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Using Quality Improvement to Design Early Childhood Services Navigation in Primary Care

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Abstract

Introduction: Enrollment in high-quality early childhood education (ECE) improves educational and health outcomes and can mitigate racial and economic disparities. Pediatricians are encouraged to promote ECE yet lack the time and knowledge to assist families effectively. In 2016, our academic primary care center hired an ECE Navigator to promote ECE and help families enroll. Our SMART aims were to increase the number of children with facilitated referrals to high-quality ECE programs from 0 to 15 per month and to confirm enrollment on a subset to achieve an enrollment rate of 50% by December 31, 2020. **Methods:** We used the Institute for Healthcare Improvement's Model for Improvement. Interventions included system changes in partnership with ECE agencies (eg, interactive map of subsidized preschool options, streamlined enrollment forms), case management with families, and population-based approaches to understand families' needs and the program's overall impact. We plotted the number of monthly facilitated referrals and the percentage of referrals enrolled on run and control charts. We used standard probability-based rules to identify special causes. **Results:** Facilitated referrals increased from 0 to 29 per month and remained above 15. The percentage of enrolled referrals increased from 30% to 74% in 2018, then decreased to 27% in 2020 when childcare availability declined during the pandemic. **Conclusions:** Our innovative ECE partnership improved access to high-quality ECE. Interventions could be adopted in part or whole by other clinical practices or WIC offices to equitably improve early childhood experiences for low-income families and racial minorities. *(Pediatr Qual Saf 2023;8:e662; doi: 10.1097/pq9.0000000000000662; Published online July 10, 2023.)*

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INTRODUCTION

High-quality early childhood education (ECE) greatly benefits children's cognitive and socio-emotional skills,[1,2] educational attainment,[3] and health outcomes,[4–7] especially for children from low-income families.[8] Unfortunately, the children who benefit most from high-quality ECE face significant barriers to enrollment. Families must provide multiple documents to prove eligibility for tuition assistance (through Head Start, public school systems, or vouchers). These requirements are often unknown to families until they begin to apply; enrollment can be delayed for months while families make multiple trips to acquire needed documents. Knowing what to look for and finding a high-quality program that meets families' needs requires time and research, and is particularly challenging for families with unstable employment or housing.[9] Furthermore, the childcare system is fragmented and operates with insufficient supply, especially for infants and toddlers. This long-standing problem has only been worsened by the COVID-19 pandemic, during which staffing restrictions and lower reimbursement rates led to many programs closing permanently.

The American Academy of Pediatrics recommends clinicians encourage families to enroll their children in high-quality ECE programs,[10,11] and families report an

openness to discussing ECE during well-child visits.[12] However, pediatricians are faced with many topics to cover during brief well-child visits,[13] they receive no training on ECE enrollment and cannot feasibly stay current on which programs have openings or what is needed to enroll. Relying on individual clinicians to provide families with actionable ECE advice is particularly challenging in a large academic medical center with numerous attending and resident physicians providing care.[14] In this setting, we had no system for determining and documenting whether children were enrolled in high-quality programs, even though we knew it to be one of the most essential and primary social determinants of health.[15,16]

In 2004, Silverstein et al described a novel program in which primary care staff assisted families with Head Start enrollment by directly mailing a computer-generated packet to Head Start. This approach substantially increased Head Start attendance compared with providing written information about Head Start programs. Still, only 25% of children in the intervention group enrolled.[17] A second study substantially increased Head Start referrals from primary care, but only 14% completed enrollment.[18]

Because primary care is often the only system to interact with young children who may not be enrolled in ECE, we saw a critical need to develop an effective system for integrating high-quality ECE enrollment into primary care. We partnered with our local childcare resource and referral agency to generate warm handoffs, but we noted that few of these handoffs resulted in applications or enrollment. As a result, in 2016, we received local foundation grant funding to hire an ECE Navigator who would educate families about ECE and work effectively across our respective disciplines (education and pediatrics) to take a data-driven approach to maximize the impact on enrollment in high-quality ECE programs, and to build a sustainable long-term model.

Our SMART aim was to increase the number of children with facilitated referrals to high-quality ECE programs from zero to 15 per month by December 31, 2020. Recognizing that the ultimate desired outcome for young children is enrollment and retention in high-quality ECE programs but lacking any system for automatically tracking that, we conducted a secondary SMART aim to confirm enrollment on a subset of facilitated referrals and that for the enrollment rate to ascend from 0% to 50% by December 31, 2020.

METHODS

Context

We conducted this study in the primary care centers at Cincinnati Children's Hospital, where ninety percent of patients are insured through Medicaid and, therefore, also likely meet income requirements for Head Start or subsidized tuition through a local tax levy passed in November 2016. The two primary care centers serve over 23,000 children, and 9022 children under the age of 60 months with >130 resident and attending physicians, and co-located social workers and integrated psychologists who provide general developmental advice to families of children under 6 years based on Healthy Steps[19] and co-located behavioral therapy to young patients. Both clinics use the same electronic medical record (EMR).

In August 2016, the ECE Navigator (A.K.) was hired in a 0.6 FTE part-time model. The Navigator's education and prior relevant work experience, which was crucial to the program's success, included a Bachelor of Science in Child Development, teaching and directing preschool and school-age programs, providing training and technical assistance to ECE programs serving children with disabilities and mental/behavioral health problems, Head Start/Early Head Start Disabilities and Mental Health Coordinator, and an early childhood continuing education instructor. The ECE Navigator's initial charge was to approach all families of patients 1 month to 6 years to counsel on techniques to promote child development at home and enquire about any family need for ECE services. As the clinic, on average, provides >200 weekly checkups in this age range and stays open 6 days a week for 65 hours a week, we knew at the outset that only a fraction of the well-child visits could be staffed by a single person working 20 hours/week. The ECE Navigator could track the number of patients served and any refusals but could not follow up with all families or community organizations about whether children had enrolled in ECE programs.

Intervention

We used the Model for Improvement to co-design the ECE Navigator program. A simplified key driver diagram is shown in Figure 1. We designed interventions related to each driver and conducted plan-do-study-act cycles to test and adapt process changes[20] (Table 1).

In the first phase of the improvement work (July 2017–December 2017), the ECE Navigator provided *facilitated referrals* (Fig. 2), which involved prioritizing encounters with families interested in referrals to high-quality ECE (as opposed to providing all eligible children general child development education) and providing those families hands-on assistance with the referral process (eg, completing applications together, assistance with compiling necessary documents, or calling agencies for available slots while the family is in the clinic room). In this phase, she could not determine if the referred children enrolled. Yet the Navigator developed relationships with staff at community ECE programs, allowing her to help troubleshoot problems in the enrollment process.

In Jan–May 2018, the Navigator began a *case management approach* by tracking fewer referrals (n = 57 out of 203 children served during this time). In addition, she contacted families outside the context of office visits, obtained parental consent to communicate directly with ECE programs on the family's behalf, and confirmed enrollments.

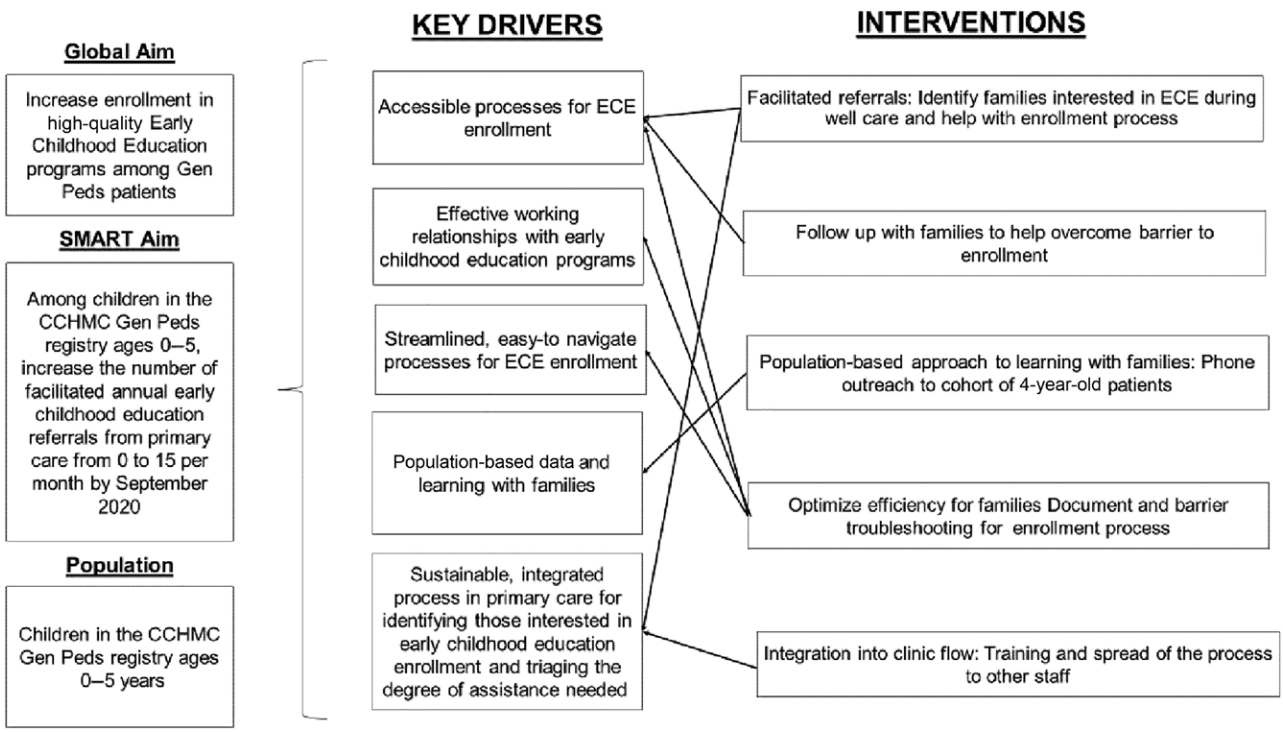

Fig. 1. Key driver diagram.

Table 1. ECE Navigation Program Study Interventions, Drivers, What Was Learned, and Their Evolution Over Time

Dates	Testing Site	PDSA Ramp	Key Drivers	What Was Learned
Jul 2017–Dec 2017	*Large clinic*	*Facilitated referrals:* Identify families interested in ECE during well-child care and help with the enrollment process	Accessible processes for ECE enrollment; sustainable processes in primary care	–Quality ECE was difficult for parents and staff to define –New model resulted in more ECE referrals for Navigator's time
Jan 2018–May 2018	Large clinic	Follow up with families to help families overcome barriers to enrollment	Accessible processes for ECE enrollment	–Many families had questions outside the context of the initial office visit
May 2018–Jun 2019	Large clinic	*Population-based approach*: Phone outreach to a cohort of 4-year-old patients	Population-based data and learning with families	–83% of 4- to 4.5-year-old patients were already enrolled in ECE programs; 55% were enrolled in high-quality programs –Of those not already enrolled, 53% were interested in enrolling
Oct 2018–Jul 2019	Large clinic	*Optimize efficiency:* Document-based troubleshooting of the enrollment process	Accessible processes for ECE enrollment; streamlined, easy-to-navigate processes for ECE enrollment; effective working relationships with ECE programs	The most common barriers to completing enrollment processes were: transportation problems, needing to fill out multiple applications due to limited slots.
Jul 2019–Jun 2020	Pilot at a small clinic with spread to a large clinic	*Integration into clinic flow:* Training other staff in parts of the process	Sustainable, integrated processes in primary care	85% of facilitated ECE referrals could be done by other trained staff in primary care clinic, with only 15% requiring the navigator's specialized background (eg, special education referrals)

PDSA, plan-do-study-act .

This approach successfully gained deep learning about the enrollment process. Still, it was labor intensive, and we lacked data to understand to what extent the cases represented our larger population's needs, as we did not understand the use or need for ECE programming in our clinic population.

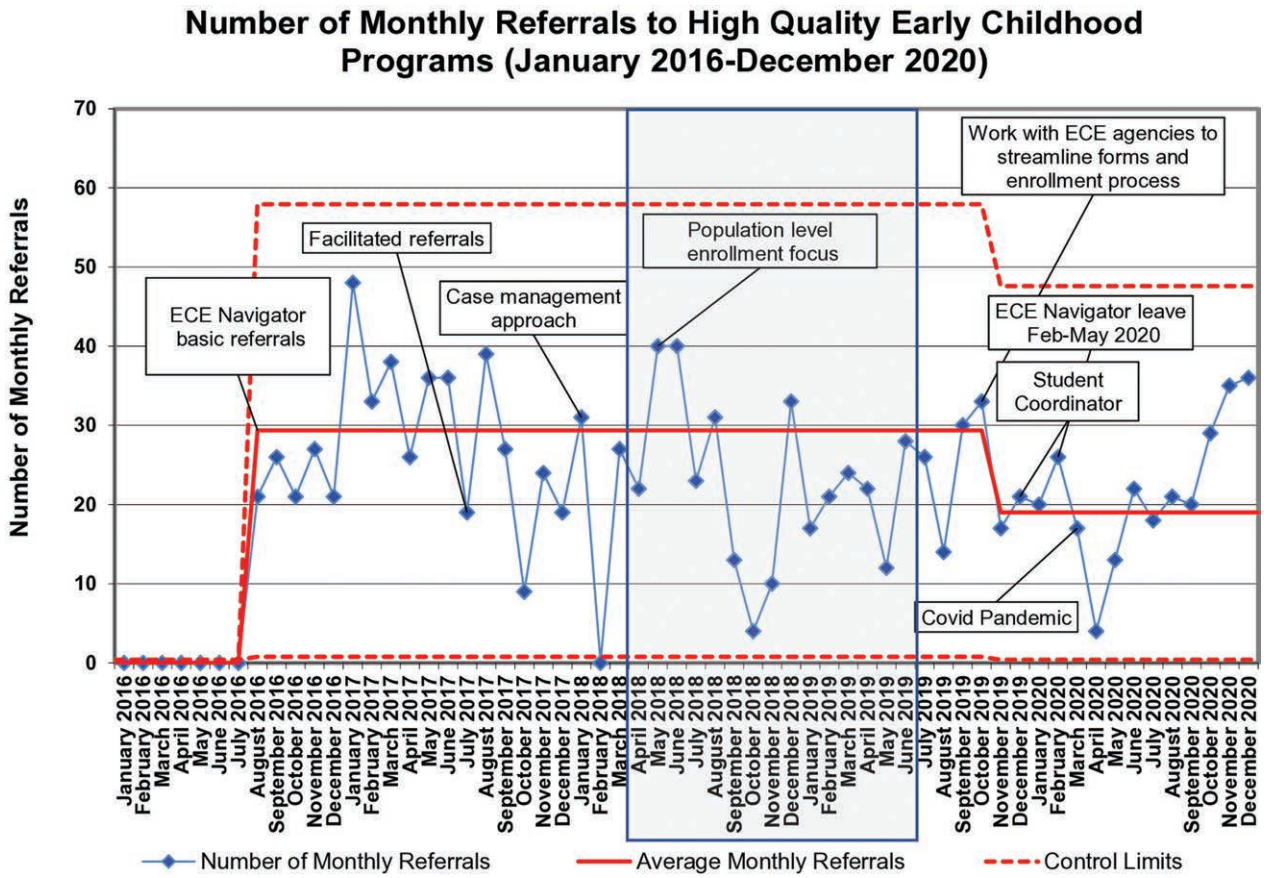

Fig. 2. Number of monthly referrals to high-quality early childhood programs (January 2016–December 2020). Monthly annotated I-chart depicting the number of basic and facilitated referrals to high-quality early childhood programs. Shading depicts the dime period of the population enrollment focus (Spring 2018 to June 2019).

Subsequently, we took a *population-based approach* to understand which patients were already enrolled in high-quality ECE programs, assess parent interest among those not enrolled, and develop a long-term plan. In May 2018, we generated a report from the EMR of all active patients who were 4 to 4½ years old (as this was the age prioritized for a newly-passed local preschool subsidy program). Then, from July 2018–June 2019, the Navigator made up to 3 attempts (call, text, or in person at their clinic visits) to reach all families and document their current childcare and/or preschool arrangements and interest in high-quality ECE programs. She then facilitated referrals for those who desired them.

Meanwhile, the Navigator drilled down on the enrollment process to *optimize efficiencies* for families. She tracked individual documents from patients' applications (eg, birth certificates, proof of income, medical forms) and used Pareto charts to identify the documents most commonly missing. She worked with community partners at government agencies and ECE programs to make obtaining documents easier. Interventions included educating parents about what documents were needed and providing documents from our clinic, when possible (eg, immunization record to prove birthdate), creating templates in the EMR to automatically generate medical forms that met ECE program requirements, enlisting community health workers to assist families with document collection, and using standardized forms. Driven by top failure categories on the Pareto chart, she also tested interventions to address the needs of families experiencing homelessness and/or lacking transportation, including a partnership with the local Homeless Coalition and an online enrollment process.

Last, the team addressed the *scalability and sustainability* of the program beyond the patients the Navigator could reach in the clinic or by phone. The team used a low-cost subscription service ZeeMaps to create an online and mobile-accessible interactive map of locally subsidized ECE programs, including program contact information, information on how and where to apply, what is needed to apply, and eligibility information. The Navigator trained other clinicians and staff members (including resident physicians, integrated psychologists, social workers, and care managers) to assist families with ECE enrollment. The training focused on the early childhood options in the community, the types of early childhood programs, information on what families need to enroll and how to enroll and use the ZeeMaps program.

A "Refer to Early Childhood Services" order was added to the EMR in August 2019, allowing more patients to tap into services than just those who could be staffed in real-time. Last, the Navigator trained a student coordinator to manage early childhood referrals while the Navigator went on parental leave (February–May 2020) and to assist with referrals when she returned from leave. As the Navigator had other roles and responsibilities that waxed and waned over these 5 years, the team trialed a range of staffing models for navigation services between 0.1FTE to 0.5FTE.

Study of the Intervention

The study of the intervention was deemed not human subjects research by the institutional review board.

Measures

The primary process measure was the number of patients with facilitated referrals to high-quality ECE programs per month. It was counted as a facilitated referral if the Navigator provided individualized assistance to families (more than just handing families a phone number or website) when enrolling in a high-quality program. "High Quality" was rated 3 stars or higher on Ohio's Quality Rating System, Step Up to Quality.[21] We chose facilitated referrals because they provided real-time feedback on functional elements of the ECE navigator program.

The outcome measure was the percentage of referred children with confirmed enrollment in high-quality ECE programs plotted monthly on a statistical control chart (P-chart). This measure reflected what we truly hoped to achieve with the program. Still, there were limitations in the ability of this measure to drive the day-to-day QI work because of seasonality in preschool enrollment, constraints on the available supply of high-quality slots, and a reporting lag on enrollment from ECE programs.

The team monitored secondary process measures such as the percentage of required documents completed within ECE applications and the frequency of reported barriers to enrollment to target specific opportunities for system improvement. The Navigator entered all referral and barrier data into a secure Excel database. Because the manually updated spreadsheet was also the working document from which the ECE navigator managed referrals, we are confident in the validity of the data. The number of ECE referral orders placed in the EMR was tracked over time.

Analysis

We used standard probability-based rules to identify common cause versus special cause variation in both the process and outcome measures. Eight or more consecutive points above or below the centerline were used to prompt a shift on the run and control charts. Summary statistics were calculated for ECE enrollment status and interest in ECE among the 4- to 4.5-year-old cohort.

RESULTS

From August 2016 to December 2020, the Navigator provided facilitated referrals to 1265 children and annually served 659 patients (7.3% of patients in the target age group). 100% of patients who the ECE Navigator approached said they learned something, and there were no refusals; so the ECE navigator stopped tracking this information. Figure 2 shows an annotated I-chart of the monthly number of facilitated referrals to ECE, ranging from 0 to 48 per month. The number of facilitated referrals per month increased from zero to a centerline of 29 referrals per month at the start of the project. It stayed at this level until early 2020, when the ECE navigator went on leave, and the Covid pandemic struck, coinciding with a seasonal dip in ECE placements. Yet it remained above our goal of 15 per month over the four years, even with different staffing levels.

Figure 3 shows an annotated SPC chart (p-chart) from the population-based approach onward with the percentage of facilitated referrals for which the ECE navigator was able to confirm enrollment, demonstrating an increase from a baseline of 30%–74% during the 12 months the ECE navigator was focused on the 4-year-old population and confirming enrollment, then a decrease to 27% in 2020 when the supply of available slots declined with the pandemic and the ECE navigator shifted focus to other projects. Special cause is noted on the SPC chart in August 2020, which is thought to be attributable to more available spots open at the start of the school year, a new, more easily accessible online enrollment process (previously in-person), and less demand than usual as some parents were not comfortable sending children to preschool amid the pandemic.

Figure 4 shows a Pareto chart of the common missing documents from ECE applications. With this process-map-based approach, the Navigator could reliably obtain 100% of the necessary documents for enrollment, up from a baseline of 40%, after implementing interventions related to parent education, reminder calls, and standardized forms.

Table 2 presents our findings from the population-based approach for 4- to 4.5-year-olds. Of the 892 patients pulled from the registry, 22 (2%) had no working phone number on file, and 41 (5%) confirmed they had moved out of the area (ineligible). Of the remaining 829 patients, we could not reach 93 (11%) patients with four attempts (phone, text, or in person during a clinic visit). Among those 736 reached, 613 (83%) were already enrolled in an ECE program, of which 405 (55%) were high-quality. Among the 123 not enrolled in any ECE, 65 (53%) were interested in enrolling in a high-quality program. Among the 208 enrolled in a program not designated as "high quality," 12 (6%) expressed interest in referral to a high-quality program. Only 11 (<1%) indicated they were not interested in high-quality ECE or could not afford it.

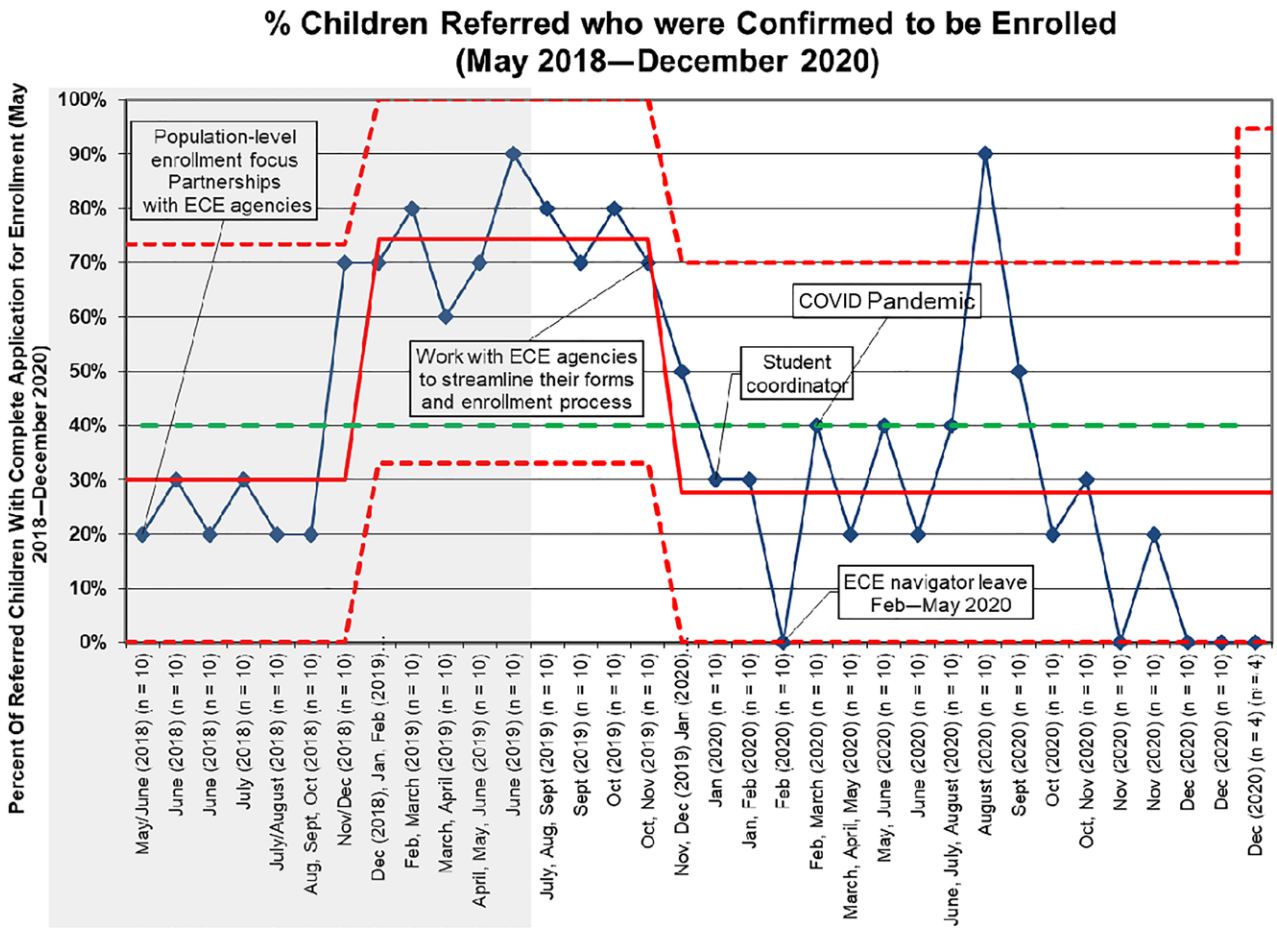

Fig. 3. Percent of children referred who were confirmed to be enrolled (May 2018–December 2020). Drill-down focus on actual enrollment from facilitated referrals during population-level focus (Spring 2018–June 2019) and afterward (sustainability). Monthly (n = 10) annotated statistical control chart (P-chart) depicting the percentage of facilitated referrals confirmed as enrolled in early childhood programming. Shading represents the period of population focus.

DISCUSSION

Our innovative ECE Navigator program facilitated referrals to high-quality ECE programs for an average of 29 patients per month throughout the project, including during the pandemic. In addition, we uncovered common barriers in the enrollment processes and addressed them on a systemic level.

In 2019, our enrollment rate was 74%; in 2020, it was 30%, still higher than the 25% enrollment rate reported by Silverstein[17] and the 14% reported by Grant.[18] This is remarkable as, during much of 2020, ECE facilities in Ohio were closed or had limited class sizes. As a result, many families chose to keep their children at home to avoid exposure. The fact that we were able to keep above our target of 15 facilitated referrals per month and enroll at higher rates than similar programs during a pandemic speaks to the need for childcare among a publicly-insured patient population, many of whom are first-line or essential workers.

Because the ECE Navigator was a new program, its effect on the initial increased number of *facilitated referrals* is clear. We *sustained* the number of *referrals* throughout the program while *increasing* the confirmed percentage of referred patients who *enrolled* during the population based-approach intervention. It is unknown how many of these families would have successfully enrolled their children in preschool without our intervention. Considering the degree of help families needed and the increase in the percentage enrolled while we implemented our case management approach, it is unlikely all the referred parents could have overcome enrollment barriers independently. On the other hand, it is also unknown how many families successfully enrolled their children because of our services during the periods we were not focused on manually tracking actual enrollment (before 2018 and after July 2019). Our data and deep learning demonstrated a clear temporal relationship between our interventions and the percentage of documents that families obtained for preschool applications; so we suspect our reach and impact on actual enrollment was greater than we were able to measure manually. The need to manually capture actual enrollment data from parents and/or agencies is a current-state limitation in our ability to share data across education and health sectors and speaks to the need for

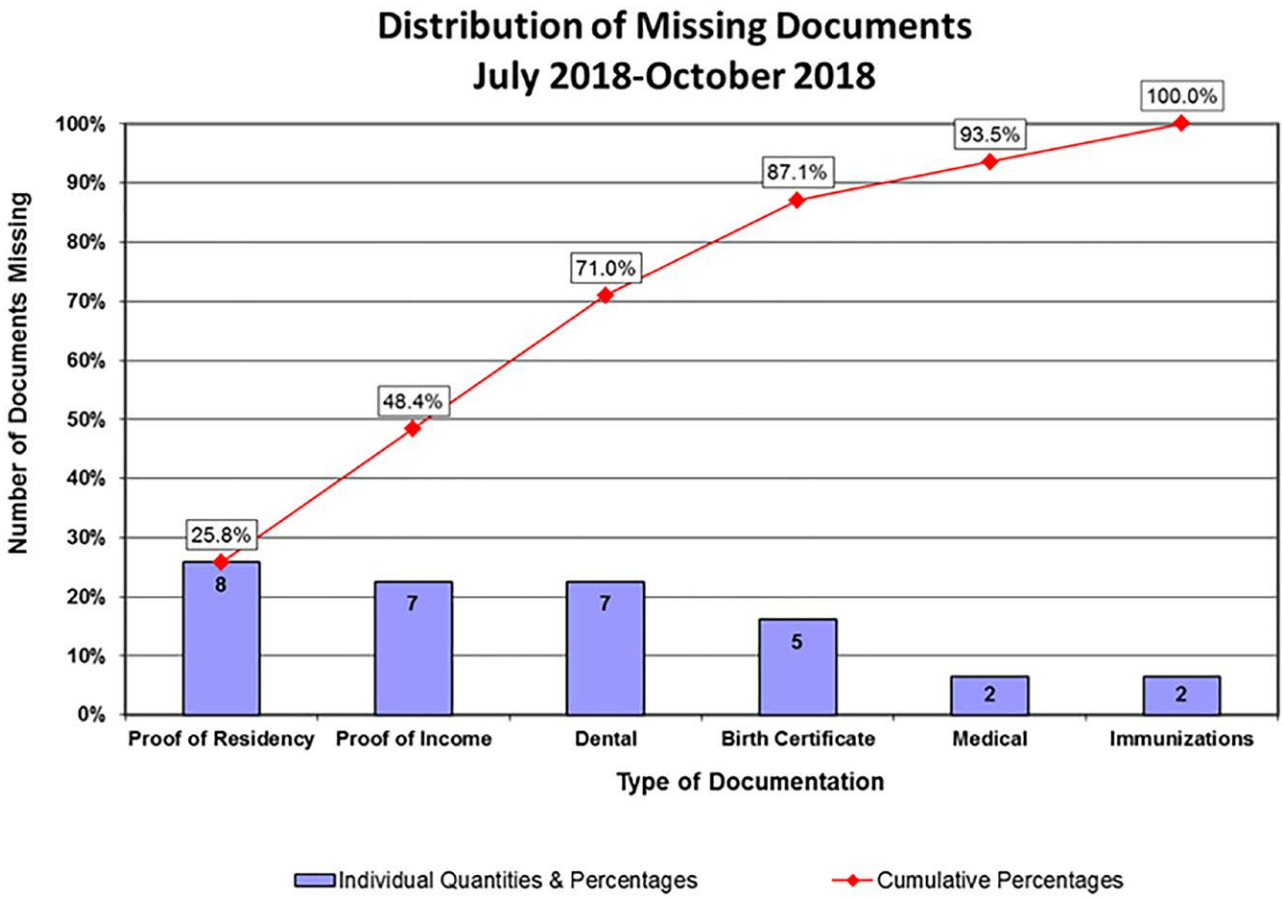

Fig. 4. Pareto chart of type of document missing from enrollment package (optimization of efficiency phase: July–October 2018).

Table 2. Findings of Population-based Approach to Understand the Proportion of 4- to 4.5-Year-Old Patients Enrolled in High-quality ECE Programs (July 2018–2019)*

	No. (%) (N = 736)
Already enrolled in child care program of any quality	613 (83)
Already enrolled in a quality program	405 (55)
Referred to quality program	65 (9)
Child enrolled in the quality program from referral	48 (6)
Total enrolled in any quality (already enrolled + enrolled from referral)	661 (90)
Total enrolled in high quality (already enrolled in quality + enrolled from referral)	458 (62)

*The ECE Navigator made up to 3 attempts to reach families of children aged 4 to 4.5 years to find out if children were enrolled in a child-care setting, then cross-checked the name of that program with the state child-care resource and referral database to determine whether the setting was high quality (at least 3 stars on a scale of a possible 5 stars), and offered referral to a high-quality setting for any family who desired it.

better systems for families with no-wrong door entry and a way to track children's engagement in specific local child development programs and their later health & education outcomes to guide policy and investment decisions at a local level.

We explored several staffing models for the program, from 0.1FTE to 0.5FTE. We saw a direct relationship between the number of families able to be served and the staffing level. Given the volume of the clinics (over 10,000 patients under age 6), we anticipate the demand for early childhood services to support a full-time ECE navigator. In 2021, philanthropic funding and local Head Start funding were secured to hire a new full-time ECE navigator at 1.0 FTE.

Data from our population-based work demonstrate that an ECE navigator program could have a sizable impact on a population level if sufficient ECE openings were available and state and local policies provided subsidized high-quality childcare. Less than 1% were uninterested; most families wanted to enroll their children in preschool.[12] A primary care-based program could help fill this gap as most children attend pediatric well-child visits. The most successful model for integrating the interventions into the work of other staff members involved engaging the integrated psychologists. Integrated psychologists are a rare but growing[22] and needed[23,24] resource in pediatric practices. But their level of expertise is not needed, as was evidenced by our program being able to be successfully transitioned to a college student coordinator who started the role without extensive experience, and the number of facilitated referrals did not drop while the ECE navigator was on family leave, or even during the pandemic. This cross-training approach ensured the sustainability of the program. In addition, it allowed the ECE navigator to offer more specialized help

to families with unique circumstances or more intensive needs (low literacy, English as a second language, child with recurrent behavioral problems).

As a limitation, our program was shaped by an individual ECE navigator's unique background and personal strengths. As a result, our data show that the program's performance depended on that individual's availability. However, the Navigator's work created systemic changes, such as the revision of forms, and some interventions were adapted to be reproducible by individuals with various backgrounds.

In conclusion, the ECE Navigator program improved access to high-quality ECE for our patient population, and the program continues in our local primary care clinics. Moreover, we have harnessed technology and distributed tasks to make the program sustainable. This program could be adopted in whole or in part by other primary care practices, specialty clinics, or WIC offices. To strengthen the evidence for our program, investigators could conduct a cluster randomized control trial to compare the percentage of children enrolled in high-quality ECE programs in similar primary care practices with and without ECE navigators. Policymakers should also consider simplifying requirements and streamlining services; so families have less need for a navigator.

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