Visualizing Early Childhood Care and Education in Austin ISD

What types of early childhood care do AISD students receive prior to school entry?

To what extent are AISD students residentially mobile prior to school entry?

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**Project Overview**

The Early Childhood Care and Education project is the product of an innovative collaboration between Austin Independent School District’s Research and Evaluation Team and Children’s Optimal Health. As part of the federal Safe Schools/Healthy Students grant known locally as the Austin Community Collaboration to Enhance Student Success (ACCESS), the partners hope that the maps and related analyses are used to raise community awareness and inform action to improve early childhood supports for families with young children.

Children’s Optimal Health (COH) is a collective leadership initiative providing analysis of shared information to support accurate, data-driven decisions to ensure that all children become healthy, productive adults engaged in their communities. COH enables communities to visualize the health of their neighborhoods, identify assets and needs, unearth and nurture opportunities for collaborative change and monitor outcomes over time through GIS mapping and related analyses applied to public and privately held data sets.

When applying GIS to areas such as health, education, and social services the greatest need continues to be access to available, accurate information. This is especially true for young children. Very few large datasets exist for children between birth (hospital and birth record data) and school entry (school demographic, health, and academic data). Given the importance of the early childhood years for healthy physical and cognitive development, school readiness, and eventually academic achievement this lack of data is problematic for school districts, service providers as well as planners and policy makers. In order to address the information gap, AISD and COH under the ACCESS grant developed a survey that captured important information on early child care and residential mobility prior to school entry for AISD students. The resulting information was then displayed geographically along with other contextual maps giving viewers an in-depth look into the factors and issues influencing early childhood care and education.

**Why Focus on Early Childhood Care and Education?**

The first few years of life create either a strong or a fragile foundation for future learning, health and behavior. Texas has the fastest growing 0-5 year old population in the country, and the Central Texas growth rate is twice that of the state rate. Travis County is home to over 75,000 children under the age of 5. That population grew by 31% from 2000 to 2010, outpacing growth in the general population. In addition, the population of young children from low income families (at or below 200% of the federal poverty threshold) in Travis County increased 71% from 2000 to 2010, growing from 25,703 to 43,836 children. 24% of children under 5 years old in Travis County now live in poverty.

Children who start school healthy and ready to learn are more likely to succeed and less likely to develop behavioral or academic problems. Research confirms the importance of children’s early years for stimulating healthy development, which significantly affects school readiness. In Central Texas overall, **50% of children enter kindergarten school-ready. For low income children that figure is a mere 19%**. However, among low income children who attended a pre-kindergarten program (Pre-K), **42% entered kindergarten school ready**. Children from economically disadvantaged families who attended a public school Pre-K program had greater school readiness than those who were at home with a relative prior to school entry.

Prior to this study, our knowledge of the early care children receive has been largely limited to counts of children who participate in licensed care, particularly center-based care or public school Pre-K programs; and measures of the quality and child outcomes from those programs. It has been very difficult to identify concentrations of children who do not encounter these systems before entering Kindergarten.

This study can help educators better understand the backgrounds of the children they serve. It can assist health providers in leveraging neighborhood and educational settings to improve the health status of young children. And it can help
policy makers and program managers know which evidence-supported, effective interventions to implement, and where to place them in order to insure that all children enter Kindergarten healthy and ready to learn.

The Economics of Investing in Early Care and Education

According to the United Way of Greater Austin Success by 6, for every dollar spent on K–12 education, only 13.7 cents is spent on our youngest children, and investments in the first three years of life represent only 1 percent of this funding. In 2007, the Economic Policy Institute (EPI) released a report stating that high-quality early education would have an enormous impact on local, state, and federal budgets by reducing child abuse, welfare costs, crime, and remedial education. The EPI estimates that these annual benefits would surpass the program costs within six years, and ultimately, exceed the costs of the program by a ratio of 12 to 1. Depending on the intervention, the return on investment (ROI) for early childhood interventions ranges from $4.10 to $9.20.

Investing in early childhood health care also makes economic sense. A 2008 Johns Hopkins study found that tobacco smoke exposure; unintentional injury, mental health problems and obesity all represent significant health threats to young children. The report lays out the costs to society of not taking an investment approach for prevention and early intervention in these health areas. Cost-benefit analyses yielded return rates as high as 12:1 for parental smoking cessation. Though such evaluative findings were not available for obesity in young children, the projections of improving nutrition and physical activity from a young age suggest huge economic impact through health cost savings over time. Safety campaigns with the aim to promote better-engineered consumer products and safe environments are credited with a 50% reduction in deaths of children 0–9 from 1979-1998, and are a key tool in reducing the billions in medical costs and lost productivity due to preventable injuries to young children. The causes of children’s mental health problems are varied and complex. Interventions that address improved parenting skills and those targeting multiple risk factors were found to be more effective, as were those targeting both parents and children. These four areas lend themselves to collaboration between early education and health professionals.

References

Harvard University Center on the Developing Child. (2007). The science of early childhood development: Closing the gap between what we know and what we do.


U.S. Census Bureau, 2010 Census.


U.S. Census Bureau, 2006-2010 American Community Survey.


United Way Success by 6 2012-2015 School Readiness Action Plan

Pre-K Survey Methodology

The Pre-K survey was developed by AISD’s Research and Evaluation team in partnership with Children’s Optimal Health. The survey was administered in both English and Spanish during November 2011. Through the cooperation of campus administration and classroom teachers, surveys were sent home to parents/guardians through the weekly communication folders. Data was manually entered by AISD Department of Research and Evaluation staff using grant resources. The goal of the survey was to capture basic information on the type of early childhood care and education a student received prior to school entry as well as the extent of residential mobility the family experienced. Survey results were linked to demographic data for the respondents by AISD.

Kindergarten and Pre-Kindergarten Questionnaire

1. What type of child care has your student had on a regular basis during the work day before this year? (In the table below, please indicate the type of care at each age level — infant, toddler, & preschooler. Select the setting used longest at each age.)

<table>
<thead>
<tr>
<th>Age of child</th>
<th>None — parent care only</th>
<th>Unpaid care (e.g., relative)</th>
<th>Paid, unlicensed care (e.g., friend, relative)</th>
<th>Licensed care in someone’s home</th>
<th>Licensed care in a center</th>
<th>Head Start</th>
<th>AISD Pre-K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant (less than 1 year)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>□</td>
<td>n/a</td>
</tr>
<tr>
<td>Infant/Toddler (1-2 years)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>□</td>
<td>n/a</td>
</tr>
<tr>
<td>Preschooler (3-5 years)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

2. In the last five years, how often has your child moved to a different home?

○ Never ○ 1 time ○ 2 times ○ 3 times ○ 4 times ○ 5 or more times

Pre-K Survey Methodology

There were 7,926 surveys returned, reflecting a 57% response rate. Returned surveys were found to be representative of the enrolled Pre-K and Kindergarten population across several variables including gender, ethnicity, economic disadvantage, language spoken at home, English language learner and Special Education status.
COH Young Children Studies

This publication is the third in a series by Children’s Optimal Health (COH) focusing on young children in the Austin area. The first was a descriptive study noting the dramatic growth in the population of young children and the changing demographics with respect to child poverty and English Language Learner status in Central Texas over the past decade.

The second publication was a collaboration between Children’s Optimal Health, United Way of Greater Austin and the UCLA Center for Healthier Children, Families and Communities. This study focused on primary data collection involving measures of early development for children in targeted low-income neighborhoods. Measurement tools included the Ages and Stages Questionnaire (ASQ) for children younger than 5 years old, and the Early Development Instrument (EDI) for Kindergarten students. This collaborative work provided clear evidence of early disparities in health and development among children in Austin area neighborhoods. Research indicates these early lags persist well into the school years. The second study supports the thesis that interventions to offset such disparities can be effectively targeted at the neighborhood level.

E3 Alliance has identified that roughly 1 in 2 children across Central Texas enter kindergarten school-ready. However, only 12% of economically disadvantaged young children enter school ready for learning.

This third study supports and enhances the earlier work. It represents another attempt to use primary data acquired through community partnership to better understand the early experiences of young children and their families. In this study, Children’s Optimal Health in partnership with Austin Independent School District looks at early care and educational experiences prior to school entry, as reported by family members. In addition, the phenomenon of family residential mobility is explored.

Structure of this Report

The first series of maps in this report represent demographic information for the families of the youngest students in AISD. These include the neighborhoods of residence for all young students and for survey respondents, ethnicity by neighborhood, concentrations of economically disadvantaged students, and language spoken at home. These maps, in themselves, are enlightening.

The demographic maps are followed by a series of maps based on family survey responses identifying the type of early care their young children receive. Knowing the importance of early learning, the maps are instructive of the limited access to high quality early learning experiences that so many families experience.

The type of child care used by families is followed by a literature review addressing the issue of residential mobility and its impact on school-aged children. Subsequent to the review are maps analyzing the residential mobility patterns of Austin families prior to the school entry of their Pre-K and Kindergarten-aged students.

The report concludes with a summary of collective action efforts to address the healthy early development and school readiness of Austin area children. These efforts are highlighted in the Success by 6 School Readiness Action Plan.
Observations: Students Enrolled in AISD Pre-K and Kindergarten

- This map represents 12,735 Pre-K and Kindergarten students enrolled in AISD during SY 11-12, based on Texas Education Agency PEIMS snapshot data.
- 7,926 Pre-K and Kinder student surveys were completed, representing 57% of all students enrolled at some point during the school year.
- Returned surveys represent 62% of students in the PEIMS snapshot data for SY 11-12.
Observations: Economically Disadvantaged Students Enrolled in Pre-K and Kinder

- This map represents 9,767 economically disadvantaged Pre-K and Kindergarten students enrolled in AISD during SY 11-12, based on Texas Education Agency PEIMS snapshot data.
- Economically disadvantaged means that students are eligible for free or reduced priced lunch.
- There are high concentrations of economically disadvantaged students near and east of I-35 and north of Highway 183.
- 76.5% of Pre-K and Kindergarten students enrolled in SY 11-12 were economically disadvantaged.
Observations: Survey Respondents

- This map represents 7,926 survey respondents.
- Comparing the map to the one on page 6, there appears to be good geographical representation of survey respondents.
Observations: Economically Disadvantaged Survey Respondents

- This map represents 5,928 economically disadvantaged survey respondents.
- Comparing the map to the one on page 7, there appears to be good geographical representation of economically disadvantaged survey respondents.
- Of surveys completed, 75% represented economically disadvantaged students.
Observations: Ethnicity of Survey Respondents

- These maps are based on survey respondents. Though they do not reflect the entire enrollment, they were found to be representative of the Pre-K and Kindergarten enrollment in AISD for SY 11-12.
- White students make up approximately 20% of the sample and are concentrated in west Austin along MOPAC.
Observations: Ethnicity of Survey Respondents

- Hispanic students make up approximately 67% of the sample and are concentrated along I-35.
- Other ethnicities make up approximately 13% of the sample.
- These percentages overall accurately reflect the AISD student population.
Observations: Language Spoken at Home by Survey Respondents

- English speaking Pre-K and Kindergarten students are found throughout the district.
- 52% (4,151 students) in the survey are English speaking.
- 46% (3,642 students) in the survey have limited English proficiency.
- 56 different languages spoken at home by the families of Pre-K and Kindergarten survey respondents.
Observations: Language Spoken at Home by Survey Respondents

- 43% of students in the survey are Spanish speaking.
- Concentrations of Spanish speaking students are located in Dove Springs and northern neighborhoods including St. John and in the Rundberg/Lamar area.
- This map can help efficiently allocate Spanish speaking services, adult education courses, etc.
Measuring School Readiness

Healthy child development and access to high quality early learning environments equip children to be school ready by Kindergarten entry. The E³ Alliance conducted an evaluation of the school readiness of Central Texas Kindergartners in 2010. Nearly 1,000 Kindergartners from 59 classrooms across 7 school districts and 1 charter school were assessed. Students were assessed using the Central Texas Guide to School Readiness. Four domains were assessed:

- Social and Emotional Development
- Language and Communication
- Emerging Literacy
- Mathematics

The E³ study identified that overall, 52% of Central Texas Kindergartners begin school ready for classroom learning, but only 12% of economically disadvantaged students were school-ready. A collaborative study involving United Way of Greater Austin, the UCLA Center for Healthier Children, Families and Communities, Children’s Optimal Health, Any Baby Can and area WIC centers identified neighborhood concentrations of children who are vulnerable based on measures of early development and school readiness. Findings indicate that developmental differences can be observed at the neighborhood level as early as 18 months of age.

These findings highlight the importance of health, education, social service providers and local governments improving policies, operations and inter-organizational relationships to improve the opportunities for early outreach, screening and intervention for young children to insure they enter Kindergarten school-ready.

For additional information see Children’s Optimal Health (2011). Young children volume II - United Way Capital Area Success by 6 Partnership: Are there neighborhoods where very young children are identified with developmental vulnerabilities?

The E³ study found that when economically disadvantaged children participate in a Pre-K program, 42% enter Kindergarten school-ready. This finding is important for the current study, as we map by neighborhood of residence, the type of early care and education children experience before school entry.
The E³ study revealed that 63% of children attended an ISD Pre-K, 22% attended another Pre-K, while 15% did not participate prior to Kindergarten. Finally, the E³ study reflected the importance of full day Pre-K for increasing utilization.

In an additional related study, the Austin Independent School District (AISD) found that AISD’s Pre-K program helped raise Pre-K student’s academic performance to the average range of their national peers. In the Fall of 2011 AISD Pre-K students were 1 standard deviation behind their national peers, but by the Spring of 2012, more than 50% of AISD Pre-K students were performing above the national average. Students gained 12-18 months of growth for their age group in a 7 month period.
Observations: Type of Early Care-Center Based

- 17% of respondents identified that their children received paid center-based care as infants/toddlers.
- The survey did not explore whether paid care was subsidized for economically disadvantaged children.
- There are few neighborhood concentrations that can be identified.
- Most of the identified clusters are located west of I-35.
Observations: Type of Early Care-Center Base

- 28% of respondents identified that their children received paid center-based care as pre-schoolers.
- The survey did not explore whether paid care was subsidized for economically disadvantaged children.
- Most of the neighborhood clusters that can be identified are west of I 35.
Observations: Type of Early Care-Paid Home-Based

- Families report that 15% of children had paid home-based care as infants/toddlers, and 10% were in paid home-based care as preschoolers.
- Small concentrations of students receiving paid home-based care as toddlers/infants and preschoolers are located in north Austin neighborhoods near I-35 and 183.
- The majority of AISD students do not receive paid care, either center or home-based, prior to school entry.
Observations: Type of Early Care-Unpaid Family/Friend Care

- 64% of respondents identified that their children had unpaid care from family/friends as infants/toddlers.
- Neighborhood concentrations are identified throughout much of the District.
- There are prominent concentrations of students receiving unpaid care from family/friends as infants and toddlers east of I-35, near highway 290 and north of the intersections of highway 183 and I-35.
- This information can help identify strategies and target neighborhoods with programming to enhance the early health, literacy and school readiness skills for young children.
Observations: Type of Early Care-Unpaid Family/Friend Care

- 42% of respondents identified that their children had unpaid care from family/friends as preschoolers.
- There are prominent concentrations of students receiving unpaid care from family/friends as infants and toddlers east of I-35, near highway 290 and north of the intersections of highway 183 and I-35.
- This information can help identify strategies and target neighborhoods with programming to enhance the early health, literacy and school readiness skills for young children.
Do children eligible for free, full day Pre-K in AISD participate?

Knowing the value of Pre-K education in increasing school readiness for Kindergartners, and understanding that the majority of Austin area families do not access paid child care for their children prior to school entry, either as infants/toddlers or as preschoolers, a related question was: Does the community succeed in insuring that all students eligible for free full-day Pre-K in AISD enroll in the program? Students from economically disadvantaged families, English language learners, and children of military families qualify for free full-day Pre-K.

Spatial analysis was used to test the question. All economically disadvantaged Kindergartners enrolled in AISD in SY 11-12 were assessed to determine whether they had been enrolled in Pre-K the prior year.

Observations
- 1,067 economically disadvantaged Kindergarten students were identified who were not enrolled in Pre-K the prior school year. Students are mapped by neighborhood of residence.
- This constitutes 19% of the Pre-K enrollment. It is possible that some of the 1,067 students qualified as English language learners or children of military families without also being economically disadvantaged, though such students are known to be few. This was an acknowledged limitation of the methodology.
- It is possible that although there are clusters, these students may not have lived in the area during the prior year and consequently could not have accessed free Pre-K in AISD.
- Some clusters of students who could have benefitted from free Pre-K are identified, primarily in north and northeast Austin. These clusters are located in areas known for high residential mobility. Mobility status of these students is not known.
- The map can be used to identify neighborhoods where parent awareness campaigns to encourage enrollment for free Pre-K could be targeted to reduce the estimated 19% of qualifying students who might benefit from the program, but were not enrolled.
What is residential mobility and how does it impact child outcomes?

One of the major contributors to student mobility is residential mobility (i.e., moving from one home to another). Mobility may be strategic, reflecting upward mobility, or reactive to the costs of living. Campus mobility (changing schools during the school year) is often associated with residential mobility. Campus mobility can interrupt the child’s learning process as well as social connections.

Reactive mobility is particularly likely when housing costs are high relative to income. Families may move because (a) they cannot pay their rent and are evicted, (b) they are seeking a less expensive rent, (c) they are temporarily housed with family or friends, or (d) they are homeowners and their home has been foreclosed (Turner & Berube, 2009). In some instances, moves may be precipitated by redevelopment, condo conversions, or foreclosure of a rental property.

An expanding body of evidence shows that high rates of school mobility are linked to negative outcomes in multiple spheres of a student’s life. Mobility affects the academic performance and psychological well-being not only of mobile children, but also of teachers and other students, and affects the overall effectiveness of the school (Mueller & Tighe, 2007).

Much of the research in the area of student mobility has focused on academic outcomes, and substantial evidence for the associations between high student mobility and poor academic performance has been reported (Mueller & Tighe, 2007). Mobility affects the individual student’s educational experience, in terms of attendance, continuity of learning, and achievement (Family Housing Fund, 1998; Reynolds et al., 2009). Effects are particularly acute for students who move frequently: in an analysis of the academic performance of economically disadvantaged children in the Chicago public schools, children who changed schools three or more times during the elementary school years were nearly a year behind more stable children (Kerbow, Azcoita & Buell, 2003). Factors cited as potential contributors to the discrepancy include insufficient exposure to foundational concepts, improper ability grouping, and other gaps in instruction. Students who are highly mobile or homeless exhibit lower scores in math and reading than do children of similar economic and ethnic backgrounds whose housing is stable (Obradovic et al., 2009; Reynolds et al., 2009).

Not surprisingly, given the educational challenges they face, children who change schools several times are at heightened risk of dropping out (Ou & Reynolds, 2008). Importantly, associations between mobility and negative outcomes do not appear to be due solely to pre-existing family characteristics. Although highly mobile families tend to be among the most fragile families, even when compared to other low-income families, mobility rates are important predictors of poor academic performance and higher drop-out rates above and beyond influences of family characteristics (Reynolds et al., 2009).

References


Early Childhood Care and Education in AISD

References, continued


What is the magnitude of residential mobility within AISD among families of Pre-K and Kindergarten students, prior to school entry?

Prior to this study, it has been very difficult to ascertain the extent of residential mobility experienced by families with very young children. Understanding the pattern of residential mobility prior to school entry could provide a mechanism for identifying vulnerable students as early as Pre-K to provide supportive services to help stabilize families and improve early student outcomes.

Residential mobility in this project was measured with a single question on the AISD Pre-K/Kindergarten Survey. Parents were asked how many times their child had moved in the past five years/prior to school entry. Although 32% of respondents reported no moves, 67% reported moving at least once and 40% reported moving two or more times. More than 700 children (9%) experienced 4 or more moves prior to school entry.

<table>
<thead>
<tr>
<th>Reported Residential Moves in Past 5 Years/Prior to School Entry</th>
<th>Count</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Moves</td>
<td>2457</td>
<td>32%</td>
</tr>
<tr>
<td>1 Move</td>
<td>2185</td>
<td>28%</td>
</tr>
<tr>
<td>2 Moves</td>
<td>1391</td>
<td>18%</td>
</tr>
<tr>
<td>3 Moves</td>
<td>946</td>
<td>12%</td>
</tr>
<tr>
<td>4 Moves</td>
<td>407</td>
<td>5%</td>
</tr>
<tr>
<td>5 or More Moves</td>
<td>306</td>
<td>4%</td>
</tr>
<tr>
<td>Total Responses</td>
<td>7692</td>
<td>100%</td>
</tr>
</tbody>
</table>

These findings suggest that the ability to identify, connect with and help stabilize the families of these most vulnerable students could have enormous lasting benefits for the children, their families, neighborhoods, and the Austin area.
Observations: Residential Stability Prior to School Entry

- 32% of respondents reported no moves in the last five years/prior to school entry. These students are represented in the above map.
- 28% of respondents reported one move in the last five years/prior to school entry.
Observations: High Residential Mobility Prior to School Entry

- 40% of respondents reported moving two or more times in the last five years/prior to school entry.
- This map represents 3,050 students who moved two or more times prior to school entry.
- Nearly 700 respondents reported moving 4 or more times prior to school entry.
- Concentrations of students who moved two or more times before starting school are identified in northern neighborhoods around I-35 and Highway 183. There is also a hotspot north of Ben White Blvd. east of I-35, and in the Dove Springs neighborhood.
Collective Action

The purpose of the maps and analysis produced by Children’s Optimal Health is to focus community action by providing information to support decisions on policy, operations, and systems improvements to promote the healthy development of all children in our community, and to monitor outcomes over time at the neighborhood level.

Improving Early Childhood Development and School Readiness

Over the last few years a number of community initiatives have coalesced in response to the rapid increase in the population of young children in Central Texas, and particularly to the increase in economically disadvantaged children. In 2008 the City of Austin, Travis County and United Way jointly established quarterly Early Childhood Stakeholders meetings to augment the work of the Early Childhood Council of the City of Austin. In 2010 an inter-organizational leadership group emerged from the stakeholders group, broadening focus beyond concerns of the child care industry to early childhood development and school readiness in general. It is known as the Results Based Planning Committee. Children’s Optimal Health is a participating member of this committee.

In 2012 a collective action initiative was articulated by the Results Based Planning Committee and published by the United Way for Greater Austin as the *Success by 6 School Readiness Action Plan 2012-2015*. It is a product of the efforts of early childhood advocates, experts, service providers, parents and business professionals. The plan consists of goals, strategies, tactics and indicator metrics. It has received the endorsement of elected officials and many community leaders. It is grounded in the formula that ready families + ready health, mental health and social services + ready communities = ready children. The results of this current mapping study were presented to the Early Childhood Stakeholders in October, 2012 in conjunction with the implementation of the School Readiness Action Plan.

Goals, strategies and metrics defined in the Success by 6 School Readiness Action Plan 2012-2015 can be found in the online report linked above.

Success By 6 Early Childhood Stakeholders Results Based Planning Committee

*Mary Alice Appleman*, KLRU
*Sue Carpenter*, United Way for Greater Austin
*Elaine Clark*, Capital Area Workforce Solutions Board
*Cindy Gamez*, Capital Area Workforce Solutions
*Cathy Doggett*, Region XIII Education Service Center
*Anna Lisa Fahrenhold*, Travis County Health and Human Services
*Kyle Holder*, City of Austin Early Childhood Council
*Ron Hubbard*, City of Austin Health and Human Services
*Dr. Aletha Huston*, City of Austin Early Childhood Council
*Laura Koenig*, E3 Alliance
*Dr. Ben Kramer*, KLRU
*Dr. Leah Meunier*, United Way for Greater Austin
*Larry Meyers*, Child, Inc.
*Dr. Susan Millea*, Children’s Optimal Health
*Meg Poag*, Central Texas Literacy Coalition

*Jacquie Porter*, Austin Independent School District
*Brook Son*, Travis County Health and Human Services
*Jessica Son*, Capital Area Workforce Solutions Board
*Dr. Linda Welsh*, Austin Community College
*Judy Willgren*, NACCRA
*Chantel Bottoms*, Community Action Network
**Map Legend Conversion**

Population densities are expressed as a count of individuals within a given area. For example, “12 taxable properties per acre” and “324 people per square mile” express densities of two different types of populations in appropriate areal units. Many of our maps show densities of various AISD sub-populations. Density in these maps is expressed in terms of the number of students residing within a 300 yard radius circle. Such an area is easy to visualize, is appropriately scaled to represent a “neighborhood,” and contains easily understood student counts between five and one hundred.

Since human population densities are often expressed as a count of individuals within a square mile, we provide a table to convert densities from “300 yard radius” units to square mile. As the table (see below) shows, a square mile has approximately 11 times the area of a 300 yard radius circle.

<table>
<thead>
<tr>
<th>Count in 300 yd radius</th>
<th>Square Mile Equivalent *</th>
<th>Count in 300 yd radius</th>
<th>Square Mile Equivalent *</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>30</td>
<td>329</td>
</tr>
<tr>
<td>5</td>
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<td>25</td>
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<td></td>
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</tr>
</tbody>
</table>

* Square mile equivalent is rounded to the nearest whole number

**Project Limitations**

The limitations of each data set may impact the way an individual map can be interpreted as well as the story a map appears to tell. For additional questions regarding specific datasets and limitations, please contact COH.

For the purposes of this map series, student level data was only obtained from AISD and not from any of the surrounding school districts. The AISD boundary is represented as the white (un-shaded) area in the maps. The area shaded in yellow represents areas that are covered by other local school districts. Because of this, COH cannot draw inferences for any of the areas outside of AISD and a lack of representation on the map does not necessarily represent a lack of need.

Visual correlations in the map do not represent causality; for more information about related research or possibilities for further research, please visit [www.childrensoptimalhealth.org](http://www.childrensoptimalhealth.org).

**Data Sources**

**Kindergarten and Pre-Kindergarten Questionnaire 2011-2012:** The AISD Pre-K survey was administered during school year 2011-12 to the parents of all kindergarten students. A response rate of 57% resulted in a representative sample of the overall AISD population for demographics. The survey can be found on page 4 of this report.

**Austin ISD Student Population and Demographics, 2011-12:** Student demographic data was based on the PEIMS 1 submission. This data pull is used by AISD to report enrollment statistics to the State of Texas Education Agency (TEA).
**COH Methodology**

Many Children’s Optimal Health (COH) maps display *density* distribution of some particular population of interest. Density maps show where high concentrations of the mapped population live. All COH density maps are rendered from raster datasets. Our GIS tool, ESRI’s ArcMap 10.0, supports a variety of ways to calculate and display density maps. We chose a methodology that we believe strikes a proper balance between accuracy and ease of interpretation while at the same time being HIPAA and FERPA compliant (i.e., without compromising individual privacy).

Spatial Analyst’s *Neighborhood Statistics* tool was used to create the population density maps. The density maps’ grid cells are squares representing an area equal to 100 yards by 100 yards. Neighborhood settings were set to a circle with a radius of 3 cells. The above parameters smoothed out the distribution of cell values to make the interpretation of hotspots easier to interpret visually, but retained enough locality to be meaningful at the neighborhood level. All density maps were categorized into deciles with the top 3 deciles symbolized as red, orange, and yellow (in descending order). The remaining deciles were symbolized in a grayscale with lighter shades representing lower deciles. The symbolization of deciles forms the consistent thread across all density maps. Thus, although density values may vary greatly from map to map, the red areas on a density map always represent the top decile’s density values. All pixels with values less than or equal to 5 were symbolized to “no color” to protect individual privacy.

To meet privacy-protection requirements of individuals’ data, residence location latitude and longitude values were randomly shifted anywhere from 100 to 300 feet. This shifting can introduce significant errors for density values at the cell level. But at the neighborhood level, for example for a one mile by one mile zone, a shift of up to 300 feet does not significantly alter the overall distribution of the population within the zone. However, it is important to remember that the density value of a specific cell can vary substantially from the cell’s true value due to the shifting algorithm used to protect privacy. Therefore, it is not appropriate to use density maps at a city block level.

For further information regarding the COH mapping methodology, contact Mohan Rao at mrao@childrensoptimalhealth.org.

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1 Decile: any one of nine numbers that divide a frequency distribution into 10 classes such that each contains the same number of individuals; **also**: any one of these 10 classes (source: Merriam-Webster).

**How to Get Involved**

The Austin community has many individuals and organizations who work cooperatively to assure that children have a healthy start to life. Still, our rapid demographic changes indicate that large numbers of children are vulnerable to having a poor start in life, and more effort is needed to assure their early success. If you are interested in gaining more information about the partners working to address these issues, please visit [www.childrensoptimalhealth.org](http://www.childrensoptimalhealth.org) or you can contact COH at (512) 324–5980.
About COH

Children’s Optimal Health is a collective leadership initiative that unites the efforts of Central Texas organizations in promoting community change to help our children reach a brighter future.

COH strives to give agencies and communities access to formerly proprietary data by using GIS mapping to illuminate issues involving Central Texas children. By layering data from multiple sources, COH can help communities visualize the health of their neighborhoods, identify assets and needs, and unearth opportunities for collaborative change.

Through a commitment to shared data, collaboration, and ongoing communication, Children’s Optimal Health is a collective leadership initiative to ensure that every child in Central Texas becomes a healthy, productive adult engaged in his or her community.

The goal of COH is to use visual images to inform policy, improve operations, promote research, and mobilize the community to better the lives of our children and youth.

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