Considering a Biopsychosocial Model: The Roles of Family Routines and Care Coordination in Supporting Youth with Asthma

by

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(Under the Direction of Stacey Neuharth-Pritchett)

ABSTRACT

This two-study dissertation investigated the roles of several psychosocial factors in health and functioning outcomes for youth with asthma through a biopsychosocial model, a framework pediatric psychologists have adopted to conceptualize how biological, psychological, and social factors influence asthma-related outcomes. The first study explored rates of family routines in families with young children with asthma, examined relationships between family routines and young children's asthma severity and health statuses, and identified connections between family routines and flourishing in young children with asthma. Findings revealed that caregivers frequently engage in key family routines—reading, sharing meals, singing and telling stories, and maintaining consistent bedtimes— with significant differences observed in the frequency of singing and storytelling in those with mild asthma. Demographic factors such as poverty and neighborhood safety were predictive of asthma severity and overall health. Although singing and storytelling emerged as a unique predictor of health status and child flourishing, this study found no moderation effect of family routines on the relationship between health status and flourishing. This study underscores the need for further research into how specific family routines can enhance wellbeing among children with chronic conditions, highlighting the importance of

environmental and community factors in shaping health outcomes. The second study examined the interplay between caregiver-perceived care coordination and school outcomes for children with asthma. Results revealed that better child health status and supportive neighborhoods are associated with improved experiences in care coordination, including reduced frustration and time spent coordinating care. Care coordination positively influenced school engagement and absenteeism; caregivers who reported receiving needed services and experiencing no frustration were less likely to report poor school outcomes. These results emphasize the importance of a biopsychosocial approach in care coordination programs, particularly for underserved populations, to mitigate the adverse effects of chronic conditions on educational attainment. Together, the two studies that comprise this dissertation highlight the importance of addressing psychosocial factors to support youth with chronic conditions.

INDEX WORDS: Asthma, family routines. care coordination, social determinants of health, biopsychosocial model

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CHAPTER 1

DISSERTATION INTRODUCTION

Forty percent of youth in the United States in their lifetime will receive a chronic health diagnosis such as asthma, diabetes, or epilepsy (Centers for Disease Control and Prevention [CDC], 2021). Among school-aged children and adolescents, asthma is a leading and consistently prevalent chronic condition impacting 1 in 12 youth (CDC, 2021; Cleveland Clinic, 2019). Asthma exacerbations occur most frequently in children under the age of five and the number of hospital visits are highest for those ages four and younger (CDC, 2018). Moreover, children with asthma are at risk for a variety of adverse outcomes when compared to their peers without asthma. These adverse outcomes include frequent school absenteeism, lower academic performance, poorer peer and teacher relationships, greater incidences of anxiety, depression, and self-esteem issues, and poorer self- and parent-reported quality of life (Banjari et al., 2018; Krenitsky-Korn, 2011; Lum et al., 2019; Moonie et al., 2008; Nurmagambetov et al., 2017; Rhee et al., 2017). With a growing percentage of youth diagnosed with asthma and strong evidence for a range of adverse outcomes, there is a need for research on home, school, and medical care factors that support not only physical health, but also social-emotional needs.

Review of Asthma

Asthma is a chronic illness characterized by airway inflammation resulting from a variety of triggers, including but not limited to exposure to environmental irritants such as tobacco smoke, chemicals, allergens, stress, and respiratory infection (Hargreave & Nair, 2009; Sockrider

& Fussner, 2020). Recent asthma research indicates asthma is not a homogenous illness and that there are currently 17 endotypes, including allergic, early-onset, infection-induced, viral-exacerbated, and exercise-induced asthma, among others (Gans & Gavrilova, 2020). Symptoms of asthma in youth are wheezing, coughing, and difficulty breathing, all of which can lead to sleep disturbances, speech difficulties, and exercise limitations (Asher et al., 2021). Numerous pharmacological interventions are used in the treatment of asthma, including corticosteroids, long-acting beta agonists (for the purpose of decreasing bronchoconstriction), antibiotics, vitamin D, immunotherapy, and more (Asher et al., 2021). Non-pharmacological factors that influence asthma management are discussed below.

Asthma Risk and Protective Factors

Factors that appear to increase the risk of developing asthma include prenatal factors such as parental asthma, prenatal exposure to tobacco smoke, and maternal stress during pregnancy; perinatal factors such as pre-term birth and low birth weight; and postnatal factors including indoor exposure to mold or fungi and contraction of viral infections in early childhood. Protective factors include maternal intake of certain vitamins during pregnancy, breastfeeding, high dietary intake of fruit, childcare attendance during the first six months of life, and exposure to animal dander in early life (Castro-Rodriguez et al., 2016; von Mutius & Smits, 2020).

Many other factors contribute to quality of life for youth with asthma and their families. One such factor is asthma control. In 2022, the Global Initiative for Asthma defined lack of asthma control as the presence of limitations in daily activities and the frequent use of rescue medication, noting that those who have better control experience fewer limitations and use rescue medication less frequently. Although percentages vary slightly, the percentage of school-aged children who

have poorly controlled asthma ranges from 32% to 64% (Gandhi et al., 2013; Koster et al., 2011; Lozano et al., 2003; Petsios et al., 2013).

Non-pharmacological factors that impact asthma control and ultimately improved quality of life include but are not limited to reduced exposure to environmental triggers (i.e., tobacco smoke), family functioning, school management, and access to quality healthcare (Findley et al., 2011; Janevic et al., 2016; Peterson-Sweeney et al., 2010; Schreier & Chen, 2010; Wheeler et al., 2009;). Family functioning and effective healthcare are explored in this dissertation.

Biopsychosocial Model

The prevalence and presentation of asthma also varies by demographic characteristics. In 2015, prevalence of asthma was 13.4% in African American, Non-Hispanic youth, and 7.4% in White, Non-Hispanic youth (Akinbami et al., 2016). African American, Non-Hispanic youth also demonstrate higher rates of asthma exacerbations, hospitalizations, and even mortality, when compared to White, Non-Hispanic youth, even when race and ethnicity are controlled for (Akinbami et al., 2012; Bryant-Stephens, 2009). Importantly, race is considered a proxy for other important factors that influence health status, such as health literacy, family stress, healthcare access, and environmental exposures (Matsui et al., 2019).

Psychosocial factors, both risk and protective, are equally as important as biological predispositions when considering presence, prevalence, and interventions for asthma (Wood et al., 2015). Asthma researchers and more broadly, pediatric and health-service psychologists, have advanced the use of a biopsychosocial model in the conceptualization and treatment of asthma, and have largely retired a traditional biomedical conceptualization that focuses only on physical and biological factors (Matsui et al., 2019; Stempel et al., 2019; Wood et al., 2015). The

biopsychosocial model suggests that there are interconnected, causal pathways between characteristics such as race, socioeconomic status, family and community factors (e.g., family routines, home climate, parenting processes, environmental exposures, healthcare access), disease management practices, and ultimately, asthma control (Wood et al., 2015). Conceptualizing asthma status using a biopsychosocial model also promotes identification of modifiable pathways, including healthy environments, health behaviors (e.g., nutrition, physical activity, medication adherence), general coping to reduce health-related distress, and access to and utilization of healthcare (Sharrad et al., 2022).

Overview of Two Studies

These two studies examine two modifiable, psychosocial factors identified in literature as supportive of the health and functioning of youth with asthma: 1) consistent family routines and 2) effective care coordination between families, schools, and medical providers. The first study focuses on young children with asthma and aims to answer three research questions: 1) What is the prevalence of select family routines in young children with asthma and their families, and does this differ based on asthma severity? 2) To what extent do consistent family routines impact asthma severity and youth's health status, and what role do select demographic, family, and community factors play in this relationship? and 3) How do variations in family routines moderate the relationship between health status and young children's flourishing? This study will provide information on the routines families of youth with asthma are engaging in at home and how these routines might be associated with their health status and overall functioning (as characterized by their flourishing). The second study focuses on school-aged youth and aims to satisfy two goals: 1) explore caregiver-perceived experiences of care coordination and identify

differences, if any, by demographic, health status, and neighborhood variables, and 2) investigate associations between perceptions of care coordination and school outcomes. Together, these two studies will contribute to a greater understanding of the role of these two psychosocial factors in a biopsychosocial conceptualization of asthma.

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CHAPTER 2

THE ROLE OF FAMILY ROUTINES AND SOCIAL DETERMINANTS OF HEALTH IN YOUTH WITH ASTHMA: EXAMINING YOUNG CHILDREN'S FLOURSHING UTILIZING A BIOPSYCHOSOCIAL MODEL [1]

[1] Davie, S.H., Neuharth-Pritchett, S., Schilling, E.J., Pidaparti, C., Lease, A.M. To be submitted to *Journal of Asthma.*

Abstract

Objective. This study aimed to explore the roles of family routines and social determinants of health in shaping health outcomes and flourishing among young children with asthma.

Methods. Using the National Survey of Children's Health (2018-2019), a nationally representative dataset, this study examined the frequency of family routines (reading, singing and telling stories, sharing mealtimes, and bedtime consistency), their association with asthma severity, health status, and flourishing, and interaction effects of family routines on health status and flourishing (n = 433). Social determinants of health were also evaluated for their impact on these outcomes and data were primarily analyzed via ordinal regression.

Results. Most caregivers reported consistently engaging in all four family routines. No significant differences were found in the frequency of routines based on asthma severity, except for singing and storytelling, which were less frequent among children with mild asthma. Neighborhood safety and income level emerged as significant predictors of asthma severity and health status, and children living in neighborhoods with poorer safety or below the poverty threshold demonstrated poorer outcomes. Health status was found to significantly predict flourishing, with children with poorer health status reporting lower odds of flourishing. Singing and storytelling emerged as a predictor of flourishing, though no family routine moderated the relationship between health status and flourishing.

Conclusions. This study highlighted the importance of family routines, particularly singing and storytelling, in promoting health outcomes and flourishing in young children with asthma. It underscores the need for interventions that address both family functioning and social determinants of health to support the overall wellbeing of children with chronic conditions.

Introduction

Asthma affects 1 in 12 children in the United States with prevalence increasing in rate each year, making it not only the most common chronic health condition but also a growing public health concern (Centers for Disease Control [CDC], 2018). Not only does asthma affect the quality of life of diagnosed individuals (Sullivan et al., 2013), but it also contributes to a significant financial burden in the United States as a whole, with estimated total costs incurred by school and workplace absenteeism and mortality reaching $81.9 billion (Nurmagambetov et al., 2017).

Individual and system-wide costs are higher in those with poorly controlled asthma (Howell et al., 2017; Sullivan et al., 2013). Although poorly controlled asthma only accounts for 5-10% of cases, it is responsible for 50% of all asthma-related healthcare costs and is linked to asthma morbidity in adulthood (Forno et al., 2012; Guilbert et al., 2014). In 2022, the Global Initiative for Asthma described lack of asthma control as the presence of limitations in daily activities and the frequent use of rescue medication, noting that those whose conditions are better controlled experience fewer limitations and have infrequent use of rescue medication. Although percentages vary slightly, the percentage of school-aged children who have poorly controlled asthma ranges from 32% to 64%, depending on the season of the year and the variables used to define control (Gandhi et al., 2013; Koster et al., 2011; Lozano et al., 2003).

Social Determinants of Health and Asthma Disparities

Healthy People 2030 notes that health disparities are health differences closely linked with social, economic, and environmental disadvantages. Health disparities also are tied with social determinants of health, or non-medical factors that influence health outcomes (World

Health Organization [WHO], n.d.). Experts in the field of asthma have emphasized the significant impact that social determinants of health, such as socioeconomic status (SES), physical environment like housing and pollutant exposure, barriers to accessing health care, and early child development have on asthma and asthma disparities (Grant et al., 2022).

Incidence rates of asthma are highest in youth from racial and ethnic groups that are minoritized and families from lower socioeconomic backgrounds when compared to White and high-SES youth and families (Asthma and Allergy Foundation of America [AAFA], 2022; Akinbami et al., 2016). Asthma exacerbations, hospitalizations, and asthma-related mortality rates are highest in African American, non-Hispanic youth compared to White youth (Akinbami, 2016) and youth living in inner-city environments are most at risk for asthma exacerbations, poorer asthma control, and higher healthcare needs (Poowuttikul et al., 2019). Given this demonstrated link, social determinants of health must be directly targeted in research and care for youth with asthma and specifically for those from groups with higher morbidity and mortality rates.

Risk Factors Related to Environment and Community

Risk factors can be subcategorized into environment/community and child/family factors to further differentiate and target areas for intervention (Stempel et al., 2019; Weinstein et al., 2019). There is a direct pathway by which housing and neighborhood environments affect asthma, and increased exposure to allergens in the household at an early age contributes to increased risk of asthma and asthma severity in youth (Bryant-Stephens et al., 2021; Matsui, 2014). Presence of pests and exposure to mold, household air pollutants such as tobacco smoke, cleaning agents, and gases from heating and cooking are associated with lung function as early as

infancy, and all of these triggers are more common in substandard housing (Dai et al., 2022; Reponen et al., 2012; Shahunja et al., 2021; Wang et al., 2009).

At the community level, higher rates of self-reported neighborhood disorder are associated with more asthma symptoms, whereas neighborhood cohesion is associated with fewer (Chen et al., 2007; Vo et al., 2016). Neighborhood educational attainment, car access, and population density explain variation in asthma-related hospital admission rates by neighborhood and exposure to community violence is associated with a higher number of days with symptoms (Beck et al., 2013; Wright et al., 2011). Importantly, the exact mechanisms by which these risk factors impact asthma morbidity and severity need further exploration and scholars note the difficulty of disentangling the role of interrelated social determinants of health such as race, ethnicity, SES, and housing in asthma morbidity. Direct links have been found between environmental pollutants and birth, neurodevelopmental, and cognitive outcomes (Kalia et al., 2017; Perrera et al., 2003; Perrera et al., 2009) in broader populations, and worsened asthma/respiratory symptoms in youth living in urban, inner-city communities (Miller et al., 2004; Patel et al., 2011).

Risk Factors Related to the Child and Family Structure and Processes

Risk factors at the child and family levels include age, parent and child mental health, and family functioning. Young children are at particular risk for asthma exacerbations and hospitalizations and children under the age of five have the highest incidence of asthma-related hospital visits, making it vital that research focuses on this vulnerable age group (CDC, 2018). Child chronic stress and symptoms of anxiety and depressive disorders are also related to

asthma, although these relationships are bi-directional and might be more attributable to overall health status instead of asthma alone (Calam et al., 2005; Landeo-Gutierrez & Celedón, 2020).

Family functioning, typically operationalized as the rules followed in the family, parent and child roles, and affective concern and interest in one another, is also related to the extent to which youth are distressed by their asthma symptoms (Weinstein et al., 2019). Family chaos is significantly and inversely associated with parental help with medication and asthma control, and youth with asthma and poorer overall health status are more likely to report lower levels of family resilience (Epstein et al., 1978; Nabors et al., 202; Sawyer et al., 2001). Parent mood is also associated with more symptom-free days for youth with asthma (Tully et al., 2019). Figure 1.1 depicts select risk and protective factors at the child/family and environment/community levels.

Family Routines and Flourishing

Family routines are another component of family functioning. Family routines are operationalized as specific, repetitive, and predictable behaviors that involve two or more family members (Spagnola & Fiese, 2007). Routines involve instrumental communication about specific tasks between family members and are typically limited to a specific time frame (Crespo et al., 2013). Practices commonly thought of as family routines include shared mealtimes, reading together, and night and morning routines, amongst others (Spagnola & Fiese, 2007). There are also asthma-specific family routines associated with better medication adherence and decreased environmental exposures (Peterson-Sweeney et al., 2010). Family routines are a protective factor with older studies finding that routines buffer against stress and protect against illness (Jensen et al., 1983). Outside the context of chronic illness and more recently, family

routines were found to lead to a range of improved outcomes in young adulthood and routines served as a buffer for stress incurred by the COVID-19 pandemic (Barton et al., 2019; Bates et al., 2021; Ferretti & Bub, 2017; Muñiz et al., 2014). Family routines are of particular importance for African American youth in the development of resilience and school readiness outcomes and are associated with language, academic, and social development in young children (Ferreti & Bub, 2014; Spagnola & Fiese, 2007).

Family routines both impact and are impacted by the presence of chronic conditions in youth. Routines are protective in that they support positive health and adaptation outcomes, and the presence of a chronic health condition also impacts the frequency and consistency of family routines (Crespo et al., 2013). In youth with asthma, family routines are associated with decreased disease-related stress levels and inflammatory markers, suggesting that family routines not only influence the social-emotional but also the biological pathways of asthma (Markson & Fiese, 2000; Schreier & Chen, 2010).

Flourishing represents a child's ability to cope with adversity, develop positive relationships, and exhibit a sense of motivation and purpose (Barnhart et al., 2022; Donney et al., 2022). It is a growing area of research that has received considerable attention within the field of positive psychology (Hauschke, 2021). Factors that support flourishing include family resilience, parental wellbeing, social support, school engagement, family-centered healthcare, and more (de la Fuente, Sánchez-Queija, & Parra, 2023; Nabors et al., 2016). Studies that examine flourishing in youth with asthma have thus far focused on adolescents and have found that flourishing is lower in adolescents with asthma as compared to their peers (Nabors et al., 2017; Nabors et al.,

2015). The current study also will explore the association between family routines and flourishing in young children with asthma.

Considering a Biopsychosocial Model

Given the demonstrated link between social determinants of health and asthma control and morbidity, there is a strong push for utilizing a biopsychosocial model in the treatment of asthma. Significant research effort has focused on integrating what is known about social determinants of health into behavioral/family-based interventions and medical treatment to not only promote improved outcomes for youth with asthma, but also to address disparities in asthma morbidity (Matsui et al., 2019).

The biopsychosocial model was developed as an alternative to a view of health that considered only the physical functioning of youth, and therefore, aims to provide a more comprehensive view of health and wellness (Brenner, 1991; Woods, 2019). This model provides information on the interconnected nature of social determinants of health and can be used as an organizational framework for understanding disparities in asthma prevalence and severity (Stempel et al., 2019). Wood et al. (2015) created a model with mutually causal pathways between family functioning and routines, disease management practices (e.g., medication adherence), stress, child asthma, child adaptation to disease, and quality of life. The current study uses this model as a framework for conceptualizing how family routines play a key role in the biopsychosocial model of chronic illness. The model from Wood (2015) can be found in Figure 1.2.

Purpose of the Current Study

The purpose of this study was to explore the role of family routines in young children with asthma's functioning utilizing a national dataset. This study sought to answer the following questions: 1) What is the prevalence of select family routines in young children with asthma and their families, and does this differ based on asthma severity? 2) To what extent do consistent family routines impact asthma severity and youth's health status, and what role do select demographic, family, and community factors play in this relationship? and 3) How do variations in family routines moderate the relationship between health status and the target child's flourishing? This study fills a gap in the literature by using a nationally representative sample and evaluating outcomes for young children only. Outcomes provide insight into the role of family routines in youth's health status and wellbeing and the importance of considering family functioning factors in a biopsychosocial approach to conceptualizing and treating chronic conditions.

Materials and Methods

Data

This study employed cross-sectional data from the 2018-2019 National Survey of Children's Health (NSCH). The NSCH is an annual, nationally representative survey that gathers complex data on the health and wellbeing, including physical and mental health, access to and quality of healthcare, and family, neighborhood, school, and social factors, of non-institutionalized children ages 0-17 in the United States. This survey is fielded annually by the US Census Bureau and primary funding is provided by The Health Resources and Services

Administration's Maternal and Child Health Bureau (Child and Adolescent Health Measurement Initiative [CAHMI], n.d.).

Procedures

Within the NSCH dataset, households were sampled randomly and those with one or more children under the age of 18 were identified via a mail survey. One child in each household was randomly selected to be the focus of the survey. The mail survey requested that an adult who was familiar with the child fill out a screener questionnaire and then the adult was either directed to a website to complete the full questionnaire or could request to receive it in the mail. Across 2018 and 2019, 59,963 total surveys were returned. Survey data were weighted to accurately represent the population of non-institutionalized children ages 0-17 in the US. The Overall Weighted Response Rate was 43.1% for 2018 and 42.4% for 2019 (CAHMI, 2020).

For this study, 2018-2019 data were selected to analyze family routines pre-COVID-19, as new evidence suggests that family routines might have been disrupted by the global pandemic (Hood et al., 2021). A public-use file containing both years of data was downloaded from the CAHMI website (CAHMI, 2023). This study was considered exempt from the university's institutional review board.

This study restricted exploration to children between the ages of three and five for the following reasons: 1) asthma exacerbations and hospitalizations are most common in children under age five, 2) up to one third of children under the age of three will cough and wheeze with colds, but those with asthma will be diagnosed at around the age of three, and 3) evidence suggests that family routines are particularly important for young children's development and as

protective factors for young children from vulnerable families (CDC, 2018; Cleveland Clinic, 2023; Romano et al., 2022). See Table 1.1 for descriptive data of this sample.

Measures

Asthma Status and Severity

Survey respondents were asked "does this child have current or lifelong health conditions?" from a list of 27 (2018) or 26 (2019) conditions, including asthma. For the purposes of this study, data were restricted to those children who had a current diagnosis of asthma. Of those with asthma, respondents described the child's asthma as "mild" or "moderate/severe".

Health Status

Survey respondents were asked "in general, how would you describe this child's health?" and response options were "excellent/very good," "good," and "fair/poor".

Social Determinants of Health

Many of the social determinants of health discussed in the literature above were included in this study. Demographic factors used in this study included age of child, sex of child, number of family members in the child's household, income as described by the household's percent of the federal poverty level, and race of child.

At the family level, data were gathered about family resilience. A composite measure assessed whether the target child lived in a home where the family demonstrates qualities of resilience. The composite measure was based on four individual survey items that asked, "When your family faces problems, how often are you likely to do each of the following: talk together about what to do, work together to solve our problems, know we have strengths to draw on, and stay hopeful even in difficult times?" Likert response options for the four individual items were

"all or most of the time," "most of the time," or "some/none of the time." The composite item included responses of "all or most of the time to 0-1 items," "all or most of the time to 2-3 items," or "all or most of the time to all items."

At the environment/community level, data were gathered about the neighborhood in which the child lives. Four items were included in the analysis. First, respondents were asked if the child lives in a supportive neighborhood and binary response options included "yes" or "no." Respondents were then asked if the child lives in a safe neighborhood with response options of "definitely agree," "somewhat agree," and "somewhat/definitely disagree." Finally, two composite measures were created based on the number of "detracting" neighborhood elements present (litter or garbage on the street or sidewalk, poorly kept or rundown housing, or vandalism such as broken windows or graffiti) or the number of neighborhood amenities present (sidewalks or walking paths, parks or playgrounds, recreation/community centers, or libraries/bookmobiles).

Flourishing

Four questions were asked that aimed to capture curiosity and discovery about learning, resilience, attachment with parents, and contentment with life. The survey questions were "How often: (1) is this child affectionate and tender, (2) does this child bounce back quickly when things do not go his/her way, (3) does this child show interest and curiosity in learning new things, and (4) does this child smile and laugh?" The "always" or "usually" responses to the question indicated that the child met the flourishing criteria, and a composite variable was created from these responses. Per the NSCH report, questions were developed based on a review of positive health indicators by a Technical Expert Panel (TEP). The TEP for the dataset

included a representative group of experts in the field of survey methodology, children's health, community organizations, and family leaders.

Family Routines

The family routines measured by the NSCH for the 3-5 age group include reading together, singing and telling stories together, eating meals together, and going to bed at the same time on weeknights. Respondents were asked “during the past week, how many days did you or other family members read to this child, age 0-5 years?,” “during the past week, how many days did you or other family members tell stories or sing songs to this child?,” and "during the past week, on how many days did all the family members who live in the household eat a meal together?” Response options for these three items were “0 days,” “1-3 days,” “4-6 days,” and “every day.” Respondents were also asked “how often does this child go to bed at about the same time on weeknights?” and response options were “always,” “usually,” “sometimes,” or “rarely or never.” To account for effects of limited variability in response categories, responses were collapsed into two categories. For reading, singing and telling stories, and shared mealtimes, responses were collapsed into “0-3 days” and “4-7 days,” and bedtime was collapsed into “always or usually” and “rarely, never, or sometimes.”

Results

To answer the first research question regarding the prevalence of family routines in young children with asthma, descriptive statistics revealed that of children ages 3-5 with currently diagnosed asthma, 35.6% (n = 154) of families read with their children between 0 and 3 days per week and 64.4% (n = 279) read with their children between 4 and 7 days per week. Results also indicated that 31.6% (n = 137) reported singing with and/or telling stories to their

children between 0 and 3 days per week and 68.4% (n = 296) reported doing so between 4 and 7 days per week. For eating meals together, 18% (n = 78) reported eating a meal together between 0 and 3 days per week and 82% (n = 355) reported eating a meal together between 4 and 7 days per week. Last, 12% (n = 52) reported that their child goes to bed at the same time each night rarely, never, or sometimes, and 88% (n = 381) reported that they go to bed at the same time each night always or usually. A series of chi square analyses were conducted to determine if there were significant differences in the consistency of family routines practiced based on asthma severity. These analyses revealed no differences for reading, sharing mealtimes, or bedtime, but did reveal significant differences for singing and telling stores ($\chi^2(1) = 3.87$, $p = .049$). Adjusted residual analyses revealed that differences in singing and telling stories were found for those with mild asthma. There were significantly more children with mild asthma who engaged in singing/telling stories 0-3 days per week than expected and significantly fewer children with mild asthma who engaged in this routine 4-7 days per week.

To evaluate the extent to which consistent family routines, demographics, and other family and community factors impacted asthma severity and health status in young children with asthma, we first created a new variable that captured both the asthma severity and health status of the child. This new variable, called asthma health groups, had six levels: 1) moderately severe asthma and fair/poor health, 2) moderately severe asthma and good health, 3) moderately severe asthma and excellent/very good health, 4) mild asthma and fair/poor health, 5) mild asthma and good health, and 6) mild asthma and excellent/very good health. These levels are in ascending order, with the poorest health coded as 1 and the best health coded as 6. After addressing missing data through listwise deletion, 1.6% (n = 7) of participants fell in level 1 (poorest overall health),

8.8% (n = 38) in level 2, 20.1% (n = 87) in level 3, 2.5% (n = 11) in level 4, 11.1% (n = 48) in level 5, and 55.9% (n = 242) in level 6 (best overall health) for a total of 433 participants. These results are found in Table 1.2.

An ordinal regression model, a statistical model that considers multiple influences simultaneously, was fit to investigate whether family routines, demographic characteristics, and family/community factors predicted the asthma/health group of the target child. Because we wanted to predict an ordinal dependent variable given one or more independent variables, this approach was determined to be the best fit for the data as ordinal regression does not have to assume equal intervals between variable levels. All predictor variables were entered into the model as factors. Results revealed that the ordinal regression model exhibited a significant improvement in fit over the intercept-only model ($\chi 2(30) = 44.75$, $p < .05$), indicating that this model accounted for a significant amount of variance in the asthma/health group variable. Nagelkerke's pseudo-R-squared value for the ordinal regression suggested a 10.8% improvement in the prediction of asthma/health group based on the predictors as compared to the null model. Results of the variance inflation factor (VIF) (all less than 2.0) verified there was no violation of the assumption of no multicollinearity. Given the number of predictors used in this model, only significant results of this regression are found in Table 1.3.

The only significant family routine that predicted asthma/health group within the model was singing and telling stories (b = .59, SE = .24, $Wald$ = 5.92, $p < .05$). Based on odds ratio calculations, the odds of falling into a higher asthma/health group (better overall health and more mild asthma) were 1.8 times greater for children whose caregivers reported singing and telling stories together often or always. Of the covariates, income determined by federal poverty level

and living in a safe neighborhood significantly predicted asthma/health group. The odds of falling into a higher asthma/health group were .48 times lower for income level 1 (b = -.73, SE = .31, $Wald$ = 5.59, $p < .05$), .44 times lower for income level 2 (b = 0.82, SE = .31, $Wald$ = 6.94, $p < .05$), and .57 times lower for income level 3 (b = -.57, SE = .25, $Wald$ = 5.11, $p < .05$) as compared to the highest income level. The odds of falling into a higher asthma/health group (i.e., milder asthma and greater overall health) were 3.15 times higher for those who definitely agreed that they lived in a safe neighborhood (b = 1.15, SE = .42, $Wald$ = 6.23, $p < .05$) and 2.4 higher for those who somewhat agreed (b = .89, SE = .64, $Wald$ = 4.12, $p < .05$) as compared to those who reported that they did not live in a safe neighborhood.

The third research question addressed how variations in family routines moderated the relationship between the target child's health status and their flourishing. A second ordinal regression model was fit to evaluate this question. Health status and family routines were entered into the model as main effects, and interaction terms between health status and each family routine were entered as 2-way interactions. Due to the potential for interactions to be correlated with main effects, all predictors were centered before being computed and entered into the model. VIF statistics were once again acceptable (less than 2) and results revealed that the model exhibited a significant improvement in fit over the intercept-only model ($\chi 2(9) = 33.89$, $p < .01$), indicating that it accounted for a significant amount of variance in the flourishing outcome. Nagelkerke's pseudo-R-squared value for the ordinal regression suggested an 11.1% improvement in the prediction of flourishing based on the predictors as compared to the null model.

According to odds ratio calculations, children with fair, poor, or good health status had .39 times lower odds (b =.-1.06, SE = .28, $Wald$ = 14.27, p < .01) of falling into a higher flourishing category as compared to children with very good or excellent health status. Of the family routines variables, singing and telling stories was once again the only significant predictor. Children whose families sang/told stories together less regularly had .39 times lower odds of falling into a higher flourishing category (b =.-.93, SE = .31, $Wald$ = 9.24, p < .01). None of the interaction terms were statistically significant. Results of this regression are found in Table 1.4.

Discussion

This study used a nationally representative dataset to explore the roles of family routines and several social determinants of health in young children with asthma's health status, asthma severity, and flourishing (n = 433). Asthma affects 1 in 12 school-aged children and its prevalence is increasing in rate (CDC, 2021; Cleveland Clinic, 2019), making it the most common childhood chronic illness. Young children are at particular risk for asthma exacerbations, with asthma attacks occurring most frequently in children under the age of five and asthma-related hospital visits being highest for children under the age of four (CDC, 2018).

Family routines promote an environment conducive to promoting health and wellbeing. Engaging in regular family routines—such as shared meals, reading, maintaining consistent bedtimes, and singing and telling stories together—not only fosters positive caregiver-child relationships but also encourages health behaviors that can mitigate asthma symptoms (Abar et al., 2017; Crespo et al., 2013; Ruggeri et al., 2023). For example, consistent bedtimes are critical for ensuring adequate sleep, which is vital for respiratory health (Zhuang et al., 2024). Empirical

evidence suggests that robust family routines can buffer the adverse effects of asthma, enabling children to navigate their condition more effectively and leading to improved health outcomes and overall quality of life (Harvey et al., 2022).

Additionally, while family routines are important for youth of all ages, there is a significant body of research detailing the protective nature of family routines for young children. Family routines are associated with language, academic, and social development in young children (Spagnola & Fiese, 2007). The current study aimed to fill a gap in the literature on the overlap of family routines and chronic conditions given the specific asthma vulnerabilities of participants and the critical role of family routines in this age group.

Among families of children between the ages of three and five in this dataset, most caregivers reported that they completed all four family routines (reading together, singing and telling stories, sharing mealtime, and adhering to a consistent bedtime) between four and seven days weekly or usually/always. Fewer reported that they completed these routines infrequently. Chi-square analyses revealed that there were no significant differences in the frequency of reading, going to bed at the same time each night, or eating meals together by asthma severity, but there were significant differences in singing and telling stories. Specifically, those with mild asthma reported singing and telling stories less frequently than expected. Literature on routines and asthma suggests that having a child with asthma increases the frequency of routines in the household, which is then related to improved health via biological pathways (Crespo et al., 2012; Schreier & Chen, 2010). One potential explanation for why most of the routines did not vary by severity is that the presence of a chronic condition alone is associated with the frequency of family routines rather than the severity of the condition. Moreover, the current study did not

examine asthma management routines, such as medication adherence and avoidance of triggers, which are strongly associated with better asthma control and ultimately might be more predictive of asthma severity than family routines (Peterson-Sweeney et al., 2010). No studies to our knowledge have examined why the routine of singing and telling stories might vary based on asthma severity, but future research would benefit from breaking down pathways by which family routines and youth's health are connected.

Another goal of this study was to examine several demographic and psychosocial factors that represent social determinants of health in the context of young children's asthma and family routines. According to Healthy People 2030, social determinants of health are "the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks". Social determinants of health can be grouped into five domains: economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context.

With these domains in mind, our second research question evaluated the extent to which consistent family routines, demographics, and family and community factors impacted asthma severity and health status in young children with asthma. Federal poverty level and neighborhood safety predicted asthma severity and health status, both of which are in line with the domains within the social determinants of health model. Children living in neighborhoods with safety concerns might experience heightened stress and anxiety, which can exacerbate asthma symptoms and lead to poorer health outcomes (DePriest et al., 2018; Kobel et al., 2014). Additionally, living in neighborhoods with safety concerns might limit opportunities for outdoor

physical activity and contribute to increased exposure to environmental stressors, further contributing to the asthma severity (Vangeepuram et al., 2012).

Interestingly, our study did not find race to be a significant factor, which is commonly identified as a predictor of asthma severity and health status. As mentioned earlier, researchers have been encouraging further differentiation between race and other factors like environment and poverty (Poowuttikul et al., 2019). The current study provides evidence for the fact that race is not necessarily as salient a predictor of health as compared to environment and community factors. Future work would benefit from exploring whether environmental and community factors like socioeconomic status and neighborhood safety moderate the relationship between race and health in young children with asthma. Of the family routines, singing and telling stories was the only predictive family routine. To our knowledge, there are no existing studies that explain this specific relationship. However, singing exercises have been shown to improve respiratory function via breath control and diaphragmatic breathing (Gick & Daughtery, 2015; Goldenburg, 2018). Future work would benefit from further teasing out the role of each individual routine in the prediction of health outcomes.

Finally, our third research question addressed how variations in family routines moderated the relationship between youth's health status and flourishing. Flourishing reflects a child's ability to cope with stress and have positive relationships, which are critical to health and wellbeing (Donney et al., 2022). Research suggests children with poorly controlled asthma might experience lower levels of flourishing, although most studies that have examined asthma and flourishing have focused on adolescents (Nabors et al., 2017; Nabors et al., 2015). Youth with asthma face challenges such as frequent absenteeism from school and restrictions on physical

activities, which can affect flourishing outcomes (Abudiab & Fuller-Thompson, 2022; Nabors et al., 2024). To our knowledge, no studies exist that examine the specific relationship between family routines and flourishing in youth with chronic conditions.

Results indicated that children with asthma that had health statuses that were either fair/poor or good had lower odds of flourishing compared to children with very good/excellent health status, which is consistent with previous studies on adolescents (Nabors et al., 2017; Nabors et al., 2015). Of the family routines variables, singing and telling stories once again predicted increased odds of flourishing in young children with asthma. Outside of the context of chronic conditions, researchers have found that telling stories predicted young children's social-emotional outcomes and singing with family supported identity and literacy development (Ferreti & Bub, 2016; Mohammed et al., 2023; Papageorgi et al., 2022), which align closely with flourishing. Although health status and singing and telling stories independently predicted flourishing, our interaction terms were not statistically significant, indicating that none of the family routines moderated the relationship between health status and flourishing. Although family routines were not moderating factors, we know that family factors do contribute to flourishing and that flourishing is lower amongst youth with chronic conditions (de la Fuente et al., 2023; Nabors et al., 2016). Given this demonstrated link, continued work should explore the role of other family factors within this relationship.

Conclusions

Results of the current study indicated that singing and telling stories is a salient family routine in the prediction of young children's asthma severity, health status, and flourishing. Results also identified neighborhood safety and income level as important predictors of asthma

severity and health status. Together, these results provide evidence for a biopsychosocial conceptualization of asthma and treatment protocols that target social determinants of health, including family factors. Psychologists and other professionals who work with children with chronic conditions can play a vital role in supporting families by developing interventions that promote consistent family routines, particularly singing/telling stories based on the current study. Roles might include providing psychoeducation on the protective nature of family routines for supporting both health and flourishing outcomes, identifying and problem-solving barriers to implementing family routines, incorporating behavior management techniques as needed, and generally fostering supportive family environments (Eals et al., 2021; Waters, 2019).

Strengths of this study include the use of a nationally representative dataset with a multitude of variables that represent social determinants of health and the exploration of the intersection between family routines and flourishing in young children with asthma, as this is currently a novel area of research. However, because data were not collected for the sole purpose of exploring family routines, a standardized measure of family routines was not used. The same limitation applies to the variables used to conceptualize flourishing. Future work might benefit from including standardized measures of these two concepts and from gathering data about asthma management routines to further tease out the role of specific types of routines in young children's health and wellbeing. Finally, variables that represented neighborhood characteristics were not operationalized for respondents and data were not gathered on urban/rural status, both of which would be useful in a replicated study.

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Table 1.1

Select Sociodemographic Characteristics

	N	**%**
Age of Selected Child		
3	116	26.8
4	156	36.0
5	161	37.2
Sex of Selected Child		
Male	268	61.9
Female	165	38.1
Race of Selected Child		
White	252	58.2
Black or African American	57	13.2
American Indian of Alaska Native	4	.9
Asian	16	3.7
Two or More Races or Other	42	9.7
Federal Poverty Threshold		
0-99% FPL	81	18.7
100-199% FPL	72	16.6
200-399% FPL	132	30.5
400% FPL or Greater*	148	34.2
Health Status		
Excellent or Very Good	329	76.0
Good	86	19.9
Fair or Poor	18	4.2
Parent-Rated Severity of Current Asthma		
Mild	301	69.5
Moderate/Severe	132	30.5

Table 1.2

Asthma/Health Groups

	N	**%**
Moderate Asthma & Fair/Poor Health Status	7	1.6
Moderate Asthma & Good Health Status	38	8.8
Moderate Asthma & Excellent/Very Good Health Status	87	20.1
Mild Asthma & Fair/Poor Health Status	11	2.5
Mild Asthma & Good Health Status	48	11.1
Mild Asthma & Excellent/Very Good Health Status	242	55.9

Table 1.3

Ordinal Regression Results: Significant Results in the Prediction of Asthma/Health Groups by Family Routines and Psychosocial Factors

Variable	Estimate	Std. Error	*p*-value	OR	95% CI for OR
Singing/Telling Stories					
0-3 days	0.59	0.24	0.02	1.81	1.12 – 2.92
4-7 days*					
Federal Poverty Threshold					
0-99% FPL	-0.73	0.31	0.02	0.48	0.26 – 0.88
100-199% FPL	-0.82	0.31	<0.01	0.44	0.24 – 0.81
200-399% FPL	-0.57	0.25	0.02	0.57	0.35 – 0.93
400% FPL or Greater*					
Safe Neighborhood					
Definitely Agree	1.15	0.42	0.01	3.15	1.38 – 7.17
Somewhat Agree	0.89	0.64	0.04	2.4	0.69 – 8.48
Somewhat or Definitely Disagree*					

* Reference category. OR = odds ratio. CI = confidence interval.
Only significant results shown.

Table 1.4

Ordinal Regression Results: Health Status, Family Routines, and Interactions in the Prediction of Flourishing

Variable	Estimate	Std. Error	*p*-value	OR	95% CI for OR
Health Status					
Fair/Good	-1.06	0.28	<0.01	0.35	0.20 – 0.60
Excellent/Very Good*					
Reading					
0-3 days	0.19	0.31	0.54	1.21	0.66 – 2.20
4-7 days*					
Singing/Telling Stories					
0-3 days	-0.93	-.31	<0.01	0.39	0.22 – 0.72
4-7 days*					
Meal Together					
0-3 days	-0.26	0.33	0.43	0.77	0.41 – 1.46
4-7 days*					
Consistent Bedtime					
Rarely/Never or Sometimes	-0.44	0.39	0.26	0.65	0.30 – 1.38
Always*					
Health Status x Reading	0.43	0.63	0.49	1.54	0.45 – 5.33
Health Status x Singing/Telling Stories	0.14	0.31	-.66	1.15	0.62 – 2.12
Health Status x Meal Together	0.17	0.35	0.62	1.19	0.59 – 2.36
Health Status x Consistent Bedtime	-0.54	0.37	0.15	0.58	0.28 – 1.21

* Reference category. OR = odds ratio. CI = confidence interval.
Only significant results shown.

Figure 1.1

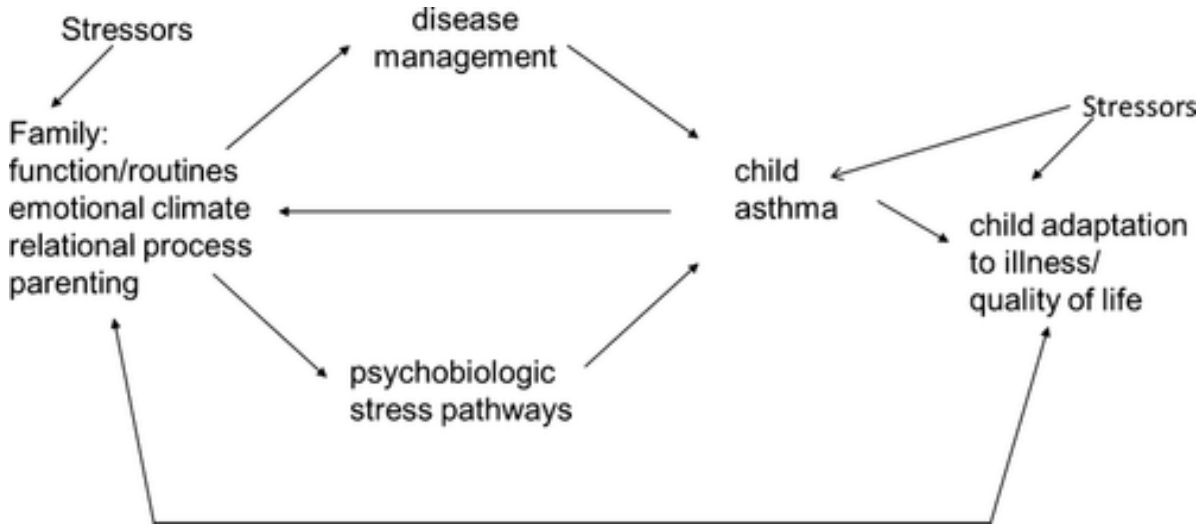
Asthma Risk and Protective Factors at the Child, Family, and Community Levels

	Child	Family	Community
Risk Factors	- Genetic predisposition (family history of asthma) - Allergies (e.g., to dust mites, pet dander) - Exposure to tobacco smoke and other environmental contaminants (prenatal and postnatal) - High stress levels (e.g., anxiety, depression)	- Poverty - Family stress (e.g., chaos, conflict, instability) - Caregiver depression - Poor family communication - Acculturative stress and experiences of discrimination	- Urban settings - Environmental pollution - High population density - Limited access to healthcare - Socioeconomic disparities
Protective Factors	- Regular physical activity - Healthy diet (rich in fruits and vegetables) - Adherence to asthma management plans - Individual self-efficacy - Strong social support networks	- Family routines (e.g., consistent mealtimes, bedtimes) - Parental involvement in health education - Family connectedness and cohesion - Family support for asthma management - Ethnic and cultural identity	- Access to green spaces and recreational areas - Community support programs - Local health education initiatives - Availability of resources for asthma education

Note: This table was adapted from several studies (Ding et al., 2015; Koinis-Mitchell et al., 2011; Shahunja et al., 2022)

Figure 1.2

Relations between Family Function and Child Asthma



*Note: This figure was originally produced by Wood et al., (2015)

CHAPTER 3

CARE COORDINATION AND SCHOOL FUNCTIONING IN YOUTH WITH ASTHMA: FINDINGS FROM A NATIONAL SURVEY [2]

[2] Davie, S.H., Neuharth-Pritchett, S., Schilling, E.J., Pidaparti, C., Lease, A.M. To be submitted to *Families, Systems, and Health.*

Abstract

Objective. The current study explored variations in caregiver-perceived care coordination for school-aged youth with asthma and examined the implications of care coordination on school outcomes. It specifically investigated how demographic, neighborhood, and health characteristics predicted care coordination experiences, and how care coordination experiences impacted school functioning, specifically school engagement and absenteeism.

Methods. Using the National Survey of Children's Health (2020-2021), a nationally representative dataset, we analyzed predictors of caregiver-perceived care coordination (e.g., receipt of services, caregiver frustration, and time spent coordinating care) for youth with asthma (n = 979). We also assessed how these elements of care coordination influenced school outcomes. Ordinal regression models were employed to identify significant predictors and outcomes.

Results. Results indicated that better child health status, supportive neighborhoods, and lower federal poverty status were associated with more positive care coordination experiences, including receiving needed services, lower caregiver frustration, and less time spent coordinating care. Additionally, care coordination services were found to improve school outcomes. Caregivers who reported receiving needed care coordination and those who experienced less frustration had lower odds of reporting poor school engagement and absenteeism.

Conclusions. This study highlights the critical role of care coordination in supporting both health outcomes and school functioning for youth with asthma, particularly in underserved populations. Targeted interventions, including school-based care coordination programs, and their potential role in mitigating the impact of chronic health conditions on school functioning are discussed.

Introduction

Asthma is the most common chronic condition in childhood (World Health Organization [WHO], 2023). The chronic illness affects an estimated 1 in 12 children in the United States and is steadily increasing in prevalence, most rapidly among children under the age of five (Centers for Disease Control [CDC], 2018; Johnson et al., 2021). Symptoms of asthma include coughing, difficulty breathing, chest tightness, shortness of breath, and wheezing (American College of Allergy, Asthma, & Immunology [ACAAI], 2018). Youth who have poorly controlled asthma, or those with symptoms more than two days per week and who have more than one asthma episode per year, experience limitations in their daily activities and poorer overall health-related quality of life, including bullying and medication dependence (CDC, 2018; van den Bemt et al., 2010). Childhood asthma also contributes to the national and global burden of disease, with 7.9 million missed school days in 2018 and an incurred $81.9 billion in total costs from 2008 to 2013 in the United States (American Lung Association [ALA], n.d.). Across many chronic conditions, only an estimated half of United States residents receive effective care for their chronic condition (DuGoff et al., 2014), mandating a need for improvement in healthcare quality and equity.

Asthma Disparities and Care Coordination Improvement Efforts

Although asthma affects all groups, youth from racial and ethnic backgrounds that are minoritized are disproportionately affected in morbidity, mortality, and severity of disease (Volerman et al., 2017). For youth under the age of 18 in 2021, 5.5% of White-Non-Hispanic youth had asthma compared to 11.6% of Black, Non-Hispanic youth. A similar trend is true for those from lower socioeconomic backgrounds. For example, 10.4% of people below the poverty threshold had asthma in 2021, whereas 6.8% of people at 450% of the poverty threshold or

higher were diagnosed with asthma (CDC, 2023). Those living in urban environments and those who have less optimal and more crowded housing are also at higher risk (Bryant-Stephens, 2009). Importantly and similarly to many other health outcomes that vary by race and socioeconomic status, these disparities reflect the social and environmental impacts of structural inequalities, and researchers and clinicians are calling for system-based interventions to target such disparities (Malleske et al., 2022).

Neighborhood and community factors such as exposure to pollution and tobacco smoke, substandard living structures, lack of availability of green spaces, poor air quality, and varying accessibility to healthcare all impact health outcomes for youth with asthma (DePriest et al., 2017). Many of these environmental factors are targeted by national efforts and programs (e.g., Healthy People 2020, The Clean Air Act), but fewer programs target care coordination for underserved communities of youth with asthma (Woodley et al., 2019). The U.S. Patient Protection and Affordable Care Act, for example, was designed to improve the role of public healthcare programs (Centers for Medicare and Medicaid Services [CMS], 2013) and the Asthmatic-School-Children's Treatment and Health Management Act aimed to improve medication self-management practices in schools (CDC, 2016). Although both targeted healthcare quality and policy in some capacity, neither outlined coordination between systems.

What is Effective Care Coordination and Why is it Important?

Care coordination involves interactions across professionals, facilities, communities, and support systems. Communication between patients, families, providers, and schools is a key element of care coordination (Singer et al., 2011). Elements of effective care coordination models include case management, by social workers for example, teaching of self-management

techniques, community resources, and transition management for patients who have been hospitalized. Another model identified as both feasible and helpful in improving quality of life for caregivers and youth with special healthcare needs is the use of a parent-to-parent model (Pollock et al., 2022). Although these models are identified as useful in promoting care coordination, barriers such as lack of resources by schools and medical practices to provide case management services are considerable (Kilbourne et al., 2018).

Youth with special healthcare needs, or those with medical and/or behavioral health needs that are more substantial than typically developing peers, are in particular need of inter-connected healthcare (Parish et al., 2009; Roman et al., 2020). Although isolated and fragmented healthcare is the norm across many settings, it not only increases the potential for medical errors, but also places the burden of care coordinating and navigating complex systems on caregivers (Anderson & Knickman, 2001; Hempstead et al., 2014; Singer et al., 2011). Explored in other medical conditions, key stakeholders in the care of youth with traumatic brain injuries (school professionals, parents, medical providers, etc.) identified three barriers to effective care coordination: 1) poor communication and collaboration between providers, 2) gaps in knowledge about the condition itself, and 3) inadequate policy to support youth with this condition (Lundine et al., 2023). Caregivers of youth with special healthcare needs, and particularly those from low-income backgrounds, have consistently reported that they need support in coordinating care due to the time commitment required to do so (Mirza et al., 2022; Vasan et al., 2023). In youth with autism spectrum disorders, school psychologists have reported that although they see the value in collaboration between schools and clinics, few engage in inter-disciplinary communication and frequently refer their students to outside clinics for services (McClain et al., 2019).

Care Coordination and School Outcomes

Youth with asthma and those without adequate management over their symptoms demonstrate increased absenteeism from school when compared to peers without asthma (Rhee et al., 2017). One estimate on annual days lost from school because of poor asthma management is 14 million days (Zahran et al., 2018). Frequent absenteeism for youth with asthma contributes to decreased academic performance on standardized tests, lower grades, poorer relationships with their peers and teachers, and poorer perceptions of their school environment, including perceptions of the organizational structures and policies within their school systems than students who do not have asthma (Krenitsky-Korn, 2011; Moonie et al., 2008). Poorly controlled asthma disproportionally affects youth from minoritized backgrounds and these youth are more at risk for increased absenteeism and reduced school connectedness, further emphasizing the need for improved support and management of symptoms (Basch, 2011).

Several studies have examined connections between care coordination, usually school-based, and school outcomes for youth. Results indicate that effective care coordination predicts reduced absenteeism for school-aged youth with special healthcare needs along with other positive outcomes, including fewer emergency department visits and hospitalizations (Cordeiro et al., 2018; Isik & Isik, 2019). Engelke (2008) found that classroom engagement, grades, and participation in extracurricular activities increased after one year of care coordination services by school nurses for youth with several chronic conditions (e.g., seizure disorders, allergies, asthma, and diabetes).

Care Coordination Models

The clear and demonstrated need for improved care coordination has been met with several studies piloting models. Pappalardo and colleagues (2022) provided caregivers of school-aged youth with asthma with contacts to support them in asthma education and trigger reduction, in-home environmental assessments, behavioral health services, and basic care coordination services. They found that those who utilized these services had improved healthcare utilization, although school absenteeism was not reduced. Further, Szefler et al. (2019) found that having school nurses serve as case managers reduced school absenteeism and increased asthma control. For youth hospitalized for asthma exacerbations, families reported that it was extremely helpful to have a hospital-to-home care coordination program that provided medications at discharge, school-based asthma therapy for medications, referral for home trigger assessments, and communication with the primary care provider (Parikh et al., 2021). Together, these studies demonstrate the benefits of improving care coordination for youth with asthma and outline key elements that support school and health outcomes.

Purpose of the Current Study

Although research has outlined the need for improved care coordination for youth with asthma and their families, there is a gap in applying this research to practice. Youth from minoritized and lower-socioeconomic backgrounds are at particular risk for having poorer outcomes related to their health condition, including missed school days and academic functioning, and as such, there is an even greater need for affecting system-wide change in care coordination efforts. The current study aims to satisfy two goals: 1) explore caregiver-perceived experiences of care coordination and identify differences, if any, by demographic, health status,

and neighborhood variables, and 2) investigate associations between perceptions of care coordination and school outcomes. This study will provide updated information on the current state of care coordination for youth ages 6-17 with asthma and their school-related outcomes using a national dataset.

Methods

Data and Participants

The current study uses data from the 2020-2021 National Survey of Children's Health (NSCH). The NSCH is a nationally representative survey conducted annually and funded by the Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB). It is fielded by the US Census Bureau (CAHMI, 2022). This dataset is commonly used in child and adolescent health research as it aims to gather data on factors related to health and wellbeing, including physical and mental health, access to and quality of healthcare, and family, neighborhood, school, and social factors of non-institutionalized US children ages birth to 17.

Procedures

The survey was conducted by randomly sampling households via a mail survey and identifying households with one or more children under the age of 18. If there was more than one child in the household, one child was randomly selected to serve as the participant for the data collection. An adult familiar with the child then completed a screening survey either via website or mail. A total of 93,669 surveys were completed for 2020 and 2021 combined. Survey data were weighted (adjusted for the combined dataset) to represent the population of non-institutionalized children ages birth to 17 who live in housing units nationally and in each state. The two-year combined dataset was requested via the Data Resource Center for Child and

Adolescent Health (DRC) website. This study was considered exempt from the university's institutional review board.

Measures

Asthma Status

Data were limited to only youth with current asthma diagnoses. Respondents were asked if the focal child currently had asthma, and responses of "yes" were included. Respondents were also asked about the severity of the child's current asthma and responded with "mild" or "moderate/severe."

Demographic and Health Status Variables

Several variables representing demographic characteristics, neighborhood factors, and health status were selected based on a review of such variables from the existing literature to identify differences in perceptions of care coordination. Demographic variables included income level of child's household as measured by the federal poverty level, sex of child, race of child, age of child, and primary household language. Neighborhood variables included living in safe and supportive neighborhoods.

Health status, as characterized by "fair/poor," "good," or "excellent/very good," and the child's identification as having special healthcare needs were used to explore the target child's health. The special healthcare needs variable was attained using the Children with Special Healthcare Needs (CSHCN) screener. The CSHCN is a five item, parent-reported tool designed to reflect the federal Maternal and Child Health Bureau's consequences-based definition of children with special health care needs. The tool aims to identify children with a range of chronic

health conditions and special healthcare needs and provides a comprehensive view of their needs and healthcare (Bethel et al., 2002).

School Functioning

School engagement and missed days were used to gather information on school functioning. For missed days, caregivers were asked how many school days the target child missed because of illness or injury in the last 12 months. Response options included 0 days, 1-3 days, 4-6 days, 7-10 days, and 11 or more days. School engagement was assessed using a composite variable. Children whose caregivers reported that their child "always" cares about doing well in school and does required homework were categorized as "always engaged in school." Children were categorized as "usually engaged in school" if caregivers responded "usually" to both questions or "always" to either question and "usually" to another question. The remaining children were categorized as sometimes or never engaged in school.

Care Coordination

The NSCH incorporated a "Medical Home" composite and effective care coordination was one of five components. The final variable used in this study provided responses of "did not need care coordination," "received needed care coordination," or "did not receive needed care coordination." The care coordination measure was constructed by assessing communication between doctors when needed, communication between doctors and schools when needed, and getting needed help coordinating care. Children who did not see more than one health care provider were coded as not needing care coordination.

Additionally, time spent coordinating care and frustration were assessed. Caregivers were asked how much time they spent coordinating healthcare for children who needed it. Response

options were less than 1 hour per week, 1-4 hours per week, 5-10 hours per week, and 11 or more hours per week. For the frustration variable, caregivers were asked how often they were frustrated in their efforts to get services for their child. Response options were "never," "sometimes," "always," or "usually."

Results

Data were analyzed using IBM SPSS (Version 29.0.0.0). After accounting for missing data via listwise deletion and restricting to school-aged youth and those with asthma currently, 979 respondents' data were included in the final analysis. Descriptive analyses were completed to describe the sample. 55.3% of children were male, 44.7% were female, and ages ranged from 6 to 17. 14.8% identified as Latinx/Hispanic, 63.3% as White, 10.2% as African American/Black, 2.3% as Asian, Hawaiian, or Pacific Islander, 1.1% as Indigenous American or Alaskan, and 8.3% as more than one race. Further, 55.1% were described as having excellent/very good health status, 34.0% were described as having good health status, and 10.9% were described as having poor health status. Due to the data being restricted to only those with asthma, 92.4% were described as having special healthcare needs.

Care Coordination

Initial analyses revealed that 51.2% of youth with excellent or very good health received needed care coordination compared with 45.3% of youth with good health and 39.3% of youth with fair or poor health status. Chi-square analysis yielded significant results and a large effect size, indicating a strong association between health status and care coordination ($\chi^2(2) = 6.438$, $p = .040$, $V = .081$). Adjusted residuals revealed that youth within the excellent/very good health

status category were more likely to have caregivers that reported they received needed care coordination.

The first study aim was addressed by fitting several ordinal regression models with different elements of care coordination serving as outcome variables. Predictors included demographic, health status, and neighborhood variables. The first model identified which predictor variables contributed to whether youth received needed care coordination or not. Multicollinearity analyses were completed and VIF statistics were all less than 2.0, indicating little to no multicollinearity within the data. The ordinal regression model exhibited significant improvement in fit over the intercept-only model ($\chi 2(13) = 72.75$, $p < .001$). Nagelkerke's pseudo-R-squared value suggested a 9.6% improvement in the prediction of receiving needed care coordination based on the predictors as compared to the null model. Results of this regression can be found in Table 2.1. Of the predictors, living in a supportive neighborhood, health status, and poverty level significantly predicted receiving care coordination. Based on odds ratio calculations, those living in supportive neighborhoods had .59 times lower odds of not receiving needed care coordination ($b = -.53$, $SE = .15$, $Wald = 12.22$, $p < .001$). Youth with excellent or very good health status had .58 times lower odds of not receiving needed care coordination ($b = -.53$, $SE = .23$, $Wald = 5.16$, $p < .05$). Finally, those in the two lower poverty level categories (0-99% and 100-199% of the federal poverty level) had .64- and .59-times lower odds, respectively, of not receiving needed care coordination ($b = -.45$, $SE = .21$, $Wald = 4.65$, $p < .05$; $b = -.52$, $SE = .19$, $Wald = 7.42$, $p < .05$).

For the frustration in receiving needed care coordination outcome, another ordinal regression model was fit. VIF statistics were once again acceptable, indicating no

multicollinearity. The ordinal regression model exhibited significant improvement in fit over the intercept-only model ($\chi2(13) = 79.15$, $p < .001$). Nagelkerke's pseudo-R-squared value suggested a 9.1% improvement in the prediction of frustration in efforts to get services for their child based on the predictors as compared to the null model. Caregivers of children with excellent/very good health status had .53 times lower odds of reporting increased frustration ($b = -.64$, $SE = .21$, $Wald = 9.03$ $p < .05$) and caregivers of youth with special healthcare needs had 2.05 times lower odds of reporting increased frustration ($b = .72$, $SE = .26$, $Wald = 7.79$, $p < .05$). For neighborhood variables, caregivers of children who lived in more supportive neighborhoods had .68 times lower odds of reporting increased frustration ($b = -.38$, $SE = .15$, $Wald = 6.85$, $p < .05$). Caregivers who reported definitely ($b = -.90$, $SE = .28$, $Wald = 10.77$, $p < .05$) and somewhat agreeing ($b = -.57$, $SE = .27$, $Wald = 4.65$, $p < .05$) with living in a safe neighborhood had .41- and .56-times lower odds, respectively, of reporting increased frustration in getting services for their child. Results of this regression are found in Table 2.2.

The final care coordination variable was the time that caregivers spent coordinating care. The variables once again met assumptions with acceptable VIF. The ordinal regression model exhibited significant improvement in fit over the intercept-only model ($\chi2(16) = 99.11$ $p < .001$) and Nagelkerke's pseudo-R-squared value suggested a 12.4% improvement in the prediction of time spent coordinating care compared to the null model. Several predictors, including poverty level, child sex, health status, special healthcare needs, and supportive neighborhood significantly predicted changes in the outcome variable. Caregivers who reported falling in poverty levels 1 (0-99% of the federal poverty level) and 2 (100-199% of the federal poverty level) had 1.83 ($b = .61$, $SE = .22$, $Wald = 7.64$, $p < .05$) and 1.65 ($b = .50$, $SE = .21$, $Wald =$

5.90, $p < .05$) higher odds of spending more time coordinating care, respectively, as compared to those in higher levels. Caregivers of male youth had 1.45 times higher odds of reporting spending more time coordinating care ($b = .37$, $SE = .15$, $Wald = 5.99$, $p < .05$). For health status, youth with excellent/very good and good health statuses had .28 ($b = -1.28$, $SE = .23$, $Wald = 31.42$, $p < .001$) and .42 ($b = -.86$, $SE = .22$, $Wald = 14.78$, $p < .001$) times lower odds of caregivers spending more time coordinating care, respectively. Children with special healthcare needs had 2.34 times higher odds of caregivers spending more time coordinating care ($b = .85$, $SE = .38$, $Wald = 5.18$, $p < .05$). Finally, those living in supportive neighborhoods had .66 times lower odds of spending more time coordinating care ($b = -.41$, $SE = 1.17$, $Wald = 5.77$, $p < .05$). Results of this regression are displayed in Table 2.3.

School Outcomes

The second aim of this study was to identify associations between care coordination and two school outcomes: school engagement and number of days missed due to injury or illness in the last 12 months. 24.8% of youth were considered always engaged in school, 33.6% were usually engaged in school, and 41.6% were sometimes or never engaged in school. For absenteeism, 17.4% missed no days for injury or illness, 30.2% missed one to three days, 18.8% missed four to six days, 13.7% missed seven to 10 days, and 19.9% missed 11 or more days.

A second set of ordinal regression models were fit to identify a predictive relationship between variables. The multicollinearity assumption was achieved with VIF statistics of less than 2 for both models. For each outcome, care coordination experiences and health status variables were used as predictors. For school engagement, the ordinal regression model exhibited significant improvement in fit over the intercept-only model ($\chi2(9) = 86.99$, $p < .001$).

Nagelkerke's pseudo-R-squared value suggested a 9.6% improvement over the null model. Children with special healthcare needs had 1.79 times lower odds of poor school engagement (b = .58, SE = .23, $Wald$ = 6.35, $p < .05$), children of caregivers who reported never being frustrated in their efforts to get services had .48 times lower odds of poor school engagement (b = -.74, SE = .24, $Wald$ = 9.37, $p < .05$), and those who received needed care coordination had .59 times lower odds of poor school engagement (b = -.52, SE = .14, $Wald$ = 14.34, $p < .05$). Results of this regression can be found in table 2.4.

Finally, an ordinal regression model was fit and exhibited a 14.4% improvement over the null model in the prediction of missed days of school ($\chi 2(8) = 145.32$ $p < .001$), according to Nagelkerke's pseudo-R-squared value. Health status, time coordinating care, and frustration in coordinating care all significantly predicted changes in number of school days missed. Youth with excellent/very good and good health statuses had .36 (b = -1.03, SE = .20, $Wald$ = 25.87, $p < .001$) and .63 (b = -.46, SE = .21, $Wald$ = 4.91, $p < .05$) times lower odds of missing more school days, respectively. Caregivers who spent less than 1 or between 1 and 4 hours coordinating care had .13 (b = -2.02, SE = .29, $Wald$ = 49.99, $p < .001$) and .17 (b = -1.72, SE = .30, $Wald$ = 33.33, $p < .001$) times lower odds of caring for youth that missed more school days, respectively, as compared to caregivers who spent more than five hours coordinating care. Last, caregivers who reported never being frustrated coordinating care for their child had .63 times lower odds of having their child miss more school days (b = -.46, SE = .22, $Wald$ = 4.27, $p < .05$). Results of this regression are found in Table 2.5.

Discussion

An estimated 4.2 million children under the age of 18 live with asthma in the United States, making it the most common chronic condition in childhood (Asthma & Allergy Network, 2023). Asthma rates are highest amongst minoritized youth and Black youth are disproportionally burdened by asthma-related hospitalizations and exacerbations, potentially due to higher rates of substandard housing and exposure to environmental allergens and pollutants (Binney et al., 2024; Scott et al., 2023). Youth with asthma and particularly those with asthma that is poorly controlled are at risk for increased school absenteeism, poorer academic achievement, and poorer health-related quality of life (Toyran et al., 2020). Similar disparities exist in school outcomes for youth without chronic conditions, including lower school engagement and increased absenteeism in youth from minoritized groups due to financial and environmental factors (Opara et al., 2022).

The biopsychosocial framework in the context of pediatric chronic conditions posits that health and health-related quality of life outcomes are a result of complex interactions between biological, psychological, and social factors (Wade & Halligan, 2017). Care coordination, which is a patient- and family-centered framework of assessment and intervention that involves collaboration between important stakeholders in the lives of youth, falls within this biopsychosocial framework (Cordeiro et al., 2018; Singer et al., 2011). Care coordination is associated with decreases in school absenteeism, emergency department visits, and hospital admissions, and yet, the need for care coordination continues to be unmet for youth with chronic conditions and special healthcare needs (Cordeiro et al., 2018; Gaaf & Gigli, 2022; Kern et al., 2020). The current study used a nationally representative dataset to explore variations in care

coordination by demographic, neighborhood, and health characteristics and implications of care coordination on school outcomes for school-aged youth with asthma.

Predictors of Caregiver-Perceived Care Coordination

Our first aim pertained to the prediction of three elements of caregiver-perceived care coordination: whether the family received or did not receive needed care coordination, the extent to which caregivers felt frustrated in attempts to receive services, and the time that caregivers spent coordinating care for their children. For the first component (whether the family received care coordination services or not), better child health status and living in supportive neighborhoods predicted lower chances of not receiving needed care coordination. Those who fell into lower federal poverty categories (e.g., lower socioeconomic status) also had lower chances of not receiving needed care coordination. For the frustration outcome, better child health status, having special healthcare needs, and living in safe and more supportive neighborhoods all predicted lower odds of caregiver frustration in efforts to receive services. Finally, those who fell in the lower poverty levels (e.g., lower socioeconomic status), caregivers of male children, and caregivers of children with special healthcare needs predicted increased odds of spending more time coordinating care. Better child health status and living in a supportive neighborhood predicted lower odds of spending time coordinating care. These findings are discussed in detail below. Importantly, several variables that have historically been thought of as predictive of poorer healthcare access, including race and household language, were not significant in our study. Our findings are aligned with others that have found race, family structure, use of English, and place of birth as non-significant factors in the prediction of care coordination (Miller et al., 2019).

Health Status. As expected, better child health status was a significant predictor in all three models for more positive care coordination experiences. Existing literature links poor asthma control with increased healthcare utilization and notes that receiving care coordination services improves asthma self-management and health-related quality of life, thus, we suggest that there is a bi-directional relationship between health status and care coordination (Janevic et al., 2016; Kercsmar et al., 2017). That is, youth with better health status and greater asthma control seek out less care coordination, and those who receive care coordination have better health status and asthma control.

Supportive & Safe Neighborhoods. Living in a supportive neighborhood was also a significant predictor of all three care coordination components, leading to receiving needed care coordination, having lower frustration, and spending less time coordinating care. Although neighborhood was not formally operationalized for respondents in this study, literature suggests that social support and neighborhood social cohesion are important factors in the prediction of health and health behaviors, including use of preventative healthcare services (Kim & Kawachi, 2017). Living in a safe neighborhood also predicted less frustration in efforts to obtain services, which also aligns with existing data that identifies neighborhood safety as a predictor for asthma control in children and poorer healthcare utilization overall (Ceasar et al., 2020; DePriest at al., 2018). Of course, it is critical to note that neighborhood characteristics such as safety and support might represent broader structural inequalities and factors such as socioeconomic status, crime and violence, air pollution, and access to healthcare resources (Mohnen et al., 2019). To our knowledge, there are no existing studies that link neighborhood characteristics with care coordination specifically, and future work would benefit from expanding on this connection.

Special Healthcare Needs. Special healthcare needs refer to individuals who require more frequent or specialized care due to chronic physical, developmental, behavioral, or emotional conditions. Care coordination services are designed to help these individuals and their families navigate the complex healthcare system, ensuring that they receive timely, effective care and tailored support for their needs (Miller et al., 2019). Results of this study revealed that special healthcare needs status was a significant predictor for two of the care coordination components, and interestingly, the results varied in how they predicted the care coordination variables. The presence of special healthcare needs predicted lower odds of frustration and higher odds of spending time coordinating care. Although the prediction of receiving or not receiving care coordination was not significant in our analysis, one study found that 55% of families of children with special healthcare needs received adequate care coordination and 72% reported receiving help in obtaining care coordination (Cordeiro et al., 2018), which might explain why our study found that these families had lower frustration. Contrary to our findings, other studies have found that parents of children with medical complexities report significant frustration around the role of coordinating care (Cady & Belew, 2017). To our knowledge, there are no studies that specifically assess the time that caregivers spend coordinating care or their perceptions of the burden of this time commitment, but it would be beneficial for future work to tease out these factors.

Federal Poverty Threshold. Finally, poverty level predicted whether respondents received needed care coordination and the time that they spent coordinating care and once again, results were somewhat conflicting. Those in the two lower federal poverty categories reported a lower chance of not receiving needed care coordination, which is a positive outcome and is

largely in contrast to much of the literature on the topic that has linked lower socioeconomic status with limited access to healthcare services (Cordeiro at al., 2018; Pankewicz et al., 2020). On the other hand, lower poverty levels also predicted more time spent coordinating care. Importantly, the two outcomes are not mutually exclusive, and caregivers can spend significant time coordinating care while still receiving needed services. Our results suggest nuance in the relationship between socioeconomic status and healthcare access and utilization, particularly with regard to care coordination services, and would benefit from further exploration.

Effects of Caregiver-Perceived Care Coordination on School Outcomes

Our second aim pertained to the effects of care coordination on school outcomes, including absenteeism and school engagement. By providing a structured approach to managing a child's medical, educational, and social needs, care coordination services help ensure that children receive comprehensive support across settings, including school, home, and healthcare environments (Treadwell et al., 2015). School-based care coordinators, whether social workers, nurses, or psychologists by training, can help to develop individualized care plans (e.g., asthma action plans, 504 plans, individualized education plans) that address both health and educational goals, promoting school attendance and improved academic performance (Barnard-Brak et al., 2017; Francis et al., 2021).

For the school engagement outcome, caregivers who reported never being frustrated in efforts to receive services and those who reported receiving needed care coordination had lower odds of poor school engagement for their children with asthma. Better child health status, spending less time coordinating care, and never being frustrated in efforts to receive care coordination services also predicted lower odds of missing school. Data are currently limited on

the relationship between care coordination and school engagement, but existing literature on absenteeism aligns with our findings. Care coordination programs, many of which are school based, have been found to improve school attendance and school functioning (Francis et al., 2021; Olson et al., 2021). Our study adds to an emerging area of research on the implications of robust care coordination programs on school functioning.

Implications and Conclusions

Findings from the current study not only add to a growing body of research but might also be beneficial to consider in the development of care coordination programs. Broadly, our findings support continued use of a biopsychosocial model of care for youth with asthma, as psychosocial factors such as neighborhood safety, neighborhood support, and poverty level were found to be significant in the prediction of care coordination.

In terms of practical implications, our study, combined with existing literature, emphasizes the importance of targeting underserved populations to maximize care coordination efforts. Our study highlights the importance of reducing the care coordination burden for caregivers, both in terms of time spent and emotional effort (i.e., frustration), for supporting school functioning. Youth with chronic conditions are already at increased risk for poorer school outcomes, and providing school-based care coordination programming might serve as a protective factor in this relationship. Grier and Bradley-Klug (2011) suggested the implementation of a biopsychoeducational model to inform assessment and intervention for youth with chronic health conditions by having school psychologists serve as communication facilitators between families, educators, and medical professionals. While barriers certainly exist for executing a model such as theirs, a greater understanding of the importance of care

coordination in improving school outcomes for youth with chronic conditions is critical in supporting continued effort to incorporate care coordination programs in schools.

There are several limitations and considerations of our study to note. First, data were collected during and immediately after the height of the COVID-19 pandemic (2020-2021) and results represent the state of asthma rates and caregiver perceptions at that time. Limited exposure to environmental triggers during the COVID-19 pandemic resulted in reduced asthma exacerbations and asthma-related hospitalizations (Papadopoulos et al., 2021; Yang et al., 2021). As most children have returned to in-person learning and isolation precautions have lessened, little is known about post-pandemic effects on asthma. The global pandemic also led to an increase in telemedicine for youth with chronic conditions and studies noted that there have been no negative effects on health-related quality of life, symptom management, or symptom burden due to these changes (Culmer et al., 2020). Furthermore, school-based models of telemedicine suggest decreased school absenteeism for youth with asthma (Kim et al., 2020). Consideration of the benefits of telemedicine might be useful for developing school-based care coordination programs.

Other limitations of our study stem from the fact that data were derived from a national survey, and although this contributes to invariable strength of the study, this resulted in fewer variables that might have been useful in our analysis and limited operationalization of concepts for caregivers. For example, a variable detailing whether caregivers had time for care coordination efforts would have been helpful for conceptualizing the time spent coordinating care outcome. As another example, neighborhood was not operationalized for caregivers, so it is possible that different respondents had different interpretations. Finally, we did not incorporate

attendance or achievement data directly from schools and relied solely on caregiver reports of school functioning, which is certainly subject to bias and potentially inconsistent amongst respondents. Future work would benefit from incorporating data directly from schools and carefully operationalizing concepts.

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Table 2.1
Ordinal Regression Results: Received Needed Care Coordination

Variable	Estimate	Std. Error	*p*-value	OR	95% CI for OR
Supportive Neighborhood					
Yes	-0.53	0.15	<0.01	0.59	0.44 – 0.79
No*					
Safe Neighborhood					
Definitely Agree	-0.58	0.29	0.06	0.56	0.31 – 1.00
Somewhat Agree	0.05	0.29	0.85	1.06	0.59 – 1.87
Somewhat/Definitely Disagree*					
Health Status					
Excellent/Very Good	-0.53	0.23	0.02	0.59	0.37 – 0.93
Good	-0.33	0.24	0.17	0.72	0.45 – 1.15
Fair or Poor*					
Special Healthcare Needs					
Yes	0.265	0.25	0.30	1.30	0.79 – 2.14
No*					
Federal Poverty Threshold					
0-99% FPL	-0.44	0.21	0.03	0.64	0.43 – 0.96
100-199% FPL	-0.52	0.19	<0.01	0.59	0.41 – 0.87
200-399% FPL	-0.15	0.17	0.39	0.86	0.62 – 1.21
400% FPL or Greater*					
Household Language					
English	0.33	0.63	0.60	1.40	0.41 – 4.76
Spanish	-0.51	0.75	0.50	0.60	0.14 – 2.61
Other*					
Child Sex					
Male	0.01	0.14	0.94	1.01	0.77 – 1.32
Female*					
Child Age	0.03	0.02	0.17	1.03	0.99 – 1.07

* Reference category. OR = odds ratio. CI = confidence interval.

Table 2.2
Ordinal Regression Results: Frustration in Receiving Care Coordination

Variable	Estimate	Std. Error	*p*-value	OR	95% CI for OR
Supportive Neighborhood					
Yes	-0.38	0.16	<0.01	0.68	0.51 – 0.94
No*					
Safe Neighborhood					
Definitely Agree	-.09	0.28	<0.01	.41	0.53 – 1.58
Somewhat Agree	-0.57	0.27	0.03	.56	0.33 – 1.00
Somewhat/Definitely Disagree*					
Health Status					
Excellent/Very Good	-0.64	0.21	<0.01	0.53	0.34 – 0.82
Good	-0.15	0.22	0.49	0.86	0.62 – 1.20
Fair or Poor*					
Special Healthcare Needs					
Yes	0.72	0.26	<0.01	2.05	1.22 – 3.53
No*					
Federal Poverty Threshold					
0-99% FPL	0.04	0.19	0.83	1.04	0.67 – 1.65
100-199% FPL	-0.01	0.18	0.96	0.99	0.62 – 1.58
200-399% FPL	0.23	0.16	0.15	1.26	0.91 – 1.75
400% FPL or Greater*					
Household Language					
English	0.66	0.62	0.28	0.53	0.57 – 6.57
Spanish	-0.63	0.74	0.39	0.86	0.12 – 2.27
Other*					
Child Sex					
Male	-0.07	0.13	0.61	0.94	0.60 – 1.44
Female*					
Child Age	0.00	0.12	0.91	1.00	0.77 – 1.24

* Reference category. OR = odds ratio. CI = confidence interval.

Table 2.3
Ordinal Regression Results: Time Spent Coordinating Care

Variable	Estimate	Std. Error	*p*-value	OR	95% CI for OR
Supportive Neighborhood					
Yes	-0.41	0.17	0.02	0.66	0.48 – 0.92
No*					
Safe Neighborhood					
Definitely Agree	-0.23	0.29	0.44	0.79	0.44 – 1.42
Somewhat Agree	-0.39	0.28	0.17	0.67	0.38 – 1.18
Somewhat/Definitely Disagree*					
Health Status					
Excellent/Very Good	-1.28	0.23	<0.01	0.28	0.18 – 0.44
Good	-0.86	0.22	<0.01	0.42	0.27 – 0.65
Fair or Poor*					
Special Healthcare Needs					
Yes	0.85	0.38	0.02	2.34	1.12 – 4.90
No*					
Federal Poverty Threshold					
0-99% FPL	0.61	0.22	<0.01	1.83	1.20 – 2.83
100-199% FPL	0.50	0.21	<0.01	1.65	1.10 – 2.48
200-399% FPL	0.14	0.19	0.48	1.15	0.79 – 1.66
400% FPL or Greater*					
Household Language					
English	0.65	0.79	0.41	1.91	0.41 – 5.59
Spanish	0.84	0.91	0.34	2.30	0.41 – 11.74
Other*					
Child Sex					
Male	0.37	0.15	0.01	1.45	1.04 – 2.08
Female*					
Child Age	-.00	0.02	0.89	0.99	0.95 – 1.04

* Reference category. OR = odds ratio. CI = confidence interval.

Table 2.4
Ordinal Regression Results: School Engagement

Variable	Estimate	Std. Error	*p*-value	OR	95% CI for OR
Health Status					
Excellent/Very Good	-0.06	0.21	0.78	0.94	0.62 – 1.38
Good	0.07	0.22	0.76	1.07	0.67 – 1.67
Fair or Poor*					
Special Healthcare Needs					
Yes	0.58	0.23	0.01	1.79	1.07 – 2.98
No*					
Time Coordinating Care					
Less than 1 hour	-0.21	0.40	0.61	0.81	0.37 – 1.77
1-4 hours	-0.04	0.42	0.92	0.96	0.43 – 2.10
5-10 hours	0.66	0.54	0.22	1.93	0.72 – 5.19
11 or more hours*					
Frustration Coordinating Care					
Never Frustrated	-0.74	0.24	<0.01	0.48	0.29 – 0.78
Sometimes Frustrated	-0.26	0.23	0.25	0.77	0.50 – 1.18
Always or Usually Frustrated*					
Received Needed Care Coordination					
Received	-0.52	0.14	<0.01	0.59	0.45 – 0.77
Did not receive*					

* Reference category. OR = odds ratio. CI = confidence interval.

Table 2.5
Ordinal Regression Results: Number of School Days Missed for Illness or Injury

Variable	Estimate	Std. Error	*p*-value	OR	95% CI for OR
Health Status					
Excellent/Very Good	-1.03	0.20	<.01	0.36	0.24 – 0.53
Good	-0.46	0.21	0.03	0.63	0.42 – 0.95
Fair or Poor*					
Time Coordinating Care					
Less than 1 hour	-2.02	0.29	<.01	0.13	0.08 – 0.22
1-10 hours	-1.72	0.29	<.01	0.18	0.10 – 0.32
11 or more hours*					
Frustration Coordinating Care					
Never Frustrated	-0.46	0.22	0.04	0.63	0.41 – 0.94
Sometimes Frustrated	0.05	0.21	0.79	1.06	0.70 – 1.62
Always or Usually Frustrated*					
Received Needed Care Coordination					
Received	-0.12	0.13	0.35	0.89	0.68 – 1.15
Did not receive*					

* Reference category. OR = odds ratio. CI = confidence interval.

CHAPTER 4

DISSERTATION CONCLUSION

Summary of Two Studies

The goal of this two-study dissertation was to better understand two psychosocial factors- family routines and care coordination- and their impact on health, wellbeing, and school outcomes for youth with asthma. The dissertation is framed by the biopsychosocial model, a framework that emphasizes the connection between biological, psychological, and social factors in influencing health outcomes (Wood et al., 2015). Unlike traditional medical models that focus primarily on the physical and biological aspects of illness, the biopsychosocial model emphasizes that health outcomes are impacted by individual characteristics and the social and environmental context in which individuals live. For youth with asthma and other chronic conditions, this model suggests that evidence-based assessment and intervention require conceptualization of psychological (e.g., mood, stress, coping) and social factors (e.g., family routines, neighborhood safety, socioeconomic status, healthcare access) in addition to physical factors (e.g., asthma severity and control) (Stempel et al., 2019). By considering these diverse influences on health, the biopsychosocial model encourages a more comprehensive approach to care and treatment.

The first study explored the impact of family routines, including reading together, sharing mealtimes, consistent bedtime, singing and telling stories together, and social determinants of health on the health outcomes of young children with asthma. Outcomes included asthma

severity, health status, and flourishing. Results revealed that singing and telling stories predicted better health status and reduced asthma severity, although the reasons for this specific relationship remain unclear. The study also emphasized the significance of social determinants of health, including income level and neighborhood safety, as predictors of asthma severity and health status. Overall, findings emphasized the complex relationship between family routines, environmental factors, and health.

In terms of flourishing, children with better health statuses had higher odds of flourishing, though family routines did not moderate this relationship. The family routine of singing and telling stories once again emerged as a predictive factor, and children who engaged in this routine more consistently had higher odds of flourishing. The study's findings contribute to a biopsychosocial conceptualization of asthma, which includes the roles of family functioning and environmental influences on health outcomes. The flourishing component of this study contributes to an emerging area of research, as there is currently limited evidence on the relationship between family routines and flourishing for children with chronic illnesses.

The second study explored the impact of care coordination on health and school outcomes for school-aged youth with asthma, emphasizing the importance of a biopsychosocial framework. The findings revealed that better child health status, living in supportive and safe neighborhoods, and having special healthcare needs are all predictors of positive care coordination experiences, including receiving needed care coordination, experiencing less frustration in receiving services, and time spent coordinating care. Of note, race and household language did not significantly predict care coordination, which historically have been factors that predict limited healthcare access. However, these findings align with studies suggesting that

other factors, such as neighborhood safety and socioeconomic status, might play a more salient role in accessing care than race alone (Miller et al., 2018).

The second study also examined how caregiver-perceived care coordination affected school absenteeism and school engagement. Positive care coordination experiences, including receiving needed services and experiencing less frustration, were associated with better school outcomes. These findings emphasize the importance of care coordination programs in supporting children with chronic conditions. Care coordination programs can help support medical, educational, and social needs, and ultimately influence both health and academic outcomes (Francis et al., 2021; Olson et al., 2021). The study calls for increased focus on underserved groups to maximize the benefits of care coordination and reduce caregivers' burden in attaining interconnected care for their children.

Future Directions

Results of this two-study dissertation could be expanded in future research in several ways. Regarding family routines, this study highlighted the protective effects of certain family routines (singing and telling stories) in buffering against adverse health and wellbeing outcomes. To our knowledge, there are no specific studies that assess the relationship between flourishing and family routines in youth with chronic conditions. Furthermore, there is little existing evidence to explain why singing and telling stories was the only family routine that significantly predicted our outcomes, and thus, the inter-connected relationship between this routine, other family structure factors, and flourishing could be further explored. The use of validated family routines and flourishing measures might also contribute to more robust results.

Regarding care coordination, results open several avenues for future research. Our study demonstrated that better care coordination was associated with improved school attendance and engagement, but the specific mechanisms by which care coordination influences academic success remain unclear. Future studies could investigate how school-based care coordination programs, and specific elements within these programs, influence students' academic performance, peer relationships, and school climate perceptions. Moreover, integrating more objective data, such as school attendance or academic achievement data, would provide a more comprehensive picture of the role of care coordination in improving educational outcomes for youth with asthma.

The two studies presented in this dissertation add valuable evidence to the growing body of literature on the need for psychosocial supports and interventions at the family and community levels for youth with asthma. In addition to future research directions, evidence presented here might also be useful in developing practical interventions. For example, findings that suggest that care coordination promotes health and flourishing outcomes raise an important question: How can care coordination be effectively operationalized across systems, and how do providers assess for its presence and impact? Parast and colleagues (2018) validated a care coordination measure to be used with families with children with medical complexities, the Family Experiences with Coordination of Care (FECC) measure, that includes items about presence of and access to a care coordinator, frequency of contact with care coordinator, perceptions of advocacy by the care coordinator, shared care plans, and more. Use of a brief measure such as the FECC by providers in medical, community, and school settings upon initial diagnosis or in

early treatment stages could help to mitigate caregiver frustration and time spent coordinating care.

To conclude, the biopsychosocial model provides a framework for understanding the complex interactions between risk and protective factors for youth with asthma. Biologically, asthma is a chronic respiratory condition that requires careful medical management. Psychologically, children with asthma may experience increased anxiety, fear, or stress related to their condition, which can influence their quality of life and exacerbate symptoms. Socially, factors such as healthcare access and family structure play a critical role in condition management (Ding et al., 2015; Koinis-Mitchell et al., 2011; Shahunja et al., 2022). Providers working with youth with chronic conditions are encouraged to continue assessing psychosocial risk and protective factors and embed evidence-based interventions on family structure and healthcare access and quality in their work.

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