Improving Timeliness of Medical Evaluations for Children Entering Foster Care
Lindsay G. Terrell, MD, Asheley C. Skinner, PhD, Aditee P. Narayan, MD, MPH

BACKGROUND AND OBJECTIVES: The American Academy of Pediatrics (AAP) recommends children in foster care (FC) have an initial medical evaluation within 3 days of custody initiation; however, this vulnerable population often suffers from disjointed care. Our aim was to improve the mean time to initial foster care evaluation (TIE) from 32 to <7 days within 12 months for children in FC in Durham County, North Carolina.

METHODS: This study was a time series, quality improvement project used to target interventions within an academic clinic and a community agency. Interventions were tested through multiple plan-do-study-act cycles. Control charts of the primary outcome, the TIE, were constructed. Charts were annotated with the dates of interventions, including workshops, performance feedback, integration of state forms, identification of appointments, development of an urgent appointment pathway, and empowerment of the scheduler.

RESULTS: The mean TIE improved from 32 to 9 days within 12 months. Significant improvement in the following 2 process measures contributed to this: the time from custody initiation to the referral date improved from an average of 10 to 3 days, and the time from referral date to the initial evaluation improved from an average of 22 to 6 days.

CONCLUSIONS: Improvement interventions and increased collaboration between medical and child welfare agencies can result in significant improvement of the TIE. However, despite improvement efforts, challenges remain in meeting the AAP 3-day TIE recommendation. We recommend further assessment of the AAP guideline as it relates to implementation feasibility and health outcomes of children in FC.

In 2015, ∼270 000 children entered foster care (FC) in the United States. These children represent a high-risk population and often have a history of childhood trauma. In addition, children in FC commonly have unmet medical, dental, and mental health needs. To address these issues, the American Academy of Pediatrics (AAP) issued a policy statement in 2015 with medical recommendations related to ensuring timely, high-quality health services, advocacy, and care coordination. Specific recommendations were based on expert opinion and advised that children in FC should receive an initial medical evaluation (IE) within 3 days of placement. There is a paucity of studies in which authors assess the feasibility of implementing these AAP guidelines. There has been only 1 study that revealed adherence to this AAP recommendation was low (across 11 sites). With our study, we are the first to examine interventions that focus on improving adherence to the...
AAP-recommended time to initial foster care evaluation (TIE).

The Duke Foster Care Clinic opened in 2013 and is supported through a memorandum of understanding with the Durham County Department of Social Services (DCDSS). Using a consultation model of care, the clinic provides initial and comprehensive medical evaluations for children entering DCDSS custody and assists in transitioning these children to their medical home. As of 2016, there were 273 children in DCDSS custody and 126 children entering DCDSS custody that fiscal year. It should be noted that the AAP recommendation differs from the current North Carolina Division of Social Services policy, which states that the IE should be scheduled within 7 days of placement. Knowing this discrepancy, the Duke Foster Care Clinic recognized the need to collaborate with community agencies to improve awareness of and adherence to AAP guidelines.

In this study, we sought to improve the TIE in our community through the development of an academic, community quality improvement collaborative. Our primary aim was to reduce the mean TIE from 32 to <7 days within 12 months for children in FC in Durham County. Because of required coordination with the DCDSS, we created 2 more specific subaims: (1) improve the average time from DCDSS custody initiation to referral date from 10 to <5 days within 12 months and (2) improve the average time from referral date to IE from 22 to <5 days within 12 months.

**METHODS**

**Ethical Concerns**

The Duke University Health System Institutional Review Board exempted this study from human subjects research review as a quality improvement project.

**Setting**

The Duke Foster Care Clinic is located within Duke's Child Abuse and Neglect Medical Evaluation Clinic (CANMEC). During the fiscal year 2015, there were 694 total patients scheduled (544 of whom were actually seen) at CANMEC, including patients in FC and children referred for abuse evaluations. CANMEC is staffed by 2 child abuse and neglect (CAN) pediatricians, 1 pediatric nurse practitioner, 1 CAN fellow, 2 social workers, and 2 part-time office assistants. The clinic uses an electronic health record (EHR); however, before initiation of the quality improvement project, providers documented evaluations both by hand (on the DCDSS required document) and within the EHR. Baseline data from January to February 2016 showed that, despite community collaboration and current state policy, the median TIE in Durham County was 33 days (mean: 32 days).

**Planning the Intervention**

In February 2016, a multidisciplinary project team (the Foster Care Collaborative) was assembled, which included the Duke Foster Care Clinic medical director, clinic providers and staff, a Durham Medicaid care coordinator, and 2 members of the DCDSS leadership team. A physician champion within the Duke Foster Care Clinic led the collaborative. Understanding the medical and social complexities of this high-risk population, the collaborative developed a novel, academic, community quality improvement project using the Model for Improvement (as described by the Institute for Healthcare Improvement and Associates in Process Improvement) to implement changes aimed at improving the TIE. The collaborative mapped the process (Fig 1), conducted a modified failure mode and effects analysis, brainstormed key drivers, and prioritized the interventions on the basis of the key driver diagram (Fig 2).

Despite initial interventions, in May 2016 the TIE remained variable and prolonged. Specifically, the time from the date of referral to IE remained >5 days. Under the direction of the collaborative, our scheduler tracked the reason for delayed date of referral to IE. The physician champion categorized these reasons by type in a Pareto chart (Fig 3). Understanding the frequency and distribution of delayed date of referral to IE allowed us to target interventions accordingly. Interventions were prioritized on the basis of common causes of delayed TIE, feasibility of implementing the intervention, and a desire to implement reproducible design concepts across other FC systems.

**Improvement Activities**

This project used a time series design to evaluate the effectiveness of specific interventions to improve the TIE. Interventions were focused on the following 5 key drivers: (1) the DCDSS is aware of AAP recommendations; (2) the DCDSS refers the child within 5 days of custody initiation; (3) Duke Foster Care Clinic staff and providers are aware of AAP recommendations; (4)
an appointment is available within 5 days of referral; and (S) IE EHR documentation is efficient and meets the requirement of the DCDSS and clinic. Interventions were developed and tested by using a series of plan-do-study-act cycles.\textsuperscript{10} Plan-do-study-act cycles are described below as they relate to the key drivers and are summarized in Table 1.

The DCDSS Is Aware of AAP Recommendations

The collaborative learned that although DCDSS program managers and social workers recognized the need for a medical evaluation for children entering FC, most were not aware of the specific AAP recommendations. In addition, the interpretation of the state policy differed among DCDSS employees. Some interpreted the phrasing to mean “scheduled within 7 days,” and others interpreted it to mean “seen by a physician within 7 days.” Our first intervention with the DCDSS included educating employees on current AAP recommendations and clarifying the state policy. Three educational workshops were held, and education and awareness interventions targeted DCDSS common reasons for delay. For example, social workers have direct contact with the FC clinic scheduler and foster parent. Social workers were encouraged to be timely in referrals and to disseminate the AAP recommendations to foster parents. Additionally, program managers had improved buy in knowing that the current TIE did not meet state policy. We observed a qualitative improvement in awareness of AAP recommendations and state policy during FC scheduling, appointments, and other informal meetings. The DCDSS Refers the Child Within 5 Days of Custody Initiation

We learned that DCDSS program managers responded well to receiving progress reports by e-mail every 2 months. The report was used to provide a new vehicle for data sharing across the Duke Foster Care Clinic and DCDSS. The reports included the average time from custody initiation to referral date, time from referral date to IE, and TIE per month as they compared with the AAP and state guidelines. By providing detailed and transparent feedback, this intervention encouraged teamwork between the DCDSS and Duke Foster Care Clinic and also reinforced the AAP recommendation.

FC Clinic Staff and Providers Are Aware of AAP Recommendations

The collaborative learned that although providers and staff recognized the importance of prompt medical evaluations for children in FC, most providers were unaware of the specific AAP recommendations. Three educational workshops were provided. Education and awareness interventions were used to target providers and staff separately and were focused on AAP recommendations in an attempt to overcome resistance to change.

During 1 educational workshop, we learned that the clinic scheduler often had real-time identification...
of delayed TIEs. For example, the foster parent would not be available to bring a child to an appointment within the 5-day time frame. The collaborative hypothesized that empowering the scheduler to teach the AAP recommendations may lead to further improvement. Testing this theory resulted in the creation of a template statement that summarized the AAP recommendations. This template could be communicated over the phone or included in an e-mail. During the test of change, we noted that most social workers and family members were willing to come in for an earlier IE once they understood the recommendations.

### TABLE 1 Summary and Timeline of Interventions

<table>
<thead>
<tr>
<th>Test of Change</th>
<th>Intervention Start Date</th>
<th>Interventions</th>
<th>Lessons Learned</th>
</tr>
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<tbody>
<tr>
<td>DCDSS educational workshops</td>
<td>March 1, 2016 (program managers)</td>
<td>Delivered 3 separate educational workshops targeting both the DCDSS program managers and the social workers that focused on dissemination of AAP recommendations and review of referral process. Time for feedback was incorporated.</td>
<td>Collaboration was required to schedule timely meetings with stake holders. Most program managers and social workers were unaware of AAP recommendations but understood the importance of a timely IE. Targeting program managers and social workers was needed to improve buy in.</td>
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<tr>
<td></td>
<td>May 3, 2016 (social workers)</td>
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<td></td>
<td>August 3, 2016 (program managers)</td>
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<tr>
<td>Feedback of performance</td>
<td>June 7, 2016</td>
<td>Provided feedback in the form of an e-mail progress report that was sent every 2 mo to DCDSS program managers and clinic staff that included the TIE for children during that time.</td>
<td>Feedback needed to be provided frequently. It was important to include date from custody initiation to referral and referral to IE.</td>
</tr>
<tr>
<td>FC clinic workshops</td>
<td>March 1, 2016</td>
<td>Delivered 3 separate educational workshops targeting staff and providers together. Time for feedback was incorporated.</td>
<td>Scheduling workshops within 1 organization was relatively simple. Most providers and staff were unaware of the AAP recommendations but understood the importance of a timely IE. Providers had resistance to change current clinical practice because of a perceived burden of the new process.</td>
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<tr>
<td></td>
<td>March 8, 2016</td>
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<tr>
<td></td>
<td>May 10, 2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identified all FC IE appointments</td>
<td>March 8, 2016</td>
<td>Flagged all available 1-h slots so that the scheduler could fill with IE as needed.</td>
<td>FC IEs need to be scheduled for 1 h. The scheduler needed a clear designation of a 1 h available slot.</td>
</tr>
<tr>
<td>Developed urgent appointment pathway</td>
<td>May 10, 2016</td>
<td>Assigned a physician champion to review the schedule and obtain approval for add-on IEs.</td>
<td>IE slots were not always available within 5 d. Providers could add on IE slots to schedule if given the opportunity.</td>
</tr>
<tr>
<td>New DCDSS forms integrated into EHR</td>
<td>April 19, 2016</td>
<td>Adapted and integrated new DCDSS FC forms into the EHR.</td>
<td>Paper FC forms increased physician perceived burden. The DCDSS and FC clinic can partner to create forms that work for both partners. Integrated new forms into EHR reduced physician perceived burden.</td>
</tr>
<tr>
<td>Empowered FC scheduler</td>
<td>June 14, 2016</td>
<td>Encouraged and empowered the scheduler to teach referring social workers and foster parents about AAP recommendations if the offered IE was not accepted.</td>
<td>The scheduler often received referrals from social workers unaware of AAP recommendations. Real-time training by the scheduler allowed for real-time reduction of the TIE.</td>
</tr>
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</table>

### An Appointment Is Available Within 5 Days of Referral

Based on the Pareto chart, a common reason for a prolonged TIE was lack of available appointments in the FC clinic. We theorized that identifying and flagging available 1-hour “urgent” appointments would allow the scheduler to find appointments within the 5-day time frame. Testing this theory resulted in the implementation of an urgent appointment pathway. This pathway was piloted on the physician champion’s schedule. The first step included reorganizing the clinic template to flag available 60-minute appointments. The scheduler also received instruction regarding how to proceed if an appointment was not available within 5 days, which included contacting the physician champion to review the schedule and obtain approval for add-on appointments. This pathway improved access to appointments and was spread to all providers in the clinic. During the test of change, we noted some providers were resistant to change. Resistance was improved when providers were given more control over urgent appointment placement.

### IE EHR Documentation Is Efficient and Meets Requirement of the DCDSS and Clinic

During the FC clinic educational workshops, providers expressed resistance to change. Before the
quality improvement project, documentation for an FC evaluation included both a DCDSS paper form that had to be completed by hand as well as a Duke EHR clinic note. Providers were concerned about the burden of completing both the paper and EHR documentation in a shorter amount of time. Testing change began with evaluating the usability and efficiency of EHR-only documentation. The North Carolina Department of Health and Human Services released initial and comprehensive evaluation forms in April 2016. These forms were adapted and integrated into the EHR with permission from the DCDSS and were tested by 2 FC clinic providers. Because of the improved provider burden, the new templates were quickly spread to all providers.

By using the AAP recommendations and the new state forms, visit components of the IE (as compared with the comprehensive evaluation) were established and tested by 2 providers. Although there was initial resistance to change, providers felt less burden over time with set visit components for the initial visit. These components were shared with other providers.

**Measures**

We identified patients after receipt of a referral by the DCDSS. The primary outcome measure was the TIE. From January to December of 2016, we reviewed all referred charts monthly. We extracted the following data from the clinic charts: (1) date of DCDSS custody initiation, (2) referral date, (3) number of canceled/rescheduled appointments, and (4) date of IE. The date of custody initiation was not available for all patients, so this information was subsequently obtained from the DCDSS. The 2 main process measures were (1) the time from initiation of custody to referral date and (2) the time from referral date to IE. A third process measure was the percentage of IEs completed on the day they had originally been scheduled with no cancelation or postponement. Balancing measures included the percentage of children in FC not referred for an IE and the number of children who did not return for a comprehensive evaluation.

**Analysis**

Primary analysis of the TIE was performed by using a statistical process control chart, specifically individuals and moving range (mR) charts (Fig 4). The individuals’ X-bar chart limits were constructed with mean $\pm 3\sigma$ control limits (where $\sigma$ is the estimated SD calculated by $MR-bar/d2$; $d2$ is a derived constant). The X-bar chart was annotated with the start date of each intervention. Special cause variation was defined as $\geq 8$ points above or below the mean, according to statistical process control rules.

**RESULTS**

During 2016, 90 children were seen for IEs at the Duke Foster Care Clinic (85 were referred by Durham County, and 5 were referred by surrounding counties). A total of 103 children were placed in DCDSS custody, and 18 of those children (17%) were not evaluated because they were placed out of the county or were hospitalized at the time of custody initiation. Demographics of the children seen in the FC clinic can be found in Table 2. The overall show rate for a scheduled IE was 89%, and the rate for a comprehensive evaluation was 92%. These rates are high compared with the average rates for CANMEC over the past 2 fiscal years (82%).

During the 12 months of this quality improvement project, the monthly average TIE improved from 32 to 9 days. The TIE improved to an average of 7 days 11 months into the project. Five (5%) children were seen within 3 days, and 31 (30%) children were seen within 7 days. Two instances of the TIE exceeded the X-bar chart parameters. Further review of these data points revealed a large time gap (488 days) between the date of custody initiation to the date of referral for a sibling set. The siblings had been placed in DCDSS custody but remained in the biological mother’s care. Several months later, the siblings were placed with a foster family, and a referral to the FC clinic was made at that time.

Improvements in the TIE were seen with each intervention; however, some interventions showed only short-lived improvement (eg, educational sessions and workshops), as is often seen in quality improvement projects. The intervention with the greatest impact on sustained TIE improvement was the performance feedback given in the form of progress reports to the DCDSS. One interesting finding regarding a specific process measure was that the time between the date of custody initiation to the referral date correlated with the type of referring DCDSS social worker. We found that investigative social workers tended to have a faster referral time (5.2 days) compared with in-home (9.6 days) and FC social workers (39 days).

**DISCUSSION**

After 12 months of intensive quality improvement efforts, we were able to drastically improve the TIE from an average of 32 to 9 days. All members of the Foster Care Collaborative viewed the project as a success. It is well known that the health care of children in FC is compromised by a lack of coordinated care, insufficient funding, poor access, and prolonged waits for medical and mental health services. Providing consistent, timely IEs for children in FC as recommended by the AAP is a deceivingly complex challenge. In our opinion, this project is the
first of its kind to describe specific interventions that have been successfully implemented across a clinic and community agency focusing on education, referral time, appointment availability, and efficient documentation.

Over the course of the project, DCDSS social workers, local pediatricians, and foster parents became more familiar with the clinic, and the clinic began to receive referrals for FC evaluations for children in surrounding counties and those placed in DCDSS custody before 2016. By the end of 2016, many FC families showed an appreciation for a timelier IE followed by an additional comprehensive evaluation. Families recognized the benefit of early recognition of the medical needs of these children, including acute or chronic medical problems, previously prescribed medications, or known allergies.

Despite 12 months of extensive quality improvement efforts, only 5 children were evaluated within the AAP-recommended time frame of ≤3 days. In addition, 17% of children in FC in Durham County were not referred to the clinic. We were unable to improve the TIE to the AAP-recommended time.
table 2 demographic data for children referred to FC clinic

<table>
<thead>
<tr>
<th>variable</th>
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<td>&lt;3</td>
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<td>white</td>
<td>20 (23)</td>
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<tr>
<td>asian american</td>
<td>3 (4)</td>
</tr>
<tr>
<td>other</td>
<td>11 (13)</td>
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<tr>
<td>not reported</td>
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frame, and authors of a previous study also found that adherence to the current AAP time frame is challenging. There is no current evidence that clearly reveals that 3 days to IE results in better health outcomes than the 9 days we were able to achieve. According to the 2015 AAP policy statement, “[recommendations] represent consensus among experts in the field rather than recommendations based on research evidence because these topics have not been studied. There is consensus among experts that health care coordination, more frequent health visits during transitions, and the receipt of health services in the context of a pediatric medical home are fundamental principles in caring for this population.” Authors of future research should examine the effects of small differences in TIE and whether there are specific children, such as those with life-threatening allergies or medical conditions, who may benefit more from rapid evaluation.

With this project, we have made it clear that medical professionals must partner with community agencies to highlight and improve the gaps in care for children in FC. Continued improvement strategies include collaborating to improve data sharing and to standardize a referral source, because there was considerable variation in the TIE among different types of social workers. Sustainability of this project depends on continued collaboration as well as the ability to gather and share data regarding the TIE.

This quality improvement project was conducted in 1 county in partnership with 1 academic center. Given that this was performed within a single clinic, our interventions may not be generalizable to other clinics. In addition, because this project was performed over a single calendar year, it is possible that temporal variation contributed to change in the TIE. For example, December’s TIE was elevated likely because of delayed referrals and decreased appointment availability secondary to clinic provider and DCDSS holiday breaks. We did not measure the cost-effectiveness of this improvement project. Lastly, we were unable to correlate whether an improved TIE improved overall health outcomes.

CONCLUSIONS

By improving communication and teamwork, the Duke Foster Care Clinic and DCDSS significantly improved the TIE. This project posed unique challenges, and it is clear that sustained improvement requires continued communication and collaboration within the clinic and community agency. There are significant challenges in the coordination of medical care for children in FC that make it difficult to adhere to the current AAP-recommended time frame. We recommend further assessment of the AAP guideline as it relates to implementation feasibility and health outcomes of children in FC. Other clinics that focus on improving timeliness of visits for high-risk populations and have community agency involvement could use methods from this project. Next steps include further interventions to continue improving the TIE and targeting the referral process to ensure that all children placed in FC in Durham County are seen for an initial and comprehensive medical evaluation. Lastly, we plan to perform a retrospective study to evaluate whether improved TIE for children in FC improves health outcomes and decreases health care costs.

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ABBREVIATIONS

AAP: American Academy of Pediatrics
CAN: child abuse and neglect
CANMEC: Child Abuse and Neglect Medical Evaluation Clinic
DCDSS: Durham County Department of Social Services
EHR: electronic health record
FC: foster care
IE: initial medical evaluation
mR: moving range
TIE: time to initial foster care evaluation

REFERENCES


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