Birth Through Eight Strategy for Tulsa Phase II Evaluation

2023 Annual Report

Eboni C. Howard, Gabriele Fain, Patricia García-Arena,
Stephanie D'Souza, and Patrick Rich

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Section I: Birth Through Eight Strategy for Tulsa Phase II Evaluation Overview—The BEST Study

The purpose of this annual report by the American Institutes for Research® (AIR®) is to summarize Birth Through Eight Strategy for Tulsa (BEST) Study activities, challenges, findings, and expected next steps for the forthcoming year. The report covers the BEST Study from January 1 to December 31, 2023, and is based on the original BEST evaluation plan.[1] In this section, we summarize the purpose of the BEST Study, including the three study components, research questions, and timeline. In Section II, we provide an update of the process study. Section III summarizes the outcome/impact study component, and Section IV summarizes the ethnography study. For each study component, we provide an update of activities, findings, lessons learned, and next steps.[2]

BEST provides coordinated supports in the earliest years of children's lives to help make Tulsa, Oklahoma, a good place for all children and families to live, grow, and thrive. By convening a diverse network of over 50 partners, consisting of public agencies, health care and women's health organizations, child care providers, education institutions, and other local nonprofit organizations, BEST aims to develop a seamless multisector continuum of high-quality programs and services for children from birth through age 8 and their families.

The BEST Study is taking place over a 7-year period to learn how and in what ways a comprehensive, continuous, and integrated system-change approach can build greater opportunities that will improve the lives of young children and their families in Tulsa. The central purpose of the BEST Study is to determine whether BEST creates change that leads toward four goals: (a) more children being born healthy, (b) more children on a positive developmental trajectory in the first 3 years of life, (c) more children prepared to enter kindergarten, and (d) more children achieving success by third grade. To measure the impact of BEST at the child level, it is valuable to track BEST processes, activities, and impacts at the system level and understand how the impact of BEST is actualized in the daily lives of children and families. As such, the evaluation has three study components:

[1] Howard, E., Bos, J., Caverly, S., Fain, G., & Dahlke, K. (2019). *Birth Through Eight Strategy for Tulsa (BEST) Phase II evaluation plan*. American Institutes for Research.

[2] The authors of this report want to acknowledge the entire BEST Evaluation team, which supports all the study activities: Hans Bos, Joanne Carminucci, Sami Kitmitto, Vivian Le, Karen Manship, Stephanie McCarty, Patrick Rich, Emily Weinberg, Cecilia Zhang, and our subcontractor team at Decision Information Resources.

1. A **process study** that provides information about how the BEST initiative engages with, supports, and interacts with the preconception-to-age-8 service infrastructure in Tulsa.
2. An **outcome/impact study** that provides information about what it is like to be born in and grow up in Tulsa or to be a parent to a child aged 0–8 in a representative Tulsa sample. It will include four cohorts of children, two cohorts followed from birth and two cohorts followed from the start of kindergarten. The outcome/impact study also includes collecting and analyzing extant administrative data to study trends over time—before and after the BEST initiative—across the Tulsa community and compared with other cities.
3. An **ethnography study** that describes the routines and experiences of a small subset of Tulsa families participating in the outcome/impact study.

These three study components work together to answer all the BEST evaluation research questions.

A technical working group (TWG) has been advising the study team on the components of the study and the activities summarized in this report. TWG members include Dr. Greg Duncan (Distinguished Professor, University of California at Irvine), Dr. Iheoma Iruka (Research Professor of Public Policy and Director of the Equity Research Action Coalition, Frank Porter Graham Child Development Institute at the University of North Carolina-Chapel Hill), Dr. Marta Tienda (Maurice P. During ’22 Professor in Demographic Studies, Professor of Sociology and Public Affairs, Princeton University), and Robert Goerge (Senior Research Fellow, Chapin Hall Center for Children at the University of Chicago).

Guiding Evaluation Research Questions

Five overarching research questions guide the BEST Study. The first four questions capture the effects of BEST on service infrastructure, service reach, parental outcomes, and child outcomes, respectively. The fifth question captures facilitators and barriers to BEST implementation, service delivery, and the initiative’s capacity to positively change the trajectory on child and family outcomes. For all research questions, it is important to specifically probe the impact of BEST on equity in Tulsa as it relates to the implicit and explicit biases that differentially affect communities and people of color.

1. **How does BEST impact the implementing partners and the larger prenatal-to-age-8 service infrastructure in Tulsa?**
    a. **Engagement.** To what extent, and in what ways, does BEST engage with prenatal-to-age-8 service providers in Tulsa?

b. **Structural Changes.** To what extent, and in what ways, does BEST structurally change the prenatal-to-age-8 service system infrastructure in Tulsa?

c. **Collaboration.** To what extent, and in what ways, does BEST change the communication, coordination, and collaboration across providers in the prenatal-to-age-8 service infrastructure in Tulsa?

d. **Equity.** To what extent, and in what ways, does BEST change diversity, inclusion, and equity of prenatal-to-age-8 service provision in Tulsa, including engaging parents and community stakeholders as partners in service design and delivery?

2. **How does BEST impact participation in services among Tulsa's children and families?**

   a. **Service Reach.** To what extent, and in what ways, does BEST increase access to prenatal-to-age-8 services in Tulsa?

   b. **Service Awareness.** To what extent, and in what ways, does BEST change the awareness of parents and caregivers of the services available to them and the benefits those services could have for them?

   c. **Service Participation.** To what extent, and in what ways, does BEST increase the use of services available to parents, caregivers, and children in Tulsa?

   d. **Equity.** To what extent, and in what ways, has BEST changed the level of diversity, inclusion, and equity in service access to children and families in Tulsa?

3. **How does BEST impact multiple dimensions of parent well-being, child-rearing practices, family functioning, and the home environments of children birth to age 8?**

   a. **Parent Well-Being.** To what extent, and in what ways, does BEST change parent well-being, including parenting self-efficacy, role satisfaction, and psychosocial well-being?

   b. **Child-Rearing Practices.** To what extent, and in what ways, does BEST change child-rearing practices, including the nature of parent–child interactions, behaviors to support children's learning and health development (including home-learning activities, well-child visits, and preconception and prenatal care), and parent beliefs and attitudes about parenting and early learning experiences?

   c. **Family Functioning.** To what extent, and in what ways, does BEST change family functioning, including resilience, mobilizing resources, and social supports?

   d. **Home Environment.** To what extent, and in what ways, does BEST change the quality of the child's home environment, including the safety, stability, and supportiveness of their household and neighborhood?

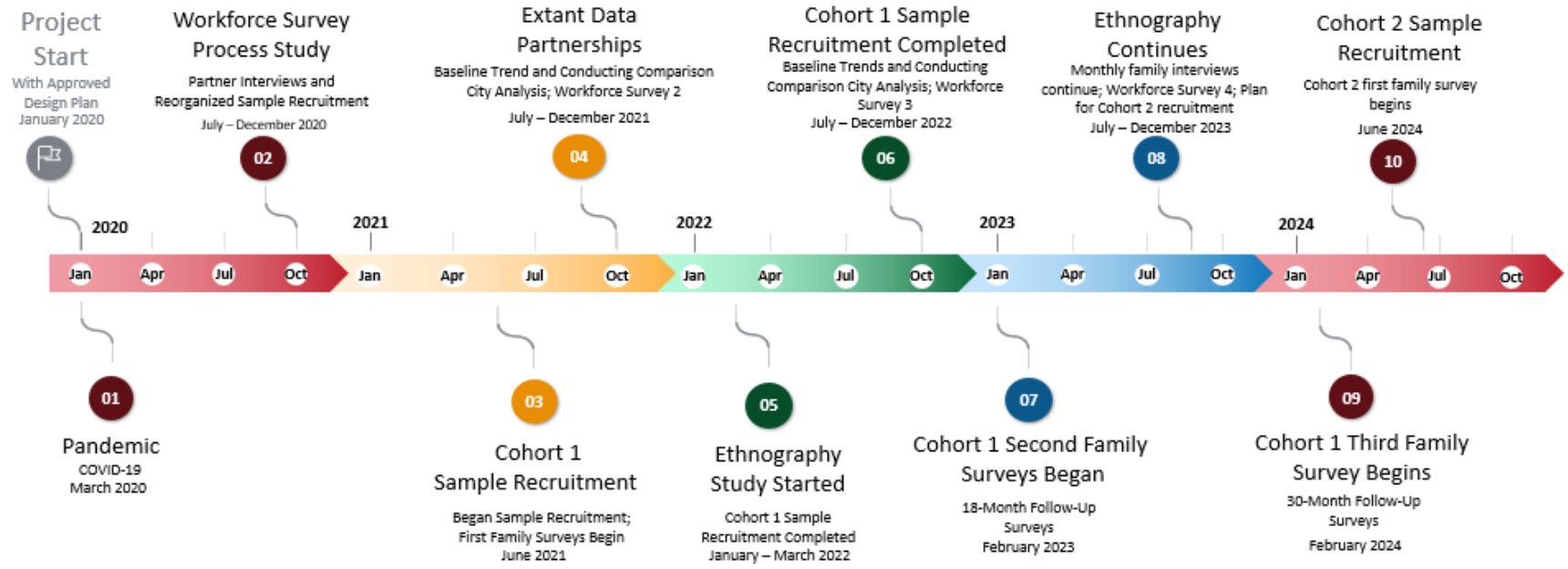
e. **Equity.** To what extent does BEST change the level of equity in these parent, family, and home outcomes across racial/ethnic groups, income groups, and neighborhoods?

4. **How does BEST impact the multiple domains of children's health and development?**
    a. **Health.** To what extent, and in what ways, does BEST change the birth outcomes and health of children in Tulsa?
    b. **Development.** To what extent, and in what ways, does BEST change the developmental outcomes (e.g., cognitive/academic, language and literacy, and social-emotional skills) of Tulsa's children?
    c. **Equity.** To what extent does BEST change the level of equity in children's outcomes across racial/ethnic groups, income groups, and neighborhoods?
5. **What are the most important facilitators for and challenges to the success and long-term potential of BEST? What changes to BEST are needed to increase its success?**
    a. What made the biggest difference in establishing and strengthening the relationships between BEST and its partners and among the partners themselves? What barriers remain, and how could they be addressed?
    b. What made the biggest difference in changing the trajectory on parents and the home environment? What aspects of children's lives are more difficult to improve? What areas are ripe for additional investment and intervention?
    c. What made the biggest difference in changing the trajectory on child outcomes? Which child outcomes are most difficult to change, and why? In which child and family developmental and functional areas do family background and neighborhood characteristics influence child outcomes?

Study Timeline Updates and Summary of 2023 Findings

The BEST evaluation began in January 2020 and is scheduled to be completed in December 2027. With the COVID-19 pandemic that started in February/March 2020, many study activities, such as sample recruitment, were delayed until 2021. Exhibit 1 provides an overview of key project milestones to date as well as evaluation activities planned for 2024.

Exhibit 1. Project Timeline and Key Milestones



Note. Q1 is January–March, Q2 is April–June, Q3 is July–September, and Q4 is October–December.

What We Have Accomplished

	Fostered **partnerships** with Tulsa organizations and state agencies.
	Facilitated **listening sessions** with BEST partners and other stakeholders.
	Conducted **annual workforce survey** (administered to frontline staff and their managers in BEST partner organizations) for the third time.
	Completed Cohort 1 **18-month survey**: for the Birth Cohort, 161 parents completed surveys; for the Kindergarten Cohort, 177 parents completed surveys.
	Developed new data-collection **instruments and training materials.**
	**Analyzed baseline trends** using administrative data and conducting comparison city analysis on educational outcomes, childcare, and maternal health and birth indicators for Tulsa and Oklahoma City.
	Maintained contact with all 20 families for **the ethnography study**; 358 total interviews with these 20 families have been completed, 199 of which took place in 2023.

What We Have Learned

Process Study	
1	The BEST workforce sample is ethnically and racially diverse and highly educated and experienced.
2	BEST partner staff's knowledge about other service providers in Tulsa increased notably from 2020 to 2021, but then either leveled out or decreased in 2022.
3	Most staff reported making referrals, informally or formally, as part of their jobs. About half of the staff who make referrals use "warm handoffs" to do so; that is, personally helping a client connect with a service provider.
4	The percentage of staff who reported making referrals to various service sectors decreased in 2022 in comparison with 2021.
5	More than half of the BEST partner staff in different programs communicated regularly about shared clients in 2021 and 2022, which is a significant increase compared with 2020.
6	Engaging families in decision making and leadership roles was a challenge for some BEST partners.
7	Partners reported that their data capacity grant had a strong positive impact on program operations, leading to improved service delivery and better client experiences.

Outcome/Impact Study	
8	The Cohort 1 Kindergarten survey sample[3] is comprised mostly of students who identify as Hispanic students (61% of the sample).
9	Sixty-eight percent of the Cohort 1 Kindergarten sample would qualify for free-or-reduced price lunches at school and almost a quarter of the parents are unemployed.
10	Beginning of kindergarten reading levels in Tulsa Public Schools (TPS) have been consistently declining, decreasing by 4 months of learning from school year (SY) 2014–2015 to SY 2021–2022.
11	Beginning of kindergarten math levels in TPS increased by about 2.5 months from SY 2019–2020 to SY 2021–2022.
12	Students identified as economically challenged in TPS experience a "summer slide" in their learning, resulting in a 6-month learning gap between economically challenged students and students who are not economically challenged.
13	Enrollment in prekindergarten is positively correlated with later educational outcomes in TPS, especially for students who are identified as economically challenged.
14	Forty percent of kindergarteners and 49% of third graders were considered chronically absent in SY 2021–2022, a substantial increase in absenteeism rates compared with before the COVID-19 pandemic.
15	Tulsa has child care slots available for only about half of its children under the age of 5.
16	Maternal health and birth outcomes, such as prenatal care, in Tulsa and Oklahoma City had similar trends. The exception was smoking 3 months before or during pregnancy, where Tulsa was higher than Oklahoma City. Differences were observed when outcomes were examined by both Medicaid status and race/ethnicity in both cities.
Ethnography Study	
17	All families in the ethnography study experienced some level of change in their daily family routines during the first six months of their participation in the ethnography study. Child care, school arrangements, or a parent's work or schooling situation were the most common areas of family change.
18	Most families (60%) in the ethnography study rented their housing instead of owning. Families described mixed satisfaction with the quality and conditions of their housing and neighborhoods.

[3] It should be noted that the respondents of the survey are not necessarily representative of the community as a whole. The data presented in this report are unweighted; AIR is currently investigating the possibility of using weights to render the results more representative of the community.

Section II: Process Study Key Activities and Findings

Activities of the process study address Research Question 1. This evaluation component describes how the BEST initiative engages with, supports, and interacts with the preconception-to-age-8 service infrastructure in Tulsa. It describes how the initiative continues to evolve in response to feedback from partners and stakeholders, as well as changing priorities and needs on the ground. The most important informants for the process study are the BEST partners and the George Kaiser Family Foundation (GKFF®)-BEST team. The process study also is a source of formative feedback to the GKFF-BEST team. Key process study activities include monthly implementation updates meetings with the GKFF-BEST team focused on:

- organizing listening sessions with BEST partners;
- conducting interviews with BEST stakeholders;
- developing and administering an annual workforce survey and analyzing data from these surveys over time; and
- developing, updating, and piloting a system assessment tool.

What We Learned from the Process Study: In 2023, the process study gathered information about partners' experiences as participants in the BEST initiative and solicited feedback on specific BEST activities, including community engagement efforts and the BEST partner data capacity grants. As described in more detail in the following sections, several key themes emerged. First, a major strength of the initiative is its ability to expand its partnership base to a wide range of organizations, including small new programs, and facilitate relationships among the partners. As the number of BEST partners increases, the GKFF-BEST team has expanded its internal capacity to improve its support of partners.

Another strength is the GKFF-BEST team's commitment to community engagement and facilitating the growth of community-based leadership. In 2023, the BEST initiative has continued to place an emphasis on engaging community members through the Community Advisory Group (CAG), which is structured to elevate community voices and engage diverse members. The GKFF-BEST team is focused on creating collaborative relationships and shared leadership opportunities that have helped to connect both partners and CAG members with state policy makers to discuss needs, barriers, and lessons learned on a variety of issues, including child care. The GKFF-BEST team has also provided grants to some partners to assess and address their data-related needs. Partners reported that their data capacity grant had a strong positive impact on program operations, leading to improved service delivery and better client experiences. Finally, another major strength is that BEST partners continued to praise the

support of GKFF-BEST staff, including its ability to aid coordination and collaboration among service providers. Partners emphasized that their participation in BEST has helped them to increase access to other services, including supports for families with urgent needs.

In the subsequent sections, we provide more details about our findings, concluding with lessons learned and next steps for the evaluation in 2024.

Organizing Listening Sessions With BEST Partners and Interviews With BEST Community Members

AIR organized two listening sessions and a set of interviews in 2023:

- The first round of listening sessions occurred in March 2022. We invited 31 partners to participate and provide input about the BEST initiative; 26 partners joined these discussions. The purpose of these all-partner listening sessions was to gather feedback from BEST partners about the current implementation status of the BEST initiative.
- We conducted interviews in June 2023 with two CAG facilitators. The purpose of these interviews was to learn about their experiences with BEST's community engagement efforts and areas for improvement for future iterations of the CAG.
- The second round of listening sessions was conducted in September 2023 with BEST partners that received a GKFF-BEST data capacity grant. The purpose of these grants is to support BEST partners' capacity to collect, manage, and use data to improve program operations and ultimately improve services for clients. Eleven of the 13 invited partners participated. Listening session topics included partners' experiences with the grant (including working with a data consultant and vendors) and recommendations for improvement, such as guidance related to the role of consultants and vendors.

Findings: March All-Partner Listening Sessions

The purpose of the March 2023 all-partner listening sessions was to gather feedback from BEST partners about the current implementation status of the BEST initiative. The listening sessions focused on partners' successes and challenges, collaboration efforts, communication with GKFF-BEST, and other related topics. Findings from the listening sessions echoed themes that have emerged in previous partner discussions. GKFF-BEST fosters collaboration among participating organizations and uses a supportive and responsive approach to engaging partners—one that celebrates partner successes and views challenges as an opportunity to learn and grow. Partners praised the value of GKFF-BEST's focus on partners' data capacity. As in prior listening sessions, the theme of workforce challenges also emerged; partners highlighted their difficulties in recruiting and retaining qualified staff.

BEST partners pointed to successes in their work, including new connections with other partners, expansion of services, and a focus on serving families whose home language is not English. Partners also described a range of diversity, equity, and inclusion (DEI) efforts focused on improving staff conditions and equitable access to services. Partners appreciated GKFF-BEST's support of efforts to improve DEI in Tulsa, while also encouraging them to take a more public stand in responding to attacks on DEI initiatives and social-emotional learning supports in education.

ALL-PARTNER LISTENING SESSIONS: KEY FINDINGS

1. A key strength of the BEST initiative is its ability to facilitate relationship building and collaboration among partners.
2. Partners reported that participation in BEST has helped improve access to services and supported families with urgent needs.
3. BEST partners praised the support they received from the GKFF-BEST team.
4. In general, partners review and use the BEST Newsletter but pointed out some areas for improvement.
5. Partners highlighted the value of the GKFF-BEST team's efforts to build their data capacity.
6. Partners welcomed the return of in-person partner convenings.
7. Partners described a range of efforts designed to improve DEI for staff and clients.
8. Partners continued to highlight the severity of workforce shortages.
9. Partners highlighted the success of services supported by BEST but indicated it was too early to rigorously determine its impact on children and families in Tulsa.

Findings: June CAG Facilitator Interview

AIR conducted an interview with the two facilitators of the BEST Community Advisory Group (CAG). The interview focused on the purpose and vision of the CAG, its successes and challenges, and lessons learned during the first iteration of the CAG. The purpose of the CAG is to identify community issues that members hope to address, develop potential solutions, and meet with service providers and policymakers to discuss them. Members of the CAG include community members, program leaders, parents, caregivers, and philanthropic organizations. Two individuals with backgrounds in community development and who are external to GKFF facilitate the work of the CAG. When the CAG began in 2022, fewer than 10 community members were involved. At the end of 2023, the CAG had grown to 60 members.

CAG facilitators described positive outcomes of the CAG, including rich engagement with its members and elevation of community voices. The CAG has been successful, according to its facilitators, because its work is authentically driven by its members, ensuring the work reflects pressing needs in Tulsa. According to the facilitators, the GKFF-BEST team has been a responsive and flexible partner, shifting their approach to ensure that the CAG is driven by the community rather than GKFF-BEST team leadership.

CAG FACILITATOR INTERVIEW: KEY FINDINGS

1. The GKFF-BEST team has refined their approach to community engagement across time.
2. The CAG is effective in elevating community voice and engaging a diverse membership.
3. The CAG and GKFF-BEST team collaborate to balance GKFF-BEST's role within the group.
4. The use of external facilitators helps ensure that the CAG's work reflects the priorities and needs of the community.

Findings: September Data Capacity Listening Sessions

> [The data capacity grant] allowed us to transition from that many, many Google form nightmare, patching together of systems and processes to one standard well-defined process. It's enabled us to do work more efficiently, but it's also enabled us to grow in our clients served, in our number of clients served. We've been able to better manage more clients.
>
> – BEST partner

In September, AIR conducted additional listening sessions with 11 BEST partners who received a data capacity grant. The listening sessions focused on partners' experiences with their data capacity consultants and vendors, their challenges and successes, and recommendations to the GKFF-BEST team regarding strategies to improve the structure of the data capacity grants. The purpose of these grants is to support BEST partners' capacity to collect, manage, and use data to improve program operations and ultimately improve services for clients. Each partner first works with a BEST-funded independent consultant with expertise in data and information technology (IT) systems. The consultant conducts a needs assessment of the partner's data needs and the status of their IT systems and procedures. The consultant then develops a set of recommendations for improvements to the partner's data systems. The consultant continues to collaborate with the partner to identify, interview, and contract with vendors with expertise in data and IT systems to conduct a defined scope of work based on the recommendations.

The GKFF-BEST team intentionally designed the grant to protect partners' privacy regarding their data needs. The consultant did not share information they gathered or discuss the partner with the GKFF-BEST team. The partner was free to do so, but the GKFF-BEST team wanted to provide a "safe place" for partners to share freely their challenges related to data and IT systems.

Partners provided strong positive feedback about the data capacity grants. The reported impact of the grants included benefits for clients (e.g., improved wait time for services and improved enrollment experiences), staff (e.g., more efficient data entry and tracking systems), and organizations (e.g., improved overall efficiency, ability to serve more clients, and shared successes from using current and accurate data). Most partners appreciated GKFF-BEST team's removed role in the grant structure, which allowed them the space to engage freely with their consultant. Regarding improvements, partner feedback suggested that partners may benefit from more information about the role of the consultant in helping them identify and select vendors, as well as guidance about what to do if they feel there may be a conflict of interest with the consultant regarding vendor selection.

DATA CAPACITY LISTENING SESSION: KEY FINDINGS

1. The data capacity needs assessment process was effective in identifying challenges and generating actionable recommendations. Partners were satisfied with the process of selecting and working with vendors, although there were some concerns regarding the role of the consultant in this work.
2. Partners reported that their data capacity grant had a strong positive impact on program operations, leading to a range of other positive outcomes, such as more efficient client data management, improved response time to support clients, and more efficient enrollment in services for clients.
3. Most partners recommended keeping the current structure of the data capacity grant.
4. Partners reported that the data capacity grant size was appropriate, and most indicated that the grant did not generate any unexpected costs for them.

Lessons Learned and Next Steps

The 2023 partner listening sessions generated rich information, including feedback on a range of issues as well as targeted information on specific topics (e.g., on the BEST CAG and on data capacity grants). As the number of organizations that participate in BEST as partners increases, AIR has found that alternating "all-partner" listening sessions with interviews focused on specific topics is an effective approach. This alternating helps us track the experiences of all

BEST partners as well as dive deeply into emerging issues. In 2024, AIR will continue to work with the GKFF-BEST team to identify key areas of interest to explore through the process study, including sustainability of the progress accomplished through BEST and the extent to which and how participation in BEST has helped partners understand and recognize the value of collaboration compared with working independently in "silos."

BEST Partner Workforce Survey

The purpose of the BEST partner workforce survey is to gather information from staff at BEST partner organizations about a range of topics, including staff knowledge of BEST partner services, referral practices, service access barriers and facilitators, communication and coordination among service providers, the role of families in BEST partner agencies, staff professional development needs, and staff perceptions regarding racial equity issues. We conducted the first survey in 2020, administrating it to 21 programs and 297 staff. We have conducted it annually to an expanding partner group (in 2022 there were 43 BEST partner organizations invited to participate). At the end of 2023 there were over 55 partner organizations. The full report can be found on the BEST Study website.

Analysis and Findings From the 2022 Workforce Survey

In 2022, the annual survey was sent to 408 BEST frontline staff and their managers in 43 BEST partner organizations. The survey response rate was 70% (*n* = 287). Thirty-nine percent of respondents (*n* = 112) completed the survey in previous years; 25% of respondents (*n* = 71) completed the survey in all years; 11% (*n* = 33) completed the survey in 2021 and 2022. Three percent of respondents completed the survey in 2020 and 2022.

Highlights from the 2022 workforce survey findings include the following:

- **Staff knowledge of other service providers in Tulsa increased between 2020 and 2021 and then either leveled out or decreased in 2022.** Staff who are more knowledgeable about other service providers that may benefit their clients are better positioned to link families to the supports they need. The slight decline from 2021 to 2022 could be related to the current workforce challenges in Tulsa, including recruitment and retention of staff.
- **In 2022, the percentage of staff who reported making referrals to various service sectors decreased in comparison with 2021.** These reductions may reflect a "return to normal" after the peak of the COVID-19 pandemic, which may have caused referrals to spike in 2021 compared with 2020. Although the percentage of staff who said they *made* an actual referral to various services decreased from 2021 to 2022, more staff this year reported that they *could* make a referral if necessary. In other words, the capacity of the workforce to make referrals remained largely unchanged from 2021 to 2022.

- **More than half of the BEST partner staff (65%) regularly communicated with staff in other agencies about shared clients.** This proportion is the same as in 2021 and represents a significant increase compared with 2020. Staff reported that the most common challenge to service coordination was lack of time.
- **Rates of family engagement with partner organizations were higher in 2020 than in 2021 and 2022.** In 2020, 97% of staff reported that it was a little or completely true that parents' opinions were heard, regardless of their race, culture, or language, compared with 80% of staff in 2022. In addition, a higher proportion of staff reported it was a little true or completely true that their organization gets ideas from parents about service improvements (91% in 2020 vs. 74% in 2022).
- **Slightly more than half of the respondents (52%) in 2022 reported that they talk with their adult clients about challenges or advantages they may face because of their race or ethnicity.** This proportion changed little compared with the 2021 and 2020 surveys. Staff reported that when adult clients spoke of challenges, the most common issue was receiving poor- or low-quality services, followed by experiencing challenges in their job and being stopped by the police or another official—the same issues described by respondents in 2021 and 2020.
- **In 2022, staff reported that housing assistance was the most difficult service sector to access, as they did in 2020 and 2021.** Besides housing, staff identified legal, child care, and mental health services for adults as among the most difficult sectors to access; this was unchanged from 2020 and 2021.

Update on the 2023 Workforce Survey

AIR launched the fourth BEST workforce survey on November 8, 2023, and we will keep it open until early January 2024. The survey was administered to 401 frontline staff and their managers within 34 BEST partner organizations; only BEST partners that directly deliver services to children, parents, or other adults are included in these surveys. As of this writing, the overall response rate for the 2023 survey is 59% (*n* = 240).[4] To date, 53% (n = 127) of the 2023 respondents are repeat respondents, meaning they also completed the survey in 2020, 2021, and/or 2022; and 47% (n = 113) are new respondents, meaning they had never completed a survey in a previous year or they began working in a BEST partner organization in 2023.

[4] The survey will be kept open until early January 2024 to reach a higher response rate. For context, the 2020 survey response rate was 67% (*n* = 206), the 2021 survey response rate was 70% (*n* = 250), and the 2022 survey response rate was 70% (*n* = 287).

Lessons Learned and Next Steps for the Workforce Survey

In 2021 and 2022, AIR made minor year-over-year changes to the survey (e.g., dropping a small number of open-ended items because they did not yield useful data). In 2023, we made slightly more substantial changes to the survey tool to reduce its length, minimize burden on respondents, and boost the survey response rate. These changes included eliminating the survey section focused on staff awareness of "non-BEST" service providers or programs in the community, such as SoonerCare and food stamps (removal of nine items) and streamlining three other survey sections. These included the survey section focused on service access (removed two items), the role of families in BEST partners (removed three items), and racial equity issues (removed two items). In 2024, we will work with the GKFF-BEST team to determine whether to add back to the tool the questions we eliminated in the 2023 survey. AIR will present the 2023 workforce survey findings in 2024. Planning for the next workforce survey will begin in summer 2024.

System Assessment Tool

To help the GKFF-BEST team track the progress of BEST over time for continuous improvement purposes, AIR developed a system assessment tool. This tool, which includes indicators (system domains) related to service infrastructure, coordination, and other aspects of early childhood systems (Exhibit 2), is intended to help document BEST's progress in creating a network of coordinated agencies working together to promote positive outcomes for children and families in Tulsa.

Exhibit 2. BEST Draft System Assessment Tool: System Domains

Components	Infrastructure	Coordination	Context
BEST helps young children and families access high-quality services that meet their needs and preferences.	BEST includes structures and supports to enhance the capacity of partners to provide high-quality services to young children and families.	BEST includes structures and supports that promote collaboration among system partners to provide high-quality services to young children and families.	BEST takes actions to improve the political context that surrounds it to create policy and funding changes to improve conditions for young children and families.
Equity: BEST promotes equity and antiracism in Tulsa's child- and family-serving systems.			

In 2023, AIR continued to refine the tool's indicators, sharing drafts with the GKFF-BEST team and integrating their feedback. In addition, the GKFF-BEST team came together to discuss and reflect on one domain of the tool (Coordination) as well as pilot test the tool in its entirety, which generated additional recommendations for improving the tool.

Lessons Learned and Next Steps

AIR and the GKFF-BEST team have increasingly discussed how to use the tool to make it most beneficial for the BEST initiative. Completing the tool will generate important context for the BEST Study that may help inform findings from the outcome/impact study. In addition to generating information for the BEST Study, the tool can serve as a technical assistance resource for the GKFF-BEST team, providing a framework for discussions on various aspects of the BEST initiative. The GKFF-BEST team (with, or without, AIR) can use the tool to come to consensus on ratings by discussing their rationale and sharing evidence from different sources. The value of the tool may come from these discussions rather than the specific ratings on various indicators, helping the GKFF-BEST team with ongoing planning and decision making. In terms of next steps, AIR and the GKFF-BEST team have discussed the development of "snapshots" of BEST progress for each of the tool's domains. These snapshots would summarize BEST's work for each domain, pulling together available information from the BEST Study and identifying where the GKFF-BEST team needs to complete the picture. These snapshots—summaries of the strengths and challenges of the BEST initiative—across the various domains in the tool can be used as context for the BEST Study and generate information to disseminate to BEST stakeholders and community members.

Section III: Outcome/Impact Study Key Activities and Findings

The outcome/impact study activities address Research Questions 2, 3, and 4. A multicohort study design can effectively assess the impact of the BEST initiative on children and families. AIR will collect relevant outcome data directly from parents and children through surveys. Eventually, the survey sample will include two Birth Cohorts and two Kindergarten Cohorts, with surveys conducted about 1 month, 18 months, and 30 months after recruitment in each cohort. The differences in the outcomes and experiences between the two sets of cohorts are a primary source of inference about the efficacy of the BEST initiative. The multicohort study component is supported by analyses of administrative data documenting baseline citywide trends in Tulsa, including analyses documenting inequalities and disparities in the city prior to and during the launch of the BEST initiative. The baseline trends will also look at Oklahoma City as a comparison city. In total, the key activities for the outcome/impact study in 2023 included:

- collecting the 18-month survey data for the Birth and Kindergarten Cohorts,
- developing the 30-month survey protocols, and
- continuing extant data collection and analysis.

What We Learned from the Outcome/Impact Study

In 2023, we collected the first round of 18-month survey data from the study's first birth and kindergarten cohorts. We began processing, cleaning, and analyzing these data and started the process of comparing the samples against the populations from which they were recruited (Tulsa Public Schools kindergartners and births from a sample of Tulsa hospitals). These comparisons are important because they provide us with the data to create sample weights to make the results more representative. The comparisons between our sample and the population will also show us where we may improve in the Cohort 2 recruitment starting in 2024. Our first round of findings from the Cohort 1 18-month survey will come out in 2024 once we have cleaned the data and developed the correct sample weights.

We also used extant data to study outcome trends over time and compare them against similar trends in Oklahoma City. These extant data analyses were hampered somewhat by the fact that 2022 data were not yet available when we created the analysis files. This means that many trends are still strongly affected by the COVID-19 pandemic. As we obtain data for 2022 and 2023, we will be able to document how COVID recovery trends in Tulsa differ from those we see elsewhere and how this recovery may vary across neighborhoods and demographic groups in Tulsa.

Analyses of student achievement data from Tulsa Public Schools (TPS) showed continued declines in reading scores but encouraging improvement in math scores over time. Our initial analyses of these data point to specific areas of focus for the BEST initiative to consider such as continued support of programs that focus on summer educational programming, support for enrollment and participation in preschool, and learning more about specific reasons that TPS children are absent from school to implement strategies that can reduce absence

Analyses of maternal health and birth outcomes administrative data showed that city-level trends for Tulsa and Oklahoma City were similar on all indicators examined, except for smoking 3 months before or during pregnancy, where Tulsa's rate exceeded Oklahoma City's rate. In addition, Medicaid recipients appear to have lower rates of adequate prenatal care, higher rates of smoking 3 months before or during pregnancy, and higher rates of low birthweight and preterm births compared with their non-Medicaid counterparts in both cities. Finally, racial/ethnic disparities were also observed. Black women appear to have lower rates of adequate prenatal care, higher rates of smoking 3 months before or during pregnancy, and higher rates of low birthweight and preterm births. We summarize our work for each activity in the subsequent sections, concluding with lessons learned and next steps for 2024.

Data Collection for the 18-Month Survey

Over the course of the study, there will be three rounds of data collection for each of the Birth and Kindergarten Cohorts. We will survey each cohort at 1–2 months (1-month survey), 18–20 months (18-month survey), and 29–31 months (30-month survey) after recruitment. In 2023, we completed the 18-month follow-up data collection for Cohort 1. The constructs we focused on in the 18-month survey are described in the sections below and are organized by Birth and Kindergarten Cohort.

Birth Cohort 1

The Birth Cohort 18-month follow-up survey consisted of in-person home visits that included a parent interview, child assessment, and observation of parent–child interactions. The 18-month parent interview gathered data on key constructs listed in Exhibit 3, along with the constructs that are planned for the 30-month survey. The 18-month survey also included a child assessment and observational tool. The child assessment, the Brigance Early Childhood Screen III Toddler, is a measure of the development of a child's language, academic, cognitive, physical, social-emotional, and self-help skills. The observation of parent–child interactions, the *Parenting Interactions with Children Checklist* of the *Observations Linked to Outcomes* tool serves as a measure of parenting practices. We completed the 18-month data collection for Birth Cohort 1 in October 2023 with a total of 161 parent interviews (of the 222 families who completed the 1-month survey), meeting the target response rate of 70%.

Exhibit 3. Birth Cohort Parent Interview Constructs by Follow-Up Period

Construct	18-month parent interview	30-month parent interview
Service use and access	•	•
Child health and health insurance	•	•
Parent health and well-being	•	•
Parenting and protective factors	•	•
Parent perspectives on racism and discrimination	•	•
Family and household characteristics	•	•
Neighborhood satisfaction	•	•
Child care	•	•
Child self-help and social-emotional skills		•

Construct	18-month parent interview	30-month parent interview
Early learning activities with children		•
Parent attitudes about early learning		•
Adverse childhood experiences		•

Kindergarten Cohort 1

The Kindergarten Cohort 18-month follow-up consisted of a survey of first-grade teachers and a parent telephone survey. The teacher survey gathered information about study children's social-emotional, literacy and language, and mathematics skills and development. The 18-month parent survey gathered data on key constructs listed in Exhibit 4, along with planned constructs for the 30-month survey. The constructs included in the 18-month surveys of parents and first-grade teachers represent child and family outcomes as well as targeted protective factors that BEST aims to improve during implementation of the initiative. Data collection for the 18-month parent survey concluded in May 2023. A total of 177 parent telephone surveys were completed (of the 253 families who completed the 1-month survey), meeting the target response rate of 70%. Data collection for the first-grade teacher survey concluded in June 2023. At the end of data collection, teacher surveys were completed for 140 of the 220 students participating in the study, for a final response rate of 64%.

Exhibit 4. Kindergarten Cohort Parent Survey Constructs by Follow-Up Period

Construct	18-month parent survey	30-month parent survey
Service use and access	•	•
Child health and health insurance	•	•
Child development	•	•
Parenting and protective factors	•	•
Parent perspectives and racism and discrimination	•	
Family and household characteristics	•	•
Neighborhood satisfaction	•	•
Before or after school care	•	•
Out-of-school activities	•	•

Construct	18-month parent survey	30-month parent survey
Early learning activities with children		•
Parent satisfaction with education experiences		•
Parent expectations for future schooling		•
Adverse childhood experiences		•

Initial 18-Month Survey Sample Data

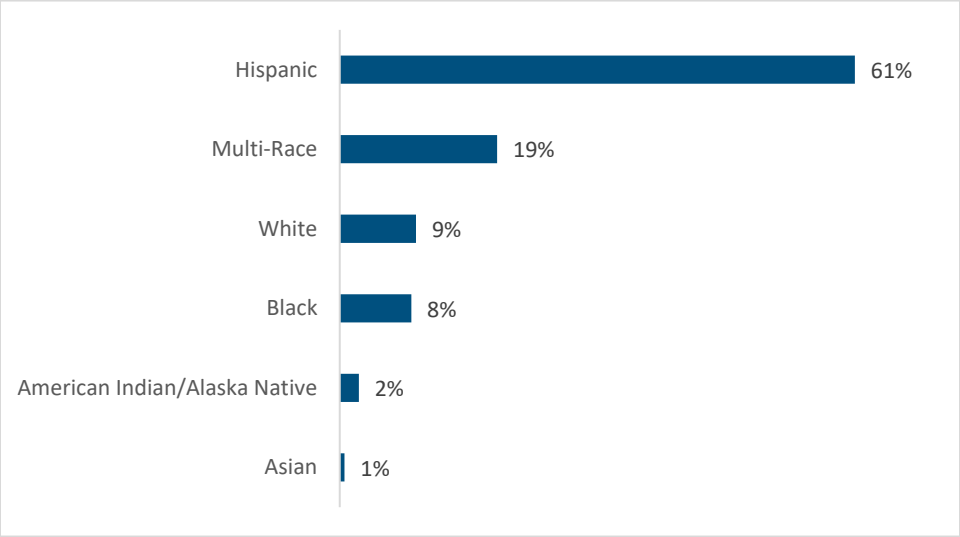
The 18-month survey data collection was completed in June 2023 for Kindergarten Cohort 1 and in October 2023 for Birth Cohort 1. We are in the process of processing and cleaning the data for analysis to examine both Birth and Kindergarten results. We are also in the process of creating sample weights to make the results more representative of the population the sample was selected from (TPS and babies born in Tulsa hospitals). As such, we can only present initial descriptive information about the respondents of the 18-month survey for = Kindergarten Cohort 1. These initial analyses are based on the raw data that does not include survey sampling weights.[5] Of the 253 respondents to the 1-month survey, 70% (*n* = 177) responded to the 18-month survey. As shown in Exhibit 5, Hispanic students comprise the majority of the 18-month sample, followed by Multi-Race Students. There is a similar proportion of White and Black students, and relatively few American Indian/Alaska Native and Asian students. Other key demographics for the 18-month Kindergarten Cohort 1 sample include:

- 52% of respondents were born outside of the United States, 52% of respondents' first language is Spanish, 2% of respondents' first language is other than English, and 93% of respondents currently live in Tulsa;
- 33% of respondents own their own home, 53% rent, and 10% live in public housing;
- 59% of respondents are currently living with a partner; and
- 62% of respondents are currently employed, and 24% are unemployed.[6]
- The median household income for respondents is $35,000, the 25th percentile is $22,000, and 75th percentile is $50,000; 68% of the children would qualify for free-or-reduced price lunches at school.

[5] The final full analysis of the Kindergarten Cohort will include sampling weights that will allow us to adjust the findings to better represent the original sampling frame of TPS kindergartners.
[6] The employment status of the other 14% included full-time student (2%), stay-at-home parent (8%), retired (1%), and disabled (3%).

- There are an average of 2.7 children per household, ranging from 1 to 6 children.

Exhibit 5. Kindergarten Cohort 1 Demographics, Children of 18-Month Respondents



Note. These data are raw. Future analysis will incorporate survey sampling and nonresponse weights to represent the overall population, and so may differ.

Developing 30-Month Survey Protocols

Data Collection Protocols and Procedures

The study's TWG members, GKFF staff, and the study leadership team reviewed the 30-month parent surveys, which included similar constructs to those on the 18-month parent surveys. The Birth Cohort 30-month parent survey also includes new constructs, such as child self-help and social-emotional skills, early learning activities with children, parent attitudes about learning, and adverse childhood experiences. (See Exhibit 4 above for a full list of the constructs in the 30-month parent survey).

New constructs for the Kindergarten Cohort 30-month parent survey include early learning activities with children, parent satisfaction with education experiences, parent expectations for future schooling, and adverse childhood experiences. We finalized and programmed the surveys for use in a pilot test in November 2023. The goal of the pilot test was to check the feasibility of the survey in terms of its overall length and item clarity and to make sure there are no errors in programming. The pilot was successful, with few changes needed in the survey instruments or our procedures to be prepared to launch the surveys in February 2024. In addition to the Kindergarten Cohort 30-month parent survey, we will also administer a survey to second-grade teachers. We began programming the second-grade teacher survey of

participating Kindergarten Cohort children's social-emotional and early learning skills. The second-grade teacher survey will be piloted in early January 2024 for a February 2024 launch.

Lessons Learned and Next Steps

We will pilot test the second-grade teacher survey protocol in January 2024 as part of the 30-month survey follow-up of our Kindergarten Cohort 1 sample. After the pilot test, AIR will review the pilot data and revise the surveys and our procedures as necessary. Data collector training for the Kindergarten Cohort's telephone survey is scheduled to occur in January 2024. Data collector training for the Birth Cohort home visit will occur in early February 2024. The 30-month Birth Cohort data collection will begin following training in February 2024. The 30-month Kindergarten Cohort data collection, including the parent telephone survey and the second-grade teacher survey of participating Kindergarten Cohort children will begin in February 2024.

Extant Data Collection and Analysis

During the past year, our efforts have focused on continuing to engage local and state agencies to obtain administrative data and to conduct baseline analyses on a variety of child and family well-being indicators associated with BEST initiative implementation. These analyses contribute to a larger body of baseline analyses we have been conducting that aim to provide a baseline portrait of trends on a range of family- and child-related indicators prior to and during the launch of the BEST initiative. Analyses in prior years of the BEST Study have examined indicators such as maternal health and birth outcomes, third-grade reading and math proficiency, preschool participation, residential mobility, housing affordability, child welfare, and public benefit receipt. These analyses have primarily served two important purposes: (a) gathering an understanding of baseline outcomes and equity gaps in Tulsa and how they compare to similar trends in Oklahoma City, and (b) refining our regression modeling approach, which uses a comparative interrupted time series (CITS) design to compare changes in trends for Tulsa before and after the launch of the BEST initiative to changes in trends in Oklahoma City. Specifying the CITS models now will allow us to further refine them as we work toward final impact analyses in 2026 and 2027.

In this section of the report, we present baseline trends in children's educational outcomes for students in Tulsa Public Schools. We also examine city-level trends in child care availability and quality for Tulsa and Oklahoma City, a comparison city as well as maternal health and birth outcomes.

Tulsa Public Schools Students' Trends

In 2023, we systematically analyzed TPS data that included student-level enrollment, demographic, formative, and summative assessment data from the Northwest Evaluation Association (NWEA) for prekindergarten to third-grade students from school year (SY) 2014–15 to 2021–22.[7] We conducted primarily preliminary descriptive analyses. We provide our findings in the sections below organized by three areas: (a) math and reading trends, (b)prekindergarten enrollment, and (c) chronic absenteeism.

To note, AIR receives most TPS data about 6 months after the conclusion of a school year and the state assessment data typically about a year after a completed school year. Thus, at the time of this analysis in 2023, AIR used the most recent data available, from SY 2021–2022. Given this delay in when we have the data, TPS has included updated information on SY 2022–2023 and SY 2023–2024 in the "TPS Insights" box on page 29.

Math and Reading Trends

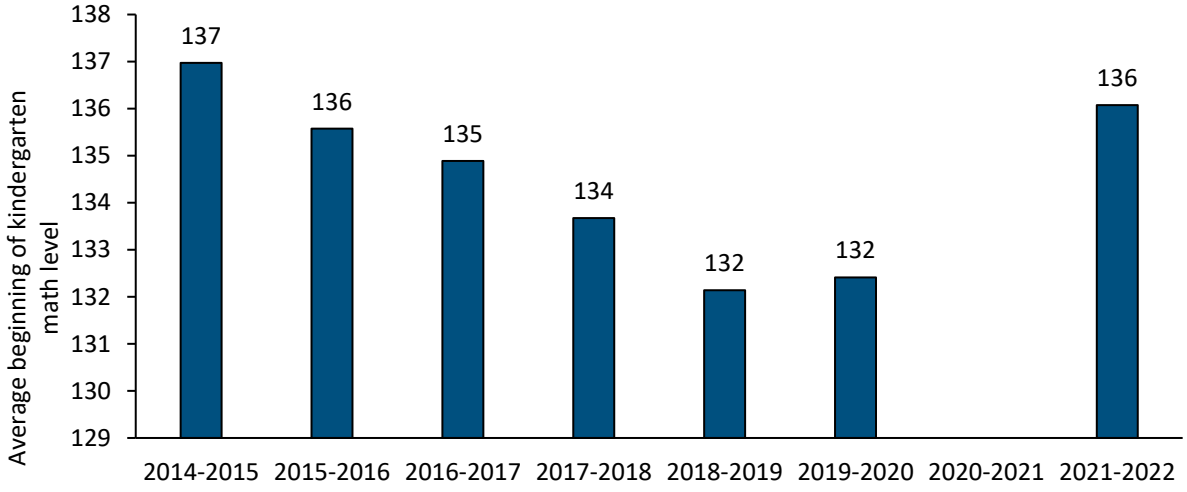
Starting with math assessment data, we found that the beginning of kindergarten math levels increased from SY 2019–2020 to SY 2021–2022, an increase of about 4 scale score points or 2.5 months of learning. Exhibit 6 depicts this bright spot, with SY 2021–2022 math scores increasing to almost SY 2014–2015 levels after years of a consistent decline.

In contrast to math, we found that TPS students' reading scores have declined over time and remain low. There has been a consistent decline of beginning kindergarten reading levels since SY 2014–2015 (Exhibit 7). The average beginning of kindergarten reading level has declined from 140 scale score points in SY 2014–2015 to 135 scale score points in SY 2021–2022, which represents a decline of approximately 4 months of learning. The declines in kindergarten and third grade have been experienced to a relatively similar degree by all student subgroups, but there remains a substantial opportunity gap between groups who are not considered economically challenged and those who may be considered economically challenged.[8] For more information on TPS efforts to address reading skills, see the "TPS Insights" box on page 29.

[7] This analysis uses NWEA's Measuring Academic Progress (MAP) achievement tests. The MAP assessment is commonly used in school districts across the country, and the MAP Reading and Math assessments are used by TPS as part of their assessment system. The assessment has strong psychometric properties and is vertically scaled, such that it can be used to accurately chart students' progress across time. In each grade, students have an opportunity to take the MAP reading assessment up to three times per year: fall, winter, and spring.

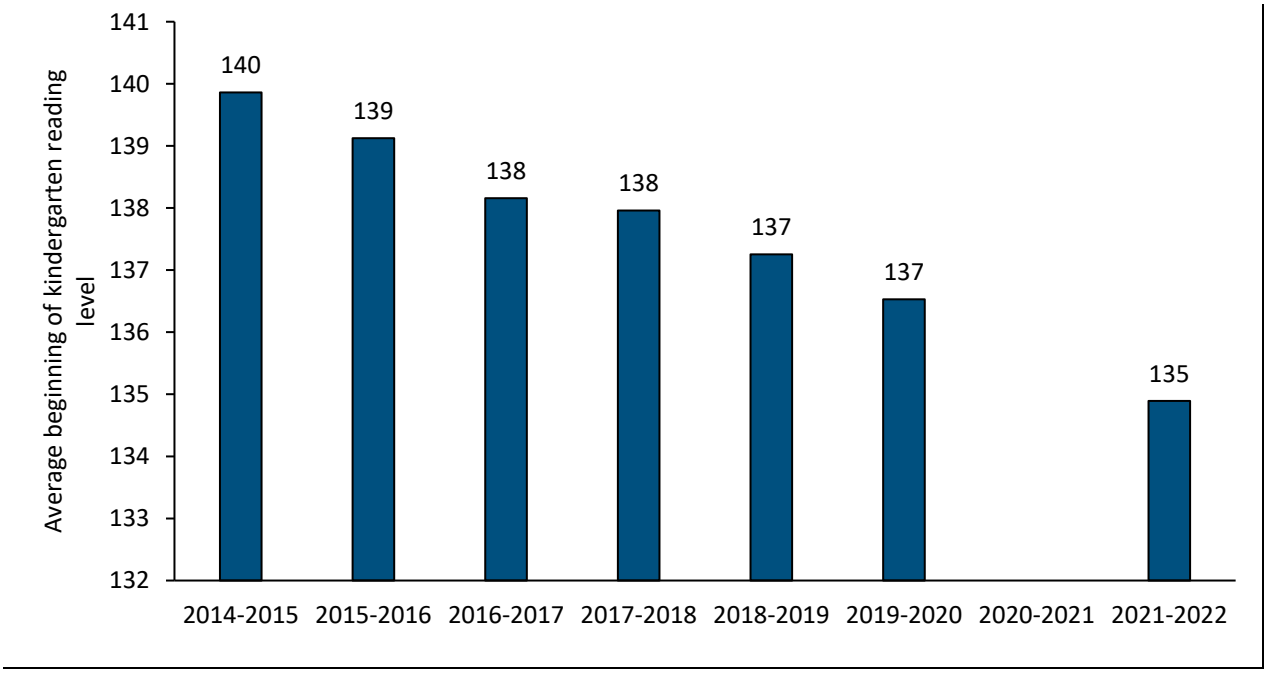
[8] TPS categorizes students as being economically challenged or not economically challenged, which generally corresponds to whether the student is eligible for free-or-reduced price lunch (or not).

Exhibit 6. Average TPS Beginning of Kindergarten Math Level, Over Time (NWEA MAP Math)



Note. NWEA = Northwest Evaluation Association, MAP = Measuring Academic Progress. With inconsistent testing policy in SY 2020–2021 (because of the pandemic), results not shown. Calculations by the American Institutes for Research based on TPS administrative records.

Exhibit 7. Average TPS Beginning of Kindergarten Reading Level, Over Time (NWEA MAP Reading)

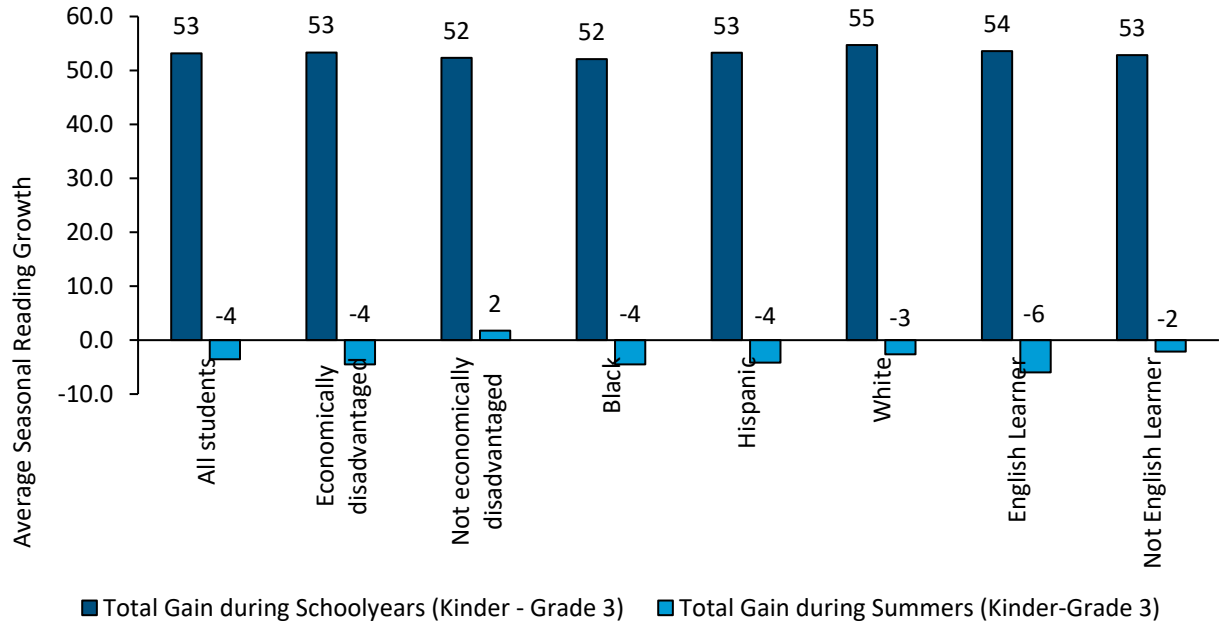


Note: NWEA = Northwest Evaluation Association, MAP = Measuring Academic Progress. With inconsistent testing policy in SY 2020–2021 (in light of the pandemic), results not shown. Calculations by the American Institutes for Research based on TPS administrative records.

Summer Reading Trends

There are different seasonal trends in reading growth for different student subgroups. Exhibit 8 depicts the amount of reading growth that students make during the school year (i.e., from the fall to spring testing periods) compared to the summer (i.e., from the spring to next fall testing periods), aggregated from kindergarten to third grade. This shows that all subgroups gain a roughly similar amount during the school year. However, during the summer, reading gaps increase for some students. For example, students who are not economically challenged tend to continue to develop in their reading levels during the summer (gaining 2 scale score points), whereas those who are economically challenged lose about 4 scale score points of the reading level gains that they made during the school year. The difference in reading levels that occurs in the summer between these two groups of students represents a difference equivalent to about 6 months of reading-level growth. In other words, due to the differences in reading-level growth during summers, an additional 6-month gap in reading levels occurs between economically challenged and not economically challenged children.

Exhibit 8. Average TPS Reading Growth During School Year and Summer from Kindergarten to Third Grade (NWEA MAP Reading)



Note. NWEA = Northwest Evaluation Association, MAP = Measuring Academic Progress. Calculations by the American Institutes for Research based on TPS administrative records.

Prekindergarten Enrollment Trends and Academic Outcomes

We found a non-causal, positive relationship between attending prekindergarten and academic outcomes. For example, students who were economically challenged or English learners were more likely to have higher academic outcomes in kindergarten and third grade than children who did not enroll in prekindergarten. Additionally, for Black children who had attended prekindergarten compared to children who had not, positive associations were seen in kindergarten math and some of the in third grade reading outcomes (Exhibit 9).

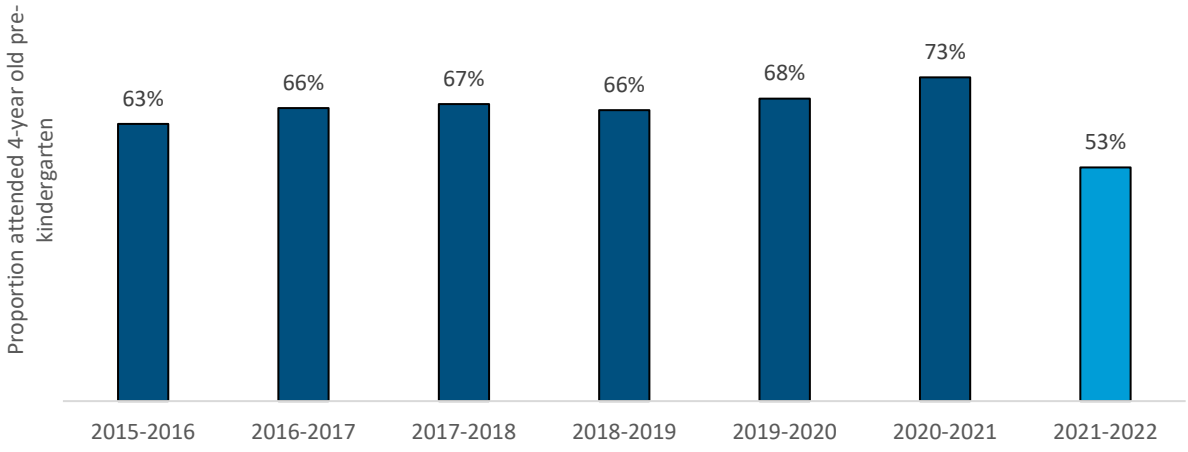
Data indicates that participation in TPS 4-year-old prekindergarten had been increasing but dropped sharply with the COVID-19 pandemic. As shown in Exhibit 10, 73% of kindergarteners in SY 2020–2021 had enrolled in TPS prekindergarten the year prior, with English learners, Hispanic, and Black students being especially likely to enroll (see Appendix A, Exhibit A2). Only 53% of kindergarteners in SY 2021–2022, however, had participated in prekindergarten the year prior. Importantly, as noted in the "TPS Insights" box, prekindergarten enrollment has begun to recover. TPS reports that the proportion of kindergarteners who attended prekindergarten has increased in the last 2 years; in SY 2022–2023, 67% of kindergartners had attended prekindergarten, and in SY 2023–2024, 75% of kindergarten students had attended prekindergarten.

Exhibit 9. Association Between TPS 4-Year-Old Prekindergarten Enrollment and Later Academic Outcomes (in Standard Deviation Units)

Outcome	Total association (main effect + interaction effect)			
	Economically challenged	Black	Hispanic	English learner
Kindergarten reading (MAP)	.12*	.03	.00	.08*
Third-grade reading (state assessment)	.17*	.10*	.01	.38*
Kindergarten math (MAP)	.15*	.05*	.09	.12*
Third-grade math (state assessment)	.13*	−.02	−.03	.27*

Note. MAP = Measuring Academic Progress. Table gives coefficients of the total association (main effect + interaction effect) of moderation analyses. * p < .05. This observational (not causal) analysis is based on a model that includes subgroups dichotomous variables and an interaction term between subgroups and prekindergarten, year fixed effects, and school-random effects. Calculations by the American Institutes for Research based on TPS administrative records.

Exhibit 10. Proportion of Kindergarteners Who Attended TPS 4-Year-Old Prekindergarten, Over Time

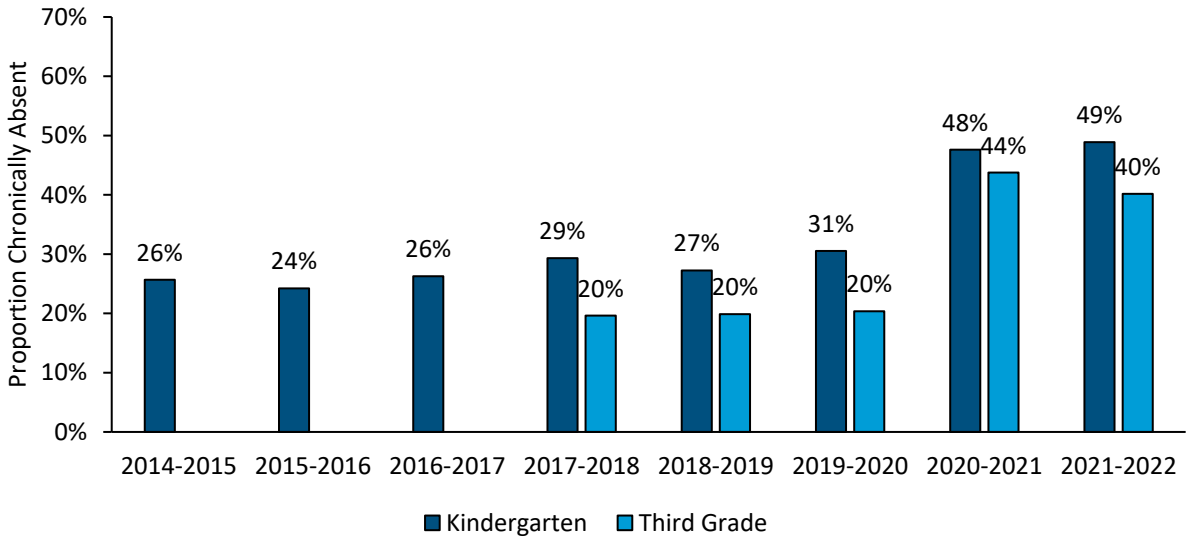


Note. Calculations by the American Institutes for Research based on TPS administrative records.

Chronic Absenteeism

The pandemic had negative impacts on attendance among the youngest students whose formal (i.e., kindergarten or later) school was disrupted. Chronic absenteeism remains at elevated levels two years after the beginning of the COVID-19 pandemic. As shown in Exhibit 11, chronic absenteeism rates increased substantially for kindergarteners, with 27% chronically absent in SY 2018–2019 compared to 49% in SY 2021–2022. For third graders, the rates doubled from SY 2019–2020 (when 20% of students were chronically absent) to SY 2021–2022 (when 40% were chronically absent). When we examined absenteeism by demographic characteristics, students who are economically challenged were particularly more likely to be chronically absent. As noted in the "TPS Insights" box, concerted efforts are underway to address chronic absenteeism by TPS.

Exhibit 11. Proportion of Chronically Absent Kindergarteners and Third Graders, Over Time, SYs 2014 to 2022



Note. Calculations by the American Institutes for Research based on TPS administrative records.

TULSA PUBLIC SCHOOLS (TPS) INSIGHTS

In response to AIR's primarily preliminary descriptive analyses with data from the SY 2021–2022 school year, Kelly Kane, the executive director of Elementary and Early Childhood Education at TPS, provided more up-to-date information from the SY 2022–2023 and midyear data from SY 2023–2024. She also provided additional contextual information about ongoing efforts in the district related to prekindergarten enrollment, chronic absenteeism, and literacy development, as bulleted below.

- Prekindergarten Enrollment Trends and Recruitment Efforts
    - In SY 2022–2023, 67% of TPS kindergartners had attended prekindergarten and midyear data for SY 2023–2024 school year indicate that 75% of TPS kindergartners had attended prekindergarten.
    - To recruit for SY 2023–2024, approximately 1,000 prekindergarten recruitment flyers were distributed across Tulsa through neighborhood canvassing and support from more than 20 community agencies, including many BEST partners.
    - More than 200,000 families were reached through Facebook and TV ads about prekindergarten enrollment.
- Combatting Chronic Absenteeism
    - TPS and the City of Tulsa are partnering for *Attend to Win!*, a comprehensive citywide effort to combat chronic absenteeism and drive home the importance of showing up for school each day.
- Literacy Development and Reading Interventions
    - Since SY 2022–2023, TPS has seen continual improvements in kindergarten reading scores. The current kindergarten cohort has 5 percentile points more students achieving at or above the 50th percentile at midyear than last year's cohort at the same point in time.
    - Using state-approved, evidence-based curriculum and interventions, elementary students at TPS receive an average of 2.5 hours of reading instruction each day.
    - TPS teachers are trained in the Science of Reading, engage in ongoing professional development, and provide individualized instruction to meet students' unique needs.
    - "Walk to Read" is a daily literacy intervention that TPS elementary students engage in, which includes teacher-led small group skills instruction and research-based digital learning designed to meet individualized needs.

Main Takeaways

In 2023, we gained an understanding of the overall "macro" trends in TPS. The next steps of our analysis will expand this understanding by exploring the variation in these trends that occur at the "micro" level of neighborhoods, schools, and regions. This descriptive analysis will provide a richer perspective on these trends to pinpoint areas that could benefit further the BEST initiative and its partners. There also may be ways to support TPS's and other community-based ongoing efforts to enhance the literacy learning ecosystem prior to kindergarten and when a student is at TPS. It may also be useful to examine what resources are available from schools and Tulsa communities to further support children's academic learning during out-of-school periods, including summers. It may also be useful to examine what the causes influencing students' chronic absenteeism are, and what resources and support can be provided by schools and communities to address those causes.

These descriptive analyses are preliminary to the analyses that we will undertake to gauge the impact of the BEST initiative. An understanding from the micro analysis of where variation exists within the city can help in defining which areas in the city can be considered as the treatment and comparison groups in our later impact analysis. Another possibility is to define a comparison group from another school district to compare to TPS. To this end, we will continue to explore the possibility of partnering with the developer of the MAP assessment (i.e., NWEA) to receive a comparison group that would include MAP scores so that we could compare reading and math performance between Tulsa and the comparison group.

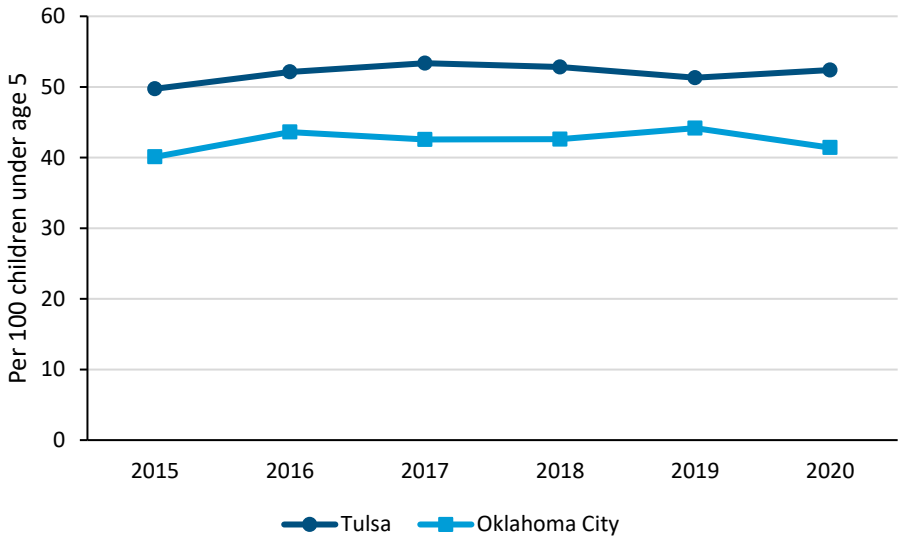
City-Level Baseline Child Care Availability and Quality Trends

Using data from Oklahoma Department of Human Services (OKDHS), we analyzed baseline child care availability in licensed center-based centers and family child care homes, plus the quality trends for Tulsa and how the trends compare to Oklahoma City from school years (SY) 2015 to 2021.[9] Child care availability denotes the number of reported slots available at licensed, care providers (center-based and family-based providers). For examining quality trends, we used the Oklahoma Quality Rating and Improvement System (QRIS) indicator from OKDHS, which is based on licensing, staff education, facilities, and parent engagement; QRIS program scores range from 1 to a maximum (highest quality) of 5.[10] Our current analysis consists of descriptive statistics.

[9] The data we have from OKDHS is the data is based on availability (e.g., available slots). We do not have data on actual enrollment. As such, this administrative data does not address the topic of the utilization of child care.
[10] For more, see OKDHS website https://oklahoma.gov/okdhs/services/child-care-services/qris/rating.html

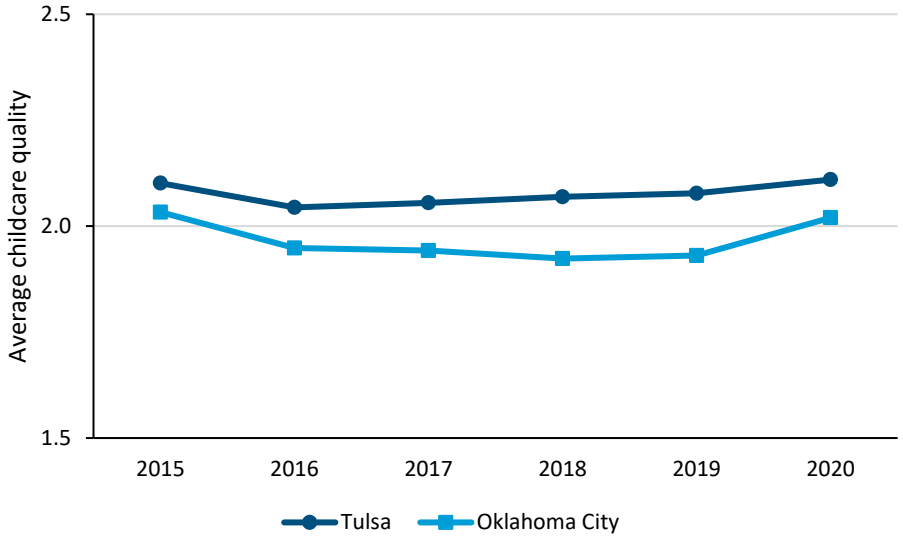
Child care availability with licensed providers is consistently higher in the City of Tulsa than in Oklahoma City over the period from SYs 2015 to 2020 (Exhibit 12). For example, over most of the years examined, Tulsa had between 50 and 53 child care slots available for every 100 children under the age of 5 years old, while Oklahoma City had between 40 and 44 slots available over the same time period. This means in the City of Tulsa, there are licensed, child care slots available for about half of the children under the age of 5. Tulsa also consistently had higher quality child care than Oklahoma City (Exhibit 13). The quality indicator in Tulsa was between 2.0 and 2.1 over the years examined, while for Oklahoma City it was between 1.9 and 2.0. The quality indicators can range from 1 to 5; Level 2 indicates that programs maintain minimum licensing requirements that ensure children's basic health and safety, and staff have enhanced education.

Exhibit 12. Licensed Child Care Availability in Tulsa and Oklahoma City, Expressed as Number of Child Care Licensed Center Slots per 100 Children Under Age 5, SYs 2015 to 2020



Note. Calculations by the American Institutes for Research based on OKDHS administrative records. Licensed child care includes both center-based and family child care homes.

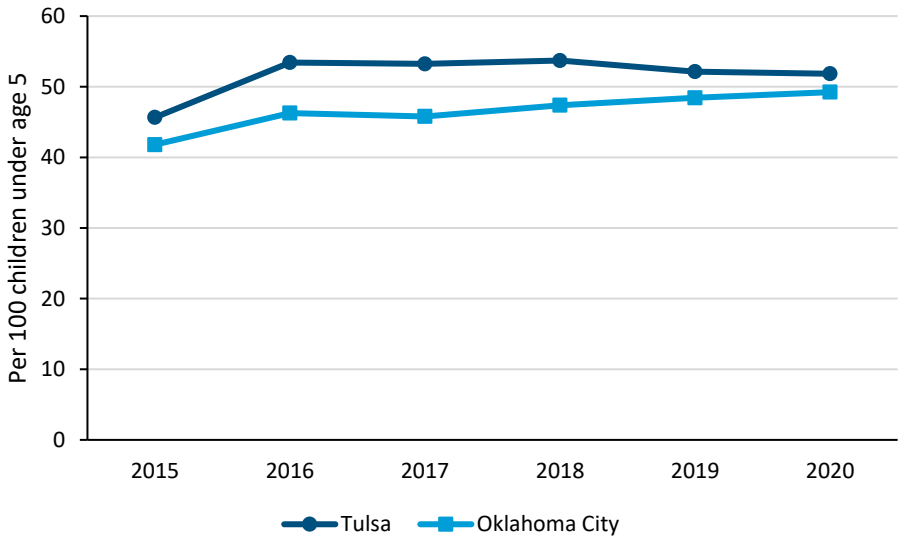
Exhibit 13. Average Child Care Quality in Tulsa and Oklahoma City, SYs 2015 to 2020



Note. Calculations by the American Institutes for Research based on OKDHS administrative records.

We also looked at child care availability by neighborhood characteristics, such as the proportion of residents living below the poverty line (e.g., low-income neighborhoods) and proportion of residents who are Black or Hispanic. Among low-income neighborhoods in the two cities, Tulsa has greater child care availability (Exhibit 14), ranging from 46 to 54 slots per 100 children, compared to 42 to 49 slots for Oklahoma City. The trend for Oklahoma City has been increasing since 2017, while Tulsa's trend has been flatter, so the difference between the two cities appears to have narrowed.

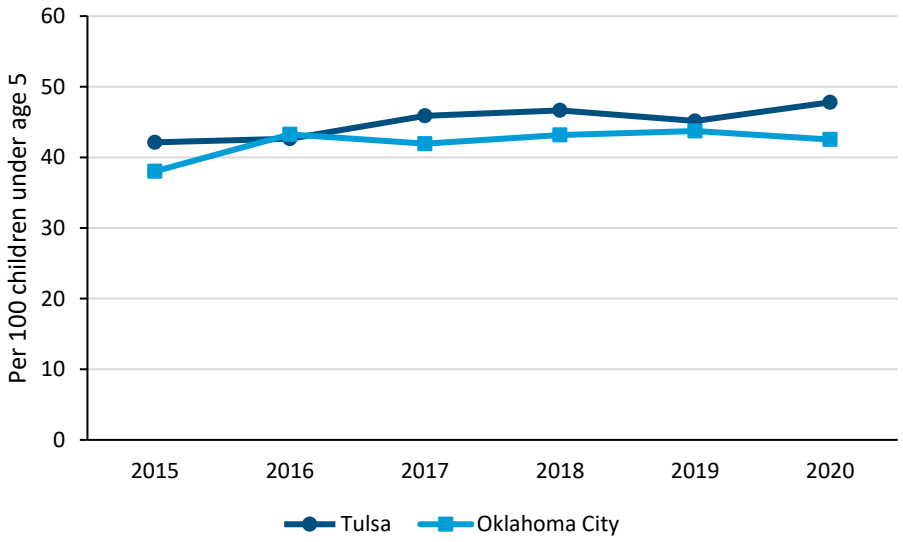
Exhibit 14. Licensed Child Care Availability in Low-Income Neighborhoods in Tulsa and Oklahoma City, Expressed as Number of Child Care Spaces per 100 Children Under Age 5, SYs 2015 to 2020



Note. We defined high- or low-income neighborhoods based on whether the neighborhood poverty rate (i.e., proportion of residents living below the poverty line) is greater or less than the median poverty rate for Tulsa and Oklahoma City zip codes. Oklahoma Department of Human Services administrative data.

Looking specifically at neighborhoods that have higher concentrations of Black and Hispanic residents, Tulsa, with 42 to 48 slots per 100 children, has generally had greater child care availability than Oklahoma City, which has 38 to 42 slots per 100 children (Exhibit 15). This has not been a consistent trend over time, however, as in 2016 Oklahoma City had slightly more availability than Tulsa. It is also important to note the average number of child care slots for both cities is lower in neighborhoods that have higher concentrations of Black and Hispanic residents (between 42 and 48 slots available per 100 young children) than it is for the average for the entire city, which is between 50 and 53 slots.

Exhibit 15. Licensed Child Care Availability for Neighborhoods with Higher Concentrations of Black and Hispanic Residents in Tulsa and Oklahoma City, Expressed as Number of Child Care Center Spaces per 100 Children Under Age 5, SYs 2015 to 2020



Note. Concentration refers to neighborhoods whose proportion of Black and Hispanic residents is greater than the median. Oklahoma Department of Human Services administrative data.

Maternal Health and Birth Characteristics in Tulsa and Oklahoma City

In this section, we explore the state of maternal health and birth outcomes in the cities of Tulsa and Oklahoma City prior to implementation of the BEST initiative in Tulsa. Birth records from the Oklahoma State Department of Health were used for this analysis. The data consist of deidentified, individual-level birth records from the Registering Oklahoma Vital Event Records database for all births in the cities of Tulsa and Oklahoma City from 2013 to 2021. We selected the following indicators of maternal health and infant well-being: prenatal care, smoking during pregnancy, and commonly researched pregnancy conditions—gestational hypertension, gestational diabetes, and eclampsia, as well as low birthweight births and preterm births. These indicators are listed in Exhibit 16.

Descriptive trends for each indicator are presented at the city level and by two characteristics: Medicaid status and race/ethnicity.[11] Exhibit 16 presents the birth characteristics examined in the analysis along with their definitions.

[11] See Appendix G for the demographic characteristics of births in Tulsa and Oklahoma City.

Exhibit 16. Maternal Health and Birth Indicators

Indicator	Definition
Prenatal care [a]	Received adequate or greater care on the basis of the Adequacy of Prenatal Care Utilization index. The Adequacy of Prenatal Care Utilization index is based on two parts: (a) the month in which prenatal care is initiated and (b) the number of visits from initiation of care until delivery. The indicator is categorized by four levels: inadequate, intermediate, adequate, and adequate plus.
Smoking [b]	Smoking 3 months before or during pregnancy
Gestational diabetes [c]	Diabetes that develops during pregnancy
Gestational hypertension [d]	High blood pressure that develops during pregnancy
Eclampsia [e]	Seizures and other conditions that result from high blood pressure
Birth outcomes	
Low birthweight [f]	< 2,499 g
Preterm births [g]	Live birth before 37 completed weeks of gestation
Demographic characteristics	
Race/ethnicity	White, Black, Latino/a
Medicaid status	Principal source of payment for delivery was Medicaid vs. non-Medicaid (i.e., private insurance, self-pay, Indian Health Service, CHAMPUS/TRICARE [for active-duty service members], other government [federal, state, or local], other, unknown)

[a] National Institute of Child Health and Human Development. (2017). *What is prenatal care and why is it important?* https://www.nichd.nih.gov/health/topics/pregnancy/conditioninfo/prenatal-care

[b] Centers for Disease Control and Prevention. (2020). *Smoking during pregnancy*. https://www.cdc.gov/tobacco/basic_information/health_effects/pregnancy/index.htm

[c] The American College of Obstetricians and Gynecologists. (2013). *Gestational diabetes. FAQ177*. Retrieved May 31, 2016, from http://www.acog.org/Patients/FAQs/Gestational-Diabetes

[d] The American College of Obstetricians and Gynecologists. (2020). *Preeclampsia and high blood pressure during pregnancy. FAQ034*. Retrieved December 30, 2020, from http://www.acog.org/Patients/FAQs/Preeclampsia-and-High-Blood-Pressure-During-Pregnancy

[e] National Institute of Child Health and Human Development. (2017). *Preeclampsia and eclampsia*. https://www.nichd.nih.gov/health/topics/preeclampsia

[f] March of Dimes. (2023). *Low birthweight*. https://www.marchofdimes.org/find-support/topics/birth/low-birthweight

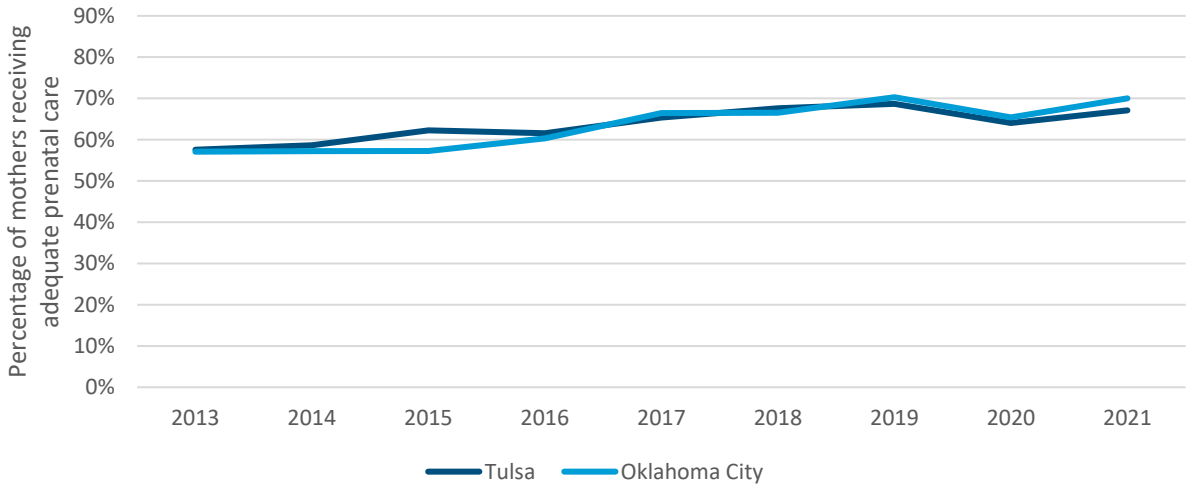
[g] Centers for Disease Control and Prevention. (n.d.). *Preterm birth.* Retrieved September 17, 2023, from http://www.cdc.gov/reproductivehealth/maternalinfanthealth/PretermBirth.htm

Key Findings

We first present findings from examining prenatal care. Second, we briefly highlight key findings from our examination of other maternal health and birth indicators (see Appendix B for details). We examined trends for every indicator by city, Medicaid status, and race/ethnicity. All exhibits present descriptive trend lines.[12]

Prenatal Care. We examined rates of adequate prenatal care, defined by a combination of when prenatal care began and number of visits (see Exhibit 16, above, for a full definition). As shown in Exhibit 17, rates of adequate prenatal care appear to be increasing over time in both cities. In 2013, the rate of prenatal care in Tulsa was 58% and increased to 67% in 2021.

Exhibit 17. Percentage of Mothers Receiving Adequate Prenatal Care in Tulsa and Oklahoma City, 2013–2021

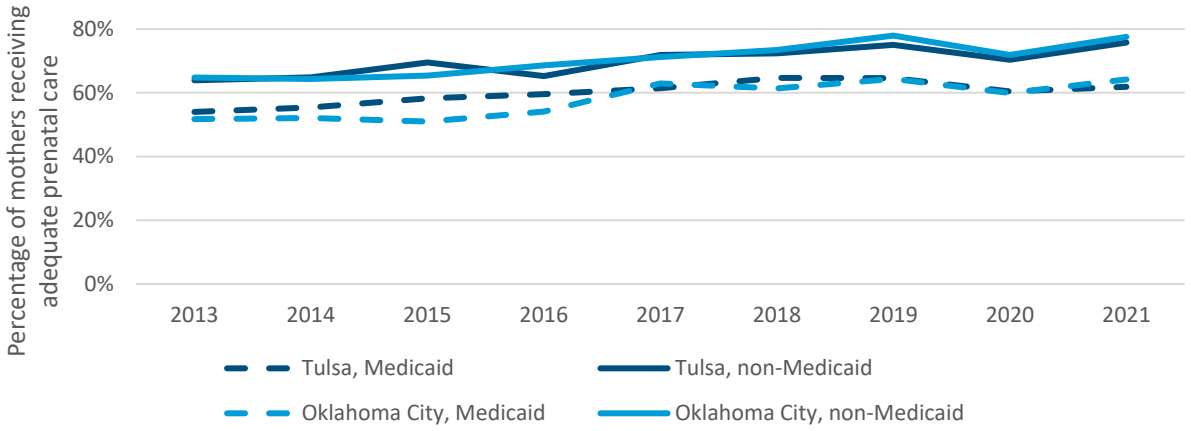


Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.
Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

There are differences in adequate prenatal care rates by Medicaid insurance status, as shown in Exhibit 18. Rates of prenatal care among Medicaid recipients were lower than non-Medicaid recipients, although the trend is increasing for all groups.

[12] Because of the descriptive nature of these trends, we advise caution in interpreting trends. We will be examining whether differences in trends are statistically significant in forthcoming analyses, which will aid in interpretation.

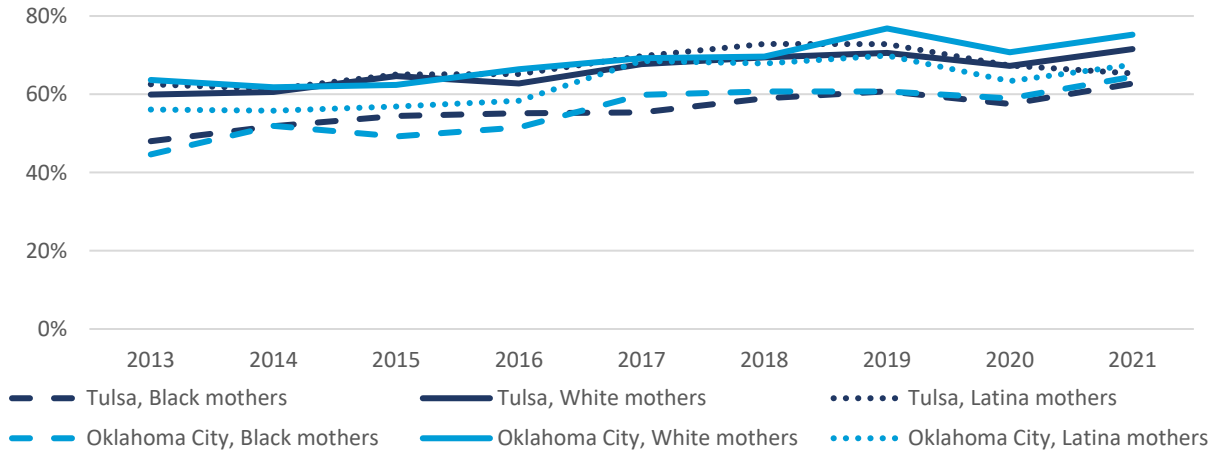
Exhibit 18. Percentage of Mothers Receiving Adequate Prenatal Care in Tulsa and Oklahoma City by Medicaid Status, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.
Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

Regarding adequate prenatal care rates by race and ethnicity, the trends show that rates of adequate prenatal care are lower for Black mothers than other racial/ethnic groups (see Exhibit 19).

Exhibit 19. Percentage of Mothers Receiving Adequate Prenatal Care in Tulsa and Oklahoma City by Race/Ethnicity, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.
Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

Additional key findings regarding other maternal health outcomes include the following:

- **Smoking**: Across years, Tulsa has a greater percentage of mothers who smoked at least 3 months before or during pregnancy compared with Oklahoma City (14% vs. 11%, respectively, in 2013 and 9% vs. 5%, respectively, in 2021). However, rates have been declining over time in both cities (see Exhibits B1 and B2).
- **Gestational Diabetes**: There was a slight increase in rates of gestational diabetes in both cities (see Exhibit B3). In 2013, the rate of gestational diabetes was 4% in both Tulsa and Oklahoma City. In 2021, the rate increased to 6% in Tulsa and 7% in Oklahoma City. Trends by race/ethnicity suggest an increasing rate among Latina mothers, especially in Tulsa (see Exhibit B4).
- **Gestational Hypertension**: The rates of gestational hypertension in both Tulsa and Oklahoma City were 4% in 2013 (see Exhibit B5). In 2021, the rates increased more quickly to 9% in Tulsa compared with 7% in Oklahoma City. When we examined differences by Medicaid status and race/ethnicity, generally, differences in rates appeared small (see Exhibit B6). Forthcoming regression analyses will indicate whether differences observed for these indicators (and all other indicators) are statistically significant.
- **Eclampsia**: Rates of eclampsia in both cities hovered at less than 1% across years (see Exhibit B7). Differences in rates by Medicaid status and race/ethnicity appeared small (see Exhibit B8).

Key findings regarding birth health indicators include the following:

- **Low Birthweight and Preterm Births**: Rates of both low birthweight births and preterm births in Tulsa and Oklahoma City were similar, fluctuating between 8% and 10% over time (see Exhibits B9 and B10).
  - In both cities, rates of both low birthweight births and preterm births were higher for Medicaid recipients than non-Medicaid recipients, although differences appear to be small (see Exhibits B11 and B12).
  - Rates of low birthweight and preterm births were also higher among Black women than White and Latina women in both cities (see Exhibits B11 and B12). For example, in Tulsa, 2021 rates of low birthweight births were 17% for Black women, 8% for White women, and 7% for Latina women. Rates of preterm births were 18% for Black women, 10% for White women, and 10% for Latina women.

Lessons Learned and Next Steps

Thus far, we have analyzed baseline trends relevant to family and child wellbeing indicators such as residential mobility, housing affordability, public benefit receipt, child care programs, education outcomes, preschool enrollment, maternal health and birth outcomes. In general, Oklahoma City's city-level trends mirror Tulsa's city-level trends, supporting its use as a comparison city for the CITS analysis. In 2024 we will begin analysis of the 18-month survey data and continue to conduct analyses of school, regional, and neighborhood trends using data from Tulsa Public Schools, the Tulsa Health Department, and Oklahoma State Department of Education.

Section IV: Ethnography Key Activities

The ethnography activities address Research Questions 2, 3, and 4 (discussed earlier). The purpose of the ethnography study is to provide an in-depth description from the families' points of view about the day-to-day experiences raising young children in Tulsa, including their interactions with systems and service providers. Key ethnography study activities include

- collecting data through regular monthly ethnographic interviews,
- analyzing data focused on Ecocultural Family Interview (EFI) domains, such as sustainability of daily routines and home–community environment, and
- creating individual case studies to present a holistic view of family life for the sample.

What We Learned from the Ethnography Study: The monthly conversations with families in the ethnography have highlighted the complexities of family life. When these changes happen in any area, such as work, school, health, or housing, families turn to a variety of supports and services to make ends meet. This complex nature of family function illustrates why it is so important for the BEST evaluation to understand the Tulsa social service sector and its partners.

We summarize our work in each of these activities in the subsequent sections, concluding with lessons learned and next steps for the work in 2024.

Sample and Data Collection

The sample for the ethnography study was selected from the Cohort 1 Birth and Kindergarten outcome/impact study sample, including 20 families based on their neighborhood, work status, number of children, and preferred home language (i.e., 10 Birth Cohort families and 10 Kindergarten Cohort families). On average, these 20 families have each completed 18 interviews since starting the ethnography study in December 2022.

The study uses the Ecocultural Family Interview (EFI), which is an approach to ethnography research that uses conversations with parents about how they organize their family's everyday routines. The approach focuses on learning how families plan, create, change, and sustain their everyday activities. The format of the open-ended interview is a mixture of conversation, probing questions, and preplanned structured questions to hear about the family routines and circumstances from the parent's perspective, using their own words. As of December 20, 2023, a total of 358 ethnographic interviews have been completed since the beginning of the study. 199 of these interviews were completed in 2023. We have completed a total of 114 EFI quarterly scoring protocols.

EFI KEY DOMAINS

1. Family Subsistence and Work
2. Services
3. Information
4. Cultural Beliefs and Influences
5. Home–Community Environment
6. Networks and Supports
7. Connectedness
8. Domestic Workload and Child Care Tasks
9. Sustainability of Daily Routine

Data Analysis

We conducted analyses of the Sustainability of Daily Routine and Home–Community Environment domains for the first six months of interviews with the 20 selected families. Focusing on these two EFI domains, AIR conducted a thematic analysis of 130 field notes.

Highlighted Findings

Sustainability of Daily Routines: Almost all of the 20 families experienced some level of change in their daily routines. Child care, a child's school arrangements, or a parent's personal work or schooling situation were the most common areas of family lives that changed.

FAMILY PROFILE: THE REYES FAMILY[13]

Carmen and Carlos Reyes are separated parents of three sons: Freddy (age 6 years), Alan (age 10 years), and David (age 17 years). Freddy was born in the United States. However, the rest of the family immigrated from Honduras after Carmen became concerned about her children's future there. They have been living in Tulsa for 6 years, where Carmen and the boys stay in a two-bedroom, one-bathroom apartment; Carlos resides elsewhere. Changes to the family's daily routine often revolve around Freddy's and Alan's school schedules (David

[13] We use pseudonyms for all participants in the Ethnography Study.

graduated from high school and is working). When the new school year began in 2023, Carmen began driving Freddy and Alan to and from school instead of having them take the bus. To accommodate this change, Carmen adjusted her work hours by going in 30 minutes late and leaving 30 minutes early. Despite losing an hour of work each day, she described the change as worthwhile because she can spend more time with the boys and knows they are getting to and from school safely.

Establishing a consistent routine is a vital component of family functioning. Routines help children to have structure and build healthy habits. Routines also help parents reduce stress and stay organized. The findings in this report reveal that families in our ethnography study, as is the case with many families, have complex lives. Most families with young children experienced two or more areas of change in their daily routine over the first 6 months of the ethnography study. Despite the changes, families adapted using the best resources that were available to them at the time, often by acquiring supports and resources from friends and extended family members (e.g., grandparents who were available to watch the children).

Home–Community Environment: From our analysis of the Home–Community Environment domain, we learned that the housing situations of the 20 sample families were relatively stable. Members of households most often included the parents and children. Most families rented their home and sometimes moved every few years. We learned living conditions for families could be improved. Families described having mixed satisfaction with the quality and conditions of their homes, and only one third of families described living in a safe neighborhood. One third of families expressed a desire to move to better housing for the purpose of providing better living conditions for their children. However, there were barriers that prevented families from moving, such as challenges with applying for and using housing vouchers and finding affordable housing.

Lessons Learned and Next Steps

In 2024, AIR will continue to collect ethnography data to better understand how these families sustain their daily routines as they raise their children in Tulsa. The monthly interviews will continue until each family has participated in the ethnographic study for 2.5 years. Along with continuing to facilitate monthly interviews with ethnography families, the project team will create family profiles for each of the participating families and analyze data aligned with GKFF-BEST's interests.

Conclusion

We designed the BEST Study to be responsive to the requirements of a participatory and equity-focused evaluation that is durable even when policy and historical events occur. We will continue to actively seek out feedback and suggestions for improvement from BEST partners, community members, and the GKFF-BEST team. Three other components of the BEST Study are helping to make up for possible data limitations associated with the survey:

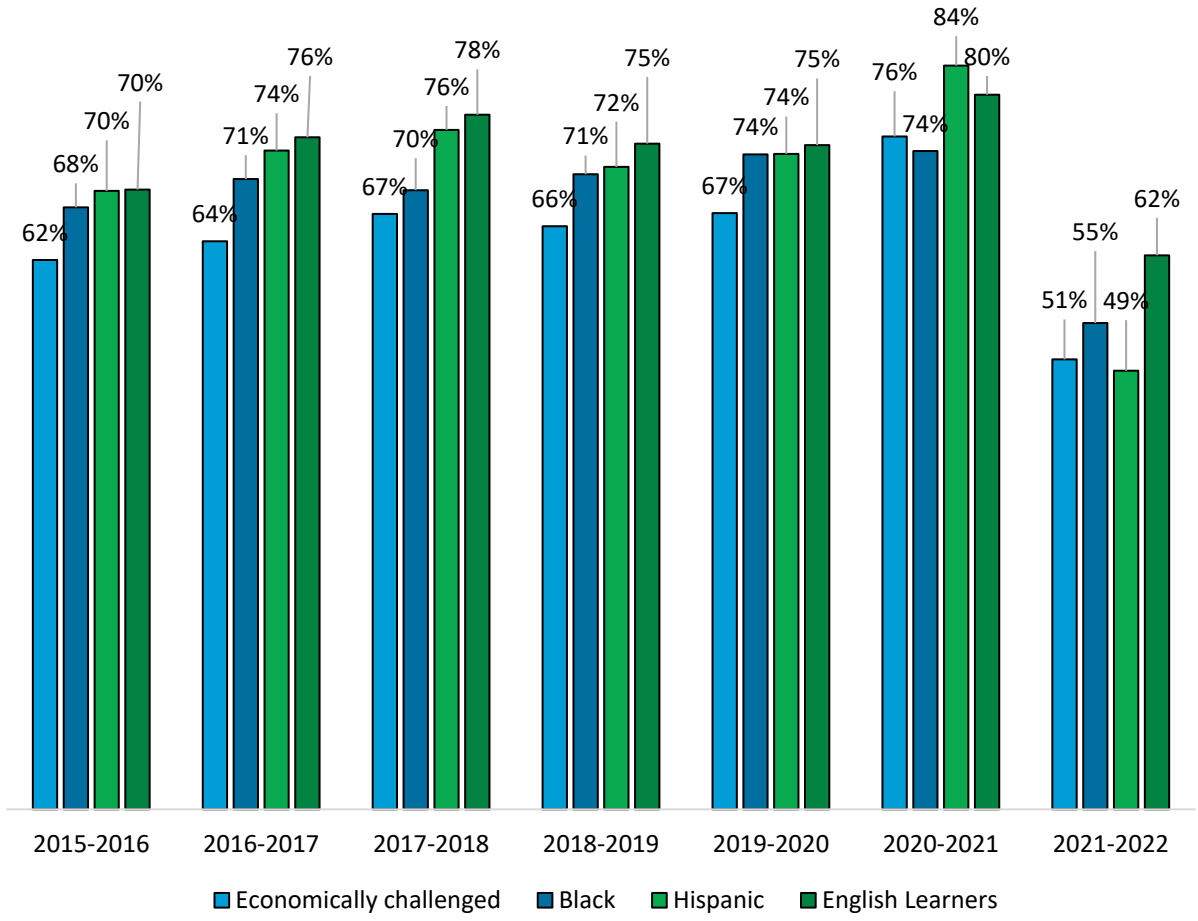
- The workforce survey in the **process study** continues to yield useful annual data on institutional and workforce changes among the BEST partners and in the larger Tulsa early childhood sector. The workforce survey is a great source of evidence on proximal system-level outcomes, which are an important part of the theory of change underlying the BEST initiative. Since the first administration of the workforce survey in 2020, the study team has purposely adapted this survey to capture change across time, from a panel of individuals in the Tulsa early childhood workforce (repeated observations) and cross-sectionally from a representative sample of staff members at service agencies across Tulsa.
- The **outcome/impact study's** efforts are increasingly focused on analyses of our cohort study data, and we continue analyses of new baseline measures using extant data. We have shifted away from using a multiple-city comparison design for our comparative interrupted time series (CITS) to focus on Oklahoma City. For the survey work, in particular, we will conduct representative analyses of the 18-month data of the Birth and Kindergarten Cohorts 1, which includes sampling and nonresponse weights; we will also focus analysis on key baseline constructs covered by the surveys.
- The **ethnography study** data collection efforts continue. The ethnography study provides in-depth longitudinal information about the experiences and outcomes of participating families, selected to broadly represent the Tulsa child–parent population. The complexities of families' lives that have been illuminated through this part of the study are critical to understand to inform BEST's ongoing efforts to coordinate services.

Evaluating a place-based initiative like BEST is challenging because the "intervention" is not precisely defined, the full range of outcomes is difficult to measure, and the communitywide, multistage growth of BEST eliminates the usual study designs that require a clearly identified "no-service" control group, which is preferred by (and familiar to) evaluators. The Tulsa BEST initiative focuses on improving the collaboration, coordination, and community leadership of dozens of partner organizations working in the birth-to-8 continuum. BEST aims to transform the service system; partner organizations are helping providers effectively collaborate with each other to create an integrated set of supports for young children and their families. The

success of BEST depends on the collaboration of many partners and the synergy resulting from such collaboration. Our BEST Study multiprong evaluation approach is critical to document and track impact at the child, family, partner, and community levels.

Appendix A. Additional Chart From Tulsa Public Schools (TPS) Analysis

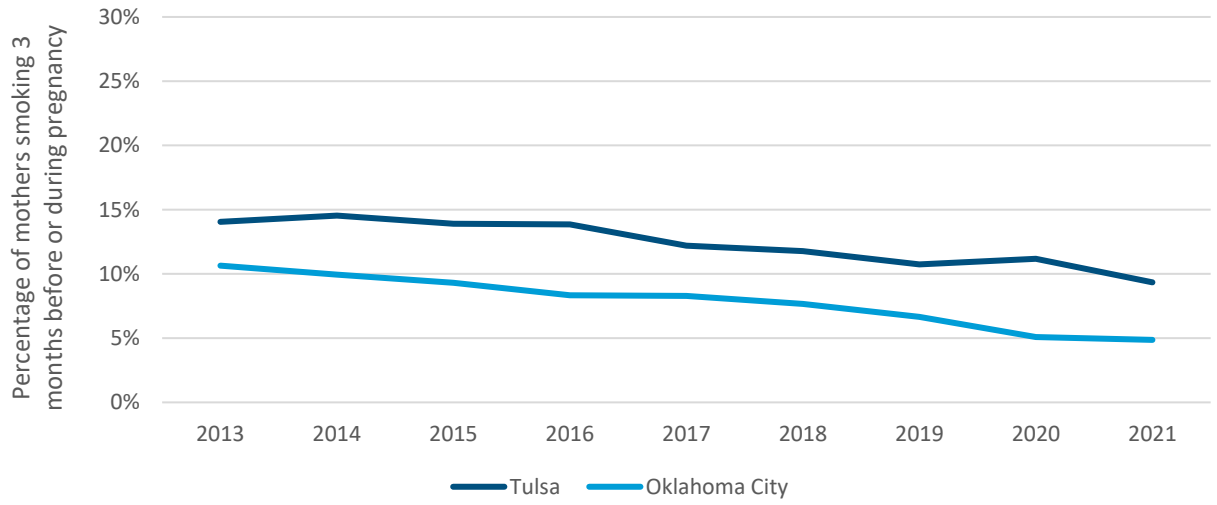
Exhibit A1. Proportion of TPS Kindergarten Students Who Attended Prekindergarten, Over Time, SYs 2015 to 2022



Note. Calculations by the American Institutes for Research based on TPS administrative records.

Appendix B. Graphs of Additional Baseline Trends in Maternal Health and Birth Outcomes

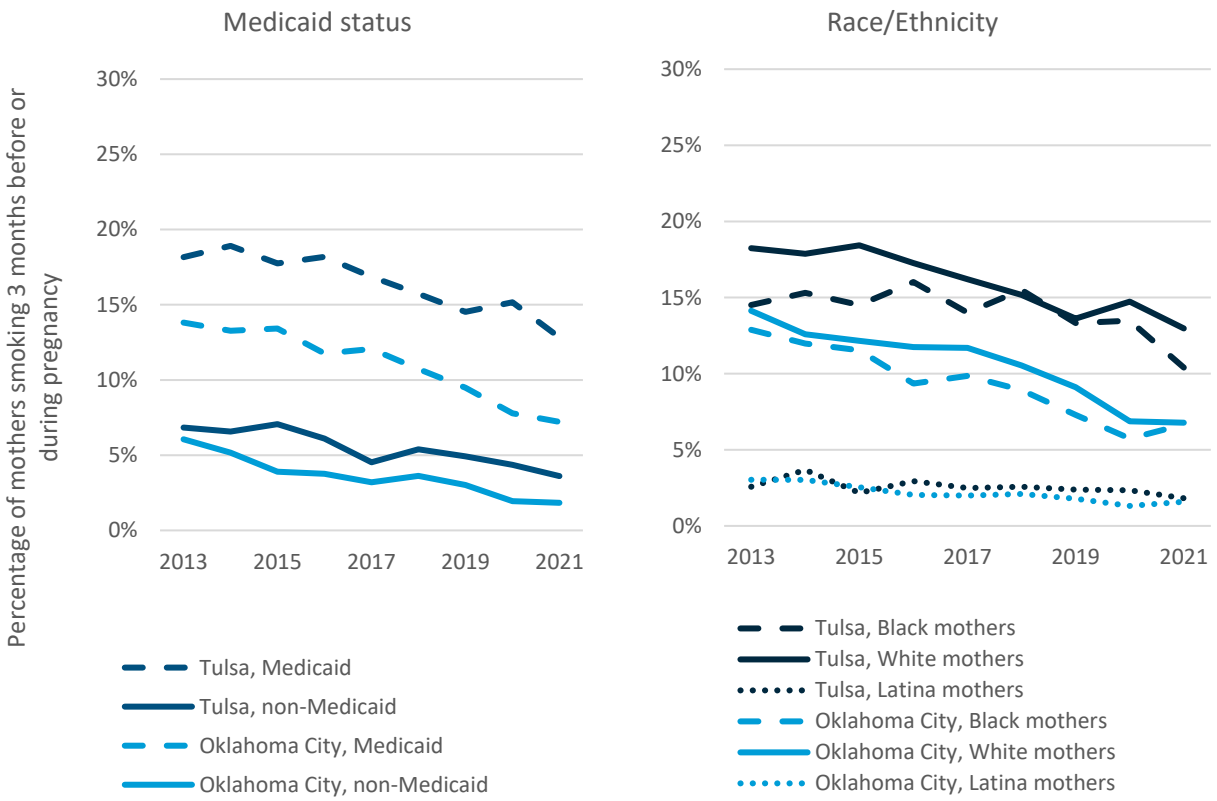
Exhibit B1. Percentage of Mothers Who Smoked 3 Months Before or During Pregnancy in Tulsa and Oklahoma City, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

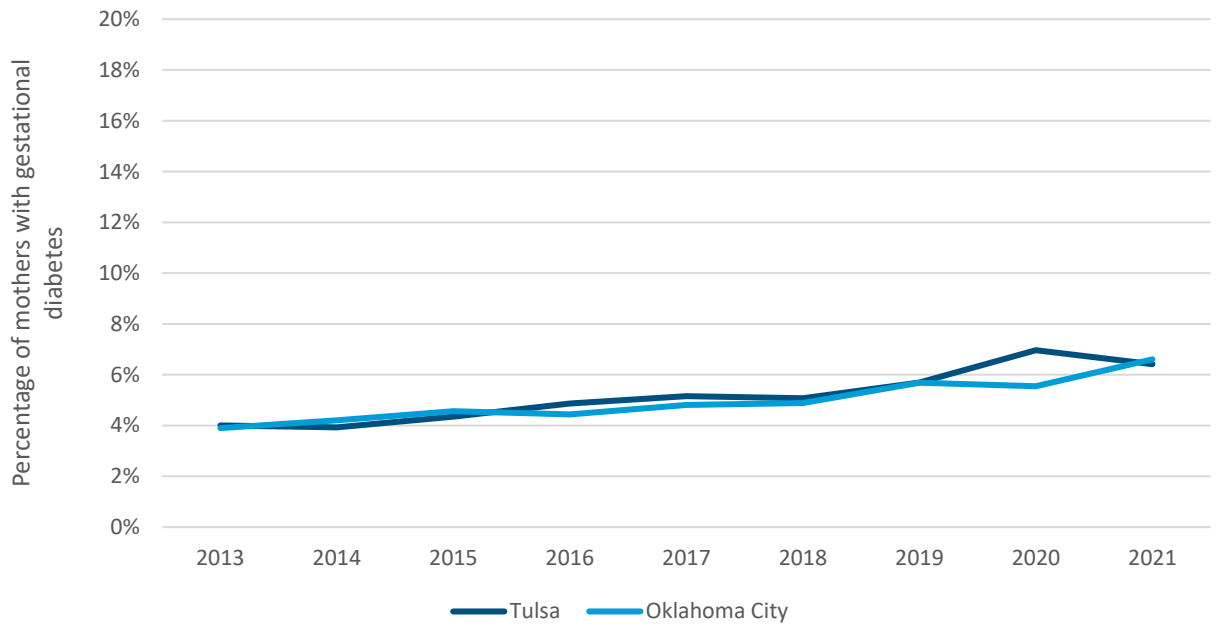
Exhibit B2. Percentage of Mothers Who Smoked 3 Months Before or During Pregnancy in Tulsa and Oklahoma City by Key Characteristics, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

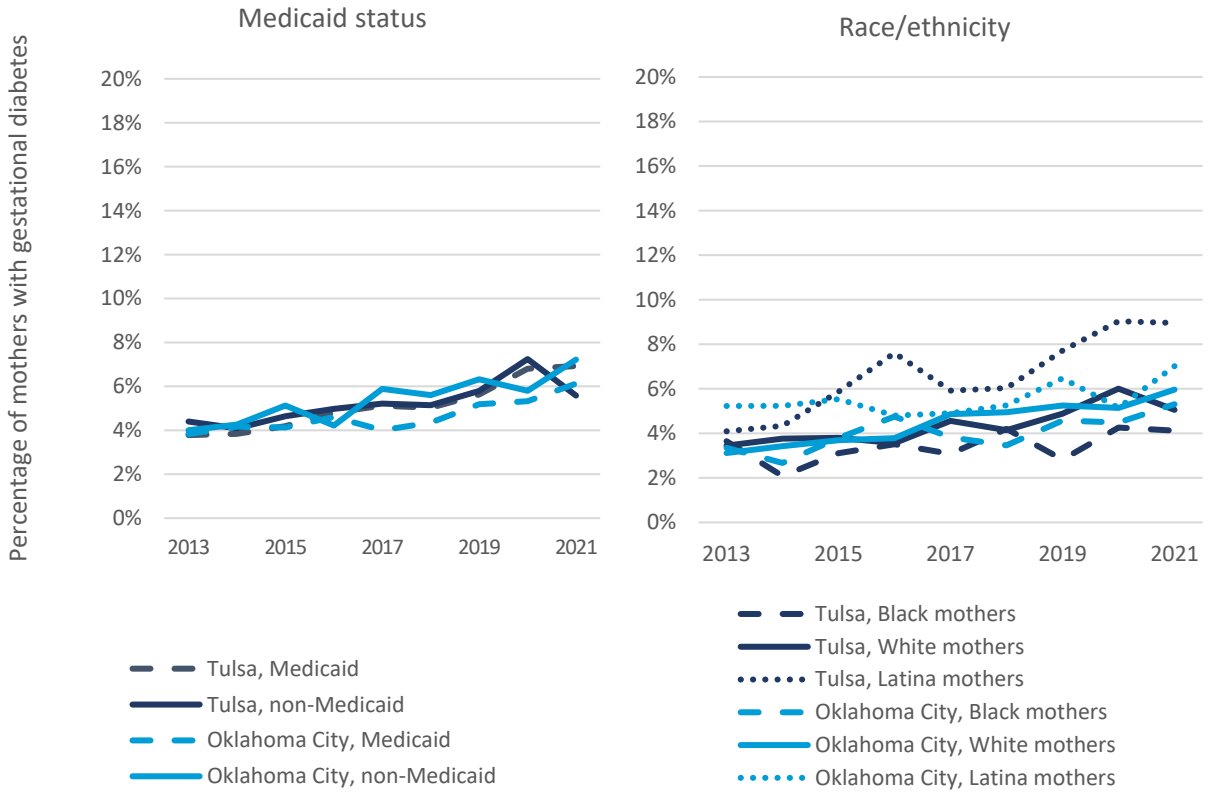
Exhibit B3. Percentage of Mothers With Gestational Diabetes in Tulsa and Oklahoma City, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

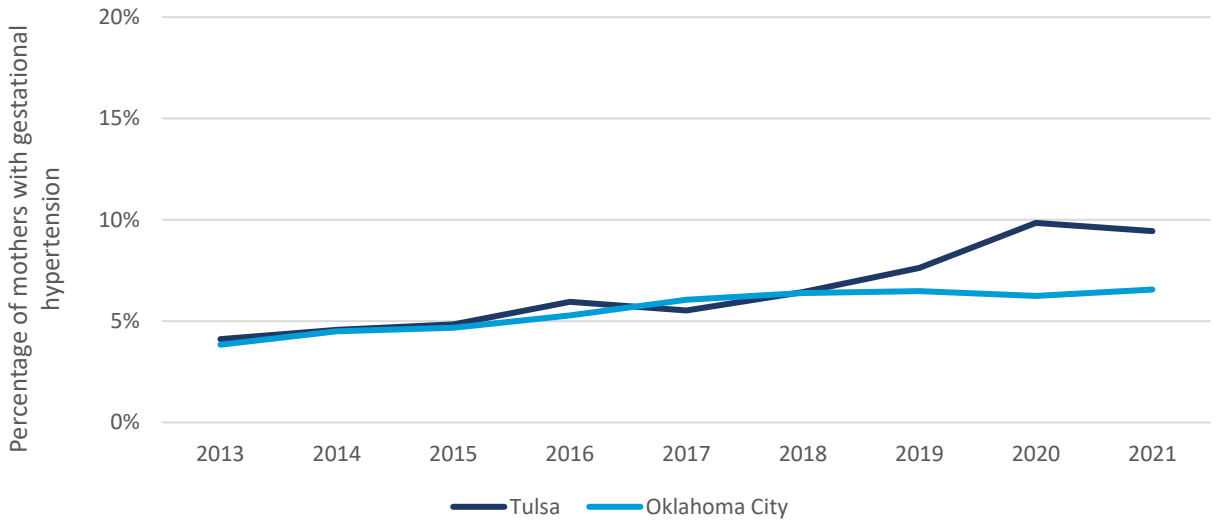
Exhibit B4. Percentage of Mothers With Gestational Diabetes in Tulsa and Oklahoma City by Key Characteristics, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

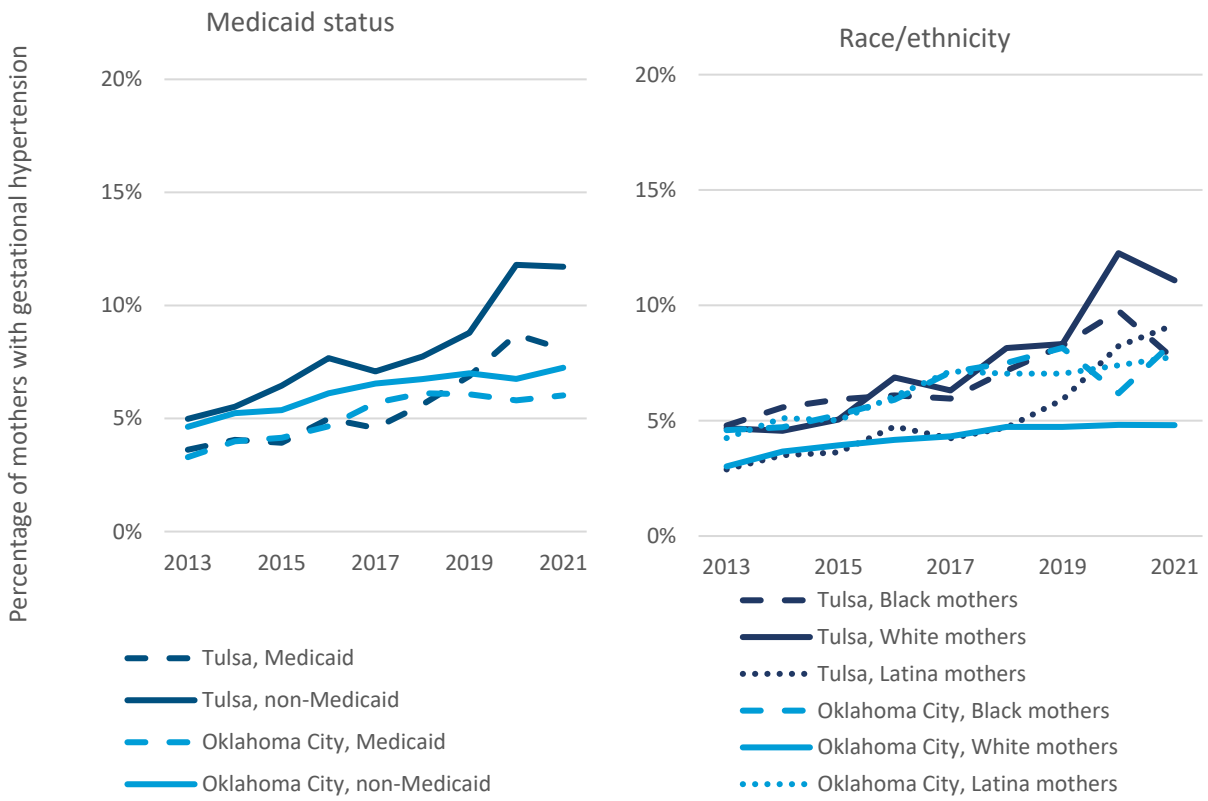
Exhibit B5. Percentage of Mothers With Gestational Hypertension in Tulsa and Oklahoma City, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

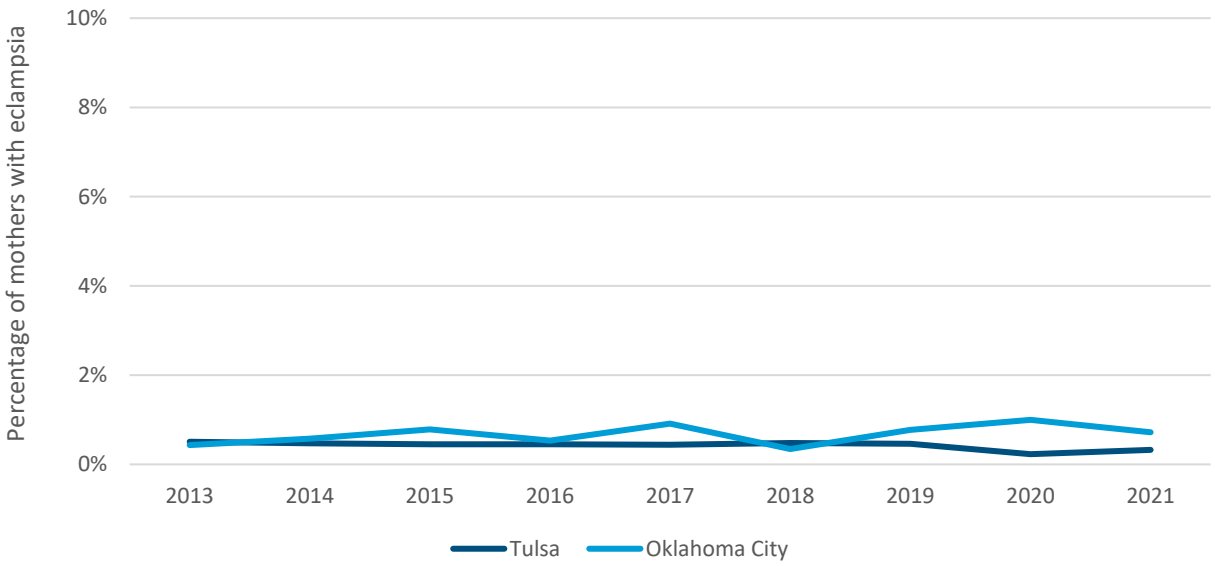
Exhibit B6. Percentage of Mothers With Gestational Hypertension in Tulsa and Oklahoma City by Key Characteristics, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

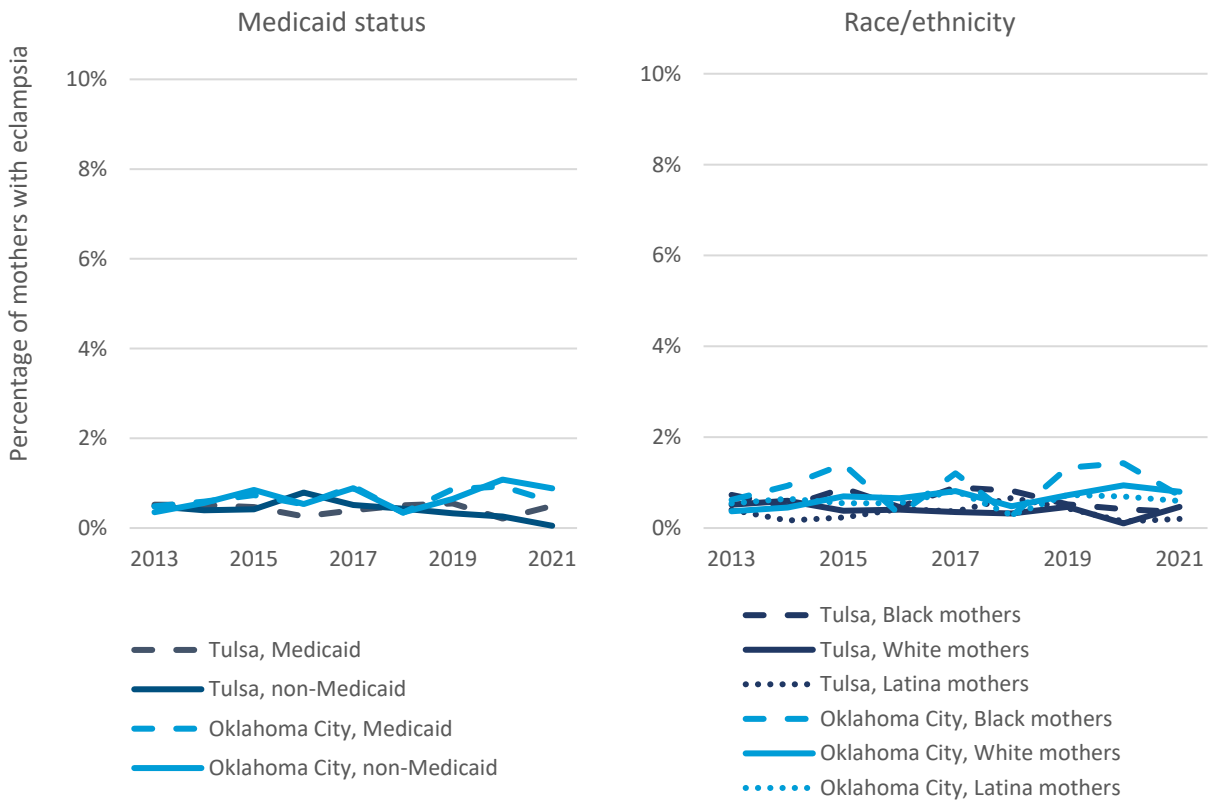
Exhibit B7. Percentage of Mothers With Eclampsia in Tulsa and Oklahoma City, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

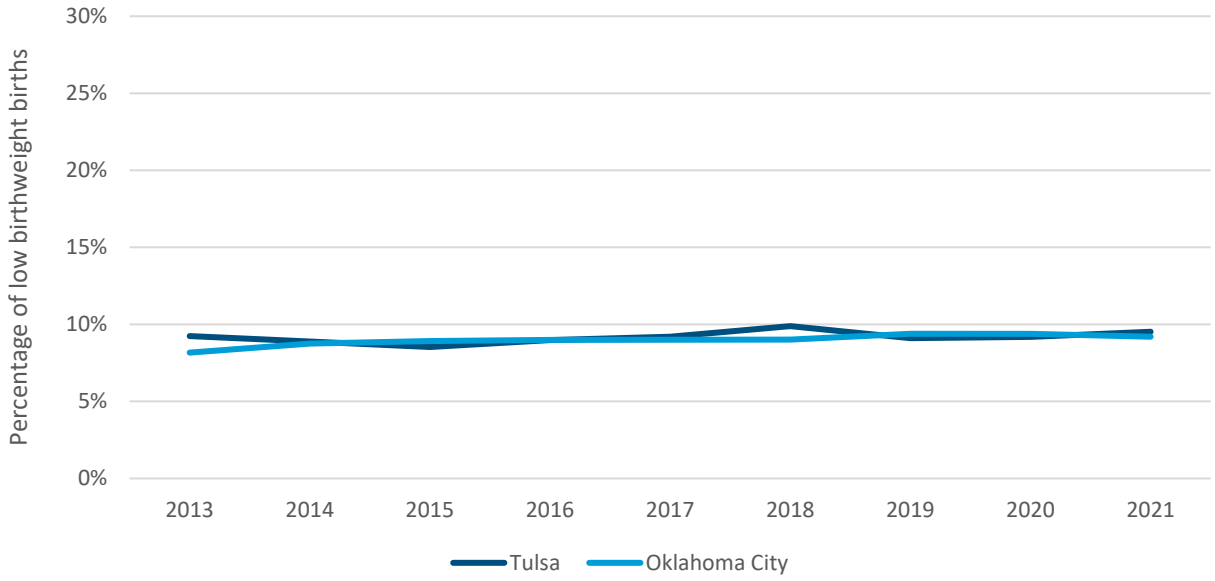
Exhibit B8. Percentage of Mothers with Eclampsia in Tulsa and Oklahoma City by Key Characteristics, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

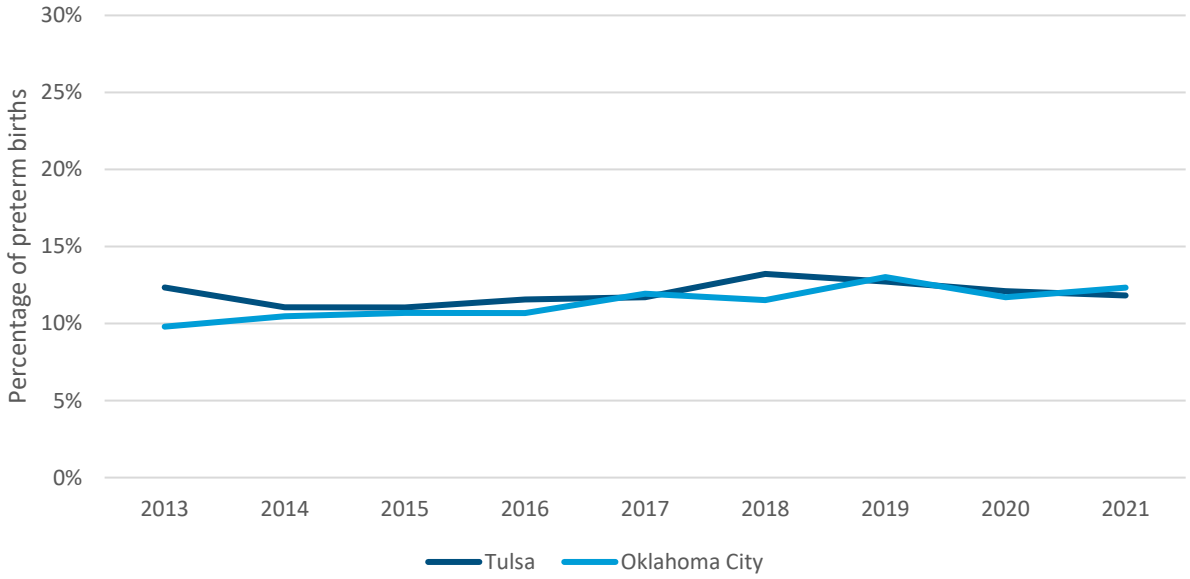
Exhibit B9. Percentage of Low Birthweight Births in Tulsa and Oklahoma City, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

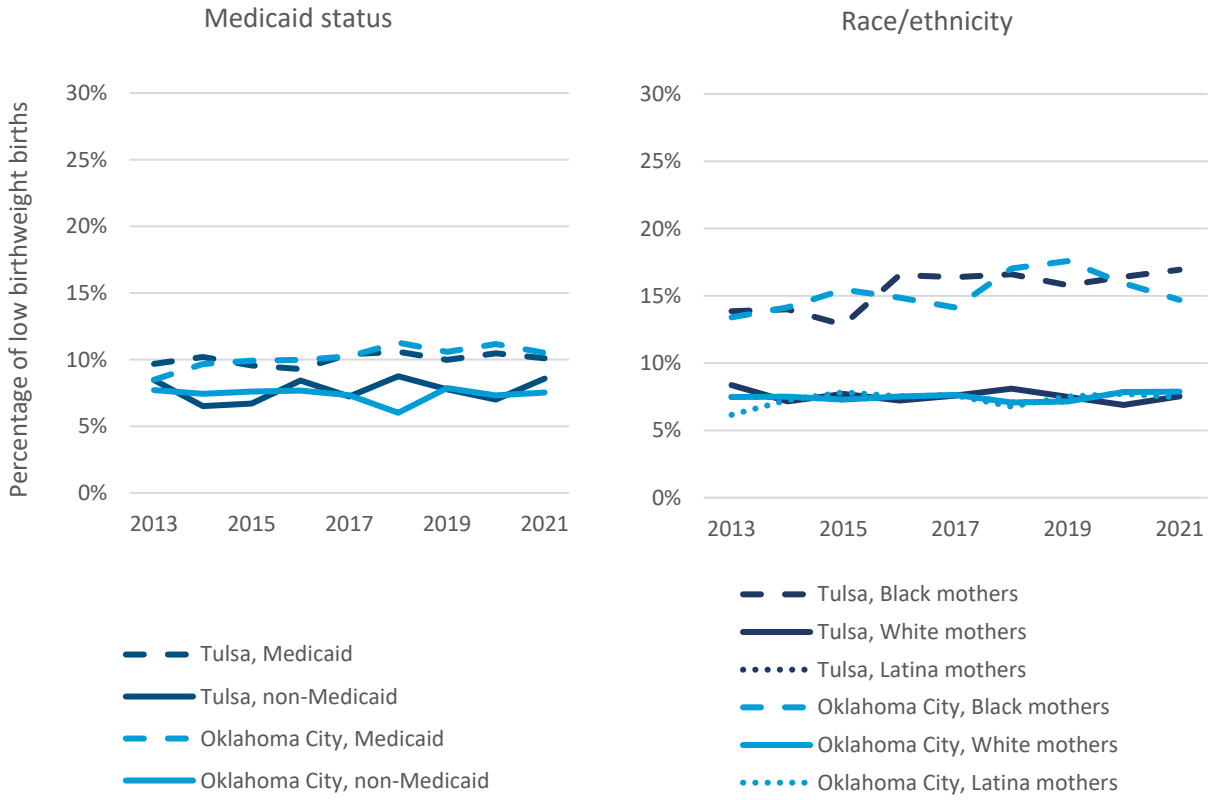
Exhibit B10. Percentage of Preterm Births in Tulsa and Oklahoma City, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

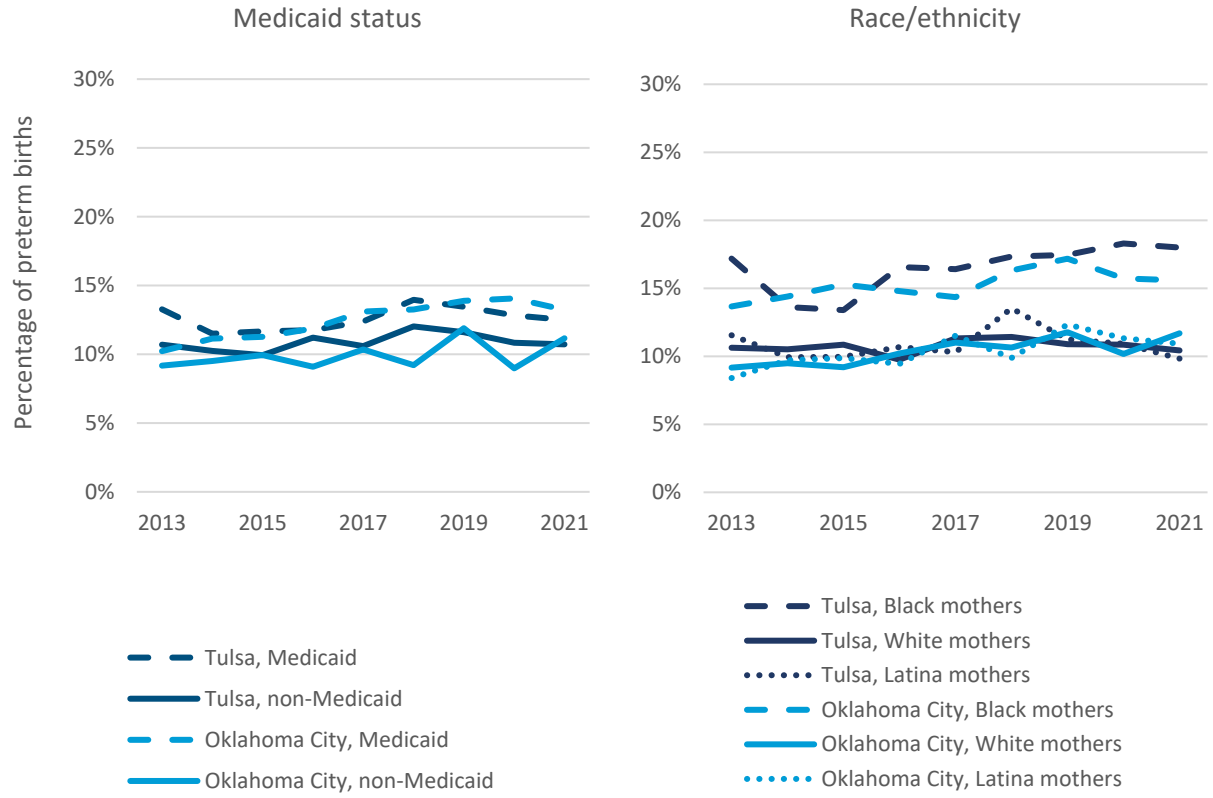
Exhibit B11. Percentage of Low Birthweight Births in Tulsa and Oklahoma City by Key Characteristics, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

Exhibit B12. Percentage of Preterm Births in Tulsa and Oklahoma City by Key Characteristics, 2013–2021



Note. Sample sizes ranged from 5,224 to 6,001 in Tulsa and 8,481 to 9,817 in Oklahoma City, depending on the year.

Source. Authors' analyses of State Department of Health Registering Oklahoma Vital Event Records.

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1400 Crystal Drive, 10th Floor
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