REST & RESILIENCE

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ACKNOWLEDGEMENTS

CHILDREN AT RISK RESEARCH & PRODUCTION TEAM:

Sharon Watkins Jones, Director of Texas Racial Equity Collaborative, BA
Sharmily Roy, Director, Center for Social Measurement & Evaluation, SME, MPH
Julie Morris, Director of Media Activism, MPA
Sara Moran, Associate Director, Center for Social Measurement & Evaluation, MPP
Amna Ali, Health Advocacy Intern, BA
Amy Shuff, Data Communications Fellow, BA

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REST & RESILIENCE

Executive Summary

Sleep is essential to health and wellbeing throughout every stage of life, but getting adequate sleep is especially crucial during the growth stages of prenatal, infancy, childhood, and adolescence. The quality of our sleep influences physical health, cognitive development, and mental wellbeing. Sleep enables our brains to consolidate memories, helps grow and repair our muscles, aids emotional regulation, and supports our immune systems. As children grow, learn, and develop for long-term success, quality sleep is indispensable.

A "good night's sleep" is typically measured by sleep duration and quality. The recommended duration of sleep for a child varies depending on their age and physiological development needs. Sleep quality refers to uninterrupted sleep that goes through adequate cycles for restoration. The long-term mental and physical consequences of inadequate sleep are costly.

Despite sleep's importance, getting the recommended amount and quality of sleep is a challenge for most families. According to the National Survey of Children's Health, 34.9 percent of individuals between the ages of 4 months and 17 years received less sleep than recommended for their age group (Wheaton & Claussen, 2021). From early school start times, to bustling family lives, or attention-pulling screens, recommendations from pediatricians and sleep experts are often incongruent with the reality of children's lives.

A good night's sleep can feel like a distant dream for children growing up in poverty. Restful sleep can be hard to come by if you are going to bed hungry, sleeping in a temporary bed, or worried about your parent's income. Socioeconomic status and race are associated with sleep quality. Children of lower socioeconomic status have been found to experience less deep, slow wave sleep associated with memory consolidation and learning than their higher status peers (Tomfohr et al. 2011). Education is often seen as a pathway out of poverty and our schools, food banks, shelters, churches, and other nonprofits regularly rally to address children's needs in the classroom. Unfortunately, poor quality sleep has the potential to take away from these admirable efforts.

Sleep is a basic need. By identifying childhood sleep disparities and supporting stakeholders to address these needs, we can provide children with the rest and resiliency they need to succeed, no matter their family's income status. This report explores the current research on sleep and child development, the intersections between childhood poverty and quality sleep, and where sleep inequity may be of most concern. Recommendations for both parents and policymakers are also provided.

CHILDHOOD SLEEP NEEDS

Inadequate sleep can affect child development at every stage of life. The consequences of inadequate sleep are felt differently by infants (under the age of 1), toddlers (age 1 to 2), preschoolers (ages 3 to 5), school-aged children (ages 6 to 12), and adolescents (ages 13 to 18) based on their unique sleep duration needs.

While there is some variation among researchers and experts as to the exact amount of sleep recommended for children based on their age, a multidisciplinary panel of experts in sleep medicine, pediatricians, and sleep science reviewed 864 publications and using their expert opinion, reached consensus (Hirshkowitz et al., 2015, Paruthi et al., 2016). They established that as children age, the amount of sleep they need for healthy growth and development decreases.

Figure 1. Recommended Sleep Duration by Age (Hirshkowitz et al., 2015)

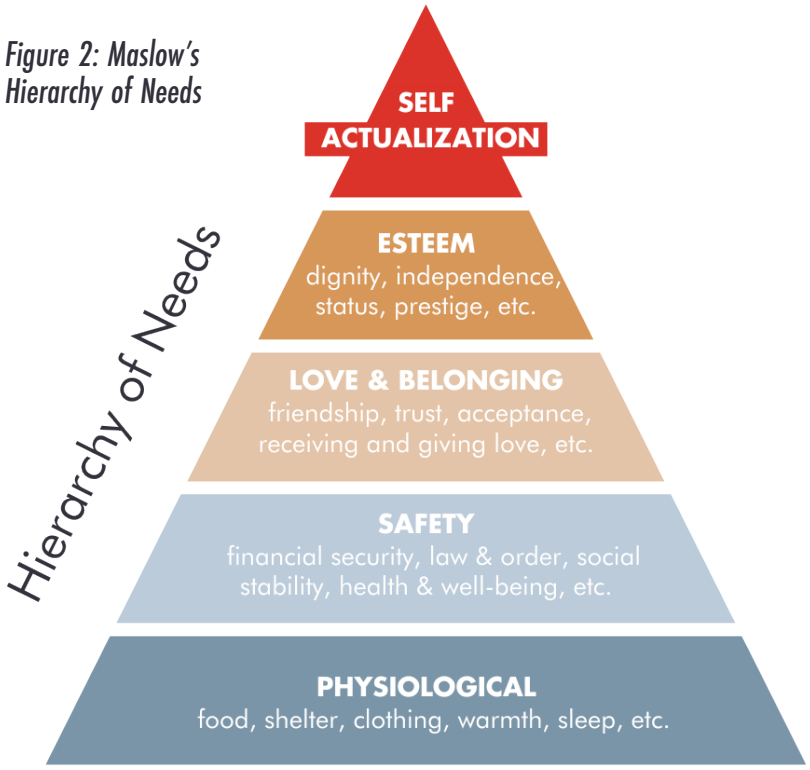
	Age Range	Recommended Hours of Sleep (per 24 hours)
Newborns	Below 3 months	14 to 17 hours
Infants	4 to 12 months	12 to 16 hours
Toddlers	1 to 2 years	11 to 14 hours
Preschoolers	3 to 5 years	10 to 13 hours
School-aged Children	6 to 12 years	9 to 12 hours
Teenagers	13 to 18 years	8 to 10 hours

While there may be agreement across the research community as to the amount of sleep children should be getting, the majority of children are getting far less shut-eye than the recommended standard. A study conducted by the Centers for Disease Control and Prevention (CDC) analyzed data from the 2016-2018 National Survey of Children's Health and found that approximately 34.9 percent of children across all age groups are consistently receiving insufficient sleep (Wheaton & Claussen, 2021). Adolescents are especially sleep deprived. According to a recent Youth Risk Behavior Survey, 72.7 percent of adolescent students receive less than the recommended 8 hours of sleep a night (Wheaton & Claussen, 2021). There is also mounting evidence that suggests children are sleeping less than previously. A meta-analysis conducted by the University of South Australia examined 690,747 children from 20 countries, including the United States and found that their amount of sleep decreased by 0.75 minutes per year over the last century (Matricciani et al., 2019).

Sleep as a Basic Need

Renowned psychologist Abraham Maslow first outlined the Hierarchy of Needs in his 1943 paper titled "Theory of Motivation." The Hierarchy of Needs consists of five tiers that describe various human needs and they are often displayed as hierarchical levels within a pyramid (McLeod, 2014). From the lowest level of the pyramid to the top, the hierarchy of needs includes physiological needs, safety needs, belongingness and love needs, esteem needs, and finally, self-actualization.

Figure 2: Maslow's Hierarchy of Needs



Physiological needs include elements that allow for basic human survival such as food, water, sex, clothing, warmth, shelter, a habitat, and sleep. Maslow argued that if an individual's physiological needs are not met, they will not be able to function properly or attain the needs described in the upper levels of the pyramid; thus, physiological needs were viewed by Maslow as the most important needs. Because sleep is defined as a physiological need, its importance cannot be overemphasized. Without adequate sleep, it is difficult for children to reach their full potential.

The CDC has declared insufficient sleep a "public health problem" (Chattu et al., 2018). In children, not getting enough sleep is associated with long-term consequences and lower health-related quality of life (Medic et al., 2017). Childhood and adolescence is a critical time period marked by rapid growth and development and sleep plays a key role in allowing these processes to occur (Medic et al., 2017).

Sleep, Learning, & Brain Development

In infancy, sleep is critical for brain development and language acquisition. Sleep allows for the development of the the brain: pons, brainstem, hippocampus, and midbrain, and it also encourages synaptogenesis (Tarullo et al., 2011). Neonatal infants who had better sleep quality demonstrated higher test scores at 6 months of age on the Bayley Mental Developmental Index (Tham et al., 2017). Sleep in infancy is also important to vocabulary acquisition in later childhood (Seehagen et al., 2015). A study examining the role of sleep in language learning in infants and toddlers reported a positive correlation between the number of daytime naps and receptive vocabulary growth (Horváth & Plunkett, 2016).

Insufficient sleep, over time, during adolescence has the ability to impact the very structural makeup of the brain. A longitudinal study found that increased variability in sleep quantity in adolescents one year before imaging of the brain is associated with lower white matter integrity, which in turn impairs decision making (Telzer et al., 2015). Gray matter volume is also impacted by insufficient sleep, as reported by Taki and associates while analyzing the relationship between sleep quantity and hippocampal volume in children aged 5 to 18 (Taki et al., 2012). While controlling for age, sex, and intracranial volume, Taki et al. found a significant positive correlation between regional grey matter volume of the bilateral hippocampal body and

sleep duration. The bilateral hippocampal body is associated with the ability to process and encode episodic memory in addition to executive functioning and decision making. Similarly, Urrila et al. found that, among adolescents, later weekend bedtimes correlated with smaller brain gray matter volumes in frontal, anterior cingulate, and precuneus cortex regions, all three of which are areas of the brain that regulate mood, impulse control, and decision making (The IMAGEN consortium et al., 2017).

Sleep is essential to memory consolidation. One study conducted on 6-month and 12-month old infants found that those who took an extended nap (greater than or equal to 30 minutes) within 4 hours of learning novel information had significantly higher memory performance (Seehagen et al., 2015). Another study examining the effect of sleep on long-term memory of adolescents reported a 20.6 percent increase in declarative memory following sleep; this difference was significant compared to adolescents who did not receive sleep and completed the same declarative memory task (Al-Sharman & Siengsukon, 2013). Declarative memory is essential to a thorough comprehension of academic material and school curriculum, as it ensures that adolescents can process facts. Since insufficient sleep contributes to issues with encoding long-term memories and retrieval, it makes sense that it also correlates with poor academic performance.

Several studies have confirmed the association between inadequate sleep and poor performance in school.

Several studies have confirmed the association between inadequate sleep and poor performance in school (Maheshwari & Shaukat, 2019; Okano et al., 2019; Wheaton et al., 2016). According to Medic and colleagues, sleep loss negatively impacts procedural and declarative learning in children and adolescents which in turn affects neurocognitive and academic performance (2017). Daytime sleepiness in children can manifest in behavioral problems in the classroom, inability to pay attention, and falling asleep during class (Calhoun et al., 2012).

Sleep & Physical Health

In addition to being critical for brain development, sufficient sleep throughout adolescence may also reduce the risk of various chronic health issues and diseases later in life. In adults, insufficient sleep has been associated with 7 of the 15 leading causes of death in the United States, including cardiovascular disease (Chattu et al., 2018). In children, sleep plays a key role in allowing physical growth and development, and not getting enough sleep is associated with lower health-related quality of life with long-term consequences (Medic et al., 2017).

Stunted growth, unhealthy weight gain, and obesity in children and adolescents are most commonly associated with insufficient sleep in childhood. A study found that children who received less sleep at three months of age had shorter body length and higher BMI in later childhood (Zhou et al., 2015). A plethora of studies argue that consistently obtaining less than the recommended amount of sleep leads to increased feelings of hunger and decreased feelings of satiety and fullness; these neuroendocrine changes, in turn, increase the risk of children developing obesity (Beccuti & Pannain, 2011).

Consistently obtaining less than the recommended amount of sleep leads to increased feelings of hunger.

Sleep is also important in metabolism in children; more specifically, sleep quality and quantity influences the release of a number of hormones, some of which include growth hormone, cortisol, leptin, ghrelin, thyrotropin, and insulin (Beccuti & Pannain, 2011). Study conducted by Seegers et al. found that among children between the age of 10 and 13, receiving less than the recommended amount of sleep was associated with a 55 percent increase in being overweight (2011). Similar findings were reported in a cross-sectional study examining the relationship between insufficient sleep duration and obesity; a higher body mass index was significantly correlated with less than average sleep duration (Almulla & Zoubeidi, 2021).

Young infants are also vulnerable to sudden infant death syndrome (SIDS), the leading cause of death among the age group in the US. Although the exact physiological causes for SIDS are still being researched, a few factors are associated with higher risk. Parents and caregivers are encouraged to put infants to sleep on their backs. The risk for SIDS can be reduced by using a firm mattress and fitted sheet for babies starting at 4 months of age. Soft beddings and pillows can restrict breathing and suffocate a baby. Co-sleeping or bed sharing can also pose a similar risk of suffocation for young infants (Carlin & Moon, 2017; Goldberg et al., 2018).

Sleep, Behavior, & Mental Health

Insufficient sleep in childhood is also connected to a variety of social and emotional issues, from behavior in school, to mood and mental health. In infants there is a significant relationship between their regular sleep/wake patterns, emotional temperament, and social developmental scores (Ednick et al., 2009). Adequate sleep is also critical in moderating the association between routines and emotional regulation in toddlers (Bocknek et al., 2018). In toddlers, there is a positive correlation between increased daytime sleep (naps) and the ability to regulate emotions (Mindell et al., 2017). A study conducted by the Children's Hospital of Philadelphia found that toddlers with later bedtimes and less total sleep were more likely to demonstrate more symptoms of depression/withdrawal, separation anxiety, and inhibition (Mindell et al., 2017).

There is a clear bidirectional association between sufficient sleep and mental health of adolescents. In other words, adolescents who are diagnosed with certain mental health disorders are also found to have sleep disturbances and/or disorders, and adolescents who have sleep issues and/or disorders often develop mental health disorders. A longitudinal study examining 1,601 adolescents reported a positive correlation between

sleep duration and better subjective psychological well-being (Kalak, et al., 2014). A meta-analysis examining 73 studies all of which investigated the relationship between sleep duration and adolescent mood found that less sleep was associated with a 55 percent increase in the likelihood of mood deficits (Seegers et al., 2011). The strongest positive correlation was found between sleep duration and positive mood among other factors.

Furthermore, adolescents who develop comorbid mood disorders and sleep issues are at a particularly high-risk of suicide or to engage in self-harming behaviors. Adolescents with both mood and sleep disorders are also more resistant to treatment options, indicating that these individuals need additional support and personalized treatment plans.

There is a strong association between insufficient sleep and increased drug use among adolescents. A prospective study involving 6,504 adolescents from the National Study of Adolescent Health examined the relationship between poor sleep and substance-related issues (Wong et al., 2015). The researchers determined that sleep difficulties and decreased sleep quantity are significant predictors of alcohol-related interpersonal issues, binge drinking, driving while drunk, regretting sexual activities while consuming alcohol, and illicit drug use (Wong et al., 2015). Another prospective study involving 829 middle school students over four years found that shorter sleep duration and greater daytime sleepiness during the first year of the study increased the chances of consuming alcohol, engaging in heavy episodic drinking, and using marijuana in the last year of the study (Miller et al., 2017).

Short sleep durations increase the probability of risk-taking behavior in adolescents.

Short sleep durations also increase the probability of risk-taking behavior and accidents in adolescents. A meta-analysis that included 24 studies and 579,380 participants found that insufficient sleep is associated with a 1.43 times greater likelihood of partaking in risk-taking behavior some of which included alcohol use, drug use, risk-taking while driving, smoking, and sexual risk-taking (Short & Weber, 2018). Another study reported similar findings: unsafe practices while driving such as infrequent seat belt use, drinking while driving, texting while driving, and riding with a drink while driving were all more significantly likely to occur among adolescents who received less than 7 hours of sleep (Wheaton & Claussen, 2021).

Multiple studies support the linkage between insufficient sleep quality and quantity and increased behavioral issues such as oppositionality and rule-breaking behavior among school-aged children (Rubens et al., 2017; Turnbull et al., 2013). Additionally, recommended sleep duration is strongly positively associated with resilience and self-control in school-aged children (Hairston et al., 2016). A study examining 82 children between the ages of 7 and 13 found that increased total sleep time was positively associated with impulse control, fewer teacher-reported behavioral issues, and less child-reported conflict at home (Hairston et al., 2016). Children with sleep disorders were found to be two to three times more likely to display aggressive behaviors and engage in bullying (Chervin et al., 2003).

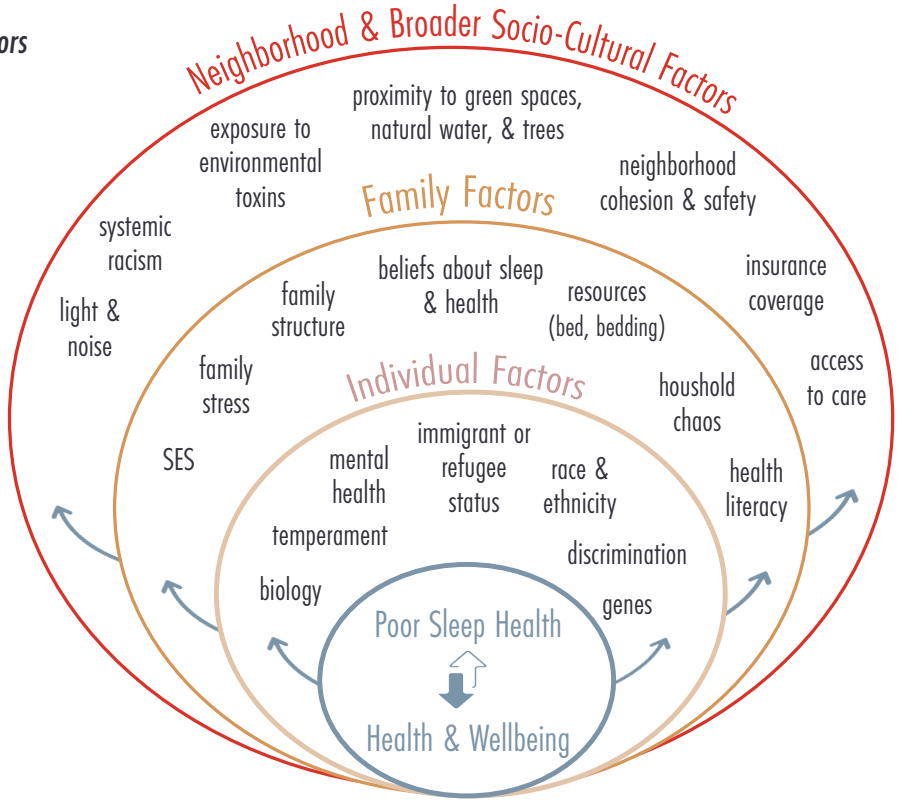
SOCIAL DETERMINANTS OF CHILD SLEEP

While there are research-backed practices parents can implement to support their child's sleep, it is important to acknowledge the barriers disadvantaged families face putting them into practice and added challenges that lead to child sleep disparities. For example, economically disadvantaged families are less likely to have the opportunity practice bedtime routines that allow for optimal parent-child interaction (Guglielmo et al., 2018). Low-income parents are more likely to work multiple jobs, have shift work, and be on-call, which can make it difficult for them to enforce consistent bedtimes or find time for bedtime activities, including language based activities such as singing and reading together.

In a study of 483 black and Hispanic 9-12-year-old children in an afterschool program open to low-income families in the Greater Houston area, most children slept about 8 hours, a much shorter duration than recommended for children at their young ages (Wong et al., 2013). Out of the 483 children, only 12 slept the recommended hours.

Family income isn't the only potential barrier to quality childhood sleep. Various socio- ecological factors can create added challenges to achieving the quality of sleep needed for adequate development (Billings et al., 2021). There are various neighborhood and environmental factors like light and noise pollution, crime and sense of safety, access to green spaces and grocery stores, or even the adverse effects of systemic racism that can affect sleep. There are also family and individual level factors such as family structure, immigration status, race, ethnicity, and resources for quality beds and bedding that can have an impact (Billings et al., 2021). Figure 4 below demonstrated the multiple levels and layers of social-ecological factors that contribute to disparities in sleep.

Figure 4: Social-ecological Factors and Sleep Disparities (Billings et al., 2021)



Neighborhood & Family Level Factors

Numerous adult sleep studies show a link between neighborhood disadvantage and sleep quality. In a study of about 500 individuals, controlling for socioeconomic status (SES), racial and ethnic differences in sleep was linked to their neighborhood (Fuller-Rowe, 2016). A study examining geocoded addresses found infants in more urbanized neighborhoods living closer to major roads, and highways had shorter sleep duration than those that did not (Bottino et al., 2012). Factors such as noise, air and light pollution played a role in the sleep duration of the infants in the study. Neighborhood segregation stemming from historically racist policies and laws also manifest in today's sleep disparities.

At the family level, SES, race, ethnicity, education, and household size often intersect or compound to affect sleep quality. A sleep study using CDC National Health and Nutrition data, found minority race and ethnicity, education, and income to be highly correlated with short and long sleep difficulties (Whinnery et al., 2014). In a study, consisting of 3,371 low-income 2-7-year-olds in low SES households, bedtime problematic behaviors and excessive daytime sleepiness was reported for all children (Mclaughlin-Crabtree et al., 2005). The children in these low SES households, on average, received less than the recommended hours of sleep, leading to chronic sleep loss (Mclaughlin-Crabtree et al., 2005).

Low maternal education, single-parent households, increased household size, and poverty were associated with decreased use of bedtime routines (Hale et al., 2011). African American children in the group had, on average, later bedtimes, and therefore, fewer hours of sleep compared to their white counterparts (Hale et al., 2011). There are also racial and ethnic disparities observed in patterns of sudden unexpected infant deaths (SUIDS), of which infant death due to SIDS is one component. Among the 3,400 babies whose deaths are attributed to SIDS, more than two times higher rates are observed among African American and Native American/American Indian babies (CDC, 2021).

Individual Level Factors

CHILD HUNGER AND NUTRITION

Diet plays a significant role in sleep quality. Food items that contain higher amounts of healthy carbohydrates and high levels of serotonin and melatonin are associated with improved sleep quantity and quality. Additionally, lower levels of tryptophan contribute to poor sleep quality. Unhealthy foods such as fast food, sugar-sweetened beverages, instant noodles, and confectionaries are also associated with lower sleep quality. The regularity of mealtimes is also a significant predictor of insufficient sleep; skipping breakfast and eating irregularly are both strongly associated with poor sleep (St-Onge et al., 2016).

There is a strong relationship between food insecurity in childhood and suboptimal sleep.

Similar findings were reported in a study conducted by Khan and colleagues in which 5,560 school-aged children and their parents were surveyed: longer sleep duration was significantly associated with better diet quality (Khan et al., 2015). Caffeine usage in children is also a significant predictor of sleep disturbances and subsequent daytime behavioral issues. A study involving 309 children between the ages of 8 and 12 found that the primary sources of caffeine in this age group are sodas, coffees and teas, and while the consumption of caffeine is small as compared to adults, there remains a significant association between caffeine and sleep issues, daytime sleepiness, and internalizing behaviors such as depressive symptoms (Watson et al., 2017). In adolescents, caffeine consumption was shown to impair deep sleep (Aepli et al., 2015)

There is also a strong relationship between food insecurity in childhood and suboptimal sleep quality. A cross-sectional study examining 362 low-income pre-school children and their caregivers found that food-insecure children were 2.25 times more likely to experience poor quality of sleep as compared to children who were not food-insecure (Na et al., 2020). While food insecurity is not a direct measure of hunger, children who live in food-insecure households are more likely to go to sleep worried, and hungry, which in turn affects their sleep quality.

Additionally, households that are food insecure are also less likely to implement a bedtime routine (Covington et al., 2019). In a study conducted by Covington and associates, there was a strong association between food insecurity and decreased utilization of a bedtime routine by mothers of toddlers. Without a regular bedtime routine, which usually provides a source of calm and comfort that signals to children that it is time for sleep, the toddlers were found to have more nighttime awakenings and sleep disturbances.

PARENTAL DEPRESSION AND ANXIETY

Children with mental health needs such as generalized depression, anxiety disorders, and other psychological conditions also suffer from sleep disorders. However, caretaker's mental health also affects children's sleep. Several studies link maternal depression and anxiety to sleep issues in infants and school-age children. In a study of 90 children and mothers from different income levels, maternal depression was linked with the onset and duration of sleep in school-age children, with the degree of mother's depression affecting the child's sleep negatively (de Jong et al., 2016).

Similar conclusions were made in a study examining longitudinal relationships between maternal mental health and infant sleep among 171 culturally and ethnically diverse families (Goldberg et al., 2013). At 12 months, maternal depressive and anxiety symptoms were positively correlated with more nighttime sleep issues. Additionally, persistent night-time waking, and other characteristics of poor sleep quality are strongly associated with maternal stress and depression.

USE OF SCREEN TIME

Screen time use among children of all ages is also associated with sleep quality (Guerrero et al., 2019; Kim et al., 2020; McManus et al., 2021). Spending a long time on screens, both before bed and throughout the day, as well as they maturity of the content have been found to result in sleep issues and behavioral challenges like anxiety and depression. On the positive side of the spectrum, high-quality and adequate sleep may also help counteract the negative health effects of too much screentime (Goldstone et al., 2019). Unfortunately, the children least likely get a goodnight's sleep, children of low-socioeconomic status, are also spending more time on screens.

Common Sense Media's latest census on media use by tweens and screens, estimated children from low-income families spent an average of 2 more hours a day on screens than their wealthier counterparts (Rideout & Robb 2019). Despite higher-income children having greater access to screens including smartphones, computers, tablets, gaming systems, and televisions, lower-income teens (ages 13-18) spent more than 8.5 hours each day on screens, compared with six hours and 49 minutes for their higher-income peers. Lower-income adolescents (ages 8-12) averaged six hours a day, compared with four hours for higher-income children of the same age range (Rideout & Robb 2019). This disparity in screen use may stem from children of lower socio-economic status having less access to other, more expensive, opportunities for learning or entertainment.

EXPERIENCE OF TRAUMATIC EVENTS

Adverse childhood experiences (ACEs) have also been found to affect childhood sleep quality and duration. ACEs are stressful or traumatic life events that occur during the first 18 years of life, such as emotional, physical, or sexual abuse, emotional or physical neglect, or other forms of family dysfunction. The psychological effects of ACEs have been found to continue into adulthood, including sleep disorders, depression, anxiety, other health effects such as hypertension, obesity, and affect the ability to maintain jobs and economic stability (Kajeepeta et al., 2015).

Refugee, asylee, and other immigrant children are at high risk for ACES. Many migrant children struggle with stress stemming from traumatic pre-migration experiences. They are also likely to experience uncertainty or anxiety during their journey, settlement, integration into new school, community, and country. These acute and prolonged stressors can easily lead to sleep challenges or result in sleep disorders (Richter, et al, 2020, Brownstein and Montgomery, 2013).

Large-scale traumatic events that affect whole communities have also been known to cause post-traumatic stress in children at lead to sleep disturbances. In a study of 191 Hurricane Katrina survivors ages 8 to 15, children's post-traumatic stress severity affected their sleep behavior (Brown et al., 2011). Younger children in this study feared sleeping alone, and symptoms were present through the three years of the study's follow-up period. The COVID-19 pandemic is another macro-event disrupting children's routines causing trauma. Prolonged duration of uncertainty and social isolation due to intermittent lockdowns, distancing and travel restrictions, and closure of schools and extracurricular activities continue to affect children and adolescents' stress, anxiety, physical activity, eating behaviors, and sleep patterns (Meherali et al., 2021; Sharma et al., 2021). Research is still on-going as to the full effects of the pandemic on childhood sleep quality.

CHILDHOOD SLEEP INSECURITY IN TEXAS

Decades of literature confirm sleep is fundamental to healthy growth and development in young children in conjunction with adequate nutrition and effective learning environments. Texas is a large and diverse state, with 1 in 10 US children residing in the state. Each region of Texas has its own mix of industries, racial and ethnic demographics, culture, and regional identity. Based on the variables and risk factors identified in our review of past research, as well as conversations with local family service providers, CHILDREN AT RISK sought to identify which Texas regions and communities are most likely to struggle with sleep insecurity. By mapping and studying regional data, we are better equipped to make recommendations for parents, community stakeholders, and policy makers to improve sleep outcomes for children statewide.

Methodology

During December 2021 and through January 2022, the CHILDREN AT RISK research team met with organizations providing health and social services for Texas children and families in a series of regional listening tours. These convenings, held virtually in six different metro areas: DFW, Austin, San Antonio, El Paso, and the Rio Grande Valley area, brought together 20-40 stakeholders in each region with 291 individuals participating in total. Both the input from these group discussions and our review of the literature informed CHILDREN AT RISK's choices on the variables and data included in our final Childhood Sleep Insecurity Index. Key themes from the listening tour and insights from providers are detailed in APPENDIX A.

DATA SOURCES

Open access and data from the US Census, TEA, CDC, and other resources was used for the mapping analysis. All analysis was done at the Zip Code Tabulation Area (ZCTA) level, and aggregated for county or school districts as needed. Files for the state of Texas 2020 Tiger/Line Shape were downloaded from the open access portal on the Census Bureau website for mapping. Analysis used data extraction tools for the US Census developed for R by Walker and Herman aggregated for ZCTA (n.d).

QGIS, an open source geographic information system, was used to generate the maps included in this report. The final sleep insecurity scores were imported into a geographic information system, matched to corresponding boundaries for ZCTAs in their respective communities and highlighted. These choropleth maps visually display the sleep insecurity between regions, and inequities observed within each region.

CHILDREN AT RISK SLEEP INSECURITY INDEX

Many of the factors identified in the literature review were validated during the listening tour. A model was developed to identify communities with higher risk for less sleep or poor quality of sleep. There are three components of the Sleep Insecurity Index: Low Socioeconomic Status, Sleep Environment, and Individual Level Factors.

The **Low Socioeconomic Status** component is made up of three American Community Survey (ACS) variables: total percentage that meet 200% poverty for families with children, percentage of household heads with high school as their highest educational attainment, and percentage of workers that are in one of the following industries: leisure and hospitality industries, transportation and utility industries, or wholesale and retail trade industries. These industries were specifically chosen because they are the most likely to work night shifts according to the Bureau of Labor Statistics.

Each variable was weighted equally and added together to create a Low Socioeconomic Status score with a higher score indicating higher risk of sleep insecurity in this category.

The **Sleep Environment** Component is made up of three variables from the ACS and TEA: percentage of households in the community that are considered crowded, student mobility rate, and student homelessness rate. For the purpose of this analysis, crowded means specifically more than one person per room or more. Room refers to all rooms in the home including living rooms, dining rooms, kitchens, bedrooms, finished recreation rooms, enclosed porches suitable for year-round use, and lodger's rooms.

Student mobility rate is the percentage of enrolled students that have changed schools during the school year. Homeless student data refers to the rate of enrolled students at a campus that a local education agency has identified as experiencing homelessness usually through a residency questionnaire given to students.

Each variable was weighted equally and added together to create the Sleep Environment score with a higher score indicating higher risk of sleep insecurity in this category.

The **Individual Factors** component consists of five variables from the ACS and CDC which included both adult and child factors.. The percentage of obese adults and percentage of adults that self-assessed as having poor mental health was pulled from the CDC Places data. The mental health variable is specifically measuring if the respondent over 18 years old rated their own mental health as not good for 14 days or more in the past 30 days).

ACS data included percentage of disabled children, percentage of youth (16 to 19 year old) that participated in the workforce during the last year, and the percentage of families with children that used the Supplemental Nutrition Assistance Program in the last year. The definition of disabled children include limitations with vision, hearing, cognitive, ambulatory, self-care or independent living difficulty.

Each variable added together to create the Individual Factor score with a higher score indicating higher risk of sleep insecurity in this category.

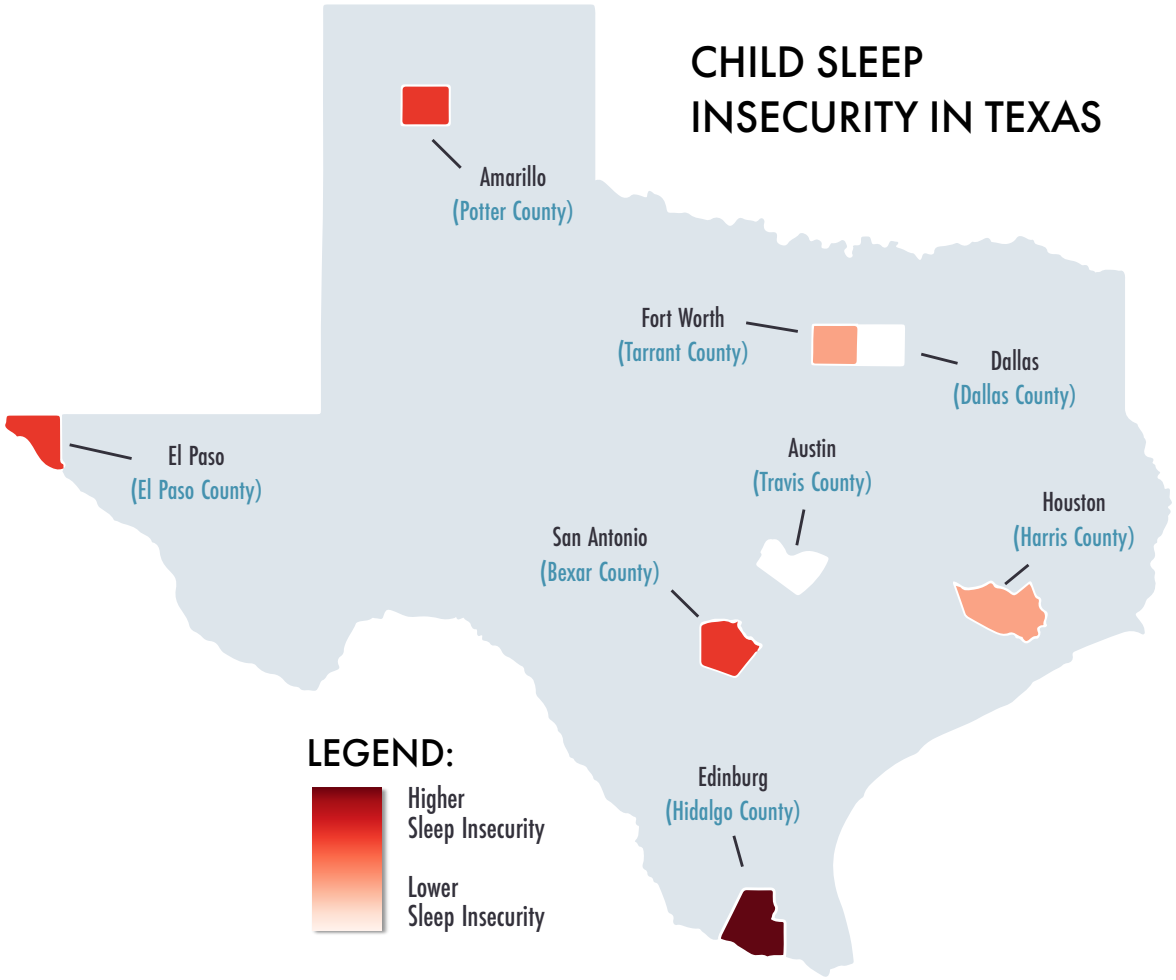
the Low Socioeconomic Status component, the Sleep Environment Component, and the Individual Factors component were weighted equally and added together to calculate the final Sleep Insecurity Score. The higher the Sleep Insecurity Score, the more social determinants of health that are associated with less sleep or less quality sleep are impacting children within that community. It is possible that a child in a high-risk community may get more and better sleep than a child in a low-risk community, but at the aggregate level children in high-risk communities face more barriers to achieving adequate sleep duration and quality. This model focuses on the aggregate impact of these barriers and social determinants on the children and families in these communities.

TEXAS | CHILD SLEEP INSECURITY

Sleep security for Texas was segmented into regions: Amarillo, Austin, Dallas, Ft Worth, El Paso, Houston, Edinburg (RGV), San Antonio. These eight communities were chosen for deep dive analyses due to CHILDREN AT RISK's history of working with these regions through previous research, statewide regional listening tours, and collaboration and advocacy work through the Texas Family Leadership Council.The data for many smaller communities was suppressed and not available.

Trends in sleep insecurity across regions as well as sleep inequities identified within regions will be discussed below. The purpose of these maps is to get a closer look and better understanding of the communities with highest sleep risk in the Texas regions examined. Across the state, the areas most at risk for sleep insecurity have considerably higher rates of low income families, higher rates of families that have used SNAP in the last year, as well as much lower educational attainment.

Out of all regions examined, Edinburg (in the Rio Grande Valley), Amarillo, and El Paso had the highest risk for Sleep Insecurity. The Austin area had the least risk for sleep insecurity – though there was some sleep risk inequity within the region. San Antonio, Houston, and Dallas had the most inequity in sleep risk – with higher risk areas on par with the highest risk regions but the regions as a whole having roughly the same level as the state average.



Hispanic and black children were disproportionally represented in the highest risk communities. Within the communities, there was a varied degree of sleep inequity, with large urban areas showing higher rates of sleep inequity within the community.

SLEEP INEQUITY:

The differential between high and low sleep security areas of each region showing inequity.

REGION	DIFFERENTIAL
Houston	30%
San Antonio	28%
Dallas	27%
Fort Worth	21%
El Paso	13%
Edinburg	9%

Notable Community Characteristics

Amarillo has the highest rate of homeless youth compared to all other regions. Amarillo tied for highest rates of night workers and percentage of household head with high school being the highest educational attainment compared with all other regions. All of these can impact access to sleep or quality of sleep.

Edinburg had the highest rates of SNAP recipients, the highest rates of crowding, highest rates of adult obesity, and the highest rates of families with children in the 200% of poverty threshold.

San Antonio had the highest rates of student mobility and the highest rates of youth in the workforce. San Antonio also had the second lowest rates of self-assessed poor mental health and the lowest rates of student homelessness compared to all other regions examined.

AMARILLO | CHILD SLEEP INSECURITY

Amarillo had the second highest rate of sleep insecurity compared with all other regions. High risk areas in this region are 6% higher in sleep insecurity risk than the sleep insecurity risk as a whole for the region. Amarillo has the highest rate of homeless youth compared to all other regions. Amarillo tied for highest rates of night workers and percentage of household head with high school being the highest educational attainment compared with all other regions. All of these can impact access to sleep or quality of sleep.

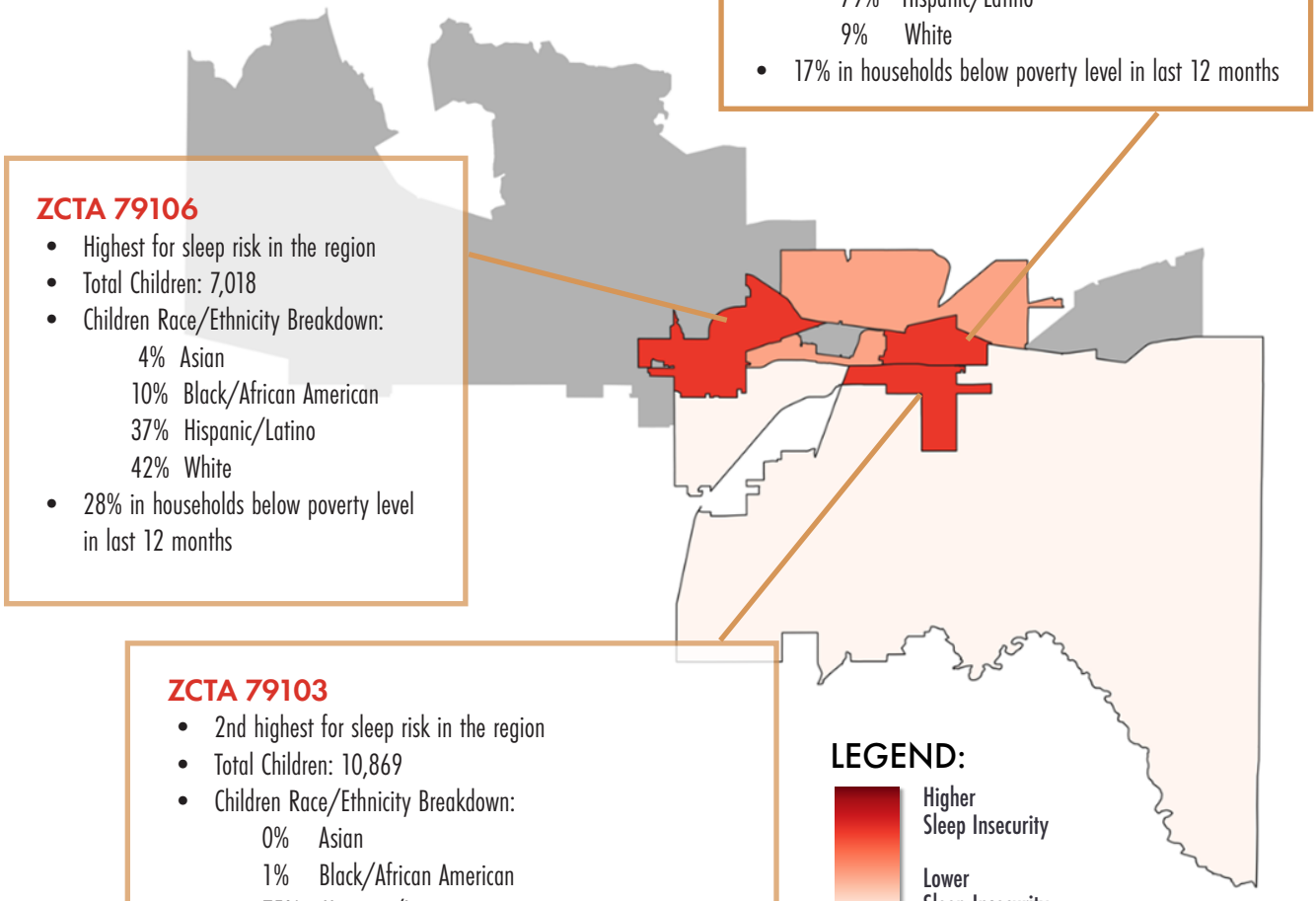
Child Demographics	*Amarillo*	*Texas*
Asian	6.6%	4%
Black	10%	12%
Hispanic	48.7%	49%
White	32.2%	32%

ZCTA 79104

- 3rd highest for sleep risk in the region
- Total Children: 7,019
- Children Race/Ethnicity Breakdown:
  - 2% Asian
  - 0% Black/African American
  - 79% Hispanic/Latino
  - 9% White
- 17% in households below poverty level in last 12 months

ZCTA 79106

- Highest for sleep risk in the region
- Total Children: 7,018
- Children Race/Ethnicity Breakdown:
  - 4% Asian
  - 10% Black/African American
  - 37% Hispanic/Latino
  - 42% White
- 28% in households below poverty level in last 12 months



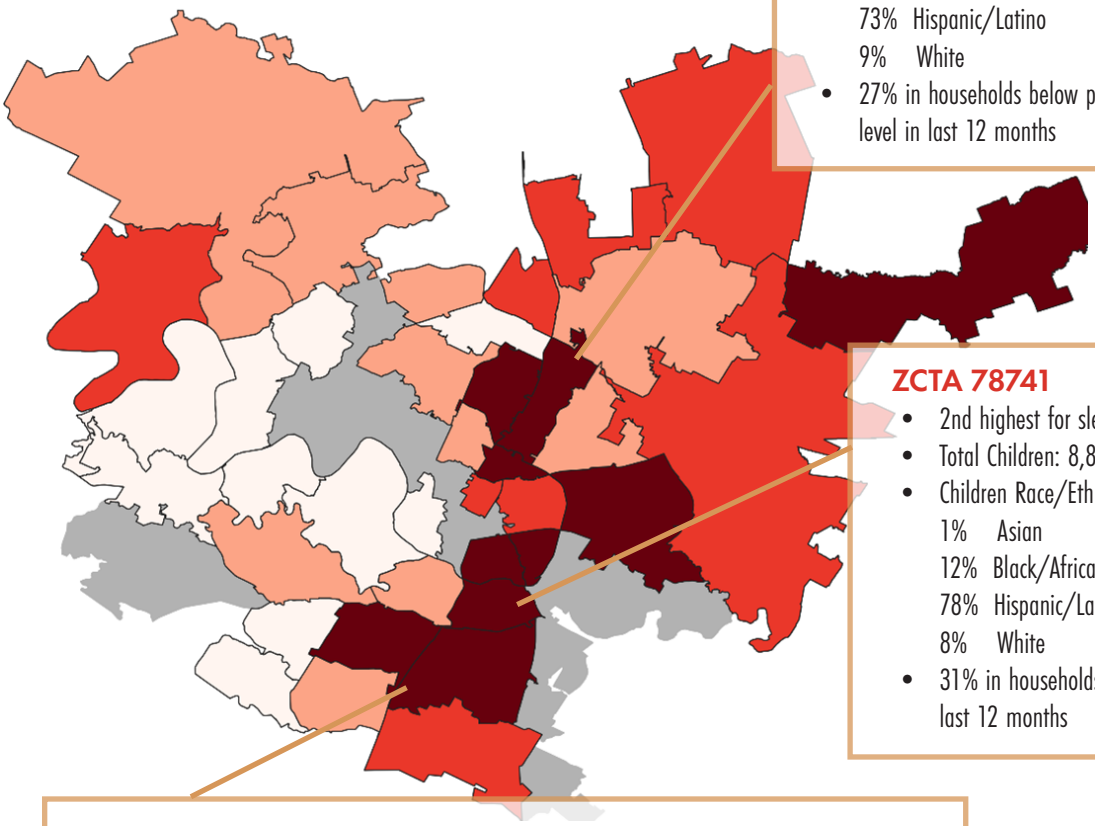
ZCTA 79103

- 2nd highest for sleep risk in the region
- Total Children: 10,869
- Children Race/Ethnicity Breakdown:
  - 0% Asian
  - 1% Black/African American
  - 75% Hispanic/Latino
  - 17% White
- 20% in households below poverty level in last 12 months

AUSTIN | CHILD SLEEP INSECURITY

Austin had the lowest rate of sleep insecurity compared with all other regions. High risk areas in this region are 25% higher in sleep insecurity risk than the sleep insecurity risk as a whole for the region. Austin is below the state average in each indicator for sleep insecurity except for Mobility rates and percentage of youth in the workforce which the Austin area has higher rates than the state average. Both of these can impact access to sleep or quality of sleep.

Child Demographics	*Austin*	*Texas*
Asian	6%	4%
Black	9%	12%
Hispanic	47%	49%
White	36%	32%



ZCTA 78753

- Highest for sleep risk in the region
- Total Children: 15,062
- Children Race/Ethnicity Breakdown:
  5% Asian
  10% Black/African American
  73% Hispanic/Latino
  9% White
- 27% in households below poverty level in last 12 months

ZCTA 78741

- 2nd highest for sleep risk in the region
- Total Children: 8,850
- Children Race/Ethnicity Breakdown:
  1% Asian
  12% Black/African American
  78% Hispanic/Latino
  8% White
- 31% in households below poverty level in last 12 months

ZCTA 78744

- 3rd highest for sleep risk in the region
- Total Children: 14,433
- 34% in households below poverty level in last 12 months
- Children Race/Ethnicity Breakdown:
  0% Asian
  8% Black/African American
  85% Hispanic/Latino
  6% White

LEGEND:

Higher Sleep Insecurity

Lower Sleep Insecurity

DALLAS | CHILD SLEEP INSECURITY

Dallas had the second lowest rate of sleep insecurity compared with all other regions. High risk areas in this region are 27% higher in sleep insecurity risk than the sleep insecurity risk as a whole for the region – meaning that there are some sleep inequities within the region. Dallas was on par or below the state average for most indicators of sleep insecurity with the one exception being percentage of youth in the workforce which is slightly above the state average. Houston tied with Dallas for the lowest rates of crowded housing environments.

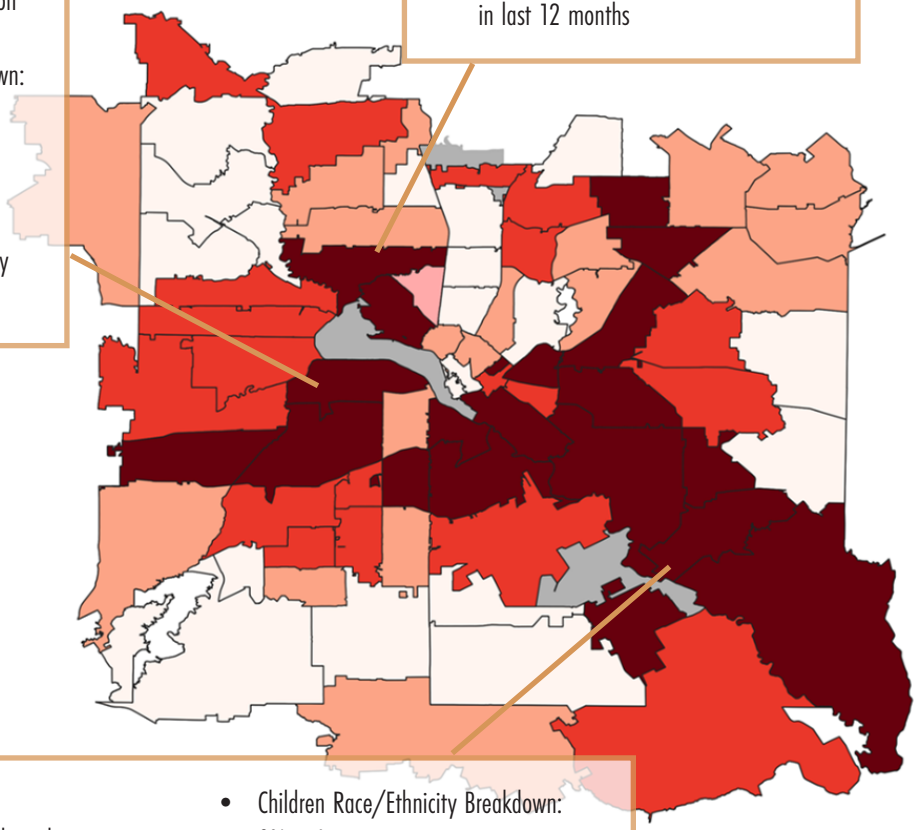
Child Demographics	*Dallas*	*Texas*
Asian	5%	4%
Black	22%	12%
Hispanic	53%	49%
White	17%	32%

ZCTA 75212

- Highest for sleep risk in the region
- Total Children: 8,080
- Children Race/Ethnicity Breakdown:
  1% Asian
  29% Black/African American
  55% Hispanic/Latino
  15% White
- 31% in households below poverty level in last 12 months

ZCTA 75220

- 2nd highest for sleep risk in the region
- Total Children: 11,972
- Children Race/Ethnicity Breakdown:
  0% Asian
  2% Black/African American
  37% Hispanic/Latino
  60% White
- 27% in households below poverty level in last 12 months



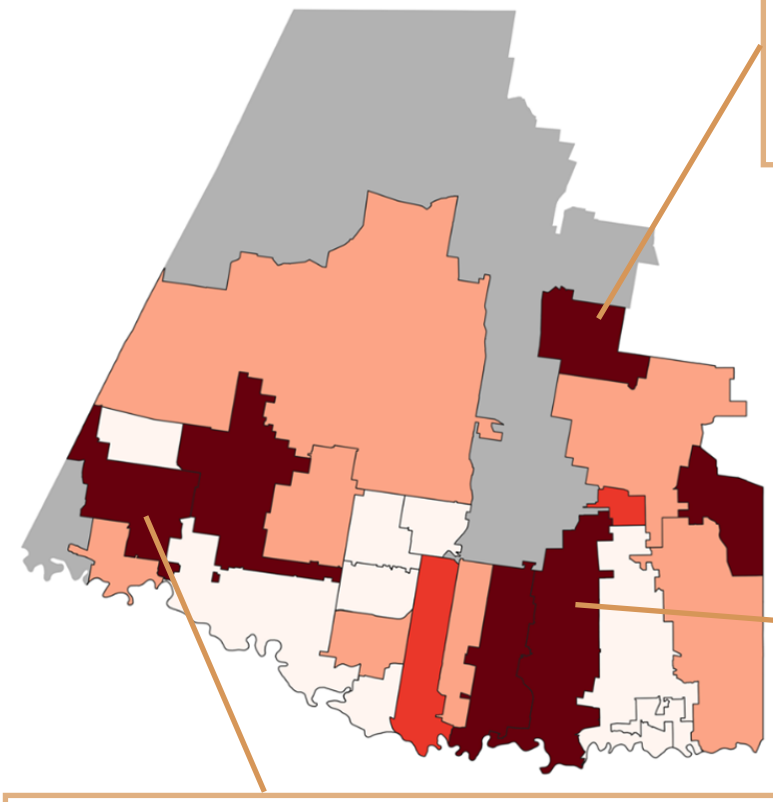
ZCTA 75253

- 3rd highest for sleep risk in the region
- Total Children: 8,698
- 30% in households below poverty level in last 12 months
- Children Race/Ethnicity Breakdown:
  0% Asian
  11% Black/African American
  77% Hispanic/Latino
  10% White

EDINBURG | CHILD SLEEP INSECURITY

Edinburg in the Rio Grande Valley had the highest rate of sleep insecurity compared with all other regions. Hidalgo County also has a much higher Hispanic population compared to the rest of the state. High risk areas in this region are 9% higher in sleep insecurity risk than the sleep insecurity risk as a whole for the region. Edinburg had overall higher scores on indicators across the state with the exceptions of percentage of youth in the workforce, percentage of homeless students, and percentage of children that are disabled. Edinburg had the highest rates of SNAP Recipients, the highest rates of crowding, highest rates of adult obesity, and the highest rates of families with children in the 200% of poverty threshold.

Child Demographics	*Edinburg*	*Texas*
Asian	1%	4%
Black	0%	12%
Hispanic	96%	49%
White	3%	32%



ZCTA 78549

- 3rd highest for sleep risk in the region
- Total Children: 1,010
- Children Race/Ethnicity Breakdown:
  - 0% Asian
  - 0% Black/African American
  - 100% Hispanic/Latino
  - 0% White
- 40% in households below poverty level in last 12 months

ZCTA 78537

- 2nd highest for sleep risk in the region
- Total Children: 17,621
- Children Race/Ethnicity Breakdown:
  - 0% Asian
  - 0% Black/African American
  - 99% Hispanic/Latino
  - 0% White
- 53% in households below poverty level in last 12 months

ZCTA 75253

- Highest for sleep risk in the region
- Total Children: 10,600
- 50% in households below poverty level in last 12 months
- Children Race/Ethnicity Breakdown:
  - 0% Asian
  - 0% Black/African American
  - 99% Hispanic/Latino
  - 1% White

LEGEND:

Higher Sleep Insecurity

Lower Sleep Insecurity

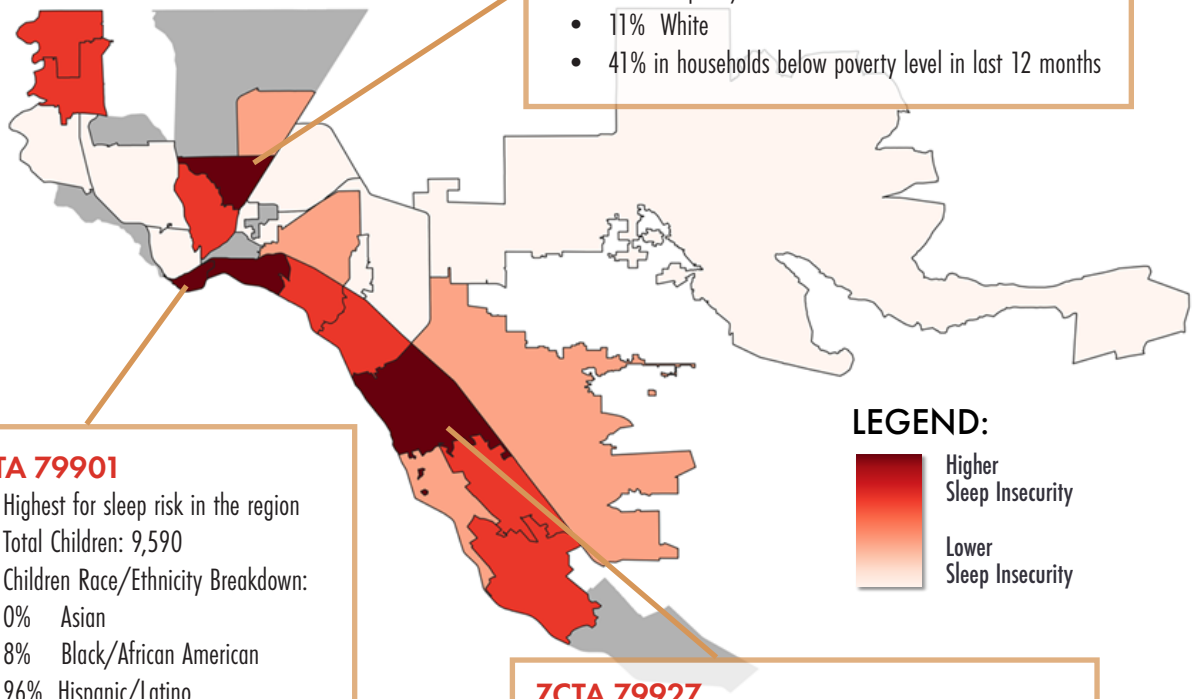
EL PASO | CHILD SLEEP INSECURITY

El Paso had the third highest rate of sleep insecurity compared with all other regions. High risk areas in this region are 13% higher in sleep insecurity risk than the sleep insecurity risk as a whole for the region. Many of the sleep insecurity indicators for El Paso was above or on par with the state average. However, educational attainment, percentage of homeless students, obesity rates, percentage of disabled children, and rate of youth in the work force were all slightly below the state average.

Child Demographics	*El Paso*	*Texas*
Asian	1%	4%
Black	3%	12%
Hispanic	87%	49%
White	8%	32%

ZCTA 79904

- 3rd highest for sleep risk in the region
- Total Children: 11,167
- Children Race/Ethnicity Breakdown:
- 1% Asian
- 5% Black/African American
- 82% Hispanic/Latino
- 11% White
- 41% in households below poverty level in last 12 months



ZCTA 79901

- Highest for sleep risk in the region
- Total Children: 9,590
- Children Race/Ethnicity Breakdown:
  0% Asian
  8% Black/African American
  96% Hispanic/Latino
  0% White
- 41% in households below poverty level in last 12 months

ZCTA 79927

- 2nd highest for sleep risk in the region
- Total Children: 11,201
- Children Race/Ethnicity Breakdown:
  0% Asian
  1% Black/African American
  95% Hispanic/Latino
  3% White
- 34% in households below poverty level in last 12 months.

FORT WORTH | CHILD SLEEP INSECURITY

Fort Worth had a slightly below average rate of sleep insecurity compared with all other regions. High risk areas in this region are 21% higher in sleep insecurity risk than the sleep insecurity risk as a whole for the region. Fort Worth was below or on par with the state average for many indicators of sleep insecurity. The exceptions being percentage of night shift workers, mobility rates, percentage of SNAP recipients, and obesity rates which were all slightly above the state average.

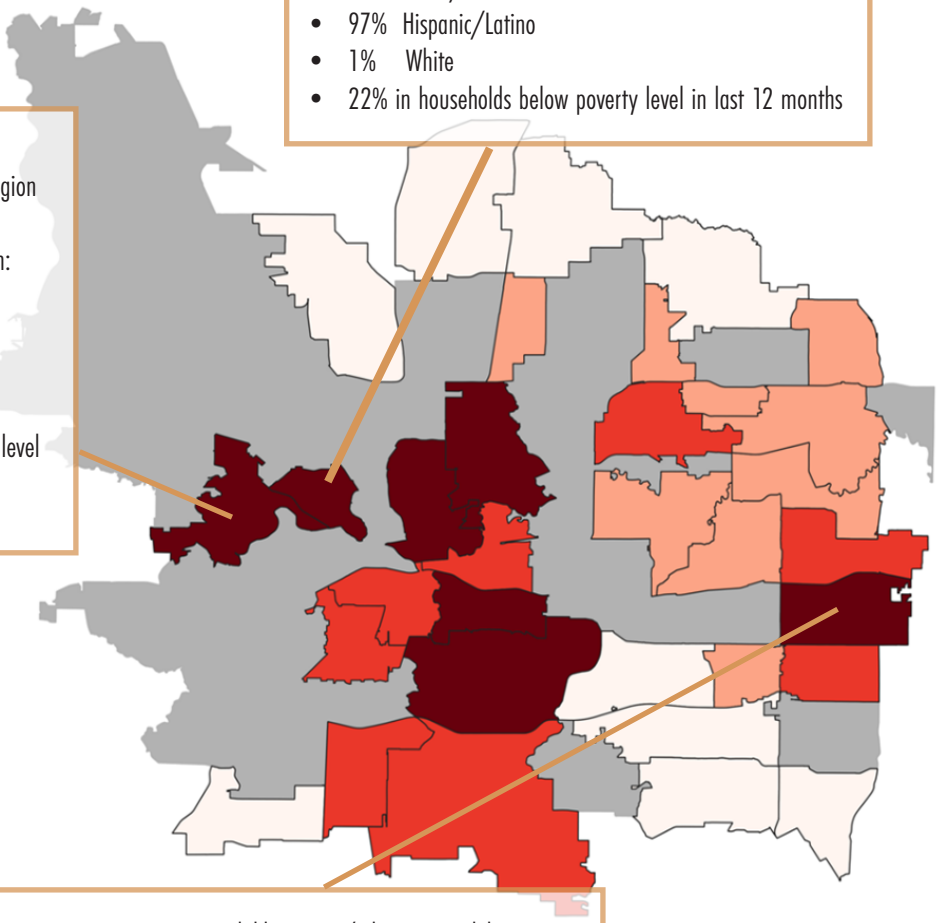
Child Demographics	*Fort Worth*	*Texas*
Asian	5%	4%
Black	18%	12%
Hispanic	38%	49%
White	35%	32%

ZCTA 76164

- Highest for sleep risk in the region
- Total Children: 15,488
- Children Race/Ethnicity Breakdown:
- 1% Asian
- 0% Black/African American
- 97% Hispanic/Latino
- 1% White
- 22% in households below poverty level in last 12 months

ZCTA 76114

- 3rd highest for sleep risk in the region
- Total Children: 26,563
- Children Race/Ethnicity Breakdown:
  0% Asian
  3% Black/African American
  78% Hispanic/Latino
  18% White
- 14% in households below poverty level in last 12 months



LEGEND:

Higher Sleep Insecurity

Lower Sleep Insecurity

ZCTA 76010

- 2nd highest for sleep risk in the region
- Total Children: 19,105
- 39% in households below poverty level in last 12 months
- Children Race/Ethnicity Breakdown:
  1% Asian
  15% Black/African American
  71% Hispanic/Latino
  9% White

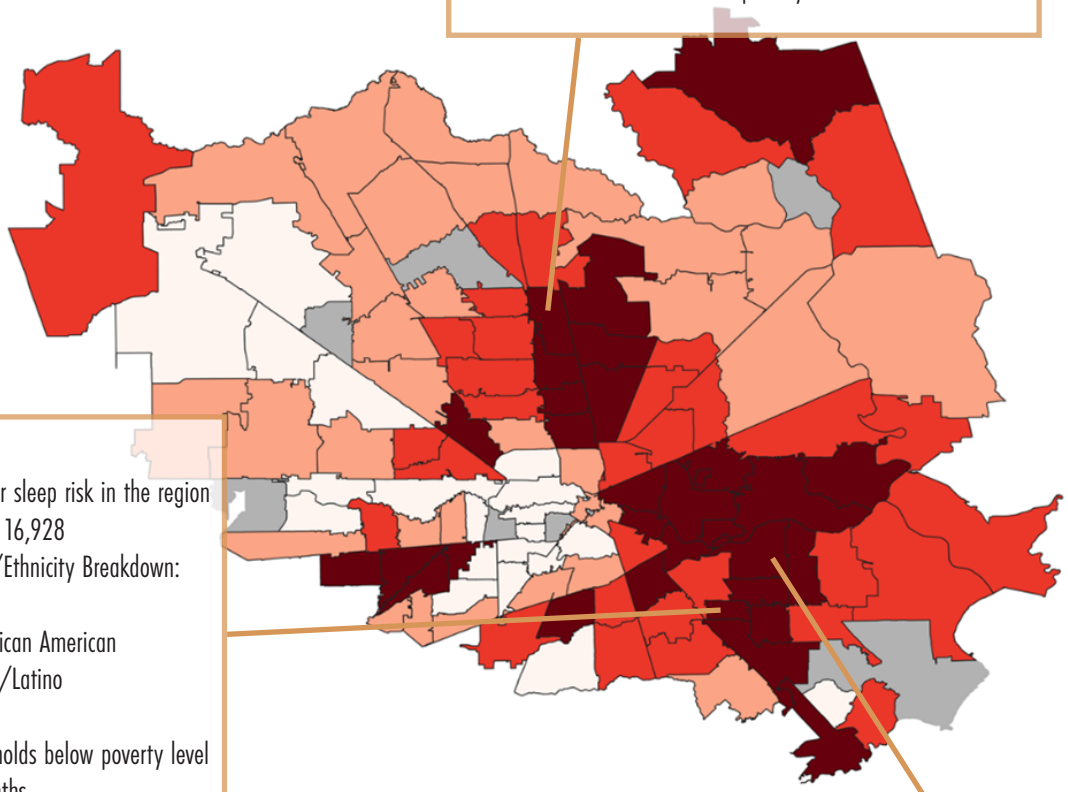
HOUSTON | CHILD SLEEP INSECURITY

Houston had the third lowest rate of sleep insecurity compared with all other regions. High risk areas in this region are 30% higher in sleep insecurity risk than the sleep insecurity risk as a whole for the region – meaning that there are some substantial sleep inequities within the region. Houston was on roughly on par or below the state average for most indicators of sleep insecurity. Houston tied with Dallas for the lowest rates of crowded housing environments.

Child Demographics	*Houston*	*Texas*
Asian	5%	4%
Black	19%	12%
Hispanic	53%	49%
White	21%	32%

ZCTA 77060

- Highest for sleep risk in the region
- Total Children: 16,268
- Children Race/Ethnicity Breakdown:
  - 0% Asian
  - 13% Black/African American
  - 85% Hispanic/Latino
  - 2% White
- 43% in households below poverty level in last 12 months



ZCTA 77587

- 2nd highest for sleep risk in the region
- Total Children: 16,928
- Children Race/Ethnicity Breakdown:
  - 0% Asian
  - 1% Black/African American
  - 97% Hispanic/Latino
  - 2% White
- 19% in households below poverty level in last 12 months

LEGEND:

Higher Sleep Insecurity

Lower Sleep Insecurity

ZCTA 75253

- 3rd highest for sleep risk in the region
- Total Children: 12,949
- 33% in households below poverty level in last 12 months
- Children Race/Ethnicity Breakdown:
  - 0% Asian
  - 2% Black/African American
  - 96% Hispanic/Latino
  - 2% White

SAN ANTONIO | CHILD SLEEP INSECURITY

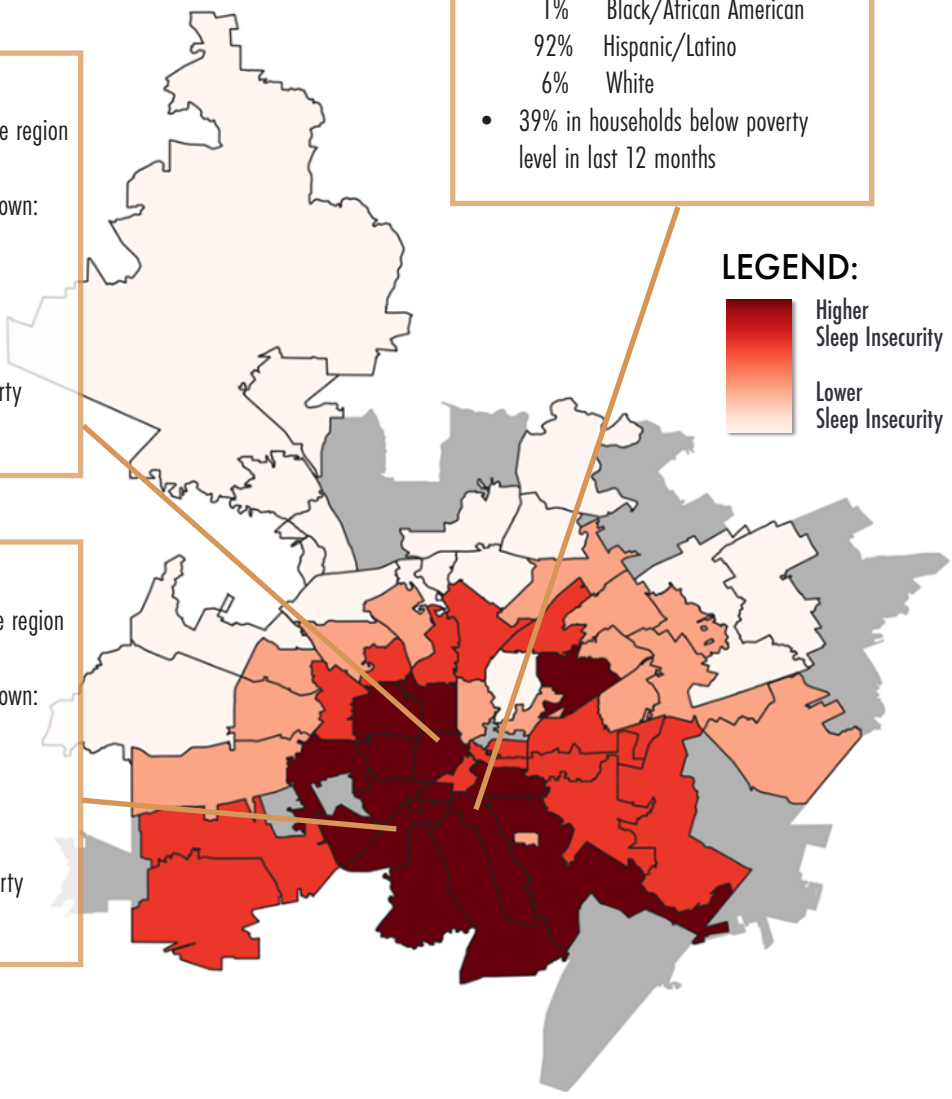
San Antonio had moderately higher sleep insecurity compared to other regions (slightly above state average). High risk areas in this region are 28% higher in sleep insecurity risk than the sleep insecurity risk as a whole for the region - meaning that there are some considerable sleep inequities within the region. San Antonio was roughly on par or above the state average for most indicators of sleep insecurity. Some items of note are that compared to the rest of the state, San Antonio had the highest rates of student mobility and the highest rates of youth in the workforce. San Antonio also had the second lowest rates of self assessed poor mental health and the lowest rates of student homelessness compared to all other regions examined.

Child Demographics	*San Antonio*	*Texas*
Asian	2%	4%
Black	8%	12%
Hispanic	68%	49%
White	20%	32%

ZCTA 78214
- Highest for sleep risk in the region
- Total Children: 8,154
- Children Race/Ethnicity Breakdown:
  - 0% Asian
  - 1% Black/African American
  - 92% Hispanic/Latino
  - 6% White
- 39% in households below poverty level in last 12 months

ZCTA 78207
- 2nd highest for sleep risk in the region
- Total Children: 15,448
- Children Race/Ethnicity Breakdown:
  - 0% Asian
  - 6% Black/African American
  - 92% Hispanic/Latino
  - 2% White
- 61% in households below poverty level in last 12 months

ZCTA 78537
- 3rd highest for sleep risk in the region
- Total Children: 8,333
- Children Race/Ethnicity Breakdown:
  - 0% Asian
  - 0% Black/African American
  - 96% Hispanic/Latino
  - 4% White
- 43% in households below poverty level in last 12 months



ADDITIONAL CONCLUSIONS

Sleep is a basic need that impacts children's brain development, the ability to focus and learn, physical health, as well as behavioral and mental health. If we want children to succeed, they need to have consistent and quality sleep. Though sleep is critical to wellbeing for children, many are unable to access high quality or consistent sleep due to socio-ecological barriers. Socio-economic Status, Sleep Environment, and Individual factors can greatly impact children's ability to get enough sleep and have the outcomes we want for all children. The purpose of this geographic analysis was to determine which children have access to consistent and quality sleep and which do not. By comparing communities and understanding what sleep access looks like across the state, advocacy organizations like CHILDREN AT RISK, family service providers and policymakers are better equipped to address inequities.

Although this analysis primarily focuses on differences across the states and within regions, there are some common barriers to quality sleep across the areas examined. Those barriers being poverty, food insecurity, and lower rates of educational attainment. Additionally, Hispanic and black children were disproportionally represented in the highest risk communities in all regions examined. Meaning that children that identify as Hispanic or black were facing barriers to consistent and quality sleep at higher rates than their peers. So further supports around raising families out of poverty, ensuring that children do not go hungry, and that families have economic opportunities can go a long way towards supporting consistent and quality sleep for children. Care should also be taken to prioritize those who have been historically the most impacted by these barriers.

LIMITATIONS

Due to small population sizes, some ZCTA level information was unavailable due to masking. If one or more the indicators used to calculate the sleep insecurity index was unavailable due to masking, that ZCTA was excluded from the analysis. Due to this limitation, the findings of this analysis highlight those ZCTAs that are included in the final results and does not attempt to comment or speculate on those communities not analyzed in these results.

This index and research was developed to identify areas of need of sleep supports and further understand the inequities of access to consistent and high quality sleep. Further work within these communities, both direct services and additional research, can validate or further improve the index model and methodology for identifying these risks.

RECOMMENDATIONS FOR PARENTS

Good sleep hygiene is critical to ensuring healthy sleep quality and preventing the onset of sleep disorders and other long-term health issues. Below are a few research-based tips for parents to help improve their child's sleep and prevent bedtime resistance.

STICK TO A ROUTINE: utilizing a regular bedtime and routine with a predictable pattern of pre-sleep activities can help kids fall asleep faster and prevent bedtime resistance. School-aged children whose bedtime varied by an hour or more during the week displayed more behavioral problems than those whose bedtime was consistently the same through the week and weekend (Biggs et al., 2011).

READ OR SING: language-based bedtime routines such as bedtime stories and lullabies have been linked to positive cognitive, behavioral, and health outcomes (Hale et al., 2011). In a longitudinal study, a positive association was found be between language-based bedtime routines that included reading a book or singing together and better verbal test scores, nighttime sleep duration, and overall general health (Hale et al., 2011).

GET ACTIVE: keeping kids active during the day, well before bedtime, and regular exercise has shown to improve sleep quality (Guerrero et al, 2019). For school age children sufficient sleep generally increased with the number of days per week that students were physically active for 60 minutes or more (Foti, et al., 2011).

KEEP IT COOL: children are more likely to get a quality night's sleep in a room that is quiet, comfortable, and cool, between 65 and 70 degrees, according to the National Sleep Foundation (Pacheco and Wright, 2021). Skin blood flow, metabolism, and sleep wake cycles are moderated by temperatures (Kräuchi, 2007)

SHUN SCREENS: avoid electronic devices, such as TVs, computers, and phones before bedtime. Sleep duration is affected by screen time and associated with anxious behavior, difficulty falling asleep and withdrawn depressed behaviors (Guerrero et al, 2019).

SAFETY FIRST: to reduce risk of SIDS, infants should be placed on a firm sleep surface (e.g., a mattress in a safety-approved crib) covered by a fitted sheet with no other bedding or soft objects. These objects can potentially restrict breathing and or result in suffocation (Carlin & Moon, 2017; Goldberg et al., 2018). Co-sleeping or bed sharing can also pose a similar risk (Wilson et al., 2015). More recommends for safe sleep practices can be found on the National Institutes of Health's Safe to Sleep Website.

Healthy sleep habits in crucial for a child's long-term health, development, and well-being However, researchers estimate as many as 30-50% of US children suffer from insufficient sleep and have difficulty practicing good sleep hygiene (Bonuck et al., 2016). Pediatricians and family service providers can help educate parents on the importance of sleep. But even with adequate public awareness, not every family has the time, money, or privilege to prioritize good sleep hygiene. Policymakers can work to address these deficiencies and ensure all families have the resources necessary for healthy sleep practices.

RECOMMENDATIONS FOR POLICYMAKERS

The quality of sleep during childhood has long-lasting effects. Prevention of low sleep quality must take into consideration factors that are both drivers and results of low quantity and quality sleep. These factors affect how Texas children learn in the classroom, how much they rely on public health systems, and how they grow into a workforce that fuels our economy.

Every child deserves the opportunity to get a good night's sleep, and every parent wants to be able to provide their child with a restful environment. Making this dream a reality will require policy change. As it stands socioeconomic status, race, and a limited social safety net, add challenges to families aiming to get high-quality sleep. Based on CHILDREN AT RISK's research, below are a few recommendations for policymakers and community stakeholders on how they might address barriers to quality sleep in childhood moving forward.

RECOMMENDATION 1:
Support legislation that allows parents to meet the basic needs of their children.

With socioeconomic status so intertwined with childhood sleep duration and quality, supporting policies that reduce child poverty is an obvious way to help more children sleep better. A number of new policies and programs started under the American Rescue Plan (March 2021) to provide relief to families during the Covid-19 pandemic have proven successful at reducing child poverty and its effects. For example, the extended Child Tax Credit (CTC), which increased the eligibility, amount, and frequency of tax refund payments families received, prevented many children from falling into poverty. The extended CTC expired in December of 2021 but is still under consideration by federal lawmakers. Continuing the now expired expanded credit is estimated to reduce child poverty by as much as 40%.

The extended CTC isn't the only Covid-19 relief policy that could help children get more, high-quality sleep if continued. Programs that increase eligibility for school meals or reduce food insecurity could go a long way given the challenges associated with sleep, hunger, and poor nutrition. Emergency Housing Vouchers and reducing the barriers families face accessing them is another approach that should continue beyond the pandemic. Not having a safe, stable place to call home, isn't good for childhood sleep quality, nor is the stress associated with housing insecurity. Ensuring all families have what they need to adequately feed and house their children can lead to better sleep and health outcomes for all.

RECOMMENDATION 2:
Increase access to healthcare, continuous coverage, and mental healthcare.

Texas has the highest rate of uninsured children nationwide. In addition to opting out of the Medicaid expansion offered under the Affordable Care Act, Texas's burdensome, inefficient enrollment practices currently cause thousands of children to lose Medicaid coverage every month due to paperwork issues. Similar to positive sleep outcomes, access to Medicaid for eligible children has been linked to better education, financial, and health outcomes in the long term. Texas can close health coverage gaps by providing 12-month continuous coverage for all infants, children, and new moms and taking advantage of Medicaid expansion.

Students also deserve increased access and availability of culturally responsive mental health services in their schools and communities. Well before the pandemic, access to mental health services was limited in Texas. COVID-19 and its resulting trauma and disruption to daily life have only made these services more in demand. Policymakers should do more to ensure children have access to mental health services, especially given how connected mental health disorders are associated with sleep issues.

RECOMMENDATION 3:
Increase opportunities for children to be active.

Given how daily activity and exercise are proven to help children fall asleep faster and get better sleep quality, policymakers should look to increase access to public green spaces, parks, and recess in school. By investing in new parks, rehabilitating unused vacant lots and other urban spaces, and creating connectivity with existing streets and trails, public leaders can help more families practice healthy and active lifestyles. These efforts can not only increase the amount of physical activity children receive but have been known to support social-emotional well-being as well.

Beyond the neighborhood, protecting access to recess during the school day may lead to better rest throughout the night. Not only does recess help students to focus during the school day, but the physical activity also associated with free play is a healthy contributor to better sleep. Unfortunately, the children who would benefit from recess the most are also the least likely to receive it. Texas schools are not required to offer recess to elementary students, defaulting on the movement that may be offered during physical education classes, at a minimum of 135 minutes per week. Often, recess is usurped to make room for more instructional time or is revoked entirely as punishment for minor infractions. Schools that serve predominantly economically disadvantaged students were less likely to have recess (CHIDLREN AT RISK, 2018).

RECOMMENDATION 4:
Increase access to flexible, high-quality child care.

Access to high-quality early learning experiences such as child care can help children maintain sleep-friendly routines or mitigate sleep disturbances caused by parents juggling shift work. Early childhood educators are experts in brain development and quality-rated programs, like those enrolled in the state's Texas Rising Star program (TRS), can set children up for long-term academic success. Licensed child care staff are also provided ongoing training to ensure safe sleep practices during nap times (Texas Healthy Steps, n.d.). Child care during non-traditional hours is more commonly offered by home-based care providers. A greater supply of these providers and their increased participation in TRS would help more parents in shift work professions afford quality childcare options.

RECOMMENDATION 5:
Adjust school start times and calendars to prioritize sleep needs and consistency.

Current school start times and traditional calendars are not always aligned with the sleep patterns and needs of children and adolescents. A delayed school start time (8:30 am) is recommended by the American Academy of Pediatrics, American Medical Association, and the CDC for middle and high school students (startschoollater.net). In addition to later start times, a year-round school schedule may also support both student academic performance and sleep consistency. Long summer breaks and time off from daily routines can disrupt regular bedtime practices and sleep schedules. More consistent school calendars could help students and their families maintain healthy sleep practices.

CONCLUSION

Ultimately all children, regardless of their parent's income, race, ethicity, education, or immigration status, deserve the opportuntiy to get a good night's sleep. Alleviating children and their family's needs through linkage to services can help family wellbeing and reduce worry and stress that may be affecting sleep. Additional research is needed to identify the most effective strategies for policymakers to support children's sleep, but these five recommendations provide a starting point. To learn more about these policies visit childrenatrisk.org/advocacy. You can also sign up for our newsletters and advocacy alerts HERE.

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APPENDIX A

During December 2021 through January 2022, the CHILDREN AT RISK research team met with organizations providing health and social services for Texas children and families in a series of regional listening tours. These convenings, held virtually in six different metro areas: DFW, Austin, San Antonio, El Paso, and the Rio Grande Valley area, brought together 20-40 stakeholders in each region with 291 individuals participating in total. The following key themes, insights, and quotes emerged from those conversations.

Income affects ability to have adequate quality sleep

- Children living near poverty may lack adequate housing, experience food insecurity, and lack other necessities. They may suffer from stress and anxiety due to family worries related to income.
- "Consider the number of children who don't have their own beds and sleep on couches"
- Youth who are attending school and working to contribute to the family income may have late hours and inadequate amount of sleep.
- Living in crowded homes affects each person in the household's sleep.
- Differing sleep schedules among family members disturbs sleep quality due to waking noises and other activities.
- Colicky infants and toddlers affect the sleep duration and quality of caregivers and others in the household.

Nontraditional work hours and shiftwork

- Parents working nontraditional hours or third shift may have inadequate childcare options. They may need to leave young children home alone due to lack of quality affordable childcare.
- Many older siblings may be caretaking due to lack of childcare and not receive adequate sleep.

Parents and caregivers

- "Look at the whole family, not just the child" was advice for exploring the concept of sleep security and children's wellbeing further.
- Many parents and caregivers may not be aware of good sleep hygiene. They may not know the recommended hours of sleep at every age. One leader asked, "Is there parent education about the importance of sleep?"
- Parents and children may all attempt to sleep 8 hours even though adequate sleep varies by age and personal physiological needs.
- Parental mental health affects children's mental health and sleep.
- One participant suggested we further explore sleep security for parents, to see how it affects their behaviors, patience, caretaking, relationship skills, and discipline choices.

Bi-directional effect of sleep

- Sleep affects mental health and ability to perform and function in daily life. Inadequate ability to function and perform may lead to distress and sleep disturbance.
- Inadequate sleep for caregivers affects their ability to perform caregiving, which may affect their children's sleep quality.

Disability, mental health, and other health conditions

- A participant, Melanie Watson, from Capable Kids, speaking of children with special needs says, "We see kids with specific medical conditions that affect their sleep – either their specific condition affects their sleep or medication they take affects it."
- Children who are overweight or obese may suffer from sleep apnea and other sleep disorders.
- Mental health and trauma, especially the impact of COVID-19 on sleep, was on the mind of all participants.

School and sleep

- School start time of 7:05 AM in the Houston area is hinderance to good sleep for many parents and children. "The school start time is an issue. Then homework is excessive. Kids are very stressed," remarked one nonprofit organization leader.
- The early start for travel time needed for binational children to arrive to school was a concern along the border community.
- Inadequate sleep can lead to lower school performance and behavioral issues, including falling asleep during lessons.
- Inadequate sleep can be mistaken for other issues in the school setting. One participant said, "Tiredness can look like ADHD, for example, and that has an impact on how children are engaged, treated, and educated."
- "Teenagers lose sleep for many reasons - packed extracurricular schedules and heavy homework loads for some, jobs for others, or the need to help care for younger siblings."

Screentime

- The effect of screens and technology on sleep for children of all ages was an area of discussion in all regions.

children at Risk

CHILDREN AT RISK's mission is to serve as a catalyst for change to improve the quality of life for children through strategic research, public policy analysis, education, collaboration, and advocacy.

CHILDREN AT RISK is a research and advocacy nonprofit leading the way in improving the quality of life for Texas's children. CHILDREN AT RISK considers the whole child by tracking issues in children's health, safety, education, and economic security. Committed to action beyond the data, CHILDREN AT RISK drives evidence-based change by speaking out on behalf of children. For more information, visit childrenatrisk.org.

CONNECT WITH US

email: info@childrenatrisk.org

phone: (713) 869-7740

mail: 2900 Weslayan Suite 400, Houston, TX 77027

Follow us on social media **@childrenatrisk**

CHILDREN AT RISK is a 501(c)(3) nonprofit organization (EIN: 76-0360533).

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