

A Mixed Methods Evaluation of a Quality Improvement Model to Optimize Perinatal and Primary Care in the Community Health Setting

Jena Wallander Gemkow, MPH, BSN, RN¹

Ashlee Van Schyndel, MPH²

Renee M. Odom, MPH²

Ananya Stoller, MPH, PMP²

Lisa Masinter, MD, MPH, MS³

Ta-Yun Yang, MS⁴

Patricia A. Lee King, PhD, MSW⁴

Abigail C. Holicky, MPH⁵

Arden Handler, DrP²

¹AllianceChicago, Chicago, Illinois

²University of Illinois at Chicago School of Public Health, Center of Excellence in Maternal and Child Health, Chicago, Illinois

³Illinois Department of Public Health, Chicago, Illinois

⁴Northwestern University, Feinberg School of Medicine, Department Medical Social Science and University of Chicago, Pritzker School of Medicine, Evanston, Illinois

⁵University of Illinois at Chicago, College of Medicine, Academic Internal Medicine, Chicago, Illinois

ABSTRACT

PURPOSE Many maternal deaths occur beyond the acute birth encounter. There are opportunities for improving maternal health outcomes through facilitated quality improvement efforts in community settings, particularly in the postpartum period. We used a mixed methods approach to evaluate a collaborative quality improvement (QI) model in 6 Chicago Federally Qualified Health Centers (FQHCs) that implemented workflows optimizing care continuity in the extended postpartum period for high-risk prenatal patients.

METHODS The Quality Improvement Learning Collaborative focused on the implementation of a registry of high-risk prenatal patients to link them to primary care and was implemented in 2021; study data were collected in 2021-2022. We conducted a quantitative evaluation of FQHC-reported aggregate structure, process, and outcomes data at baseline (2020) and monthly (2021). Qualitative analysis of semistructured interviews of participating FQHC staff focused on the experience of participating in the collaborative.

RESULTS At baseline, none of the 6 participating FQHCs had integrated workflows connecting high-risk prenatal patients to primary care; by the end of implementation of the QI intervention, such workflows had been implemented at 19 sites across all 6 FQHCs, and 54 staff were trained in using these workflows. The share of high-risk patients transitioned to primary care within 6 months of delivery significantly increased from 25% at baseline to 72% by the end of implementation. Qualitative analysis of interviews with 11 key informants revealed buy-in, intervention flexibility, and collaboration as facilitators of successful engagement, and staffing and data infrastructure as participation barriers.

CONCLUSIONS Our findings show that a flexible and collaborative QI approach in the FQHC setting can help optimize care delivery. Future evaluations should incorporate the patient experience and patient-level data for comprehensive analysis.

Ann Fam Med 2024;22:37-44. <https://doi.org/10.1370/afm.3059>

INTRODUCTION

Maternal mortality rates have continued to rise nationally, with non-Hispanic Black birthing people being disproportionately affected—in 2020, they were almost 3 times more likely to die than non-Hispanic White counterparts.¹ Cardiac and coronary conditions were the leading underlying cause of pregnancy-related deaths among non-Hispanic Black persons, whereas mental health conditions led among Hispanic and non-Hispanic White persons, with a large proportion of deaths occurring postpartum.²⁻⁴ Consequently, it is critical for birthing people to remain engaged in care the first year postpartum. The transition from postpartum to primary care to address ongoing health concerns and to ensure long-term engagement with preventive care has received a lot of attention including recommendations by the American College of Obstetricians and Gynecologists and through federal and expanded Medicaid coverage extensions to 12 months postpartum in many states.⁵⁻⁸ There are, however, disparities in the use of preventive care services before and after pregnancy, and accordingly in maternal mortality and morbidity outcomes.⁹⁻¹²

Federally Qualified Health Centers (FQHCs) are safety-net settings that provide community-based care, often through multiple clinic sites, to underserved populations; as such, they are major sites for perinatal and primary care delivery. In 2020, FQHCs served more than 16.8 million women and 566,000 pregnant persons,

Conflicts of interest: authors report none.

CORRESPONDING AUTHOR

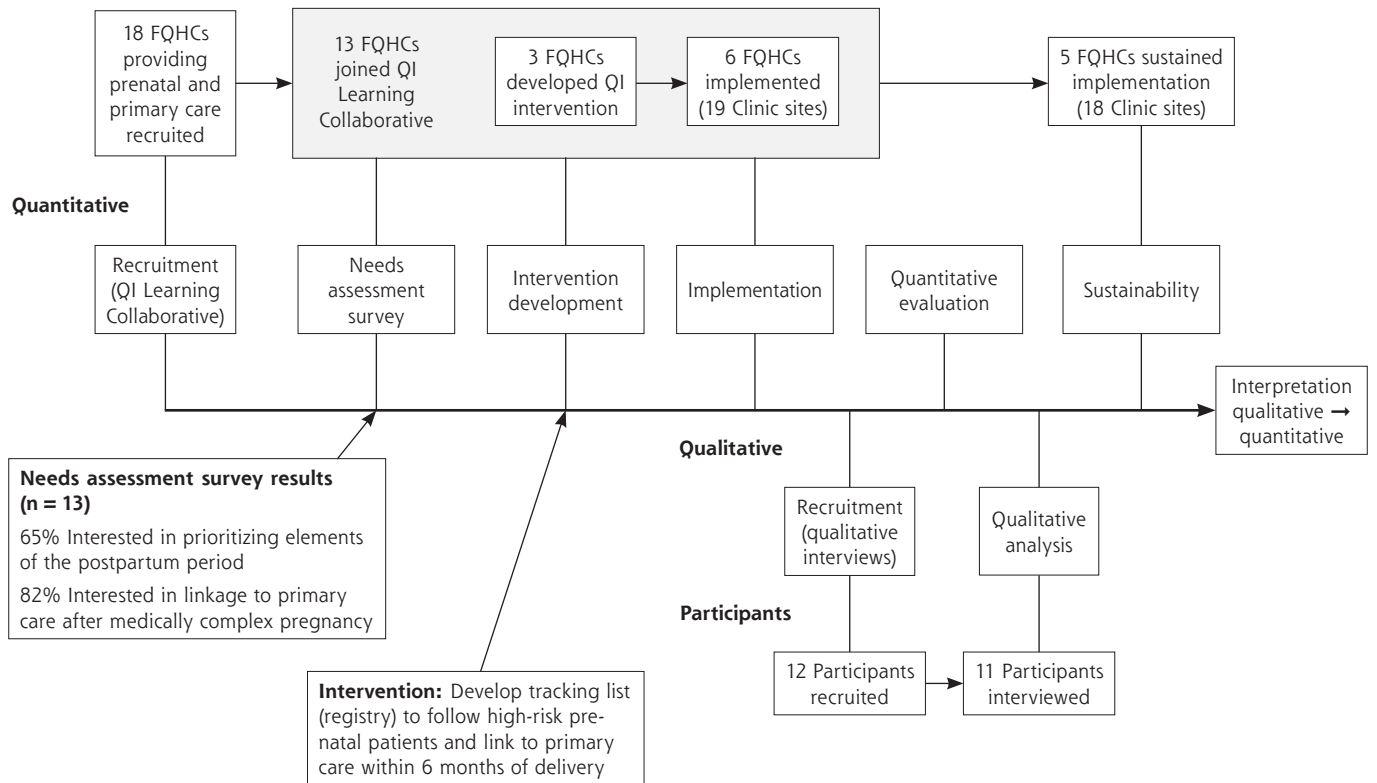
Jena Wallander Gemkow
AllianceChicago
225 W Illinois St, 5th Fl
Chicago, IL 60654
jgemkow@alliancechicago.org



Figure 1. Design of the maternal health QI intervention study.

Overarching aim: to develop and assess the implementation and outcomes of a maternal health QI intervention in FQHCs

Participants



FQHC = Federally Qualified Health Center; QI = quality improvement.

making them ideal settings in which to implement and study postpartum quality improvement (QI) interventions.¹³ FQHCs have long participated in QI efforts to address specific conditions and/or population health.^{14,15} One QI approach is the learning collaborative, in which similar organizations convene to implement QI initiatives through sharing ideas and experiences while implementing new processes to improve health care delivery.¹⁶ QI collaboratives have been used at the state level to address maternal mortality and morbidity in the hospital setting, including in Illinois, and have been shown to improve perinatal outcomes.^{17,18}

This study assessed the development and implementation of a maternal health QI intervention implemented within the QI Learning Collaborative (QILC) in 6 Chicago FQHCs providing prenatal and primary care. The intervention entailed implementation of a registry of high-risk prenatal patients to facilitate linking them to primary care within 6 months of delivery. The QILC was based on the Institute for Healthcare Improvement's Breakthrough Series Collaborative model and was informed by expertise from the Illinois Perinatal Quality Collaborative.¹⁹ The first aim of our study was to identify any quantitative impact of the intervention on postpartum and primary care use by high-risk prenatal patients, while the second

aim was to explore the experiences of staff participating in the QILC. The results of this mixed methods approach can inform sustainability, scalability, and future QI efforts focused on maternal health and beyond in safety-net settings.

METHODS

We used an adapted Explanatory Sequential-Participant Design (Figure 1).²⁰ Quantitative monthly data were collected and analyzed from January through December of 2021; qualitative data were collected and analyzed from November through April of 2022 (Table 1). Quantitative and qualitative results were then integrated and reinterpreted during June and July of 2022. Both studies had institutional review board approval.

Quantitative Methods Study Design

We compared outcomes before and after implementation of a maternal health QI intervention through the QILC. A central organization recruited 18 FQHCs providing onsite prenatal and primary care to participate in the QILC, of which 6 FQHCs agreed to participate (Table 2). QILC membership

Table 1. Maternal Health QI Intervention: Measures and Data Sources by Study Aim

Study Aim	Measure	Data Source
Quantitative aim: identify if and the extent to which the QI intervention improved primary care use for high-risk prenatal patients	Structure measure: criteria for defining high-risk patients have been defined and implemented	Internal FQHC tracking
	Structure measure: a registry to identify high-risk patients is in place and implemented	Internal FQHC tracking
	Structure measure: a process to coordinate care for high-risk patients is in place and implemented	Internal FQHC tracking
	Process measure: cumulative number of clinic sites implementing	Internal FQHC tracking
	Process measure: number of staff trained	Internal FQHC tracking
	Outcome measure: change in proportion of high-risk patients with a documented primary care visit within 6 months postdelivery, compared between baseline (calendar year 2020) and postimplementation (calendar year 2021)	EHR extraction and manual record reviews
Qualitative aim: assess the experience of FQHCs participating in the QILC to gain an understanding of the challenges and successes of participating and of implementing the QI activities	Outcome measure: change in proportion of high-risk patients with a documented postpartum visit, compared between baseline (calendar year 2020) and postimplementation (calendar year 2021)	EHR extraction and manual record reviews
	FQHC staff experience of participating in QILC	Semistructured key informant interviews of 11 health care professionals

EHR = electronic health record; FQHC = Federally Qualified Health Center; QI = quality improvement; QILC = Quality Improvement Learning Collaborative.

included FQHC clinicians and staff. A needs assessment conducted by the central organization in March 2020 revealed that the majority of QILC participants were interested in linkage of birthing people to primary care after a medically complex pregnancy.

Members of the QILC developed the registry intervention between April and December of 2020 (rather than adapting an evidence-based intervention designed by an external entity) and presented it to the full QILC and to the administrative and clinical leaders of the 6 FQHCs. The central organization offered a small stipend for implementation. Implementation by the 6 participating FQHCs took place from January through December of 2021 at 19 clinic sites. The FQHCs tailored the intervention to clinic operations, workflows, and populations served. All FQHCs reported data monthly to the central organization from January through December 2021, leveraging Plan-Do-Study-Act cycles to test change and identify opportunities to adjust the intervention.¹⁵ The central organization convened the QILC for 10 virtual learning sessions before, during, and after implementation to discuss successes and opportunities.

Sample

The population addressed were high-risk prenatal patients within the scope of the FQHCs' practice ability who delivered between January and June of 2021 and received prenatal care at the 6 FQHCs. The participating FQHC sites identified these patients throughout pregnancy from chart reviews and/or electronic health record (EHR) data extraction, and conducted direct patient outreach through 6 months

postpartum to connect them to postpartum and primary care. High-risk conditions included pregestational diabetes, gestational diabetes, gestational or chronic hypertension, and depression. FQHC staff identified high-risk patients using *International Classification of Diseases, Tenth Revision* (ICD-10) diagnosis codes and structured data fields such as blood pressure and blood glucose measurements.

Data Collection and Analysis

We compared deidentified, aggregate data before implementation (baseline) and after implementation (postimplementation). Baseline data from calendar year 2020 were collected in January 2021, and FQHCs began implementation between January and April of 2021. Data were collected by FQHC staff using a standardized template encompassing all structure, process, and outcome measures (Table 1). Structure measures were selected to assess capacity for implementation. Process measures were selected to measure progress of the intervention.

Our primary outcome was the change between baseline and postimplementation in the proportion of high-risk prenatal patients with a documented primary care visit within 6 months after delivery. The 6-month timeframe was chosen to assess timeliness of transition to primary care and to reflect the frequent occurrence of maternal morbidity and mortality beyond the immediate postpartum period. We also measured the change in the proportion of patients with a documented postpartum visit within 6 weeks after delivery.

Outcome data were collected by the FQHCs and the central organization through EHR extraction and manual chart reviews to confirm whether visits were postpartum or

primary care based on the care provided, the provider at the visit, and the timing of the visit postdelivery. One FQHC did not report postpartum visits because of existing policies referring all high-risk patients for prenatal and postpartum care to maternal-fetal medicine specialists. The other FQHCs provided postpartum care to all prenatal patients, including high-risk patients. We aggregated baseline and monthly reported structure, process, and outcome data across all FQHCs before, during, and after implementation. We then conducted binomial tests of significance between aggregated baseline and postimplementation primary care and postpartum visit frequencies using the Python programming language.²¹

Qualitative Methods

Key Informant Interviews

We conducted key informant interviews with FQHC clinicians and staff who were active in implementing the QI intervention, using an interview guide ([Supplemental Appendix](#)) to evaluate their experiences with participation in the QILC and with QI implementation. The key informant interviews had 2 specific aims: (1) to gather relevant information regarding past QI projects at the FQHC sites participating in the QILC, including information about the types of QI projects that had been previously undertaken, how they were implemented, the level of staff involvement in making decisions about the projects, and staff/clinician perceptions of the strengths and weaknesses in engaging these past efforts, and (2) to gain an understanding of the challenges and successes of participating in the QILC and implementing the QI activities.

Twelve individuals across the 6 FQHCs were recruited using purposive sampling for key informant interviews based on recommendations by clinic leadership or because these individuals served as the clinic champion during the QI process. The key informant participants are identified in Table 2 by FQHC site and are noted to be either clinicians or staff, and either FQHC leadership or case managers. Three researchers (A.V.S., R.M.O., and A.S.) were trained to conduct the interviews by the principal investigator (A.H.) using the interview guide. Interviews were conducted via Zoom (Zoom Video Communications, Inc) between November 2021 and January 2022, and were recorded; the recordings were sent to a transcription service for full transcription.

Thematic Analysis

To conduct the thematic analysis, we developed a preliminary code directory consisting of a priori codes reflecting key concepts from the research questions and interview guide, along with operational code definitions.²² After review and annotation of interview transcripts by multiple members of the

team, additional codes were developed reflecting concepts emergent in the data. The interviews were coded in Atlas.ti version 9 software (ATLAS.ti Scientific Software Development GmbH) by 5 team members (A.V.S., R.M.O., A.S., A.C.H., and Nadine Peacock, University of Illinois at Chicago School of Public Health), with each interview being independently coded by 3 persons. Interrater agreement was calculated for each code; disagreements were reviewed and reconciled, and where appropriate, code definitions were refined.

Once the code directory was finalized and the team reached agreement on code criteria, 1 team member (R.M.O.) conducted the final coding of all interviews. Codes and code combinations were then used to extract text passages on specific topic areas, and results were reviewed to identify key themes and subthemes. Relevant quotes for each theme and any subthemes were extracted, and several representative quotes for each theme were selected to support and describe the findings. Themes were organized with respect to the evaluation questions (aims) developed before the key informant interviews.

Table 2. Characteristics of Maternal Health QI Intervention Participants by Study Aim

Quantitative Aim					
FQHC	Perinatal Care Providers ^{a,b,c}	Perinatal Support Staff/Nurses ^{b,c}	Prenatal Patients ^{b,d}	Prenatal Patients Who Delivered ^{b,d}	Clinic Sites ^{b,d}
FQHC A	1-5	6-10	1-500	1-500	10-20
FQHC B	1-5	6-10	1,001-2,999	500-1,000	10-20
FQHC C	1-5	1-5	3,000-5,000	1,000-2,999	10-20
FQHC D	6-10	6-10	501-1,000	1-500	10-20
FQHC E	1-5	1-5	501-1,000	1-500	1-5
FQHC F	6-10	10-20	3,000-5,000	1,001-2,999	1-5
Total	33	46	11,430	6,001	61
Qualitative Aim					
Key Informant ^e	Leadership Role	Case Management Role	Clinician Role ^f	Other Role	
A1			X		
A2			X		
B1		X			
B2	X		X		
C1				X	
D1			X		
D2	X	X			
D3	X		X		
E1		X	X		
F1		X			
F2	X	X			

^a Physicians, nurse practitioners, physician assistants, and midwives.

^b Ranges used to help ensure anonymity of participating sites.

^c Data reported to the research team, 2021.

^d Publicly available data from the Health Services and Resources Administration Uniform Data System, 2021.²⁹

^e For key informant identifiers, letter refers to clinic, number refers to participant in order of interviewing.

^f An employee with a clinical position (eg, physician, nurse); titles defined this way to also ensure anonymity.

RESULTS

Quantitative Results

Overall Implementation

Although all 6 participating FQHCs agreed to develop a registry of high-risk prenatal patients across their sites as their main strategy, their approaches varied. For example, 2 FQHCs leveraged preexisting risk stratification (inclusive of and extending beyond the high-risk conditions noted previously) within their health systems and extended this process through the postpartum period. Through implementation, FQHCs identified a need for patient education about the importance of a primary care visit in the postpartum period, especially for high-risk prenatal patients. The central organization and FQHCs developed talking points, including points about the purpose of primary care after postpartum care and what to expect at the visit for providers, staff, and patients.

Structure and Process Measures

Before implementation of the QI intervention, 50% of the 6 participating FQHCs had established criteria for defining high-risk prenatal patients and a registry to identify these patients (Table 3). None had a process documented to coordinate care for high-risk prenatal patients. By the end of implementation, all FQHCs had defined high-risk criteria, developed a registry, and established a process to coordinate care for high-risk prenatal patients. Also, 54 staff were trained and the QI intervention was implemented at 19 clinic sites associated with the 6 FQHCs. After implementation, 5 FQHCs (and 18 of the 19 clinic sites) elected to continue the new processes developed. The FQHC that did not continue with the new workflow cited lack of staff and capacity as the primary reasons.

Outcome Measures

At baseline, 25% of the 102 identified high-risk patients had a documented primary care visit within 6 months postpartum, and 83% of 61 patients had a documented postpartum visit within 6 weeks (Table 4). After implementation of the QI intervention, the percentage of 134 high-risk patients completing a primary care visit within 6 months postpartum almost tripled from baseline to 72% ($P < .001$). The postpartum visit completion rate also significantly increased from baseline to 91% of 96 patients ($P = .04$).

Qualitative Results

In total, 11 individuals agreed to participate in the key informant interviews, with all 6 participating FQHCs represented (Table 2). Saturation was not used as a criterion as informational redundancy was established early in the interviews and it was important to obtain feedback about participation in the QILC and intervention implementation from all 6 FQHCs. The major themes identified related to organizational facilitators and barriers regarding implementation of the QI intervention. These themes are described below with associated quotes shown in Table 5.

Theme 1: Multiple Facilitators of QI Success

Key informants identified multiple factors that supported participation in the QILC. These factors included organizational buy-in and supportive clinic leadership, the flexibility allowed in the intervention, and collective meetings.

Organizational buy-in. Organizational buy-in was cited as critical for facilitating implementation of the QI intervention. At all FQHCs, buy-in from senior leadership was required for participation. Because leadership approved participation,

Table 3. Structure and Process Measures for the Maternal Health QI Intervention, Before, During, and After Implementation

Measure	Before Implementation	Midpoint of Implementation	After Implementation	Sustained Implementation
Structure measures				
FQHCs with high-risk criteria defined and implemented, No. (%) ^a	3 (50)	5 (83)	6 (100)	5 (83)
FQHCs with a registry to identify high-risk patients in place and implemented, No (%) ^a	3 (50)	5 (83)	6 (100)	5 (83)
FQHCs with a process to coordinate care for high-risk patients in place and implemented, No. (%) ^a	0 (0)	5 (83)	6 (100)	5 (83)
Process measures				
Perinatal staff trained, No. (%) ^b	0 (0)	50 (63)	54 (68)	NA
Clinic sites implementing initiative, No. (%) ^c	0 (0)	16 (26)	19 (31)	18 (30)

FQHC = Federally Qualified Health Center; NA = not applicable.

^a Total number of participating FQHCs was 6.

^b Total number of perinatal staff was 79 (33 perinatal care providers + 46 perinatal support staff and nurses, as shown in Table 2).

^c Total number of clinic sites was 61, as shown in Table 2.

Notes: Before implementation (baseline): calendar year 2020. Midpoint of implementation: June 2021. After implementation (postimplementation): calendar year 2021. Sustained implementation: after December 2021.

there was a better understanding of the resources needed for implementation. In addition, buy-in likely contributed to the sustainability of the revised clinical practices at the end of the QI intervention at 5 of the 6 FQHCs.

Intervention flexibility. Key informants also referred to flexibility as a critical factor in both their willingness to participate in the QILC and successful implementation of a registry process for high-risk prenatal patients. Malleability allowed clinics to integrate the registry intervention more easily into current workflows. In some FQHCs, participation in the QILC was viewed as an opportunity to improve and collect data on processes that already existed.

Collaborative nature of the QI intervention. Another facilitator of QI intervention implementation was the collaborative nature of the intervention. Key informants cited learning from others within the QILC as particularly helpful. Many reported that the targets and objectives provided by the central organization administrators enabled them to examine deficiencies and discuss how to potentially resolve issues. Likewise, some key informants noted that the QILC meetings enabled them to compare results across FQHCs, which helped to facilitate their progress in intervention implementation.

Theme 2: Multiple Barriers to QI Success

Key informants reported a variety of barriers related to implementing the QI intervention; many of these were not related to the intervention itself but to individual clinic circumstances or to the patients served and their needs. The main barriers included insufficient staffing and inadequate data infrastructure, both of which relate to resource challenges.

Insufficient staffing. One barrier to successful QI intervention implementation cited by several key informants was

staffing. Both turnover and insufficient staffing were referenced as detrimental to implementation and sustainability. For example, if participants in the QI intervention were asked to perform additional unrelated work, especially during the COVID-19 pandemic, this meant less time for implementing the QI intervention. Key informants reported that there was not always sufficient information transfer as most QI training efforts within clinics were informal because of provider and staff time constraints. Furthermore, turnover was a threat to long-term sustainability in FQHCs where only 1 person was designated to work on the QI intervention.

Inadequate data infrastructure. Another barrier to implementing the QI intervention and a threat to sustainability was inadequate data infrastructure at many FQHCs. Although the notion of developing a registry and tracking patients is theoretically simple, in an understaffed clinic environment, it can be difficult to determine which patients meet the criteria and ensure that they are flagged and then followed longitudinally from prenatal care through delivery to primary care in addition to other care obligations. Key informants emphasized that this task would be more easily accomplished with robust data infrastructure.

DISCUSSION

We found that FQHC participation in a QI learning collaborative significantly improved postpartum and primary care use by high-risk prenatal patients, albeit with challenges resulting from structural factors. Despite these challenges, the significant increase in both postpartum and primary care use, with minimal funding, is a key indicator of success, especially considering the context of the COVID-19 pandemic in which health care use, in general, decreased in FQHCs.²³

The insights provided by the key informants align with the literature on conducting QI initiatives in community health

centers, including FQHCs, particularly in terms of facilitators of and barriers to QI efforts and how these affect the sustainability of such initiatives.²⁴⁻²⁷ Flexibility and collaboration, noted by the key informants, are hallmarks of successful QI initiatives, accommodating each clinic's unique needs, available resources, and culture. This flexibility facilitated participation, peer sharing, and data reporting across FQHCs with varying workflows, EHR platforms, and data capabilities.

Participants acknowledged the limited staff for patient outreach and the difficulty

Table 4. Outcome Measures for the Maternal Health QI Intervention, Before, During, and After Implementation

Measure	Before Implementation	Midpoint of Implementation	After Implementation	P Value ^a
Postpartum visits^b				
Total high-risk prenatal patients ^c	61	64	96	
No. (%) with a postpartum visit	51 (83)	45 (70)	87 (91)	.04
Primary care visits^d				
Total high-risk prenatal patients ^c	102	87	134	
No. (%) with a primary care visit	26 (25)	38 (44)	97 (72)	<.001

QI = quality improvement.

^a Comparing values before implementation (baseline) and after implementation (postimplementation).

^b Within 6 weeks of delivery.

^c Difference in denominators is due to a preexisting clinic policy for 1 site that refers high-risk patients for prenatal and postpartum care.

^d Within 6 months of delivery.

Note: Before implementation (baseline): calendar year 2020. Midpoint of implementation: June 2021. After implementation (postimplementation): calendar year 2021. Sustained implementation: after December 2021.

Table 5. Themes and Selected Quotes From Key Informant Interviews of Participants in the Maternal Health QI Intervention

Theme	Quote
Facilitator: buy-in	"Because it's been a project that's been blessed by the medical director and by the administration team that we've been able to get the resources that we needed and the right people at the table to be able to make this happen ... So, having this team-based approach and having the primary stakeholders in terms of the administration and the medical director approving this, I feel like that was hugely instrumental in making this project as successful as it is." – Key informant A2
Facilitator: flexibility	"It was like, 'However you wanna' do it, as long as you can get us these key things, it's however you wanna' create it.' And so that gave us opportunity to really look at our program processes and to fine tune some of those areas that were weak. So, it actually helped us, because we know we needed to do it, but we actually have the focus on it. We had a reason why that we needed to focus." – Key informant F2
Facilitator: collaboration	"But also, when they show us different metrics from other health centers, it helps us to see like, 'Okay. Are we just doing really, really badly? Or is this something that we're all struggling with, so therefore, it's good to be altogether, struggling together, so we can come up with a better solution?' I like that." – Key informant A1
Barrier: staffing	"Well, my challenge is that I'm the only person doing the study, personally ... it's not sustainable for me alone to be running this program. As they add more and more duties to my job, I spend less and less time on the high-risk list. I can't look at it every day. I used to be able to eyeball it every day, but now I can look at it every other day, and now I can really only look at it a couple times a week." – Key informant D2
Barrier: infrastructure	"Barriers are it's not easy to put everyone on an Excel spreadsheet. And the way I did it was scanning the schedules every day and looking for anyone who was scheduled for a new OB appointment. But sometimes patients were misscheduled under new patient, so I might miss them ... And also, that's time-consuming and then cutting and pasting them, and putting every detail on this spreadsheet ... But I do feel like there's got to be an easier way to pick up these patients. And I know the [central organization] did implement a little bit of a new system for capturing them, but we haven't started that yet." – Key informant D1

FQHC = Federally Qualified Health Center; OB = obstetrics; QI = quality improvement.

Note: For the key informant identifier, the letter refers to clinic, and the number refers to participant in order of interviewing.

following patients through data tracking and EHR platforms. The noted barriers also provide insight into why not all high-risk prenatal patients tracked had completed a primary care visit in the extended postpartum period. Five of the 6 FQHCs achieved sufficient systems and culture change to sustain identification of high-risk patients for both primary and postpartum care follow-up beyond the QI implementation period, however, suggesting the facilitators outweighed the barriers. As such, these facilitators should be considered in future QI implementation within FQHCs, especially if there is funding.

This study had several strengths, including the mixed methods approach, standardized quantitative data collection, and exploration of qualitative themes focused on facilitators and barriers derived from clinician and staff experiences from all participating FQHCs. Additionally, interviews were conducted toward the end of QI implementation, providing time for reflection, limiting recall bias, and enhancing trustworthiness. Interviewing people with different responsibilities and roles within their respective clinics allowed diverse perspectives to emerge. Multiple perspectives in coding allowed for a rich discussion about the identified themes.

As for limitations, the data infrastructure developed by the central organization to ensure ease of data sharing resulted in the collection of only aggregate data, so patient-level data could not be analyzed. Patient experience data could have provided additional insights into the successes and opportunities of the registry intervention. Additionally,

although we collected information on roles and responsibilities (eg, staff, clinician), we did not collect participant credentials; the latter may have provided additional insights regarding implementation and care provided. Another limitation was the lack of a comparison group because quantitative and qualitative data were not collected from the FQHCs that did not participate in the QILC; however, an evaluation conducted by some of the authors exploring postpartum and primary care use rates in a national FQHC network (inclusive of some of the sites in this study) for patients who delivered in 2018 found rates for high-risk patients similar to those in the baseline period of this study, aligning with previous research in other safety-net settings.^{10,28} These results confirm that the intervention was implemented in a representative setting reflecting national trends in use despite the pandemic timeframe.

Although states have successfully implemented perinatal quality collaboratives with a hospital focus,^{17,18} fewer efforts have been implemented on the local level to improve the delivery of outpatient maternity care. Ours was the first initiative in Chicago to directly tackle the issue of maternal mortality and morbidity across multiple community-based clinics sites using a QILC framework. The quantitative data indicate that the QI intervention was successful in meeting its objectives, and the qualitative data contextualize these results through the eyes of those who participated in or experienced its implementation.

The results of this proof-of-concept study support maternal and infant health-focused QI efforts at the community level and indicate the need for adequate resources for both initial implementation and sustainability. One possibility is for state- and hospital-based QI implementation to expand to the ambulatory and community health setting. Finally, more robust evaluations of QI implementation that incorporate patient-level data and patient experiences should be included in future efforts.

 [Read or post commentaries in response to this article.](#)

Key words: quality improvement; pregnancy, high risk; maternal health; postpartum period; primary health care; medical record linkage; registries; continuity of patient care; preventive medicine

Submitted January 27, 2023; submitted, revised, October 2, 2023; accepted October 4, 2023

Funding support: The activities described here were supported by grants from Merck for Mothers, Merck's \$500M global initiative to help create a world where no woman has to die while giving life, as part of the Safer Childbirth Cities initiative, and by the VNA Foundation, a private, independent grantmaking foundation supporting home- and community-based health services to the disenfranchised. Merck for Mothers is known as MSD for Mothers outside the United States and Canada.

Disclaimer: The content of this article is solely the responsibility of the grantee organization and does not represent the views of Merck or the VNA Foundation.

Acknowledgments: We thank the participating FQHCs and staff for their contributions to the implementation and qualitative analysis.

 [Supplemental materials](#)

References

- Hoyert D; NCHS Health E-Stats. Maternal mortality rates in the United States, 2020. CDC Stacks. Published Feb 23, 2022. <https://stacks.cdc.gov/view/cdc/113967> 10.15620/cdc.113967
- Centers for Disease Control and Prevention [Internet]. Pregnancy-related deaths: Data from Maternal Mortality Review Committees in 36 US States, 2017–2019. Published Sep 2022. Accessed Dec 15, 2022. <https://www.cdc.gov/reproductivehealth/maternal-mortality/erase-mm/data-mmrc.html>
- Hoyert DL, Miniño AM. Maternal Mortality in the United States: Changes in coding, publication, and data release, 2018. National Vital Statistics Reports. Published 2020. Accessed Jul 18, 2022. <https://www.cdc.gov/nchs/data/nvsr/nvsr69/nvsr69-02-508.pdf>
- Petersen EE, Davis NL, Goodman D, et al. Racial/ethnic disparities in pregnancy-related deaths – United States, 2007–2016. *MMWR Morb Mortal Wkly Rep*. 2019;68(35):762–765. 10.15585/mmwr.mm6835a3
- American College of Obstetricians and Gynecologists [Internet]. Optimizing postpartum care. Published May 2018. Accessed Jul 18, 2022. <https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2018/05/optimizing-postpartum-care>
- Women's Preventive Visits Services Initiative [Internet]. Well-woman preventive visits recommendations. Published 2022. Accessed Dec 15, 2022. <https://www.womenspreventivehealth.org/recommendations/well-woman-preventive-visits/>
- Wang S, Rexrode KM, Florio AA, Rich-Edwards JW, Chavarro JE. Maternal mortality in the United States: Trends and opportunities for prevention. *Annu Rev Med*. 2023;74(1):199–216. 10.1146/annurev-med-042921-123851
- Hawkins SS. Current evidence to guide practice, policy, and research: extending Medicaid coverage in the postpartum period. *J Obstet Gynecol Neonatal Nurs*. 2023;52(1):95–101. 10.1016/j.jogn.2022.11.006
- Pazol K, Robbins CL, Black LI, et al. Receipt of selected preventive health services for women and men of reproductive age — United States, 2011–2013. *MMWR Surveill Summ*. 2017;66(20):1–31. 10.15585/mmwr.ss6620a1
- Gemkow JW, Liss DT, Yang T-Y, et al. Predicting postpartum transition to primary care in community health centers. *Am J Prev Med*. 2022;63(5):689–699. 10.1016/j.amepre.2022.05.010
- Petersen EE, Davis NL, Goodman D, et al. Vital signs: Pregnancy-related deaths, United States, 2011–2015, and strategies for prevention, 13 states, 2013–2017. Published May 2019. Accessed Jul 18, 2022. <https://www.cdc.gov/mmwr/volumes/68/wr/mm6818e1.htm>
- Oates GR, Jackson BE, Partridge EE, Singh KP, Fouad MN, Bae S. Sociodemographic patterns of chronic disease: How the mid-South region compares to the rest of the country. *Am J Prev Med*. 2017;52(1S1):S31–S39. 10.1016/j.amepre.2016.09.004
- Maternal Health, National FQHC Advisory Board [Internet]. Improving maternal health outcomes in Medicaid through FQHCs and managed care. Published 2022. Accessed Dec 15, 2022. <https://www.uhcommunityandstate.com/content/topic-profiles/partnering-with-health-centers/improving-maternal-health-outcomes-in-medicaid-through-fqhcs-and-managed-care>
- Rohweder C, Wangen M, Black M, et al. Understanding quality improvement collaboratives through an implementation science lens. *Prev Med*. 2019;129S:105859. 10.1016/j.ypmed.2019.105859
- Chambers DA. Commentary: Increasing the connectivity between implementation science and public health: Advancing methodology, evidence integration, and sustainability. *Annu Rev Public Health*. 2018;39(1):1–4. 10.1146/annurev-publhealth-110717-045850
- Gotham HJ, Paris M, Hoge MA. Learning collaboratives: a strategy for quality improvement and implementation in behavioral health. *J Behav Health Serv Res*. 2023;50(2):263–278. 10.1007/s11414-022-09826-z
- McCain C, Krakowiak P, Sun D, et al; Public Health Institute. California pregnancy-associated mortality review. California pregnancy-related deaths. Published Jun 28, 2022. Accessed Jul 25, 2023. <https://www.phi.org/thought-leadership/california-pregnancy-associated-mortality-review-california-pregnancy-related-deaths-2008-2016/>
- Lee King PA, Henderson ZT, Borders AEB. Advances in maternal fetal medicine: perinatal quality collaboratives working together to improve maternal outcomes. *Clin Perinatol*. 2020;47(4):779–797. 10.1016/j.clp.2020.08.009
- Institute for Healthcare Improvement [Internet]. The Breakthrough Series: IHI's collaborative model for achieving breakthrough improvement. Published 2003. Accessed Jul 18, 2023. <https://www.ihl.org/resources/white-papers/breakthrough-series-ihis-collaborative-model-achieving-breakthrough>
- Creswell JW, Poth CN. *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Sage; 2018.
- Python Software Foundation. What is Python? Executive summary. Published 2019. Accessed Jun 1, 2023. <https://www.python.org/doc/essays/blurb/>
- Lochmiller CR. Conducting thematic analysis with qualitative data. *Qual Rep*. 2021;26(6):2029–2044. 10.46743/2160-3715/2021.5008
- Simon J, Mohanty N, Masinter L, Hamilton A, Jain A. COVID-19: Exploring the repercussions on Federally Qualified Health Center service delivery and quality. *J Health Care Poor Underserved*. 2021;32(1):137–144. 10.1353/hpu.2021.0013
- Arora S, Mate KS, Jones JL, et al. Enhancing collaborative learning for quality improvement: Evidence from the improving clinical flow project, a Breakthrough Series collaborative with Project ECHO. *Jt Comm J Qual Patient Saf*. 2020;46(8):448–456. 10.1016/j.jcjq.2020.04.013
- Meredith LS, Komaromy MS, Cefalu M, et al; CLARO Study Group. Design of CLARO (Collaboration Leading to Addiction Treatment and Recovery from other Stresses): A randomized trial of collaborative care for opioid use disorder and co-occurring depression and/or posttraumatic stress disorder. *Contemp Clin Trials*. 2021;104:106354. 10.1016/j.cct.2021.106354
- O'Donoghue SC, DiLibero J, Altman M. Leading sustainable quality improvement. *Nurs Manage*. 2021;52(2):42–50. 10.1097/01.numa.0000724940.43792.86
- Thies K, Schiessl A, Khalid N, Hess AM, Harding K, Ward D. Evaluation of a learning collaborative to advance team-based care in Federally Qualified Health Centers. *BMJ Open Qual*. 2020;9(3):e000794. 10.1136/bmjopen-2019-000794
- Shankar M, Chan CS, Frayne SM, Panelli DM, Phipps CS, Shaw JG. Postpartum transition of care: racial/ethnic gaps in veterans' re-engagement in VA primary care after pregnancy. *Womens Health Issues*. 2021;31(6):603–609. 10.1016/j.whi.2021.06.003
- Health Resources and Services Administration. Health Center Program Uniform Data System (UDS) Data Overview. Accessed Jul 18, 2023. <https://data.hrsa.gov/tools/data-reporting/program-data>