Establishing A Functional and Meaningful Benchmarking Tool for Midwifery Practice: A Quality Improvement Project

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Abstract

Background: The cesarean birth (CB) rate is a public health crisis and has increased more than 50% in the last thirty years. Practices can only decrease their cesarean rates by understanding the modifiable indications for CB. Robust data collection can yield performance metrics and benchmarking data that is needed to drive quality improvement initiatives aimed at reducing CB rates. *Local Problem:* A collaborative practice at a midsized suburban hospital wished to decrease their CB rate of 33.7% to be in alignment with world health organization recommendations. The creation and implementation of a data collection tool and benchmarking system was required so the practice could gather more data to identify factors associated with and initiate efforts to decrease the CB rate and submit aggregate data to the American College of Nurse-Midwives (ACNM) Benchmarking Project. *Methods:* As a collaborative practice, data submitted needed to include care provided by both midwives and physicians. *Intervention:* An Excel spreadsheet was created and implemented as a data collection tool and benchmarking system to capture information about each birth. The new tool was audited weekly by the Delivery Statistics Report (DSR), a report generated by the electronic health records to ensure all births were accounted for. *Results:* The practice midwives captured 94.4% of all births that occurred during the project timeline. Weekly usage percentage ranged from 80 – 100% of births captured. *Conclusion:* The Excel spreadsheet was found to be a low-cost and user-friendly data collection tool and benchmarking system that can be successfully implemented into a collaborative practice. It has the ability to be easily editable, allowing the practice to collect more birth data depending on their goals. The spreadsheet accurately captured and aggregated the data for the six required metrics, plus an additional fourteen to be submitted to the ACNM Benchmarking Project.

Table of Contents

Establishing A Functional and Meaningful Benchmarking Tool for Midwifery Practice: A Quality Improvement Project

Problem Description

The increasing cesarean birth (CB) rate in the United States (U.S.) is a public health crisis. With more than a 50% increase, the national rate rose from 20.7% in 1996 to a high of 32.9% in 2009 (Caughey, 2017). This is significantly higher than the World Health Organization's (WHO) ideal CB rate of 10-15% (WHO, 2015). While high, the U.S.'s CB rate has remained at approximately 30% since 2009 and is now at 32.1% in 2021 (Osterman, 2021). Although CB can be life-saving, it is consistently associated with adverse maternal and neonatal outcomes and the U.S.'s CB rate has increased without evidence of decreasing maternal and neonatal morbidity and mortality (Caughey et al., 2014). This discordance in increased CB rates without evidence of benefit has led to numerous national and local initiatives that have focused on ways to decrease the CB rate. Understanding the indications for CB in the U.S. are critical as drivers to the implementation of evidence-based practices to affect change (California Maternal Quality Care Collaborative, n.d.a). The only way a practice can know the drivers of CBs is through robust data collection which yields performance metrics and benchmarking data needed to drive the quality improvement initiatives aimed at reducing CB rates (Willmington et al., 2022).

This quality improvement project was implemented at a new midwifery and physician collaborative practice at a community hospital in the Pacific Northwest. The practice recently began collecting data in Fall of 2022 to submit to the American College of Nurse-Midwives (ACNM) Benchmarking Project. Initial data showed the practice possibly had a high CB rate and

so the practice expressed interest in growing the number of data variables collected, to focus on potential drivers of CBs (*The ACNM,* n.d). The initial data the practice collected found their total CB rate to be 33.7% and primary CB rate to be 24.8%. Those rates are higher than both comparable collaborative practices in the area and the national average. The practice was interested in gathering more data to identify factors associated with and initiate efforts to decrease the CB rate. The current system of data collection is not equipped to collect new variables related to CB. This project will use best evidence to trial a tool that will collect pregnancy and birth data variables. The goal of this project is to use the improved data collection method to gather more information that could contribute to future quality improvement efforts to reduce the local CB rate and provide benchmarking data to the ACNM Benchmarking Project.

Available Knowledge

A literature review was conducted using PubMed with terms: *cesarean birth, cesarean delivery, cesarean section, primary cesarean section, indications, quality improvement, data collection, tools and benchmarking*. Publication dates were originally limited to 2013 through May 2023, but expanded to 2005 over the course of the search. CB rates in the US increased by 50% over the last 30 years without any concomitant decrease in maternal and neonatal morbidity and mortality (Caughey et al., 2014). The overall CB rate is comprised of the primary CB rate and repeat CB rate. Primary CB is defined as the first cesarean delivery for a pregnant person and is most often in nulliparous pregnant people. The significant rise in CB rates over the last few decades was driven mainly by an increase in primary CB rates (Osterman, 2021). National data show that there is a great amount of variation in primary CB rates between states, hospitals, and even individual providers (Caughey et al., 2014). The wide variation in CB rates "has been attributed to nonstandardized approaches to labor management" (Bell et al., 2017, p. 1083;

Caughey et al., 2014). To address these inconsistencies the American College of Obstetricians and Gynecologists (ACOG) in association with the Society for Maternal Fetal Medicine (SMFM) published a consensus on labor management focusing on the safe prevention of the primary cesarean delivery (Caughey et al., 2014). In the document, the authors discuss the main indications of primary CB, which include labor arrest (34%), nonreassuring fetal heart rate tracing (23%), malpresentation (17%), and multiple gestation (7%) (Caughey et al., 2014). While these are the major indications of primary CB, research has shown that they are impacted by a multitude of variables.

The environment in which a pregnant person delivers plays a pivotal role on the outcome of their birth. For example, Nagle & Samari (2021) found that states with higher rates of structural sexism were more likely to have increased rates of CB, both at the provider and hospital level. While this is a multifactorial issue, when pregnant people's bodies and reproductive healthcare are not valued at a systems level it creates an environment of overmedicalization of birth and higher rates of CB (Nagel &Samari, 2021). This increase was found to exist at both the provider and hospital level. CB rates are also significantly higher among pregnant people who delivered in a private hospital when compared to public hospitals (Montoya-Williams et al., 2017). Within the hospital, the staffing model can impact CB rates, with research showing fewer CBs occur in hospitals that utilize in-house hospitalists compared to traditional "on call" models (Iriye, 2015; Montoya-Williams et al., 2017). In addition, as obstetrics is one of the most litigious fields in medicine, a fear of litigation by providers was found to be a driver of CB rates (Elaraby et al., 2023). Finally, care by obstetricians when compared to care by midwives was associated with an increased risk of an unplanned CB (Carlson et al., 2018).

Along with the environment a patient delivers in, the actual course of their labor can have the biggest impact on their mode of delivery. Research has consistently shown that intrapartum interventions are associated with an increased risk of CB (Iobst et al., 2020a). However, the data is mixed about the number and which specific interventions are more strongly associated with CB. A Cochrane review found early amniotomy and oxytocin augmentation are in fact negatively associated with CB, while later studies showed the opposite association an increased risk in CB (Carlson et al., 2018; Iobst et al., 2020a; Wei et al., 2013).

As previously mentioned, the article by Caughey et al. (2014) discussed the best evidence to help prevent the primary CB. The effort on reducing the CB rate is primarily focused on preventing the first CB because 90% of people who experience CB will deliver by the same route in future pregnancies, in turn increasing the repeat CB rate and the overall CB (Iobst et al., 2020b). Within that focus, most efforts are geared towards pregnant people who are considered low-risk, nulliparous, and "pregnant with a term, singleton gestation in the vertex position (NTSV)" as these are the variables that have been shown to be associated with the largest unnecessary increase in primary CB (Iobst et al., 2020, pg. 228).

There are currently several national initiatives that help hospitals and providers utilize evidence-based practices to tackle quality improvement efforts aimed at reducing their primary CB rates. The first is through the California Maternal Quality Care Collaborative (CMQCC). Collectively, CMQCC is an organization "working to end preventable morbidity, mortality and racial disparities in California maternity care" (CMQCC, n.d.b). The collaborative has a Maternal Data Center, allowing hospitals to track and measure performance metrics and provides the benchmarking data needed to drive quality improvement (CMWCC, n.d.a). With these resources, research is conducted and quality improvement toolkits are created. CMQCC has a

specific toolkit to support vaginal birth and reduce primary cesareans. Another national initiative comes from ACOG's Alliance for Innovation on Maternal Health (AIM), an organization that connects with states and hospitals to help implement and support quality improvement efforts to achieve best practices that improve maternal health outcomes (AIM, n.d.). AIM (n.d.) has developed multiple patient safety bundles, including one focused on the safe reduction of primary cesarean birth, which provide a structured way of improving patient outcomes. Like the CMQCC, AIM collects quality metrics and baseline data through their AIM Data Center to provide direction to the quality improvement efforts delivered by their patient bundles (AIM, n.d.). Multiple studies have found both initiatives from CMQCC and AIM to be effective at reducing primary CB rates (Bell et al., 2017; Callaghan-Krou et al., 2021; Rosenstein et al., 2021).

The ability of a practice to collect data for benchmarking to drive quality improvement initiatives, like reducing the primary CB rate is critical. Robust data collection and the use of benchmarking has been shown to be a crucial tool to identify best practices within an organization as well as compare those processes over time (Emeis et al., 2021; Willmington et al., 2022). Established in 2004, the ACNM Benchmarking Project is a structured process by which organizations can identify, publicize, and compare national data. In addition to practices being able to compare their own data over time, benchmarking allows practices to compare themselves with similar organizations to judge performance and determine areas of improvement (Emeis et al., 2021). While it is understood that data collection and benchmarking are imperative, no one collection method has been found to be superior. Research shows that although using technology has improved the quality, accessibility, and availability of collected data over time, retrospectively collecting that data has many pitfalls and limitations (Blumenberg & Barros,

2016; Craswell et al., 2016). Overall, more research is needed in the arena of data collection and tools that reflect midwifery processes and outcomes of care.

Rationale

Although not exclusive to healthcare, data collection for benchmarking has been used since the 1970s as a method for continuous quality improvement (Willmington et al., 2022). The ACNM Benchmarking Project is no different. However, when it was initially created, it was not yet built to support collaborative practices, making data collection within those practices difficult. In order to capture meaningful data that highlighted the impact midwifery care can have on patient outcomes, ACNM launched the Clarity in Collaboration project to create standard definitions to document midwifery care delivered in collaborative practices (Freytsis et al., 2017). With these efforts, the ACNM Benchmarking Project became more inclusive in the aggregate data it collects around the country. It is imperative that the data generated from these collections accurately captures the impact midwives and midwifery care can have on maternal and neonatal outcomes as it affects quality improvement, education, best practices, research, and policy (Freytsis et al., 2017).

An extensive literature review found no one best method for data collection for benchmarking in obstetrics. While some software options do exist, they are often costly, and the research supporting them is out of date (Walker et al., 2008; Willmington et al., 2022). While it is possible to create reports directly from the electronic health record (EHR), many of the variables and data points that the practice is interested in collecting do not have a specific location in the EHR, making it difficult to retrieve the necessary data. For this quality improvement project, an Excel spreadsheet on a secure cloud storage platform was utilized for data collection as it was a no-cost, easily accessible and user-friendly tool.

In addition to utilizing benchmarking to guide this project, the Model for Improvement (MFI) was employed. The MFI is a framework used by the Institute for Healthcare Improvement (IHI) to guide improvement work in healthcare settings (IHI, 2023). The method of action for this framework is the Plan-Do-Study-Act (PDSA) cycle. A PDSA cycle provides a systematic method for testing a change, creating a plan, carrying out the test, learning from the test and deciding what modifications are needed for the next PDSA cycle (IHI, 2023).

Specific Aims

The global aim of this project was to implement a practice data collection and benchmarking system for the purpose of practice and quality improvement efforts. The specific aims of this project were: first, by October 1, 2023, to create and implement a practice data collection and benchmarking system. Second, between October 1, 2023 – December 31, 2023, the practice data collection and benchmarking system would capture 80% of births by the practice midwives. Third, this project will establish a pathway for dissemination of the data to the practice midwives and submit the collected benchmarking data to the ACNM Benchmarking Survey by March 22, 2024.

Context

This quality improvement project was implemented at a combined midwifery and physician practice, affiliated with a university at a mid-sized community hospital in the Pacific Northwest. As a collaborative practice, patients are seen in the antenatal, intrapartum, and postpartum periods by both midwives and physicians. Based on this definition, according to the ACNM Benchmarking Project practice care models, this practice is a combined practice model and submits data under that umbrella. In addition to the collaborative practice being on the unit, two other practices attended births at the hospital, including a community clinic, run by both

midwives and physicians and a family medicine practice. While several practices deliver at the hospital, the project will only be tracking data from the university-affiliated combined midwifery and physician practice.

Midwives contributed 5.1 full time equivalents (FTEs) and the physicians contributed 5.3 FTEs to the practice. As the practice is affiliated with a university, midwifery students and family medicine residents were often a part of patient care. On average, the practice had 16-20 births per month. The collaborative practice utilizes a labor and delivery unit that has 14 beds, which were labor, delivery, recovery, and postpartum (LDRP) rooms. There were two triage rooms, one operating room, and a level two neonatal intensive care unit (NICU). In 2022, the patient population had the following racial identities: 77.5% White, 5.8% Asian, 2.6% Black, 1.4% American Indian/Alaska Native, 0.5% other Pacific Islander, 0.08% Native Hawaiian, 9.7% declined to disclose, and 0.4% unknown. Ethnic identify was 26.3% Hispanic and 63.5% non-Hispanic, 3.7% declined to disclose, and 0.3% unknown (C. Emeis, personal communication, May, 2023). The majority of patients used Medicaid insurance coverage, with managed care and private insurances plans being the next most common.

The midwives in the practice began collecting benchmarking data in Fall of 2022 to be submitted to the ACNM Benchmarking Project in 2023. The practice initially chose to submit the six-survey metrics that the ACNM Benchmarking Project considers to be mandatory to all participating practices: total number of vaginal births (including vacuum and forceps assisted births and vaginal births after cesareans (VBAC)), number of primary cesareans, number of repeat cesareans, number of CNM/CM FTEs, practice name and address, and a primary contact name, phone number and email address.

Since the practice was a collaborative practice, the data reported to the ACNM Benchmarking Project needed to include data from the entire practice, regardless if the delivering provider was a midwife or physician. In order to obtain that data, the collection process included use of a patient sticker sheet (PSS) to track number of births and cross reference with a delivery statistics report (DSR) that could be generated by the EHR. The PSS was a log that was filled out by the inpatient midwives with patient identification stickers whenever a patient was delivered by a midwife. Initially, the PSS was solely used as a cross reference for the practice's billing and coding specialist, however it was found to be a useful tool to help with data collection. However, there were multiple flaws with the ad hock nature of the process of the retrieving benchmarking data from this system. The DSR was a way to capture all deliveries by the hospital and could be filtered to include just the physicians and midwives from the collaborative practice, allowing birth data to be collected for the whole practice, not just the midwives. While these tools are sufficient to collect the minimum data necessary for the six required metrics of the ACNM Benchmarking Project, they are not effective at collecting the expanded data variables associated with birth, including indications of CB, to assess practice outcomes and drive quality improvement that the midwives are interested in collecting. In addition, the current process is not sustainable in its current format as there is no identified data champion, it is time consuming, and there were no communication routines that informed the midwives about the practice data to drive value. The midwives are unable to use BirthTracks as they are employed in a lease-model by the hospital and a subscription to BirthTracks is not covered. Additionally, RedCap isn't applicable because there is not an identified research study at this time.

Interventions

The interventions for this quality improvement project focused on developing and implementing an Excel spreadsheet as a data collection tool. An Excel spreadsheet allows the practice to track and analyze more data variables related to birth, specifically aimed at indications of CB. The shared Excel spreadsheet can be accessed by all midwives at the practice as it is stored securely on Microsoft OneDrive, the organization's approved cloud storage platform. At the onset of the project, an initial presentation in the form of a recorded voiceover presentation was done which served several functions: reminder of the practice's data collection and benchmarking efforts, the need for data variable expansion for future quality improvement efforts, and to educate on how to access and utilize the Excel spreadsheet. The spreadsheet was developed prior to implementation of the project and an Excel content specialist was consulted to ensure the tool was functional, effective at data capture, and could be expanded for future improvement efforts. The spreadsheet included both new variables and the six required metrics for the ACNM Benchmarking project that the practice was already collecting. The new data variables collected were selected based on both the future quality improvement efforts the practice wished to focus on, reducing primary CB and understanding their indications for the inductions that occurred on the unit and other metrics collected by the ACNM Benchmarking Project.

To effectively introduce the new Excel spreadsheet into the current data collection process, the project utilized the methods the midwives were already using. Currently, after each birth, the inpatient midwives use the PSS to help track which patients they provided care to and the outcome of their delivery. Over the course of the project, they continued to utilize the PSS as it is also an audit tool for the billing and coding specialist. Since the PSS was already an integrated aspect of the midwives workflow while on the unit, a sheet was placed directly

adjacent to the PSS on the wall of the midwifery call room to act as a reminder to use the new data collection tool, the Excel spreadsheet. Instructions on how to access and correct usage of the Excel spreadsheet were posted on the wall beside the computer in the midwifery call room, as well as emailed to each midwife and student individually at the onset of the project. Throughout the course of the project, the project champion attended the practice's monthly meetings to both report on the data that had been collected and gather real time feedback about the integration of the Excel spreadsheet.

Study of the Interventions

In order to ensure the accurate use and effectiveness of the Excel spreadsheet as a data collection tool for the practice, three PDSA cycles occurred during the implementation of the project. At the end of each PDSA cycle, changes were made to the Excel spreadsheet and process based on the suggestions from the midwives to make the workflow more seamless. As a way to get real time responses, the project champion attended the monthly midwifery practice meetings to hear thoughts and gather feedback from the midwives that were utilizing the Excel spreadsheet. In addition to attending the meetings, as a way to seek feedback from both midwives and midwifery students, who also participated in data collection on the unit, a Google Form questionnaire was emailed out. The questionnaire sought to gather information about how well the midwives and students felt the integration of the Excel spreadsheet was going. It gave space for the recipients to provide feedback on what was working well and what aspects of the process of utilization could be improved. Answers from the questionnaire were placed into themes and tracked over the course of the project. Every week over the course of the project, the project champion audited the Excel spreadsheet by using the existing data collection tools, the PSS and the DSR, to determine if the midwives were actively capturing the required data and

utilizing the new tool adequately. If differences existed, they were logged in a separate spreadsheet tracking the discrepancies. At the end of those week periods, chart reviews and data extraction filled in any missing data on the Excel spreadsheet that was missing by comparing it to the PSS and the DSR. During the first PDSA cycle, the champion logged any missing data in the Excel spreadsheet, while the midwives and students were learning how to utilize the new tool. In the next PDSA cycle, the champion decreased the frequency of their audits to every other week, so by the final PDSA cycle, they were no longer entering in missing data as the midwives were appropriately capturing all births that were occurring.

Measures

By comparing the birth data collected on the Excel spreadsheet with the data from the PSS and the DSR, effectiveness of the Excel spreadsheet as a data collection tool for benchmarking was evaluated. Utilizing the existing data collection tools (PSS and DSR) as a measure for the new data collection tool (Excel spreadsheet) guaranteed accuracy of the reported birth data. If any discrepancies occurred between tools, additional sources of verification existed, such as the "undelivered list." This report was generated by the billing and coding specialist from the EHR, showing all patients who received antenatal care through the collaborative practice. Throughout the project, there was ongoing aggregate data collection from the Excel spreadsheet into another secure spreadsheet by the doctoral student. This data included totals of vaginal births, primary cesareans, repeat cesareans, indications of cesarean from the patient's chart, spontaneous or induced labor, and reason for induction. In order to track the utilization of the Excel spreadsheet, the percentage of births logged into the Excel spreadsheet was measured against completed births in the PSS, DSR, or undelivered list. This percentage was logged weekly in a secure spreadsheet and used to inform adherence to the new workflow.

Analysis

The data collected over the course of the project that tracked usage of the Excel spreadsheet as a benchmarking collection tool, was analyzed in the form of a run chart. Specifically, the percentage of births logged against the actual number (as verified by the PSS and DSR) were plotted weekly and put on a run chart, for a total of 13 data points. This was analyzed using run chart rules. The run chart provides an easy way to present data that showed the usage of the Excel spreadsheet over the course of the project and PDSA cycles. Qualitative data in the form of feedback focusing on the process was collected from providers and students during each PDSA cycle. The information gathered was categorized into themes and analyzed using a Pareto chart. Quantitative and qualitative methods were used in the analysis of the data, by using descriptive statistics, including a run and Pareto chart. The data collected from this tool will be utilized to analyze data extracted from it in future QI efforts.

Ethical Considerations

Initial data collection for this quality improvement project consisted of patient level data, however, once the data entry was verified, the information retained was de-identified. The data that was submitted to the ACNM Benchmarking Project consisted of aggregate, de-identified practice-level data rather than patient-level data. No personally identifiable information was retained or analyzed. This quality improvement project maintained patient confidentiality at all times and adhered to hospital policy during the collection of data in the Excel spreadsheet as it was on a secure platform and in accessing the EHR for data reconciliation. A determination by the Institutional Review Board (IRB) confirmed that this project was not human subject research.

Results

A total of 115 deliveries occurred during the study period of October 2, 2023 – December 31, 2023. Using the Excel spreadsheet, the practice midwives and student midwives captured 94.4% (108) of those births. There were thirteen weeks during the study period and the weekly usage percentage ranged from 80 – 100% of births captured (Figure 1). The Excel spreadsheet was compared each week to the DSR, the report generated by the EHR that shows all deliveries by both the midwives and physicians of the practice. Initially, both the DSR and PSS were going to be used for the weekly audits, but it became clear that the DSR was a superior choice because there was a delay in receiving the PSS forms as they had to be physically given to and scanned by the billing and coding specialist. Of note, the Excel spreadsheet was created with the ability to aggregate the birth data as it was entered into spreadsheet, and while that data is important for showing the impact the midwives had within the collaborative practice, it is not relevant to this specific project, as the focus was utilization of the spreadsheet (Appendix A).

There were four weeks during the first PDSA cycle (October 2 – October 30) and the first week had 100% of births captured on the Excel spreadsheet. The following three weeks utilization rates were 90%, 80%, and 90%, respectively. The births that were not captured during those weeks included midwife vaginal deliveries and a primary CB. There were also four weeks during the second PDSA cycle (10/31 - 11/27). Three out of the four weeks captured 100% of the births that occurred and the fourth week missed one birth resulting in 90.1% utilization rate. The birth that was missed was a vaginal delivery done by a physician. The final PDSA cycle had five weeks (11/28 – 12/31). The first two weeks of the cycle each missed a single birth, resulting in 87.5% and 90.1% utilization rates. The births that were not captured included a single midwifery birth was a repeat CB. The final three weeks of the project captured 100% of the births that occurred in the practice. An additional two practices deliver on the unit and, occasionally the

physicians from the collaborative practice will provide care to their patients in the form of a CB or assisted vaginal delivery. It was ultimately decided to not include those deliveries in the benchmarking data as no midwife or physician were a part of their prenatal or intrapartum care up until the delivery, potentially skewing their aggregate data. It was a job of the doctoral student to ensure those were not included in the Excel spreadsheet although they would occasionally appear in the DSR.

In addition, qualitative data was collected during the project. Each PDSA cycle a Google form questionnaire was sent out requesting feedback from the practice midwives and student midwives. Over the three times it was sent out, a total of 9 responses were received. Additional feedback was given to the doctoral student during the practice's monthly meetings. The feedback collected was analyzed and grouped into categories, including additional data point requests, process improvement suggestions, and issues with the process (Figure 2). The majority (62%) of the feedback received was requesting additional data points be added to the Excel spreadsheet to track more birth variables. Of the feedback received, 31% was about suggestions to improve the process of using the Excel spreadsheet and 8% included issues with the current process.

Summary

This quality improvement project launched a data collection and benchmarking tool at a collaborative midwifery and obstetric practice at a small community hospital between October 3, 2023 and December 31, 2023. This project achieved two of its specific aims. First, a data collection tool and benchmarking system was created and implemented. Second, the data collection tool would capture 80% of births by the practice midwives. Throughout the project there was an average capture rate of 94.4% of the births, with 80-100% of the births captured each week. While there was not steady improvement between each PDSA cycle of total births

captured each week, the practice midwives consistently used the spreadsheet throughout the entire project. Although a total of seven births were missed over the project timeline, they were easily identifiable by the weekly audit with the DSR. The majority of the feedback received about the Excel spreadsheet was requests to add more data points to the spreadsheet. Practice midwives found the tool to be easy to use and saw value in continuing to use the spreadsheet even after the project came to an end. With the data gathered, the practice will be able to submit an additional fourteen metrics to the ACNM Benchmarking Project, up from the required six metrics the previous year. Overall, the Excel spreadsheet was successful as a new data collection tool and benchmarking system for the midwifery team within the collaborative practice.

Interpretation

Over the course of the project the Excel spreadsheet was found to be a straightforward tool to integrate as a new process of data collection and benchmarking at a collaborative practice. It proved to be a low-cost format that shows the impact midwifery care can have on patient outcomes. For example, from the data gathered between October – December 2022, the practices total CB rate was 33.7% and their primary CB rate was 24.8%. The data gathered over the timeline of this project however, found the total CB rate to be 25.2% and the primary CB rate to be 19.1%. A significant decrease in only a year, as the midwives were properly staffed after being new to the collaborative practice the previous year, highlighting the importance of data collection and benchmarking. This and other aggregate data collected will be submitted to the ACNM Benchmarking Project in March of 2024 which is currently the responsibility of the midwifery practice manager.

The utilization rate of the Excel spreadsheet remained steady over the course of the project, with utilization rates being the lowest in the first PDSA cycle. This was to be expected as

the practice midwives and student midwives were being introduced to the process. With the first Google form questionnaire, two points of feedback were suggested that were implemented in real time to aid in the process. First, a brightly colored reminder sheet was placed adjacent to the computer where most of the data input was occurring and second, a change to the spreadsheet. A suggestion from one of the practice midwives added an additional indication for a cesarean that was previously not included. From this, an entire "Notes" section was also added as a way for the midwives and student midwives to give context as needed to each birth they entered. The process change seemed to help initially with utilization rates of the spreadsheet remaining steady entering the second PDSA cycle, but taking a dip towards the end. Another piece of feedback that was received and implemented was to update the PSS to include the Excel spreadsheet as it was a process the midwives were already accustomed to doing. The updated PSS was implemented during the third PDSA cycle, where the final three weeks of the project had 100% utilization rates (Appendix B). Utilizing a process like the PSS that was routine for the midwives helped to improve uptake of the Excel spreadsheet in the final weeks of the project.

Unfortunately, it is difficult to compare the success of this quality improvement project with other studies focusing on testing a new data collection tool and benchmarking system for midwifery practices because those studies don't exist. A thorough literature review using PubMed was unable to discover any such studies, indicating a clear need for more research in this area.

Limitations

There were two major limitations to this project. The first was the inclusion of only the midwives of the collaborative practice as contributors to the Excel spreadsheet, while not including the physicians. Specifically, this is an imprecision in design in that it was

underestimated, perhaps, the contribution of per diem midwives. Of the seven births that were not captured over the course of the project, three of them were physician deliveries, meaning its possible they could have been captured if the physicians were included in the roll-out of the project. However, at this particular collaborative practice, while there are a number of specific practice physicians, there are also many per-diem physicians that take call on the labor and delivery floor, making physician inclusion more difficult. Another design flaw that presented itself was the original plan of using a run chart to analyze the qualitative data. Upon closer examination, a line chart more accurately captured the performance of this project.

Another limitation of the project, that was not discovered until the project was completed, was that not all the practice midwives contributed equally to the birth data in the Excel spreadsheet. Due to the nature of the Excel spreadsheet being stored on a cloud platform, it tracks users who edit the document and upon review, it was clear that two of the practice midwives were not utilizing the spreadsheet for data collection. Instead, their births were being imputed by several other midwives who were doing the extra work of backfilling the information. Without the midwives doing the extra work, it is likely that the weekly utilization percentages would have been significantly less.

This project was characterized by its context within a collaborative practice, making it not generalizable to all practice models, such as midwifery-led or shared models. In those models there is a midwifery patient caseload that is distinct from that of physicians. While those practices could create and design their own data collection tool and benchmarking system in Excel, it would need to account for those differences to accurately capture the impact midwives are having on patient outcomes.

Conclusion

A functional and meaningful data collection tool and benchmarking system is critical to future quality improvement efforts for any practice, but especially a midwifery and physician collaborative practice. This system is important because the data gathered from these collections show the impact midwifery care can have on maternal and neonatal outcomes, not only at a practice level but on a national level through the ACNM Benchmarking Project. The Excel spreadsheet that was created at the onset of this project has shown to be a low-cost, user-friendly tool that can be successfully implemented into a collaborative practice. It accurately captured and aggregated the data not only for the six required metrics for the ACNM Benchmarking Project, but an additional fourteen metrics as well. While some practice midwives have already shown interest in continuing to use the Excel spreadsheet as a meaningful data collection tool and benchmarking system moving forward, understanding the problem of buy in for all the midwives could be critical in getting them to engage with the spreadsheet going forward.

A benchmarking champion has been selected from within the practice and will fill the role previously held by the doctoral student of auditing and backfilling data as needed. The next iteration of the Excel spreadsheet for the collaborative practice involves adding the additional birth data variables they wish to capture, which in turn allows the practice to be able to submit more metrics to the ACNM Benchmarking Project. Despite several challenges in adoption and implementation, due to the ease of use and continued education on the importance of data collection, it is likely the new system will continue to be utilized and be beneficial to the practice at the end of the project. This project set out to create a sustainable data collection tool and benchmarking system that would gather data for future quality improvement efforts, an understanding of the practice's indications for CB and submit data to the ACNM Benchmarking Project. The chosen data collection tool and benchmarking system, the Excel spreadsheet, met

those goals and has the capacity for expansion of the data the midwives want to collect in the future, while showing the impact midwifery care can have on birth outcomes.

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Appendices

Appendix A: Aggregate Birth Data

Total Deliveries (10/2 – 12/31)	115
SVD (total)	86 (74.8%) VBAC – 6, VAVD – 3, FAVD – 1
SVD (CNM)	82 (95.1%) Excluding VAVD and FAVD
CB (total)	29 (25.2%)
Primary CB	22 (19.1%)
Repeat CB	7 (6.1%)
Indications for CB	12 (41.4%) – nonreassuring fetal heart rate tracing 6 (20.7%) – labor arrest 4 (13.8%) – malpresentation 3 (10.3%) – other 2 (6.9%) – patient request 1 (3.4%) – failed induction 1 (3.4%) – cord prolapse
Total Inductions	67 (58.3%)
Medical IOL	52 (77.6%)
Elective IOL	15 (22.4)

Appendix B: Updated Patient Sticker Sheet

PATIENT STICKER SHEET

Use for admitted intrapartum patients or GYN procedure (bilateral tubal ligation, MVA) if involved in care. ***REMEMBER TO ROUTE YOUR NOTE TO CODER***

Patient Sticker	**Date of admit**	**Admitting service**	**Date of delivery**	**Delivering service**	**Mode of delivery**	**Log birth data**
		☐ CNM ☐ OB ☐ VG ☐ FM		☐ CNM ☐ OB ☐ VG ☐ FM	☐ SVD ☐ FAVD ☐ VAVD ☐ Primary CS ☐ First Assist ☐ Repeat CS ☐ First Assist	☐ Yes ☐ No
		☐ CNM ☐ OB ☐ VG ☐ FM		☐ CNM ☐ OB ☐ VG ☐ FM	☐ SVD ☐ FAVD ☐ VAVD ☐ Primary CS ☐ First Assist ☐ Repeat CS ☐ First Assist	☐ Yes ☐ No
		☐ CNM ☐ OB ☐ VG ☐ FM		☐ CNM ☐ OB ☐ VG ☐ FM	☐ SVD ☐ FAVD ☐ VAVD ☐ Primary CS ☐ First Assist ☐ Repeat CS ☐ First Assist	☐ Yes ☐ No
		☐ CNM ☐ OB ☐ VG ☐ FM		☐ CNM ☐ OB ☐ VG ☐ FM	☐ SVD ☐ FAVD ☐ VAVD ☐ Primary CS ☐ First Assist ☐ Repeat CS ☐ First Assist	☐ Yes ☐ No
		☐ CNM ☐ OB ☐ VG ☐ FM		☐ CNM ☐ OB ☐ VG ☐ FM	☐ SVD ☐ FAVD ☐ VAVD ☐ Primary CS ☐ First Assist ☐ Repeat CS ☐ First Assist	☐ Yes ☐ No

Figures

Figure 1: Line Chart

Line Chart Showing Spreadsheet Utilization by Week

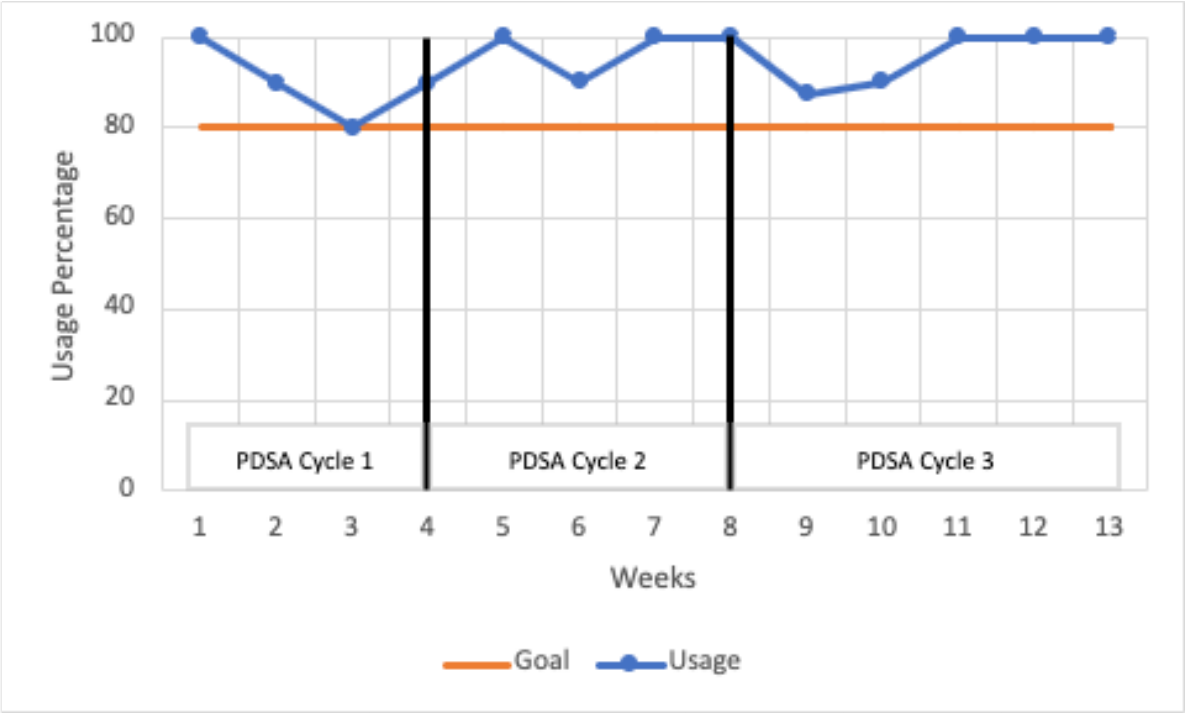

Figure 2: Pareto Chart

Types of Feedback Received Over the Course of the Quality Improvement Project