QI as part of their clinic infrastructure.

One potential weakness of the evaluation was that LC clinics were not involved in the focus groups. The LC cohort was not finished when recruitment began for the focus groups. It was determined by the evaluation planning group that, although not ideal, it was acceptable to only include the AD clinics in this portion of the evaluation. In contrast, one strength of the evaluation was the focus groups included clinics with a wide range of characteristics including clinics from rural and urban areas of Utah, those with large and small minority populations, different types of clinics (FQHC vs. private clinic), and those with varying levels of QI infrastructure. Regardless of the wide variety in clinic characteristics, the themes reported from the focus group data were the same, suggesting that evaluation recommendations would apply to a wide range of clinics. An additional limitation related to generalizability is the impact of self-selection bias on successful outcomes. Although clinic recruitment was targeted to high burden clinics, inevitably, the clinics that chose to participate in the project may have already understood the importance of QI or had a QI infrastructure in place and were therefore in an advantageous position to see improvements.

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