

**Childhood Thriving in Urban and Rural Areas during COVID-19**

by

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Submitted to the Graduate Faculty of the  
School of Public Health in partial fulfillment  
of the requirements for the degree of  
Master of Public Health

University of Pittsburgh

2022

UNIVERSITY OF PITTSBURGH

SCHOOL OF PUBLIC HEALTH

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June 23rd, 2022

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2022

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## **Abstract**

The COVID pandemic has exacerbated existing disparities in health and social needs between rural and urban settings across the United States. To discern family needs during COVID, two community-partnered surveys were developed to assess social determinants of health, flourishing, and other health information to collect actionable, real-time data, connect families to existing community resources. The surveys were administered monthly in urban and rural counties of southwestern PA. The surveys included validated and community-informed measures of child and parent wellbeing, unmet health needs, access to care, housing quality/stability, food security and social service use and needs.

Data from the September 2021 surveys were analyzed using descriptive statistics, Chi-square, and Fisher's test of differences between rural and urban participant groups. The aim of the study was to explore if the COVID-19 pandemic had similar impacts in urban and rural regions and whether rural households faced similar challenges as urban households during and after the pandemic.

A total of 158 caregivers completed the surveys in September 2021. Caregivers in rural areas reported higher levels of unmet health needs for children than caregivers in urban areas (10% vs. 3%), although not statistically significant. Rural caregivers reported greater access challenges such as transportation. A trend of greater food insecurity in rural compared to urban areas (19% vs. 10%) was observed. A significantly greater percentage of caregivers reported

using economic assistance in rural (47%) compared to urban areas (16%), despite a similar level of income/employment loss due to COVID across rural and urban settings (36% vs 31%). Caregivers in rural areas had a lower odd of meeting all child thriving measures included in the survey. Rural caregiver responses showed significantly lower odds of meeting five out of ten thriving measures such as getting food to you and children, adequate household utilities, adjusting to changes in work, employment, or income; child safety and supervision; and child protection from inequality, racism, prejudice, and exclusion.

The results suggest persistent unmet needs in urban and rural areas during COVID, with a higher trend of health and social needs in rural areas despite higher levels of social service use.

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## **Preface**

This paper relies on the data collected from previous survey research conducted by the UPMC Children's Hospital Community Health Division. I would like to thank my practicum experience mentor for her guidance over the past year and my essay primary advisor for her feedback and mentorship.

## **1.0 Introduction**

The COVID-19 pandemic has disrupted child, family, and social contexts, raising concerns about issues that range from academic and developmental delays to increased rates of child abuse and neglect. Pandemic-related income and job loss can strain families, leading to increased parental stress and poor mental health, and negative impacts on children.

The pandemic has restricted access to community agencies, health and social services, and supportive resources, preventing many families from receiving basic needs such as food, health care, education, and social supports. Job loss, illness, lost childcare, and online schooling have placed tremendous stress on families, while physical distancing has decreased access to supports and resources (United Nations Educational, Scientific, and Cultural Organization, 2020; Okereke et al., 2021; Abrams et al., 2020). These strains fall most heavily on those least ready to bear it, and children living in poverty are more likely to have parents who have lost employment and rely on now disrupted services (Parolin & Wimer, 2020; Wong et al., 2020). In addition, racial inequities in health, employment, and education that were already apparent before COVID-19 have become even more pronounced with the pandemic (Sharma et al., 2020). Pandemic-relates stressors impact parents' ability to support their children's physical, psychological, academic, and social wellbeing (Chung et al., 2022; Brown et al., 2020).

Despite these challenges, families have demonstrated resilience during the pandemic, yet few studies have examined how family strengths and child wellbeing varied during this crisis in conjunction with other social indicators such as health access, social and community factors, and economic factors. Understanding what children need in the changing landscape of the pandemic

is important to adapting existing support programs to effectively help already-stressed households.

Using data from two community-partnered surveys conducted during the COVID-19 pandemic, this paper compares the impact of COVID-19 on child wellbeing and different social determinants of health (SDOH) between urban and rural communities in southwestern Pennsylvania. The Family Strengths Survey (FSS) was conducted in Allegheny County (primarily an urban sample) throughout 2020-2021. The Healthy Families Survey (HFS) was conducted across Washington, Greene, and Fayette counties (primarily a rural sample) for months spanning 2020-2021.

These online, monthly cross-sectional surveys used the same SDOH and child positive wellbeing measures, termed child thriving and indicating optimal functioning across different developmental domains. This paper compares the results for a single month (September 2021) of the surveys when children returned to school after many social isolation measures were lifted. The goal of this essay is to compare differences in child thriving outcomes, SDOH indicators, and access to and utilization of community resources between rural and urban families, thus improving our understanding of what gaps and barriers to child and family wellbeing exist in these areas.

### **1.1 Public Health Significance**

COVID-19 has exacerbated existing social inequities in health (Sharma et al., 2020). Overburdened families may not have time or capacity to digest daily everchanging pandemic

information, and misconceptions are causing harm. While much of the attention towards enforcing public health measures to curb the spread of the virus has focused on large urban regions, rural areas face different challenges during the pandemic. Differences in life expectancy between rural and urban Americans have been widening over the past several decades, with rural Americans dying on average two years earlier than their urban counterparts (Centers for Disease Control and Prevention [CDC], 2017). With nearly one fifth of the American population residing in rural areas (US Census, 2016), it is important to explore the needs of these communities.

Rural families experience a higher susceptibility to the virus (Peters, 2020). After assessing a COVID-19 susceptibility scale at a county level, Peters (2020) found 33% of rural counties are highly susceptible to COVID-19 due to higher proportions of older, health compromised individuals. Furthermore, there are higher rates of COVID-19 co-morbidities in rural settings such as obesity (Trivedi et al., 2015), heart disease (CDC, 2017), smoking (Orgera, 2020), diabetes (O'Connor, 2012), and chronic lung diseases (CDC, 2017). The presence of co-morbidities to COVID-19 is a risk factor for severe COVID-19 infection (Orgera, 2020) and are all more prevalent in rural areas compared to urban areas. Rural populations also have higher proportions of older adults compared to urban (Orgera, 2020), and age is another major determinant to severe COVID infection (CDC COVID-19 Response Team, 2020). Finally, rural areas have fewer resources against the pandemic. For example, there are fewer ICU beds (Orgera, 2020) and fewer physicians and mental health services (Peters, 2020) in rural areas compared to urban areas. By exploring possible differences between urban and rural communities, we can coordinate and target existing resources and supports to address the real and urgent challenges for these communities.

This essay first covers a background on childhood flourishing and thriving and the measures used to assess them. Next the Healthy People 2030 Social Determinants of Health (SDOH) Model is discussed in the context of COVID-19 and urban-rural disparities. Then the methods used to develop, administer, and analyze data from the September 2021 FSS and HFS surveys are explained. Finally, the essay covers the results and significant findings amongst these data.

## **2.0 Background Literature Review**

### **2.1 Child Thriving and Flourishing**

#### **2.1.1 Child Thriving Definition**

Every healthy family aims to promote their child's overall wellbeing, helping them to thrive and flourish. Keyes (2003) has defined flourishing as "a state in which an individual feels positive emotion toward life and is functioning well psychologically and socially" (p. 294). Flourishing and thriving go beyond preventing adverse outcomes, such as illicit drug use or teenage pregnancy. Thriving and flourishing imply positive development in children, which is important to address at an early age (such as between birth and elementary years) because this critical time in a child's life can establish a positive developmental trajectory (Moore et al., 2016). The life course model and whole child perspective have been used to develop broad domains of wellbeing that can be used as a framework (Moore et al., 2015; Moore et al. 2012). Flourishing or thriving can be defined as success or development across multiple domains: cognitive and academic development, mental and emotional wellbeing, social behavior, physical health and functioning, and relationships (Moore et al., 2017).

Unfortunately, government agencies and foundations provide greater funding to research with a focus on problem behaviors, dangers, and risk factors amongst youth (Moore & Lippman, 2005). For example, many current indicators of youth health measure "ill-being" such as the level of illicit drug use, crime, and violence (Lippman et al., 2014). While prevention of negative

outcomes among children is important, a primary focus on just mitigating problem behaviors and risk factors results in an incomplete picture of child wellbeing (Moore et al., 2016). An equal focus must be made on child thriving – positive behaviors, learnings, emotions, and factors that result in positive outcomes (Moore & Lippman, 2005).

Knowing indicators of problem behaviors among youth helps governments, institutions, and schools prevent such behaviors and monitor the effects of interventions (Lippman et al., 2014). Similarly, providing information on child thriving measures can help such organizations focus on the positive behaviors and strengths amongst youth that lead to positive long-term outcomes (Lippman et al., 2014). In addition, understanding and measuring the needs of children to thrive and flourish is important to primary and pediatric care practices (Brown et al., 2020).

The field of child wellbeing indicators originated from the social indicator movement of the 1960s (Ben-Arieh, 2007). Social indicators were measured to give researchers and policymakers a better understanding of the populations around them (Ben-Arieh, 2007). Originally, child wellbeing indicators were developed to monitor child survival (Ben-Arieh, 2007). Therefore, the wellbeing indices focused on behaviors, risks, and factors that directly harmed survival of children (Lippman, 2007). However, the child indicator movement was a period marked by the desire for government agencies and organizations to find positive child behaviors to measure the effectiveness of their youth development programs. This movement in addition to increasing public policy accountability to promote child health pushed for the development of more positive child thriving measures (Moore & Lippman, 2005).

One challenge is whether accurately defining and measuring child thriving is possible. Child thriving indices must be comprehensive and representative to drive interventions. Research shows that academic measures alone are not enough to predict long-term success and must



incorporate non-academic measures (Moore et al., 2015). Success in any one domain, such as academics, with struggles in other domains may not mean positive development. However, across the multiple domains of child development (e.g., cognitive, mental, and socioemotional wellbeing, physical health/functioning), standardized constructs and measures/indices are lacking (Moore et al., 2017).

### **2.1.2 Gaps in Existing Measures**

Previous models of adult thriving and flourishing have been developed (Diener et al., 2010; Huppert & So, 2013; Keyes, 2002; Ryff et al., 2004). However, developmental changes during childhood require a new and tailored thriving model for children. Existing child thriving models include Positive Youth Development (PYD) (Lerner et al., 2011) and adolescent thriving models (Benson & Scales, 2009). However, such models do not span the early ages of childhood and may not reflect the ideals and values of all communities.

Currently, we lack a set of robust, actionable, and culturally sensitive measures for child thriving (Moore et al., 2017). This is especially true for young children (Moore et al., 2017). For measures that do exist, there is controversy over their validity and application in different community settings (Moore et al., 2017). One challenge with developing a standardized definition of child thriving is the variation in community members' values and ideals around healthy thriving. Past studies have found stark differences in vocabulary and terms used in the PYD model compared to terms used by parents, practitioners, and youth to describe thriving (King et al., 2005). The lack of a standardized definition for child thriving affects interventions. For example, many child welfare programs prioritize promoting child wellbeing, yet lack a

means to measure this (Moore et al., 2017). Differences between academic research models and the values and ideals of community members lead to poor intervention design, acceptance, uptake, and adherence (Moore et al., 2017).

Community-based participatory research methods such as concept mapping integrate community members' views into research. Concept mapping is a six-step research method focused on converting complex qualitative data from community groups and individuals into a visual form that displays the relationships between ideas in a way that is easily understood by community partners (Windsor, 2013). A previous study (Ettinger et al., 2021) built upon existing models of child thriving by adding community-informed conceptualizations that is used as the basis of the current essay. The study used the mixed methods approach of concept mapping with over 91 community members and health professionals to develop domains of child thriving and health from the insights and experiences of community members. Participants deemed having "someone to talk to," being "comfortable in their own skin," having "pride in themselves," and a "strong sense of self and self-worth" as essential components of child and youth thriving (Ettinger et al., 2021). The community informed conceptual framework of child and youth thriving included eight domains that spanned individual, relationship, and contextual levels, including Strong Minds and Bodies, Positive Identity and Self-worth, Fun and Happiness, Safety, Caring Families and Relationships, Vibrant Communities, Healthy Environments, and Racial Justice, Equity, and Inclusion (Ettinger et al., 2022; Figure 1).



**Figure 1. Community Informed Child Thriving Model**

Individual-level child development domains at the center of the circle are Strong Minds and Bodies and Positive Identity and Self-Worth along with the picture of the children growing over time (Ettinger et al., 2022). The Strong Minds and Bodies domain included items related to child cognitive development, health behaviors, and mental health. Positive Identity and Self-Worth included items related to self-efficacy, self-concept, and whether children feel comfortable and accepted in various spaces.

Relationship and Contextual Factors include Vibrant Communities, Healthy Environments, and Caring Families and Relationships. Healthy Environments was ranked the highest for importance to community members. This domain included physical and social environment factors such as having clean air and water, and having access to mental, social, and medical health care. Furthermore, having access to fresh, healthy foods, being in food secure

households and access to economic opportunities are also part of this domain. The Vibrant Communities domain is comprised of items related to community programs, family services, educational programs, and accessible transportation (Ettinger et al., 2022). It differs from the Healthy Environments domain by focusing specifically on neighborhood and local community resources. Caring Families and Relationships contained items about having a caring, stable, and positive relationships with family members, caregivers, peers, and mentors.

The Relationship and Contextual Factor domains provide safety and opportunities for fun and happiness in children as shown in the yellow ring around the center of the circle (Ettinger et al., 2022). Safety included items about having safe spaces in schools and neighborhoods, and secure relationships with protected development (Ettinger et al., 2022). The Fun and Happiness domain consisted of items about having opportunities for fun, feeling happy, and having positive attitudes about a child's local community. Finally Racial Justice, Equity, and Inclusion are the basic foundational practices that promote child development (Ettinger et al. 2022).

## **2.2 COVID-19 and SDOH**

Social determinants of health are the conditions in which individuals are “born, work, play, eat, learn, live, and worship” (Healthy People 2030, n.d.). These conditions affect an individual's health and quality of life. The Healthy People 2030 organization under the US Department of Health and Human Services divides SDOH into five domains (Figure 2). The COVID-19 pandemic has amplified existing inequalities and families' social and healthcare needs (Sharma et al., 2020). Literature suggests that disparities in SDOH are also linked to

increased exposure and susceptibility to COVID-19, decreased access to treatment, and disparities in COVID hospitalizations, morbidity, and mortality (Abrams & Szeffler, 2020). SDOH disparities lead to differential exposure, vulnerability, and post-infection consequences of the virus (Burstrom & Tao, 2020).



**Figure 2. Healthy People 2030 SDOH Framework (Healthy People 2030, 2022)**

These five SDOH domains share links to several child thriving domains. For example, the SDOH domain of Health Care Access and Quality focuses on benchmarks that increase the number of individuals who get timely, high-quality health care. Youth-focused objectives in this domain focus on increasing the proportion of adolescents who have a preventative health care visit, decreasing uninsured rates, and increasing the number of times an adolescent can speak privately with a health professional at a medical site (Healthy People 2030). This domain is

similar to the Strong Minds and Bodies thriving domain, which is characterized by positive mental health, cognitive development, physical health, and having the resources to be a healthy, self-sufficient, growing adult (Ettinger et al., 2022). Similarly, objectives within the economic stability domain focus on housing security, food insecurity, and living in a clean environment (Healthy People 2030). The Healthy Environments thriving domain focuses providing adequate resources like food, air, water, electricity, and housing for a child (Ettinger et al., 2022). The current study combined the child thriving framework and the SDOH framework to guide survey development.

The promotion of healthy choices is not enough to prevent disparities and inequities caused by adverse SDOH. Over half of all families with children reported at least one unmet health or social service need during COVID that varied by race, ethnicity, and household income (Ray et al., 2020). Public health organizations must act in multiple sectors to improve the conditions people live and work in (Healthy People 2030). Therefore, collecting information on SDOH factors amongst families targeted by both surveys helps see how child thriving varies with other measures in the survey like economic stability, education and healthcare access, and neighborhood and built environment (safety and transportation) between rural and urban residents.

Shelterless and housing insecure individuals are more susceptible to COVID-19 infection because of physical space constraints and difficulties social distancing due to physical crowding during lockdown (especially if public spaces are closed) (Tsai & Wilson, 2020). Poor housing conditions, such as crowded living arrangements and multigenerational households, may increase the risk of COVID-19 infection (Burstrom & Tao, 2020). For example, a Boston COVID-19 screening study found 36% of individuals residing in a large homeless shelter had a positive PCR

test for COVID (Bagget et al., 2020). The closing down of schools also causes difficulties for children who live in unsafe home environments.

People with poorer general health such as those with numerous underlying chronic conditions like lung diseases, poor cardiovascular health, and diabetes have a greater risk for adverse COVID outcomes (Jordan et al., 2020). Smoking exposure and former or current smoking status are correlated with COVID morbidity and mortality (Vardavas & Nikitara, 2020). Personal health factors like smoking and chronic conditions are inversely correlated with socioeconomic status (Sommer et al., 2015).

Individuals with low-income jobs are also at increased risk for COVID exposure and transmission. Jobs that do not permit online work and require physical proximity or direct contact with the public, which is typical among low-income jobs in the service sector, health care, transportation, cleaning, and hospitality, make it difficult for such workers to socially distance (Abrams & Szeffler, 2020). Furthermore, jobs that require the use of public transportation or that lack personal protective equipment increase exposure for those individuals. In addition, low-income employment typically has fewer benefits, such as paid sick or family leave, unemployment, etc., which limits their financial ability to stay at home during illness (Burstrom & Tao, 2020). As a result, low-income earners often work in industries hardest hit by the pandemic and have the fewest financial buffers for it (Burstrom & Tao, 2020). Unemployment itself has negative health outcomes like poor mental health, family violence, and substance abuse (Bustrom & Tao, 2020).

### **2.3 Impact of COVID-19 Pandemic on Rural and Urban Areas**

As the COVID-19 pandemic took its course, much of the research and focus was devoted to large urban centers rather than rural areas (Willyard, 2021). However, based on individual and community resilience indicators, rural areas appear more vulnerable to COVID-19 given existing health disparities and access issues in rural areas (Peters, 2020). Since individuals with multiple risk factors will face adverse outcomes, it is important to understand rural-urban differences in vulnerability to the pandemic.

Compared to the proportions of citizens in urban areas, the percentage of residents living in rural areas is inversely correlated with COVID-19 cases (Bhowmik et al., 2021). This is because the less dense population makes it easier to socially distance (Bhowmik et al., 2021).

However, the testing for COVID-19 has not been conducted as frequently in rural areas, and therefore results in a lower number of cases detected (Souch & Cossman, 2021). Compared to urban areas, the death toll of COVID-19 has been lower in rural areas. However, given the inequalities in the prevalence of COVID-19 comorbidities in rural populations (CDC, 2017), the severity of COVID-19 infections could be much worse amongst the aging rural population with more chronic conditions (Peters, 2020).

Rural Americans experience disparities in both healthcare access and outcomes. Rural risk factors include geographic isolation, lower SES, greater rates of health risk behaviors, decreased access to health specialists and sub-specialists, and limited job opportunities (Rural Health Information Hub, n.d.). Health inequities between rural and urban communities are well-documented (Rural Health Information Hub, n.d.; CDC, 2017; Orgera et al., 2020). A frequently cited care access model is the “*Five A’s of Access*,” as noted by Penchansky and Thomas (1981).



This model includes five “A’s” of factors describing health access: affordability, accessibility, availability, acceptability, and accommodation.

Availability is the ability of local healthcare facilities to obtain enough resources to fulfill the health needs of patients and provide adequate health services. Accessibility is the physical distance of facilities to patients and the effort needed to reach them. Accommodation is how organized and how well can facilities meet the preferences and needs of patients in relation to patients’ constraints (Lori et al., 2013). Affordability is whether a patient has a sufficient income to pay for health care costs and services (Lori et al., 2013). Finally, acceptability is how comfortable and trusting patients are when seeking care from a provider. This especially relates to unchanging patient characteristics such as gender, sexual orientation, social class and ethnicity (Lori et al., 2013).

Affordability is adversely impacted by higher rates of poverty and fewer economic opportunities in rural areas compared to urban areas (Wolfson & Leung, 2020). Accessibility is jeopardized as rural individuals must travel longer distances than urban residents to reach the same healthcare services, as well as other resources that impact health such as fresh food (Akinlotan et al., 2021). Availability of health care is reduced due to the shortage of mental health and specialty providers in rural locations (Orgera, 2020). Acceptability of health treatments is affected by rural cultural factors and social stigma (Morales et al., 2020). Finally, accommodation is lacking as treatments found in urban settings cannot always easily be transferred to rural settings.

Rural settings may also intersect with income and racial disparities to further exacerbate health disparities. Chronic exposure to such stressors increases stress psychopathology (e.g. depression) (Haynes et al., 2017). Thirty percent of rural African Americans have clinically

significant depressive symptoms (Haynes et al., 2017). Morales et al. (2020) found a higher risk of suicide in rural populations due to presence of social risk factors. For example, “geographic isolation, factors associated with an agrarian lifestyle, access to lethal means such as firearms and pesticides, and a culture that promotes individualism and rugged independence that may also promote stigma associated with mental illness or seeking treatment for suicidality” (Morales et al., 2020, pg. 1).

### **2.3.1 Access to Health Care**

America’s rural hospitals have less capacity in terms of intensive care unit beds and infrastructure compared to urban hospitals, which is compounded by recent rural hospital closures and continued vulnerability to closure among remaining rural hospitals (Orgera, 2020). Rural healthcare facilities and hospitals have been financially strained partly due their different patient population compared to urban facilities. Rural hospital systems treat higher proportions of patients with chronic disease and aging populations, while facing limited access to physicians which was further exacerbated with social distancing measures (Hirko et al., 2020).

Because COVID-19 first emerged in urban regions across the US and spread to rural areas later, the rural perceptions of the virus and the pandemic may differ from urban areas (Jiang et al., 2020). For example, rural residents may not feel that social distancing and other public health measures enforced in urban regions are applicable to them in rural areas (Cramer, 2016). This may lead to differences in adoption of public health practices (Jiang et al., 2020), physical distancing, and ultimately acceptance of the COVID vaccine.

For example, multiple studies have found that living in rural areas and not having health insurance has been associated with a decreased likelihood of obtaining both adult and child vaccinations (Glatman-Freedman & Nichols, 2012; Olusanya et al., 2021). Studies also show that COVID-19 most likely worsened the adverse effects of SDOH on vaccination uptake behaviors (such as employment, poverty, healthcare access, food insecurity, and education) (Olusanya et al., 2021).

COVID-19 vaccine hesitancy is the lack of willingness for an individual (or parent for their children) to obtain the immunization against the disease, even if the drug has been scientifically proven to be effective (Olusanya et al., 2021). Since immunizations have been proven to be one of the most effective and safest public health measures against a variety of diseases, vaccine hesitancy has been identified as one of the top 10 global health threats by the World Health Organization (WHO) in 2019 (WHO, 2019).

A survey conducted among parents regarding their perspectives on vaccinating their children during and after the pandemic in LA found an increase in hesitancy to vaccinate due to risk perception especially among non-White ethnicities and lower income groups (He et al., 2021). Another survey comparing vaccination rates in rural and urban counties of Tennessee found 40% of the state was vaccinated mainly due to higher rates in urban areas (Alcendor, 2021). While 70 out of 95 counties in Tennessee are rural, the unvaccinated counties remain the greatest contributors to COVID-19 infections, hospitalizations, and deaths (Alcendor, 2021). The primary reason linked to hesitancy was lack of evidence on vaccine effectiveness, cited by 32.1% of survey participants (Alcendor, 2021). Other factors linked with vaccine hesitancy amongst rural populations include political affiliation, mistrust of health systems, and religion (Glatman-Freedman & Nichols, 2012; Olusanya et al., 2021).

### **2.3.2 Income and Job Loss**

Almost 20% of children in the US live in poverty, and this population is disproportionately composed of minority ethnicities such as (National Center for Children in Poverty, n.d.). The COVID pandemic introduced financial strains as the job market shifted from in-person to remote. More than 30 million jobs were lost during the COVID-19 pandemic (Department of Labor Report, 2022). Past research shows that a rise in unemployment and foreclosure rates is associated with an increased parental stress and increased likelihood of investigated and substantiated maltreatment (Frioux et al., 2014).

Government interventions to address the increasing poverty and unemployment rates during COVID included the CARES (Coronavirus Aid, Relief, and Economic Security) Act, which provided stimulus checks of up to \$1200 per adult and \$500 per child and an extra \$600 per week for unemployed or dislocated US adults (Wolfson & Leung, 2020). SNAP and WIC federal programs were also bolstered to include more individuals (Wolfson & Leung, 2020). While many of these programs provided temporary relief during the pandemic, long-term solutions are still needed.

### **2.3.3 Food Insecurity**

Food insecurity occurs when there is restricted access or concern/uncertainty about the ability to obtain healthy, nutritious foods needed for a healthy and active lifestyle (Wolfson & Leung, 2020). Food insecurity is a major concern because individuals or households without necessary resources to obtain healthy food are more prone to skip meals and go hungry resulting

in further negative health outcomes. Thus, the experience can be stressful and is associated with negative physical and mental health problems (Gunderson & Ziliak, 2015). Especially among children, food insecurity can contribute to poor health behaviors and academic outcomes (Wolfson & Leung, 2020).

As public health measures of social distancing were put into practice and numerous organizations shut down to prevent the spread of the virus, unemployment rates spiked and poverty rates increased (Parolin & Wimir, 2020). One consequence was the increase in food insecurity rates due to the economic downturn after March 2020 (Wolfson & Leung, 2020). Research showed elevated levels of food insecurity that were higher than any other large economic disaster seen in the past few decades. For example, in 2014 the US Department of Agriculture (USDA) conducted surveys and estimated national food insecurity rates to be around 11-12% (Coleman-Jenson, 2014). However, after March 2020, national rates spiked up to around 38% (Fitzpatrick et al., 2020). The disruptions to daily living and changes in employment created different hardships for low-income Americans who were already at risk for food insecurity and poor health outcomes. School closures increase food insecurity for children living in poverty and relying on school lunch programs (Abrams & Szeffler, 2020). This can harm physical and mental health of affected children and lower their immune response increasing the risk of infection and viral transmission (Abrams & Szeffler, 2020).

Congress and the USDA have taken actions to improve the situation, including bolstering the Supplemental Nutrition Assistance Program (SNAP) and expanding eligibility criteria to take on more participants (Wolfson & Leung, 2020). The government created the pandemic-EBT (electronic benefits transfer) program that increased ability to purchase food, and certain school districts have found ways to deliver food to students that previously relied on school lunch

assistance programs, even though in-person instruction was shut down (Wolfson & Leung, 2020).

Regardless, surveys conducted by Wolfson and Leung (2020) between June 23<sup>rd</sup> and July 1, 2020, found over 43% of US adults with incomes less than 250% of the FPL (federal poverty level) experienced food insecurity. Most (59%) households with just one adult member losing a job were food insecure, and 72% of households with more than one member losing a job were food insecure. These data demonstrate that, despite governmental assistance programs, the economic strain of COVID persists.

Furthermore, rural populations are known to experience a higher prevalence of COVID-19 co-morbidities and chronic diseases such as obesity (CDC, 2017). Access to food and the food environment in rural areas may play a role in causing this. Rural individuals face travel barriers in achieving healthy food (Andress & Fitch, 2016), and rural areas are known to have lower availability of healthy foods (Whelan et al., 2018; Campbell et al., 2017). Studies comparing food insecurity amongst rural regions of other high-income countries have found that those regions have lower healthy food promotion, higher healthy food prices, and poorer access to food insecurity assistance resources (Cuttler et al., 2019; Buck-McFadyen, 2015). Therefore, the culmination of such factors may result in a rural food environment of poor diets and increased risk for obesity and other diet related chronic conditions.

#### **2.3.4 Burdens to Mental Health**

Public health practices such as social distancing and isolation increase susceptibility to stress and can cause harmful mental and physical effects (Hawkley & Cacioppo, 2010).

Furthermore, children and adolescents are more likely to experience symptoms of depression and anxiety both during and after social isolation measures end (Loades et al., 2020). For example, children and adolescents with behavioral health needs faced reduced access to care due to school closures (Loades et al., 2020). Behavioral treatments require frequent in-person communication and contact with therapists and teachers (Wong et al., 2020). In fact, among adolescents needing mental health services, 58% received them in an educational setting, and a larger proportion of them were low-income, minority students (Ali et al., 2019).

### **2.3.5 Parenting and Child Welfare**

Family and parent perceptions of COVID 19 are associated with increased caregiving demands on parents and increased parenting stress (Chung et al., 2020). Public health measures such as social isolation, and shutdown of schools, businesses, and childcare facilities have placed universal external stressors on families across the United States (US) (Brown et al., 2020). These in turn lead to an increased risk of harsh parenting (Chung et al., 2020). Child maltreatment results from an accumulation of risk factors. The ecological-transactional model of child maltreatment says that maltreatment risk and protective factors exist and compete at various levels (cultural, community, family, and individual) (Cicchetti & Lynch, 1993). Therefore, multiple risks or lack of protective factors at multiple levels can increase potential for abuse in an additive manner (Brown et al., 2020).

The closure of schools adds to parenting demands, endangering children already at risk for maltreatment (Wong et al., 2020). School personnel, who are mandated reporters of child maltreatment, were unable to report because of school closures (Wong et al., 2020). Child

protection workers reporting households with suspected maltreatment or families receiving child welfare services were unable to complete important safety checks due to social distancing measures (Wong et al., 2020).

Beyond stresses to parents, children living in poverty faced increased challenges during COVID. Some urban areas have reported as many as one third of their students not participating in online classes (Goldstein et al., 2020). Missing more than 10% of the school year is associated with adverse long-term outcomes such as reduced reading levels and graduation rates, and grade retention (Allison et al., 2019).

However, protective factors such as perceived control can help reduce risk of abuse. Perceived control, the belief that one has control over life events and outcomes, is important to understanding stress and coping (Dijkstra & Homan, 2016). Increased perceived control is associated with decreased overall stress, anxiety, depression, and better situational adjustment (Ballash et al., 2006). Supportive family environments are a protective factor in the context of parenting. Previous research shows that mother's perceptions of having family support are associated with less parenting stress; thus, parents with more support are better able to engage in positive parenting (Sanders et al., 2014). Therefore, child thriving domains, such as "Caring Families and Relationships" and "Positive Identity and Self Worth" can be important to examine for children during the pandemic.

### **2.3.6 Black, Indigenous, and People of Color (BIPOC) Ethnic Minorities**

For this section the term "Black" and "African American" are used interchangeably because of similar usage seen in the literature. Understanding the epidemiological data on patient



incidence and outcomes of the coronavirus disease is necessary to identify differences in the burden of the disease across different demographic groups. Black individuals are more susceptible to COVID-19 infection and hospitalization due to systemic inequities (Vahidy et al., 2020). Across the US, predominantly demographically Black counties have COVID-19 infection rates that are three times higher than predominantly white counties (Yancy, 2020). In Chicago, over half of all COVID cases and 70% of COVID mortalities are among the Black population, while only a third of Chicago's demographic is Black (Yancy, 2020).

In another study across a large Louisiana health system, Price-Haywood et al. (2020) found Black patients to represent only 30.6% of the study hospital's routine patients, yet 70.6% of its COVID patients. Black patients had twice the odds of hospital admission compared to white patients due to higher rates of comorbidities (e.g., obesity, diabetes, and hypertension). Overall, variables such as Black race, increasing age, more co-morbidities, public insurance, and residence in low-income areas were all associated with greater odds of hospital admission (Price-Haywood et al., 2020).

However, Black race was not associated with higher in-hospital mortality than white race. Therefore, racial disparities in COVID-19 hospitalization are likely due to unequal distribution of socio-economic risk factors along racial lines. For example, occupations that require high levels of contact with people and cannot be conducted online or remotely expose workers more to the disease. Studies have shown that Black and other minority groups are more likely to be involved as essential workers, causing increased barriers to social distancing practices (Selden & Berdahl, 2020). Socioeconomic differences between racial groups related to food insecurity, access to care, presence of comorbid, underlying chronic health conditions, and housing

instability may all contribute to the overrepresentation of minority populations having COVID-19 outcomes (Ahmed et al., 2020; Chowkwanyun et al., 2020).

## **2.4 Problem Statement and Purpose**

To understand the impact of COVID-19 on child and adolescent thriving and find out the needs of families in Allegheny County, the Family Strengths Survey (FSS) was conducted from April 2020 till August 2020 in Allegheny County, Pennsylvania. The Healthy Families Survey (HFS) was adapted from the FSS instrument using the exact same thriving measures and was similarly administered across Washington, Fayette, and Greene counties in rural southwest Pennsylvania. Each month, families were linked to resources to address barriers to services. This paper compares the results of child thriving measures and SDOH items used in the HFS and FSS surveys to explore differences in the impact of COVID on child thriving and families between urban and rural communities. Data from one of the most recently available months, September 2021, were analyzed. Examining thriving and SDOH measures together provides a more complete picture of how families in rural and urban areas are coping with the pandemic using a strengths perspective and reveals possible relationships between SDOH and thriving.

### **3.0 Methods**

This study examined data from two repeated cross-sectional online surveys of child and family strengths and challenges during COVID-19 (Ray et al, 2021). The Family Strengths Survey was conducted for 26 consecutive weeks after May 1, 2020, and then monthly from October 2020 through November 2021. The Healthy Families Survey was conducted in a repeated cross-sectional manner across Washington, Greene, and Fayette counties monthly from May to November 2021. The target population for both surveys was parents and caregivers who were pregnant or had at least one child (under the age of 18) living in the respondent's household. Measures included both validated measures from national surveys and other community-informed measures based on input from community partners, members, and other stakeholders.

#### **3.1 Community Engagement and Outreach**

The FSS was situated in the Pittsburgh Study, an ongoing academic community collaborative with many community partners including the local health department and social service agencies. Together with community partners, an online and telephone survey was developed, which addressed domains of childhood thriving, social determinants of health, and family demographics. The definition and validated measures of childhood thriving were based on the community partnered conceptual framework of child thriving (Ettinger et al., 2021).

Community based participatory action research methods including asset-based community development (ABCD) and asset mapping were conducted to identify community partners to include in the Healthy Families Survey project. ABCD is a research strategy to promote community capacity building and is strength-based, emphasizing existing assets and mobilizes resources for community driven change (Lightfoot et al., 2014). ABCD is internally focused, meaning that community members set the agenda and build community capacity before seeking outside resources. This method is also relationship driven, meaning it strengthens trust between individuals and groups (Lightfoot et al., 2014). ABCD methods included prompts to community members to list individual, association, institution, physical, local economy, and other types of assets in their community.

Asset mapping is a research method where community members identify individual, organizational, physical, and other types of assets in their community. This is conducted by facilitating discussions amongst community members where they define their community and its boundaries, compile a list of assets in their community, and eventually composing a physical or visual map displaying the interconnections and relations of the assets (Lightfoot et al., 2014). This asset-based approach was used to identify school partners, community organizations, and community members in Washington, Greene, and Fayette counties to collaborate on development and dissemination of the HFS, and to ensure that the resulting data are relevant and actionable in rural communities. Working with community partners helped tailor the survey questions to topics that were important to community partners and families. These methods included community asset mapping, outreach events, and presentations. Community members contributed to ideas about how to utilize the study results in a non-judgmental space.

## **3.2 Survey Development**

The Family Strengths Survey was a 246-item survey instrument including validated and community-informed measures of child and parent wellbeing, unmet health needs, access to care, housing quality and stability, food security, and social service use and needs. Some items were staggered across months and not asked every week. A shorter, 74-item instrument with questions adapted from the previous Family Strengths Survey was used to make the Healthy Families Survey. Common measures included SDOH factors and child thriving indicators.

### **3.2.1 SDOH Measures**

Measures were included from each of the five domains of the Healthy People 2030 SDOH model (Figure 2). For healthcare access and quality, unmet healthcare needs (any medical, dental, vision, mental health need) and health insurance status (public, private, or no insurance) items were based on National Survey of Children's Health Child and Family Health Measures. Economic stability items included household income (categorical), pandemic-related job/employment loss (yes/no), food insecurity (two items Hunger Vital Signs screener; Hager et al., 2010), and housing stability (two items from PRAPARE (Protocol for Responding to and Assessing Patients' Asset, Risks, and Experiences) screening on current housing situation and worried about losing housing from the National Association of Community Health Centers Measures. Food insecurity was measured via a response of "yes" to the prompt "We worried whether our food would run out before we got money to buy more." Household income was

categorized as low (<\$50,000), medium (\$50,000-\$100,000); and high (above \$100,000). Cut points were established based on benefit limits for childcare subsidies.

Social and community context measures included caregiver social support, mental health (Kessler-6; Kessler et al., 2002), and living needs (clothing, utilities, phone, internet, childcare, and school supplies from PRAPARE screener; (National Association of Community Health Center Measures), and the Everyday Discrimination Scale (Kriger et al., 2005). For education access and quality, questions about school and access to technology were included. Finally, for neighborhood and built environment, questions about participants' views towards their neighborhood and local community safety and support were included. Aside from transportation items, survey items also asked about the participant's perceptions of collective efficacy and safety in their local neighborhood/community. Participants were given various statements about their neighborhood and given four possible answer choices ("Definitely agree", "somewhat agree", "somewhat disagree", "definitely disagree"). Questions about lack of transportation acting as a barrier to medical and non-medical appointments were also included.

### **3.2.2 Child Thriving Measures**

The community-informed measures on child and parent thriving were based on the conceptual model of thriving (Figure 1; Ettinger et al., 2021). From these eight domains, ten community-informed child thriving items were used in the HFS and FSS surveys that covered all eight domains (See Supplemental Figure 3, Appendix A). The thriving indicators displayed convergent validity with previously existing validated measures. Parents reported on their ability

to do the following, with responses ranging from “not at all” to “completely” over the last seven days:

1. Strong Minds and Bodies: Keeping children’s medical conditions under control, meeting their socioemotional and learning needs
2. Positive Identity and Self-worth: Children feeling loved
3. Fun and Happiness: Playing inside and outside
4. Safety: Safely supervising children
5. Caring families and relationships: Connecting to family and friends
6. Vibrant communities: Maintaining connection to neighbors and organizations
7. Healthy environments: Meeting food and housing needs
8. Racial justice, equity, and inclusion: Protecting children from racism and prejudice

Survey responses to the child thriving measures were rated on a four-point scale from “not at all,” “somewhat,” “mostly,” and “completely.” Responses to child thriving measures were stratified into binary values: completely versus not completely. “Not completely” combined those who responded “mostly,” “somewhat,” or “not at all.”

### **3.3 Data Collection**

To identify existing strengths, needs, and inequities in communities living in concentrated disadvantage, community partners were enlisted and compensated to distribute the FSS and HFS both online and in person. In rural areas, survey flyers were distributed during community events, including health fairs and back to school events, with food distributions, and

at local childcare centers. School partners distributed the survey to families by email. Survey participation was incentivized via gift cards. For HFS, every participant was eligible to receive a \$15 gift certificate upon survey completion. For FSS, participants could opt to provide their contact information at the end of the survey to be included in a random weekly drawing for a \$100 gift certificate (due to funding limitations). In this way, a subset of families could receive direct aid to support economic and food security.

In addition to community partner outreach and incentives, survey participants were recruited via multiple listservs, local press, social media, Pitt+me referrals, the UPMC Community Health Team's Healthy Family Survey website, and texts/emails for prior participants who could opt for further contact and participation. Participants could take the survey over the phone or online in English and Spanish. The University of Pittsburgh IRB reviewed and determined these surveys were exempt FSS (Study No. 20040004) and HFS (Study No. 21030125). No identifying information on participants was collected so participation was anonymous with no longitudinal linking. Upon completion, participants were directed to online webpages of local resources; however, participation did not result in any case management or access to specific resources.

### **3.4 Analysis and Dissemination of Results**

#### **3.4.1 Data Analysis**

Responses to the September HFS survey were limited to zip codes included from Washington, Greene, and Fayette counties, and September FSS responses were limited to zip



codes from Allegheny County. HFS responses with children older than 18 were also excluded. Data from the September 2021 surveys were analyzed using descriptive statistics and Chi-square tests for SDOH measures. Descriptive statistics of survey data were conducted for both surveys to determine means, percentages, and frequencies. Identical measures and items from HFS and FSS were compared. These included measures within domains of unmet health needs, income/employment loss, economic assistance, food insecurity, housing insecurity, and the child thriving/flourishing measures.

Chi-Square and Fisher's exact test (for smaller sample sizes) were used to compare the ten child thriving measures, and an unadjusted logistic regression was done on SAS to calculate unadjusted odds ratios. All analyses were conducted in SAS Enterprise 9.3 (SAS Institute, Cary NC).

### **3.4.2 Data Dissemination**

Data dissemination was facilitated using UPMC Children Hospital's robust infrastructure of partnerships created by the Community Health Team's Healthy Schools program and The Pittsburgh Study. Collected data were shared with regional service, education, and philanthropic entities that are providing pandemic response services and resources in southwestern PA. A website was developed for the survey highlighting the resources available in the region (Children's Hospital of Pittsburgh, n.d.). Monthly reports, topic sheets, and other materials were sent to community partners. Presentations to community partners displayed summary graphs and charts of survey responses to specific SDOH items.

## 4.0 Results

**Study Participants.** The study included 158 parents/caregivers in September 2021 across both surveys. Of the 42 caregivers from rural counties, most were 30-44 years old (76%), female (98%), white (83%), and had a household income > \$100,000 (44%) (Table 1). Of the 116 caregivers in urban areas, most were also 30-44 years old (67%), female (90%), white (87%), and had a household income > \$100,000 (56%) (Table 1). Participants in rural counties were more likely to be female and younger compared to caregiver participants in urban areas. Both samples had a similar ethnic makeup. The percentages for race do not add up to 100% due to the presence of a third option marked “Other,” meaning remaining participants identify with other racial groups.

**Table 1. Unweighted Participant Characteristics in September 2021**

	Total n=158	Rural (HFS) n=42	Urban (FSS) n=116	P-values
Respondent age				
18-29 years old	10	6 (14%)	4 (3%)	
30-44 years old	110	32 (76%)	78 (67%)	
45-64 years old	37	4 (10%)	33 (28%)	
65 years of older	1	0 (0%)	1 (1%)	0.0060
Respondent gender				
Female	145	41 (98%)	104 (90%)	0.0257
Respondent race				
Black or African American	7	0 (0%)	7 (6%)	
White	136	35 (83%)	101 (87%)	0.0237
Child’s race is different than parent	11	5 (12%)	6 (5%)	0.1674
Respondent Hispanic or Latino/a/x ethnicity	3	0 (0%)	3 (3%)	0.5656

	Total	Rural (HFS)	Urban (FSS)	P-values
	n=158	n=42	n=116	
Current Household income				
<49,999	27	10 (24%)	17 (15%)	
50,000-99,999	46	13 (32%)	33 (29%)	
>\$100,000	81	18 (44%)	63 (56%)	0.3065
English-speaking household	155	42 (100%)	113 (97%)	0.6947

***Social Determinants of Health:*** Table 2 provides a summary of the SDOH needs experienced by rural and urban families during COVID. P-values are not reported for certain items due to small sample sizes (especially amongst HFS participants) for certain comparisons.

**Table 2. September 2021 HFS & FSS SDOH Measures and Results**

SDOH Factor	Measure(s)	Rural (HFS)	Urban (FSS)	P-value
Healthcare access and quality	Caregiver Unmet Health Needs (% Yes)	4 (10%)	9 (8%)	0.747
	Child Unmet Health Needs (% Yes)	4 (10%)	4 (3%)	0.207
	Form of Health Insurance			--
	Medicaid / CHIP	22 (42%)	29 (25%)	
	Commercial / Employer Based	34 (65%)	97 (84%)	--
	Uninsured	0 (0%)	1 (1%)	--
Economic Stability	Pandemic related Job/Income Loss (% Yes)	15 (36%)	36 (31%)	0.570
	At least One Household Adult Employed in last 7 days? (%No)	4 (10%)	6 (5%)	0.346
	Economic Assistance Resource Usage (% Yes)	15 (47%)	14 (16%)	0.0009

SDOH Factor	Measure(s)	Rural (HFS)	Urban (FSS)	P-value
	Housing Insecurity (% Yes)			0.676
	Food Insecurity (% Yes)	1 (2%)	6 (5%)	0.177
	Food Security Assistance Resource Usage(% Yes)	8 (19%)	12 (10%)	
		14 (45%)	32 (30%)	0.161
Social and Community Context	Caregiver Living Needs	8 (15%)	11 (9%)	--
	Clothing	8 (15%)	11 (9%)	
	Utilities	4 (8%)	13 (11%)	
	Phone	4 (8%)	13 (11%)	
	Internet	9 (17%)	16 (14%)	
	Child Care	3 (6%)	10 (9%)	
	School Supplies	1 (2%)	5 (4%)	
Education Access and Quality	Number of Days Eldest Child Missed from School	34 (77%)	85 (73%)	--
	No Missed Days	5 (11%)	12 (10%)	
	1 Day	4 (9%)	11 (9%)	
	2-3 Days	1 (2%)	4 (3%)	
	4 or more Days	0 (0%)	4 (3%)	
Neighborhood and Built Environment	Transportation Issues (Combined both items – barrier to medical and non-medical commitments)	8 (19%)	5 (4%)	--

***Healthcare Access and Quality:*** Reports of more unmet health needs for children were observed in rural compared to urban areas (10% vs. 3% respectively), although this was not statistically significant, potentially due to the small sample size of the HFS. For children in rural areas, dental (75%) and vision (50%) were the highest unmet health needs, and for children in urban areas, mental health (75%) was highest unmet need (Table 2). Similar trends were seen for

caregivers themselves. Slightly higher levels of unmet health needs for caregivers were observed in rural compared to urban areas (10% vs 8% respectively). For adults in rural areas, medical care for an illness or health condition (56%) and medical care for a check-up or shots (33%) were the highest unmet need. For adults in urban areas, unmet dental care needs were highest (75%). Finally, a higher proportion of rural households were enrolled in Medicaid or CHIP forms of health insurance (39.3% vs 25% respectively).

***Economic Stability:*** Income/employment loss due to COVID was similar in rural and urban settings (36% vs. 31% respectively). Furthermore, a similar number of rural and urban participants reported working from a job outside of their home (67% vs 61%). A lower portion of the rural sample reported working via remote means in the past seven days compared to the urban sample (24% vs 34%), though not significant. A significantly greater percentage of caregivers in rural areas reported using economic assistance areas compared to urban areas (47% vs 16% respectively). In both rural and urban areas, the most common forms of family support assistance were unemployment compensation (15% of rural caregivers compared to 3% of urban caregivers), pandemic stimulus payments (29% of rural caregivers compared to 10% of urban caregivers), and SNAP benefits (15% of rural participants compared to 8% of urban participants) (Table 2).

Reports of housing insecurity, measured via the two-item screener from PRAPARE, were similar between rural (2%) and urban (5%) areas. A trend of greater food insecurity in rural compared to urban areas (19% vs. 10%) was observed, although this was statistically insignificant (Table 2). For example, 25% of rural participants responded often or sometimes true to “We worried whether our food would run out before we got money to buy more”

compared to 10% for urban participants. Use of food security assistance was also greater among rural families (45%) compared to urban families (30%).

***Education access and quality:*** Participants reported the number of school days missed by children in their household. Only 2% of rural participants had children who missed 4 or more days of school compared to 6% of urban participants.

***Social and Community Context:*** HFS and FSS participants reported unmet household needs. The most reported unmet household needs included childcare services: 17% (rural) vs 14% (urban), clothing: 15% (rural) vs 9% (urban), and utilities 15% (rural) vs 9% (urban).

***Neighborhood and Built Environment:*** Transportation was a struggle for rural participants: 14% of rural participants reported that transportation was a barrier for non-medical meetings, appointments, work, or other needs compared to 2% for urban participants. After combining both items asking about transportation barriers to medical and non-medical meetings, appointments, 19% of HFS participants reported transportation as a limiting factor for these commitments compared to 4% for FSS participants.

A slightly higher proportion of rural participants reported dissatisfaction with the collective efficacy and safety in their neighborhood. For example, 17% of HFS participants somewhat disagreed or definitely disagreed with the statement “People in this neighborhood help each other out” compared to 11% for urban participants. 17% of HFS participants somewhat disagreed or definitely disagreed with the statement “When we encounter difficulties, we know where to go for help in our community” compared to 13% of FSS participants.

***Child Thriving Outcomes:*** A consistently higher percentage of urban caregiver participants reported completely meeting the child thriving/flourishing measures across all ten measures on the HFS and FSS surveys. Response data showed a statistically significant difference between urban and rural participants for five out of the ten child thriving measures: Getting food to you and children; Adequate household utilities; Adjusting to changes in work, employment, or income; Child safety and supervision; and Child protection from inequality, racism, prejudice, and exclusion from resources (Table 3). Overall, rural residents had a lower odd (OR<1) of completely meeting the child thriving measures compared to urban resident survey participants in September 2021 (Table 3).

**Table 3. September 2021 HFS & FSS Child Thriving Measures and Results**

<b>Thriving Outcome</b>	<b>Rural (HFS) (% Yes)</b>	<b>Urban (FSS) (% Yes)</b>	<b>Odds Ratio (95% CI)</b>	<b>P-value</b>
<i>(Q1) Healthy Environments:</i> Get food to keep you and your child fed	73.81%	94.83%	0.15 (0.053-0.45)	0.0005
<i>(Q2) Healthy Environments:</i> Keep your child housed with adequate electricity, water, and bills paid	76.19%	92.14%	0.27 (0.10-0.72)	0.0071
<i>(Q3) Healthy Environments:</i> Adjust to changes with work, employment, or income.	47.62%	62.93%	0.54 (0.26-1.09)	0.033
<i>(Q4) Strong Minds and Bodies:</i> Keep your children's medical issues under control	61.90%	64.66%	0.89 (0.43-1.84)	0.14
<i>(Q5) Strong Minds and Bodies:</i> Help your children be well-adjusted socially, mentally, and emotionally	42.86%	43.97%	0.96 (0.47-1.95)	0.143
<i>(Q6) Safety:</i> Help your children learn and be safely supervised	50.00%	63.79%	0.57 (0.28-1.16)	0.0434

Thriving Outcome	Rural (HFS)	Urban (FSS)	Odds Ratio	P-value
<i>(Q7) Positive Identity and Self-worth:</i> Help your children feel safe, happy, and loved	73.81%	76.72%	0.86 (0.38 – 1.93)	0.153
<i>(Q8) Fun and Happiness:</i> Find ways for your children to have fun and safely play inside and outside	54.76%	62.07%	0.74 (0.36-1.51)	0.103
<i>(Q9) Caring Families and Relationships/Vibrant Communities:</i> Care for and keep your children connected with your friends, family, religious community or neighbors	38.10%	47.41%	0.68 (0.33-1.40)	0.085
<i>(Q10) Racial Justice, Equity, and Inclusion:</i> Protect your children from inequality, racism, prejudice, or exclusion from available resources	40.48%	59.48%	0.46 (0.23 – 0.95)	0.016

***Community-Partnered Data Dissemination:*** A series of infographic flyers specific to the urban and rural southwestern PA counties were also developed. Topics of the infographic flyers included economic assistance resources, food insecurity resources, and unmet health needs resources. These were distributed to partners for dissemination and to educate households on where to find resources for support.



## 5.0 Discussion

The results of this study provide a snapshot of child thriving outcomes during September 2021 of the pandemic, adding to our understanding of how COVID-19 is impacting families in rural and urban areas of PA. Results suggest persistent unmet health and social needs in urban and rural areas during COVID. These findings align with both national reports of unmet needs and significant challenges faced by rural families reported by community partners, including transportation, food insecurity, and employment/income loss.

Different unmet health needs were reported in rural and urban areas. Although not significant, rural areas showed a trend toward greater unmet health needs compared to urban areas. The results for greater unmet health needs amongst rural participants is aligned with current literature showing the limited access to healthcare that rural US populations have due to geographic isolation, lower SES, and lack of health insurance. For example, a CDC 2021 report shows a greater number of uninsured individuals living in rural and non-metro counties compared to their urban/metro area counterparts (National Center for Health Statistics, 2021). The 2014 National Center for Health Workforce Analysis report identified health workforce shortages in rural US communities. Only 8% of physicians and surgeons' practice in rural settings, and a larger proportion of rural healthcare workers have lower levels of education and training (Rural Health Information Hub, n.d.). Peters (2020) found higher proportions of individuals in rural areas who are uninsured or have disabilities.

Another reason for greater unmet health needs in rural areas is the transportation barriers rural residents face. A greater number of HFS, rural participants reported transportation as a

barrier to their medical and non-medical commitments. This is consistent with the 2017 National Household Travel Survey which reports that the distance travelled for a one-way trip to receive medical/dental care in 2017 for rural residents (17.8 miles) is more than twice the distance travelled by urban residents (8.1 miles; Akinlotan et al., 2021). Furthermore, more than half (55.8%) of rural residents identified gasoline costs, time, and expenses associated with travelling as barriers to receiving care compared to the number of reports from urban residents (45%) (Akinlotan et al., 2021).

The high levels of unmet dental health needs of children in rural communities are consistent with known dental care access disparities between urban and rural counties in PA. For example, a RAND report identified children's access to specialized dental care in PA an acute issue, as more than half (39 out of 67) of PA counties lack a pediatric dental specialist (Baird et al., 2016). In fact, PA counties with low population size and population density were lower on almost all dental access indicators included in the RAND report. The top 25% of PA counties, based on population density, had about five times as many dental specialists as the bottom 25% of PA counties (Baird et al., 2016). Therefore, access to dental care has been an ongoing and pressing need for rural PA children.

Economic needs were some of the most challenging for rural families based on both SDOH and child thriving measures. Urban and rural caregivers reported similar levels of income/employment loss due to COVID; however, a significantly lower number of rural caregivers reported being able to adjust to changes with work, employment, or income. This suggests additional unemployment supports and employment training and opportunities are needed in rural areas.

One of the most notable findings was the statistically significant difference in social service usage between urban and rural participants. More rural participants were enrolled in Medicaid or CHIP than urban participants and use of economic assistance, such as pandemic stimulus packages and unemployment compensation, was significantly higher among rural families.

Despite this, rural families had a harder time meeting some of the economic-related thriving measures. A significantly lower number of rural participants reported being able to house their children with adequate electricity, water, and bills paid. Rural caregivers also reported a trend of greater food insecurity based on the 2-item Hunger Vital Signs Screener and had significantly lower levels on the thriving measure of getting food to keep you and your children fed. These results suggest that existing forms of economic and social support programs are not meeting the needs of rural communities. However, income was not adjusted for in the samples and could be potentially confounding these relationships.

Overall, factors such as geographic isolation, transportation, workforce shortages, and uninsurance rates are all factors that may contribute to higher unmet needs in the HFS sample. Transportation and geographic isolation can make rural residents more likely to delay or miss their healthcare appointments and receive less primary, preventative, and other forms of healthcare. Possible interventions include incorporating telehealth services in rural primary care practices too allow urban workforce professionals to connect to rural populations. Past literature has shown how telemedicine can be leveraged to address healthcare access and economic challenges during public health emergencies and disasters (Lurie & Carr, 2018).

A current strategy that has been adopted by about 50 health systems across the U.S. so far is “forward triage”, where patients are sorted, screened, or referred virtually before they arrive at a hospital emergency department (Hollander & Carr, 2020). Webcam computers and mobile video chatting apps have been used to communicate directly with patients regarding respiratory symptoms which is a common early sign of COVID-19 infection. Some health systems, such as Jefferson Health, have automatic logic flows that triage moderate to severe patients and allow patients to schedule visits with on-demand virtual healthcare providers. Patients can provide information such as recent travel and exposure history needed for a diagnosis. Automated programs have also been integrated allowing for efficient updates to epidemiologic databases and information.

Another example is an initiative in Houston, Texas called Project ETHAN (Emergency Telehealth and Navigation) which uses mobile healthcare technology to supplement and increase the level of care provided by emergency first responders such as paramedics (Langabeer et al., 2016). Such programs have the potential to diagnose patients in their home or refer them directly to a hospital bed/healthcare facility and bypass the emergency department process (Langabeer et al., 2016).

The main barrier to large scale adoption of telemedicine practices is the lack of provider payment parity (Lacktman et al., 2021). Policies regarding healthcare provider’s credentialing, Medicaid reimbursement, and commercial reimbursement are left up to the discretion of states (Hollander & Carr, 2020). A national survey found only 16 states have laws regarding telehealth reimbursement and only 10 states offer true equal pay (Lacktman et al., 2021). Therefore, providers in other states will face difficulties in seeking compensation for telehealth care.

One of the lowest self-reported thriving measures amongst both rural and urban survey samples was meeting the socioemotional needs of children. Less than half of the urban and rural samples reported being able to completely help their children be well-adjusted socially, emotionally, and mentally. Similarly, amongst the healthcare access and quality SDOH measures, mental health was reported as one of the highest unmet health needs for the urban sample. These findings support past research showing psychological distress has significantly increased nationally during COVID-19 in 2020 based on National Health Interview Survey (NHIS) survey results (McGinty et al., 2020). These challenges are also consistent with national studies of child and adolescent mental health during the pandemic which show that more than a third of adolescents reported high levels of loneliness during the lockdown agreeing that the lockdown made their mental health much worse and over half (51%) of youth participants said the lockdown made their mental health a bit worse (Young Minds Report, 2020).

Loneliness as an unintended consequence of social isolation measures can be particularly problematic for young people because of the importance of peer groups as an identity and social support for individuals at this age (Loades et al., 2020). Teenagers may be particularly vulnerable to loneliness and its associated effects on mental health during the pandemic. Studies that examined mental health after enforced isolation and quarantine found that children exposed to such measures were up to five times more likely to experience mental health services and higher levels of stress (Loades et al., 2020). Past research shows that the length of loneliness is also a predictor of such symptoms (Qualter et al., 2010, which is relevant to politicians and policy makers deciding upon the length of national isolation measures or reinforcing such measures if another variant of the virus breaks out.

However, common practices that can mitigate the mental health impacts of the pandemic include promoting the quality and quantity of social networks and ensuring parents and households can provide a reliable support network for children and adolescents during such a stressful time. Allowing children to feel a sense of belonging within their families and communities is essential (Wang et al., 2017). Furthermore, finding new hobbies and alternative activities to address the involuntary social isolation will provide rewards (Pass et al., 2018). Collecting and reporting reliable measures on child and adolescent flourishing and the risks and benefits of social media and networking to parents who restrict screen time for their children can help young people access the benefits of virtual social contact (Loades et al., 2020). Finally, educating and raising awareness amongst parents about child thriving can help promote such practices at home. Completing surveys on child thriving measures may raise awareness about the lack of such activities in the participant's home. Regardless, schools and communities should continue to find ways to support child and adolescent learning and relationships for all children.

Furthermore, current research and intervention development for rural teens are based on the results of health surveys that do not include the first-person views of rural adolescents and primarily rely on statistical indicators (Curtis et al., 2010). One possible change is to incorporate more data from focus groups and interviews of rural adolescents into future interventions. Studies have found that the perceptions and opinions of rural adolescents towards being healthy and thriving differs from their urban counterparts (Miller et al., 2018; Interagency Working Group on Youth Programs, n.d.). Since resource availability, political affiliations and views, and opinions towards the pandemic all differ between urban and rural regions, interventions will need to be adapted to the different and changing needs of both settings (Cramer, 2016). Therefore, future interventions should include more diverse data on supporting rural youth.

## **6.0 Conclusion**

To understand the needs of families in our community, two community partnered surveys were administered during the COVID pandemic. This study analyzed differences amongst the September 2021 results of urban and rural PA participant samples. Comparisons of community-informed child thriving measures were analyzed. In addition, survey items corresponding to the five SDOH domains were also compared and analyzed. Rural caregivers reported higher levels of unmet individual and child health needs, greater rates of food insecurity, and transportation barriers. Furthermore, there was a significantly greater usage of economic assistance programs amongst rural participants compared to urban participants despite a similar level of COVID related income/employment changes amongst both samples. Regarding child thriving, rural caregivers had a significantly lower odds of meeting five out of ten included thriving measures for their children compared to urban caregivers.

This study had several limitations. A primary limitation was the small sample size of the rural population in the Healthy Families Survey. This prevented more complex data analysis of FSS and HFS surveys and affected the power of the study to detect statistically significant results for certain SDOH categories. Furthermore, zip code information from participants was classified as being rural, suburban, and urban. Therefore, participants from Washington county zip codes with a higher population density could be classified as a suburban resident which may skew rural participant data. The cross-sectional design of the surveys allowed for a single time snapshot of the most pressing needs faced by our community but prevents any cause-and-effect associations

of how community needs may be changing over time as we phase out of the coronavirus pandemic.

One of the strengths of this study were the use of community informed measures on child thriving. Involving community members ensures we assess measures relevant to the community rather than assuming we know what families of southwestern PA need during the pandemic. The survey administration used incentives and was offered in both English and Spanish, which are both practices necessary to increase the diversity of participants.

Future research directions are to increase sample size, add temporality (measuring changes in thriving measures and SDOH measures throughout months during the pandemic), and categorize responses based on zip code.

The coronavirus pandemic posed a range of sudden and unexpected challenges for families across the US and recovering from this will not be easy. The pandemic increased inequities amongst SDOH between rural and urban regions. While numerous efforts have focused on cities and finding means to cope with the pandemic through public health measures, the same support measures may not be equally effective in rural areas that face unique challenges related to accessing resources. Rural children, youth, and families may hold different opinions and views about what it means to live a healthy and flourishing lifestyle. The challenges parents face in providing a healthy environment and meeting the thriving needs of their children are different than urban parents. Assuming the same interventions developed and used for urban regions will be equally effective in rural regions has resulted in pressing unmet needs. Furthermore, practices needed to curb the spread of the virus such as social distancing and isolation have left unintended harms on the mental health of our children and adolescents for



both rural and urban areas. Bringing parent's attention to practices that can improve their child's thriving will be crucial to improve our youth's mental and physical health.

Possible interventions include telemedicine, political awareness, and providing resource support to rural healthcare systems. Telemedicine practices that promote referrals and decrease patient wait times. Such practices decrease the in-person workload for hospital emergency departments which can be especially useful for rural health systems where resources are relatively lower such as the shortage of ICU beds that has been consistently reported as a struggle during the pandemic. Furthermore, such telehealth practices help address workforce shortages. However, beyond this, increased awareness of the impacts COVID has made on both our personal and family's health is needed to move forward.

## Appendix A Supplementary Figures

Q7 Think about the **last 4 weeks** and your family or the people you live with. If you are pregnant (soon to become a parent), think about your immediate household. Over the last 4 weeks, do you feel like you were able to do the following things for your children as much as you wanted to?

	Not At All	Somewhat	Mostly	Completely	Doesn't Apply or Not a Priority For Us Currently
Get food to keep you and your children fed.					
Keep you and your children housed with adequate gas, electricity, and water and bills paid.					
Keep your children healthy and their medical issues under control.					
Help your children be well-adjusted socially, mentally, and emotionally.					
Help your children learn during this time and be safely supervised.					
Help your children feel safe, happy, and loved.					
Find ways for your children to have fun and safely play inside and outside.					
Care for and keep your children connected with your friends, family, religious community, or neighbors.					
Protect your children from inequality, racism, prejudice, or exclusion from available resources.					

**Figure 3. Child Thriving Survey Item**

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