

Implementation and adoption of a health insurance support tool in the electronic health record: A mixed methods analysis within a randomized trial

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Research article

Keywords: Community health centers, Health insurance, Outreach and enrollment, Health information technology tools, Electronic health record, Hybrid implementation-effectiveness, Mixed methods

Posted Date: September 30th, 2019

DOI: <https://doi.org/10.21203/rs.2.15423/v1>

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Version of Record: A version of this preprint was published at BMC Health Services Research on May 15th, 2020. See the published version at <https://doi.org/10.1186/s12913-020-05317-z>.

Abstract

Background: In addition to delivering vital health care to millions of patients in the United States, community health centers (CHCs) provide needed health insurance outreach and enrollment support to their communities. We developed a health insurance enrollment tracking tool integrated within the electronic health record (EHR) and conducted a hybrid implementation-effectiveness trial in a CHC-based research network to assess tool adoption using two implementation strategies.

Methods: CHCs were recruited from the OCHIN practice-based research network. Seven health center systems (23 CHC clinic sites) were recruited and randomized to receive basic educational materials alone (Arm 1), or these materials plus facilitation (Arm 2) during the 18-month study period, September 2016-April 2018. Facilitation consisted of monthly contacts with clinic staff and utilized audit and feedback and guided improvement cycles. We measured total and monthly tool utilization from the EHR. We conducted structured interviews of CHC staff to assess factors associated with tool utilization. Qualitative data were analyzed using an immersion-crystallization approach with barriers and facilitators identified using the Consolidated Framework for Implementation Research.

Results: The majority of CHCs in both study arms adopted the enrollment tool. The rate of tool utilization was, on average, higher in Arm 2 compared to Arm 1 (20.0% versus 4.7%, $p < 0.01$). However, by the end of the study period, the rate of tool utilization was similar in both arms; and observed between-arm differences in tool utilization were largely driven by a single, large health center in Arm 2. Perceived relative advantage of the tool was the key factor identified by clinic staff as driving tool utilization. Implementation climate and leadership engagement were also associated with tool utilization.

Conclusions: Using basic education materials and low-intensity facilitation, CHCs quickly adopted an EHR-based tool to support critical outreach and enrollment activities aimed at improving access to health insurance in their communities. Though facilitation carried some benefit, a CHC's perceived relative advantage of the tool was the primary driver of decisions to implement the tool. Trial

Registration: ClinicalTrials.gov: NCT02355262, Posted February 4, 2015

Background

Community Health Centers (CHCs) provide a vital source of health care to more than 28 million people in the United States. Because CHCs accept patients regardless of their ability to pay, these health centers care for a large proportion of patients with no health insurance, patients with frequent health insurance coverage gaps, and patients with Medicaid insurance.¹ The Patient Protection and Affordable Care Act (ACA) greatly expanded access to health insurance and also increased funding to CHCs via the Community Health Center Fund.²

Because of the increased access to health insurance coverage and the insurance enrollment complexity following the ACA, the Health Resources and Services Administration (HRSA) provided grant-funding to over 1000 CHCs to support health insurance outreach and enrollment (O&E) efforts.³ This grant funding

supported many CHCs in establishing health insurance enrollment assisters to help patients enroll and re-enroll in health insurance, especially Medicaid. Patients who require assistance with insurance may self-identify for these services, may be referred at the time of an appointment, or may be identified for outreach outside of the context of an appointment.⁴ Individual CHCs develop their own systems for O&E supports, thus models for providing these services vary widely, as do the systems for tracking outreach.

To support health insurance enrollment assisters, our team developed and implemented an electronic tool integrated within the electronic health record (EHR)—referred to as the ‘enrollment tool.’ The enrollment tool was designed to streamline and improve tracking of O&E services, with the ultimate goals of increasing insurance continuity, reducing uninsured visits, and improving patient care.⁵ We used a mixed method, hybrid effectiveness-implementation design^{6,7} to study adoption of the enrollment tool. As health centers are increasingly asked to implement new strategies to streamline and improve care, just as this tool was conceptualized to do, it is critical to understand which implementation strategies best support practice change (or not) and why. In this manuscript, we report on the implementation component of this study’s hybrid effectiveness-implementation design and compare tool utilization outcomes among two implementation strategies: (1) basic educational materials (Arm 1); and (2) basic educational materials plus facilitation (Arm 2)—a strategy that evidence shows can assist practices with implementing change, such as adopting evidence-based guidelines.^{8,9}

Methods

Study Setting & Participants: Primary care health centers were recruited from the OCHIN practice-based research network (PBRN).¹⁰ OCHIN is the largest network of CHCs using a single instance of the Epic EHR. Its centrally hosted EHR is deployed in over 100 health center systems (595 clinic sites) caring for nearly 3.6 million patients across 22 states. For this study, eligible OCHIN health centers met the following criteria: located in a state that expanded Medicaid in 2014, implemented the OCHIN EHR prior to 2013, and no history of participation in a study of similar tools targeted toward children.¹¹ Of 32 eligible health centers, 10 were not approached because they were being recruited for other OCHIN PBRN projects. Of the 22 health centers invited, seven (31.8%) agreed to participate. This study adhered to CONSORT guidelines (Appendix Figure 1). The seven participating health centers were composed of twenty-three individual clinic sites (we will refer to the larger entities as health centers, recognizing that most health centers are systems with more than one affiliated clinic site). The health centers included in this study ranged from one to six clinics per health center, and all were designated Federally Qualified Health Centers (FQHCs). All participating clinics sites received HRSA grant funding for O&E. Quantitative data were available for all 7 health centers throughout the entire study period, however, one health center in Arm 1 (Health Center D) was lost to qualitative follow up.

Study Design and Intervention: This project was designed as a hybrid effectiveness-implementation study to identify the factors that explain why some health centers implemented the tools and others did not. More detailed description of study design can be found in the study protocol by DeVoe.⁵ The tool

implementation period consisted of 18 months—September, 2016 through March, 2018. This period was preceded by a 6-month tool testing and refinement window (March-September, 2016) where a preliminary version of the tool was released to all participating clinics and Arm 2 clinics were engaged in ‘beta testing.’ For Arm 2 clinics, this initial period of beta testing included working with the facilitator and participating in user-centered design feedback sessions that led to tool refinement and updates. The final version of the tool was released to all clinics in Arms 1 and 2 mid-September, 2016. Qualitative data collection continued through July, 2018. The intervention included the enrollment tool, education, and facilitation which are described below.

- The Enrollment Tool: As described in Table 1, the enrollment tool consisted of an electronic fillable ‘form’ which appeared alongside typical patient registration processes within the EHR. This form was intended for use by enrollment assisters or other staff who help patients or community members with registration or insurance enrollment. Each ‘form’ can be used to assist multiple individuals and is electronically linked to a single individual’s health record (e.g., when a mother brings her three children and one spouse for insurance assistance, the enrollment tool is linked to her chart and the number of individuals assisted is five).

[INSERT TABLE 1]

- Facilitation: All participating health centers received basic educational materials consisting of an electronic manual with instructions for tool use. Arm 2 clinics also received facilitation customized to meet individual practice needs. During the 18-month implementation study period, the facilitator contacted health centers (by phone, virtual meeting space, or email) at least monthly. During these contacts, the facilitator provided audit and feedback reports which included graphs of monthly rates of uninsured and Medicaid visits, as well as monthly use of the enrollment tool, for each of the clinic sites and the composite health center. The facilitator also provided tailored guidance to support clinic-led rapid change cycles focusing on enhancing tool utilization. Throughout the study period, the facilitator was also able to expedite problem-solving (including technologic support) for any questions/concerns regarding study tools for Arm 2 clinics.

Randomization Procedure: The study team randomized four health centers (11 clinic sites) to Arm 1 which received educational materials only, and three health centers (12 clinic sites) to Arm 2, which received educational materials plus facilitation. Participating clinic sites were randomized by health center system into one of two intervention arms through covariate-constrained randomization. We used state (Oregon vs. non-Oregon), number of clinics per health center, total number of patients per health center, and percentage of uninsured patients per health center as covariates in our random procedure as these were theorized to be important confounders. Given the focus on comparing intervention arms on tool adoption, we do not report on how we selected controls for testing effectiveness as these are beyond the scope of this paper and can be found in the study protocol paper.⁵

Quantitative Data: The primary quantitative outcome of interest was tool use during the study period. First, we measured individual instances of tool use and number of unique patients for whom the tool was used. Then, because health center size and population varied widely, we quantified tool use as a rate setting the numerator as the number of unique patients with tool use and the denominator the number of CHC patients with ≥ 1 Medicaid-insured or uninsured clinical visits at an intervention CHC during the study period (presumed to be individuals at highest risk of insurance discontinuity).

For descriptive purposes, we collected patient- and CHC-level information rolled up to the health center. Patient-level characteristics included patient status at time of first tool use (established patient, new patient, or never patient); and insurance type prior to first tool use (Medicaid, Medicare, private, other public, Uninsured, no prior visits/missing). CHC characteristics included number of active patients (individuals with an ambulatory encounter during the study period); % uninsured ambulatory visits during the implementation period; % Medicaid-insured ambulatory visits during the implementation period; % nonwhite; % Hispanic; median patient age (years); % Federal poverty level (FPL) $< 138\%$ at the beginning of the implementation period; number of clinics within their health center system; and urbanicity (rural, urban, mixed—one health center had clinic sites in both rural and urban locations).

Qualitative Data: Qualitative data collection included observation and semi-structured interviews with key stakeholders at CHCs and was focused on understanding why (or why not) and how the enrollment tool was implemented, with attention to differences between each arm. Data were collected through in-person site visits to CHC clinics, and through monthly phone interviews with CHC contacts.

Two experienced researchers conducted in-person site visits with all but one of the CHCs; Health Center D did not participate in a site visit. Health centers in Arm 2 received a baseline site visit aimed at assessing existing clinic O&E processes prior to intervention, understanding motivation for using the enrollment tool, and understanding aspects of practice organizational capacity, including existing tools used for O&E. Post-implementation site visits, conducted at least once at all but one health center, focused on identifying practices' experiences with the enrollment tool, including how the tool was integrated into clinical work flows and the barriers and facilitators to tool use. Site visits lasted 1–2 days and included 8–14 hours of observation, 3–6 semi-structured interviews with practice staff ($n = 47$) who were directly or indirectly involved in tool use (*e.g.*, front desk staff, leadership, outreach and enrollment staff, health information technology support), and the collection of artifacts related to the enrollment process (*e.g.*, enrollment applications, training and educational materials). The number of interviews conducted at each clinic varied by clinic size, and interviews were approximately 45–60 minutes long.

In addition to site visit data, one researcher made monthly phone contact with each CHC during the study period, targeting one or more staff who were closely involved in implementation of the enrollment tool. Phone interviews were approximately 20 minutes long and included discussion of tool implementation, enrollment patterns, and experience with implementation support.

Quantitative Analysis: First, we described patient and clinic characteristics by health center and study arm. Similarly, we compared several characteristics of tool utilization by health center and study arm. We

compared rates of tool use between Arms 1 and 2 using a two-sided Poisson exact rate ratio test, and report the rate ratio (95% confidence interval) comparing Arm 2 to Arm 1. Statistical significance was set at $\alpha < 0.05$. To maximize learnings from individual health centers, we also report descriptive rates of tool use by health center. Lastly, to understand uptake and continued tool use throughout the implementation period, we visually present trends in tool utilization over time by estimating monthly rates of tool use by study arm and for each health center. Quantitative analyses were performed using SAS software, v.9.4 (SAS Institute Inc., Cary, NC) and R version 3.6.0.¹²

Qualitative Data Management and Analysis: Interviews were audio-recorded, professionally transcribed, and checked for errors. Jottings made in the field were developed into comprehensive field notes within 24–48 hours of the site visit's end. Fieldnotes and interview transcripts were de-identified and put into Atlas.ti (Version 7.0, Atlas.ti Scientific Software Development GmbH, Berlin, Germany) for data management and analysis.

We used an immersion/crystallization approach¹³ to analyze the data. Two experienced qualitative analysts read the data by health center (immersion) and then regularly met to discuss patterns within each clinic (crystallization). Through this process, the team developed a codebook to tag relevant portions of the text, and data were analyzed a second time to draw comparisons across health centers. This process yielded patterns in the factors that influenced implementation and use of the enrollment tool, and we began to make connections to relevant literature to help enhance and explain emerging results. We used the Consolidated Framework for Implementation Research (CFIR) to help name the barriers and facilitators to implementation that we observed. Lastly, we developed a matrix organized by health center and study arm, and input qualitative data for each of the factors identified as influencing implementation. This allowed the team to identify cross-cutting findings and to develop a more robust understanding of what happened among participating health centers and why.

Throughout the study period, quantitative and qualitative analytic teams worked in parallel to analyze the data. When analyses were complete, the results were examined by the full study team to identify common themes explaining the observed results and to integrate the presentation of data. This study was approved by the Institutional Review Board at Oregon Health & Science University and was registered as an observational study at clinicaltrials.gov (NCT02355262).

Results

The seven health centers (with 23 study clinics) had patient populations ranging in size from 3,584 patients to 22,286 patients during the implementation period (Table 2). The rate of uninsured visits varied across clinics, from 13.9% to 52.8%. In all but one health center, more than 40% of encounters were Medicaid-insured. Characteristics of the patient population that health centers served (e.g., race and ethnicity) varied.

[INSERT TABLE 2]

Most clinics utilized the tool

From Table 3, five of seven health centers recorded tool use. One health center in Arm 1 (D) and one health center in Arm 2 (E) did not record any tool use. Health Center G (Arm 2) had the highest rate of tool utilization, with over five times more unique patients with tool use and just over 4 times more instances of tool use compared to the next closest health center. The population for whom the tool was used was generally similar across health centers, and most were uninsured or Medicaid-insured patients. However, at Health Center A, 44% of individuals who received insurance support with the enrollment tool never became patients at that health center during the study period, demonstrating that their health center utilized the tool to engage in more community enrollment support than other CHCs. Though most tool utilization assisted one person per encounter, many unique instances of tool use assisted more than one person. At health center C, 49% of tool use instances assisted multiple individuals while at health center G, only 22% of tool use instances assisted multiple people.

[INSERT TABLE 3]

For patients at high risk of uninsurance, Arm 2 health centers used the tool more frequently than Arm 1 health centers

Among the population we defined as at highest risk of insurance discontinuity—those with at least one Medicaid-insured or uninsured ambulatory visit during the study period ($n = 51,656$)—a total of 6,602 (12.8%) unique patients received insurance support with the enrollment tool (Table 4). Overall, the rate of patients with at least one Medicaid-insured or uninsured visit who received support with the enrollment tool was significantly higher in Arm 2 health centers compared to those in Arm 1 (20.0% vs 4.7%, $p < 0.01$, RR = 4.27 95%, CI = 4.01–4.56).

[INSERT TABLE 4]

Table 5 demonstrates variability in rate of tool use by health center with a higher rate of tool use by Health Center G (33%) and a much lower rate of tool use at health center B (1.5%).

[INSERT TABLE 5]

Tool utilization varied over time, with similar tool utilization rates in study Arms 1 and 2 by the end of

the study

Monthly tool utilization rates varied over time for health centers in both study arms. Arm 2 CHCs had a high rate of tool use initially which peaked sharply in March of 2017, and subsequently decreased with multiple smaller surges, ending at a rate similar to Arm 1. Utilization in Arm 1 increased sharply in month 3 of the project and remained approximately steady afterward. (Figure 1)

[INSERT FIGURE 1]

Stratifying the total instances of tool utilization by health center (Figure 2) demonstrates that the shape of the Arm 2 line in Figure 1 is similar to the shape of the line of tool utilization for Health Center G. In some health centers, small peaks of tool utilization were evident during open enrollment periods, most notably at Health Center C. Variability of tool use over time was impacted by multiple factors including leadership engagement and implementation climate (described below).

[INSERT FIGURE 2]

Perceived Relative Advantage played an important role in implementation

Three CFIR elements were identified as influencing implementation of the enrollment tool at the health centers: relative advantage, implementation climate, and leadership engagement. Table 6 provides a definition of these three CFIR elements and corresponding qualitative data examples to illustrate how health centers varied from low to high on each element. Table 7 shows the variation of the CFIR elements across health centers.

Health centers reported that the enrollment tool's *relative advantage* over existing systems was one main factor driving tool utilization. The organizations with the most favorable views of the tool either had no previous system in place for tracking enrollment work, or systems they considered disorganized. The biggest advantages of the enrollment tool were its utility in tracking enrollment applications during the period between an application's submission and acceptance, and its usefulness for federal HRSA reporting. For example, Health Center E did not use the enrollment tool and instead used a different insurance tracking tool outside of their EHR system that better suited the needs of their staff (who did not always have access to the EHR). Health Center B started using the tool more after discovering its advantage of fulfilling HRSA reporting. Health Center G found the tool most beneficial when paired with Medicaid date of coverage data (the specific date on which a patient's Medicaid insurance would expire) which they were intermittently able to acquire from a state-level partner and use for proactive patient outreach.

Some health centers reported that *implementation climate* also influenced tool utilization. Health centers with high implementation support, usually from technical staff or leadership, found that this support promoted consistency in tool use across assister teams; these health centers commonly used audit and feedback mechanisms to address issues and inconsistencies in enrollment tool use as they arose. This support also helped assister teams initially understand where tool use might best fit within their workflow, and how it might benefit their work. For example, a collaborative climate of partnership with the local Accountable Care Organization to receive health insurance coverage dates among patients in Health Center G occurred at the same time as the dramatic increase in tool utilization at Health Center G in early 2017. When this partnership was not sustained, there was a subsequent decrease in tool utilization. Health centers with a less favorable implementation climate, such as Health Center C, had assister staff members who found the tool to be burdensome, and some reported to be doubling up their work.

Finally, *leadership engagement* impacted how the tool was initially received at a health center and could drive tool use. Engaged upper and middle management leaders were able to facilitate buy-in for the tool from assister teams, especially when leaders conveyed excitement regarding how the tool might benefit their own work and/or conveyed the expectation to assisters that they use the tool, and that their work is part of a larger goal. This was exemplified in Health Center C which had a competing tool developed by one of the assisters, but the directive from leadership fostered use the enrollment tool. Conversely, unengaged health center leaders had little knowledge of the work that assisters do, nor knowledge of the enroll tool. In the case of Health Center D, leadership turned over and left no one at the health center engaged in tool implementation. As such, this health center did not use the tool at all.

[INSERT TABLES 6 & 7]

Discussion

We developed a novel, integrated EHR tool designed to support health insurance enrollment assisters at CHCs in performing O&E activities over time. During an 18-month implementation period, most health centers used the tool regardless of implementation strategy (basic educational materials in Arm 1 versus materials with facilitation in Arm 2). On average, CHCs that received facilitation (Arm 2) utilized the tool at a higher rate than did CHCs that received basic educational materials only (Arm 1). This observed difference between implementation groups is likely attributable to multiple factors including (a) the presence of facilitation, (b) more immediate tool use among Arm 2 CHCs, and (c) a unique combination of perceived relative advantage, leadership engagement, and implementation climate that allowed a single health center (G) to drive much of the observed between-group differences.

The value of individualized in-person facilitation has been demonstrated for a wide variety of clinic-based interventions.^{8,14} Notably, the facilitation provided in our project required substantially fewer resources than in other studies,¹⁵ which suggests that modest or low-intensity facilitation in the form of tailored regular outreach and stand-by support may be effective and important to consider for targeted primary

care interventions. The value of this particular strategy of audit and feedback with individualized close follow up has been demonstrated elsewhere.¹⁶

While health centers that received facilitation utilized the tool more on average across the study period, the fact that health centers without facilitation utilized the tool at a similar rate by the end of the study period suggests that basic educational materials might be sufficient for successful implementation, if given additional time. The more immediate tool utilization observed in Arm 2 may have been related to the presence of facilitation, engagement in beta testing prior to the study period, or due to intrinsic differences between health centers. Alternatively, with more intensive facilitation or additional support of outreach and enrollment activities outside of our enrollment tool, we might have observed a continued increase in utilization in Arm 2, rather than the observed plateau.

Qualitative interviews revealed that perceived relative advantage of the tool, above all else, drove decision-making regarding tool utilization within health centers. The most commonly reported relative advantage of the enrollment tool was the reporting functionality that assisted with generation of needed O&E tracking reports to satisfy HRSA grant requirements. Presence of this functionality was strongly motivating to health centers, and increased after these data became mandated metrics for the Unified Data Set (UDS) during the study period.

Barriers to tool uptake were also evident, particularly in Health Centers D and E that chose not to engage with the tool. In health center D, dramatic staff turnover in leadership left minimal awareness of the tool's presence. Health Center E utilized a purchased product (external to the EHR) to perform some of the same tracking functions as the enrollment tool and, though they initially planned to utilize the enrollment tool for a subpopulation, they ultimately decided not to use it. The complete lack of tool use from these two health centers suggests a need to more thoroughly assess clinic receptivity before investing in facilitated tool implementation.

Beyond the specifics of this study, as one of the first pragmatic hybrid implementation-effectiveness trials to be launched, our findings highlight two important and ongoing themes for future investigation in the emerging field of implementation science. (1) As a general rule, implementation support speeds adoption, but often the control group eventually gets there. When is this investment in implementation worth it? How might pre-implementation assessments be used to tailor support that maximizes its value? (2) Often, an implementation plateau (or backslide to baseline) coincides with a "wind down" of the most active period of support. How do we develop and test more effective sustainability strategies? Is there a minimum level of readiness and receptivity in a given clinical setting before we invest in implementation support?

Limitations

Clinics volunteered to be part of the study; thus, they are not representative of the general population of CHCs. Reasons for non-participation in the project included staff turnover, competing priorities, already

utilizing an alternative tool, and participation in alternative research/intervention projects. Thus, our subset of participating health centers may be more motivated, stable, and available than others. Despite a strong randomized design, the small number of participating health centers in each arm makes it difficult to generalize from the conclusions.

In this pragmatic trial, clinics in both arms decided how to implement the tool within their particular populations. This flexible implementation approach was a strength of the study, but it may have also created some disconnection between perceived and measured tool use which manifested as some discordance between qualitative themes and utilization rate (for example, low relative advantage, low leadership, and low implementation climate in a health center with high tool utilization). Similarly, a lower rate of tool utilization may represent less robust O&E activities overall, rather than incomplete implementation of the tool itself.

The primary outcome of this study was the rate of tool utilization overall, but given that the enrollment tool had many layers of functionality (Appendix Table 1), it is possible that some differences in tool utilization strategy were not measured between groups. For example, health centers may differ in their utilization of tool functionalities with some using the tool only for HRSA reporting, and others using the tool more robustly to assist with proactive insurance outreach, as noted above with Health Center C.

Conclusions

Health centers are increasingly active in supporting patients and other community members in enrolling in health insurance. Our EHR-based tracking tool was implemented successfully at CHCs to facilitate tracking of O&E activities. The successful tool implementation in this project suggests promising value of lower intensity facilitation, especially relevant to community health centers with limited resources.

Abbreviations

HIT: Health information technology

CHC: Community health center

ACA: Affordable Care Act

HRSA: Health Resources and Services Administration

O&E: Outreach and enrollment

EHR: Electronic health record

PBRN: Practice based research network

FQHC: Federally Qualified Health Center

FPL: Federal poverty level

CFIR: Consolidated framework for implementation research

Declarations

- Ethics approval: This study was approved by the Institutional Review Board at Oregon Health & Science University
- Consent to participate: This study was approved by the Institutional Review Board at Oregon Health & Science University. Participating health center management provided written consent for their health center to participate in the project. Individual staff who were interviewed provided verbal consent to participate. Verbal consent was deemed sufficient because of the neutral content being discussed, the fact that all data were deidentified, and because of the need to efficiently and informally discuss workflow with many staff.
- Consent for publication: N/A
- Availability of data and material: The datasets generated and/or analyzed during the current study are not publicly available in compliance with the Health Information Portability and Accountability Act but deidentified data could be made available from the corresponding author on reasonable request.
- Competing interests: The authors declare that they have no competing interests
- Funding: A research grant from the National Cancer Institute (R01CA181452) supported 100% of the research staff time, materials, and travel, to complete this project. The funder had no direct role in study design, data collection, analysis, or interpretation, or writing the manuscript.
- Authors' contributions:
 - BH: Wrote the first draft and synthesized component parts of the manuscript, conceptualized and advised the quantitative analysis, and substantively edited the final manuscript.
 - CT: Led the quantitative analysis and writing of the quantitative methods, and substantively edited the final manuscript.
 - NH: Contextualized the implementation processes and substantively edited the final manuscript.
 - MM: Consulted and advised on the study design and quantitative analysis and substantively edited the final manuscript.
 - AB: Participated in qualitative data collection, conducted the qualitative analysis, led the writing of the qualitative methods and results, and substantively edited the final manuscript
 - JN: Provided facilitation to health centers, contributed to qualitative data, assisted with interpretation and contextualization of results, and substantively edited the final manuscript.
 - AS: Recruited health centers and managed their participation, led development of the health information technology tool, contextualize implementation processes and tool development, and substantively edited the final manuscript.

- DC: Conceptualized and oversaw the qualitative analysis and substantively edited the final manuscript.
 - JD: Conceptualized and designed the study, contextualized the results, and substantively edited the final manuscript.
 - All authors have read and approved the manuscript.
- Acknowledgements: The authors greatly appreciate the participation of the OCHIN health centers that contributed substantial time and energy to this project while constantly seeking to improve access to care.

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Figures

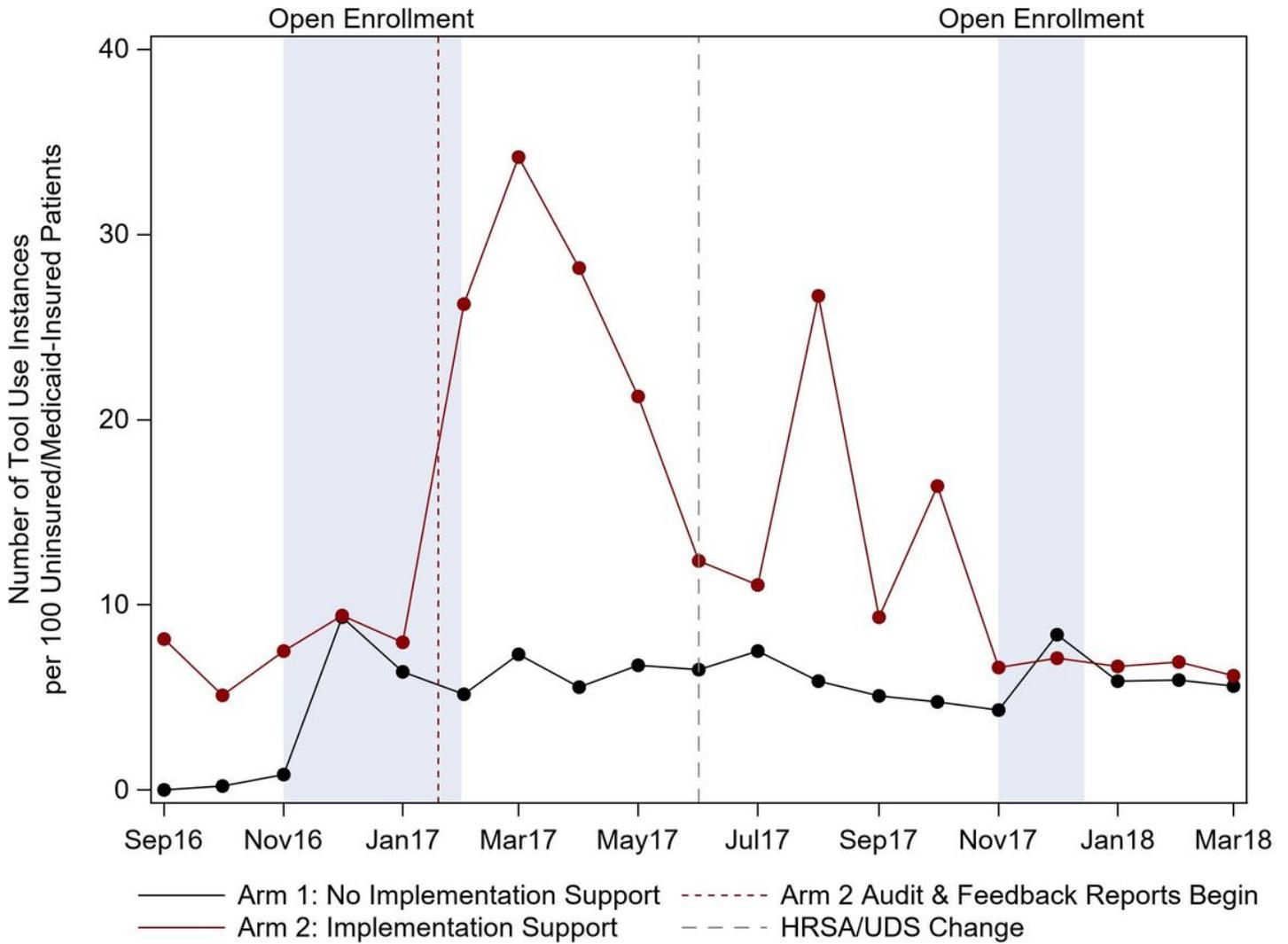


Figure 1

Rate of tool use per month between Arm 1 and Arm 2 clinics, among patients with at least 1 Medicaid-insured or uninsured visit during the study period, Sept 2016-Mar 2018 *Note: 'HRSA (Health Resources and Services Agency) UDS (Unified Data Set) Change' was a policy mandate that required health centers to report on health insurance enrollment assistance provided. This change was hypothesized to potentially impact tool utilization.

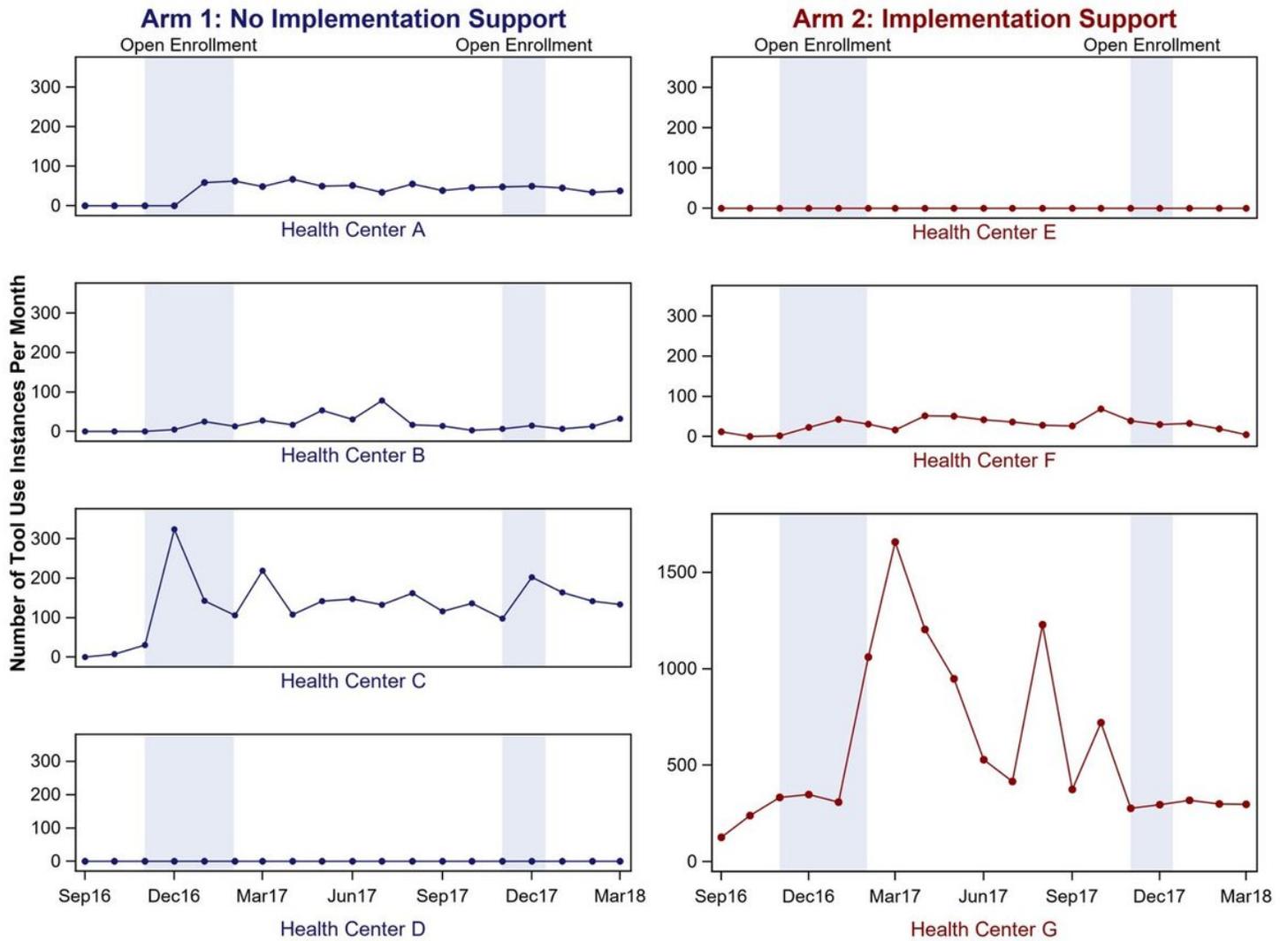


Figure 2

Monthly instances of tool utilization by health center, September, 2016 – March, 2018

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

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- [ImplementationScienceAdditionalFile.docx](#)