

Family Health Service Utilization Patterns:
Analysis of Predictors, Economic Costs, and Preventative Factors

by
Alexey Urusov

A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirements for the degree of
Master of Arts
in
Psychology

Waterloo, Ontario, Canada, 2023

© Alexey Urusov 2023

Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

This study examined the family and individual-level predictors of caregiver/child health and social service utilization expenditures during the COVID-19 pandemic. A sample of UK caregivers ($n = 418$) provided reports on their families and two of their children between the ages of 5-18 ($n = 836$) during May and November of 2020. Caregiver report measures included COVID-19 distress, family functioning, caregiver distress, social support, child functional impairment, social and health service utilization expenditures, and demographic variables. Kruskal-Wallis non-parametric tests revealed significant group differences among families in relation to service expenditures based on family social support, caregiver distress, and child impairment. Zero-inflated negative binomial regressions revealed that for the younger child, COVID-19 stressors were the most important predictor of service expenditures. For the older child, functional impairment in different areas (e.g., school, home) was the most important predictor. For the caregiver, their own mental health, and demographic characteristics (e.g., relationship status, age), were the most important predictors. For the whole family, child impairment played the biggest role in predicting service utilization expenditures. These results demonstrate the importance of considering family and individual variables in relation to social and health service utilization expenditures. These outcomes highlight the importance of supporting families with prevention and early intervention initiatives that consider systemic factors across the family ecology, especially during large-scale social disruptions. Additionally, the findings highlight that there are multiple family processes at work associated with family well-being and the resulting societal healthcare expenditures.

Keywords: family functioning, COVID-19, family stress, mental health, service use, service expenditures, social support

Acknowledgments

I am grateful to all of the people who have contributed to my growth since starting this project. From offering constructive feedback to providing a different viewpoint, this work would not be the same without them. I want to thank Dr. Dillon T. Browne, Dr. Megan McCarthy, and Dr. Jonathan Oakman for their input and suggestions that have helped shape my work to the point where it is today.

I want to thank the Government of Ontario, for supporting my thesis with a research scholarship.

I am thankful for the support of my father, who always believed in my ability and encouraged my pursuits, no matter which direction I chose to head. Your encouragement has provided me with the motivation to stick it out through the hard times and to be mindful and present in the times where I have achieved success.

Finally, my partner for being by my side regardless of the late nights, the tired eyes, and the hours at the office. The love you have provided made this experience ever more worth it.

Table of Contents

Authors Declaration	ii
Abstract	iii
Acknowledgements	iv
List of Tables	vii
Literature Review	1
Introduction	1
Social and Health Service Utilization	1
Factors Contributing to Health and Social Service Utilization	3
Impact of a Pandemic on Families	5
Understanding the Pandemic Effects on Well-Being Using a Conceptual Framework	7
The Stress Process Theory	7
The COVID-19 Family Disruption Model	9
Determinants of Child Functioning	10
Caregiver and Child Dynamics	10
Caregiver-Related Variables Affecting Child Functioning	11
Sibling Relationships Affecting Child Functioning	12
Increases in Stressors Impacting Family Functioning	12
Family Connections and the Functioning of the Family as a Unit	13
Family Processes Modifying Risk to Social Disruption	15
Family Vulnerabilities and Protective Factors	17
Family Stress, Mental Health, and Resulting Service Utilization Expenditures	18
The Present Study	20
Method	23
Participants and Procedure	23
Measures	27
COVID-19 Disruption	27
Family Functioning	27
Caregiver Distress	27
Social Support	28
Child Functional Impairment	28

Social and Health Service Utilization Expenditures	29
Analytical Approach	29
Calculating Service Use Expenditures	29
Normality and Missing Data	32
Service Utilization Costs Among Low and High Scoring Groups	32
Generalized Linear Models	33
Results	35
Descriptive Statistics	35
Group Expenditure Comparison	37
High and Low COVID-19 Distress Groups	37
High and Low Family Dysfunction Groups	38
High and Low Caregiver Social Support Groups	39
High and Low Caregiver Distress Groups	40
High and Low Child Functional Impairment Groups	42
Generalized Linear Models	43
Specific Caregiver Service Utilization Expenditures	43
Specific Younger Child Service Use Expenditures	44
Specific Older Child Service Utilization Expenditures	44
Combined Generalized Linear Models	45
Caregiver Total Service Utilization Expenditures	45
Younger Child Total Service Utilization Expenditures	47
Older Child Total Service Utilization Expenditures	49
Combined Family Total Service Utilization Expenditures	51
Discussion	53
Service Utilization Expenditures of Families and Family Members	53
Group Differences in Expenditures	57
Limitations and Future Directions	59
Clinical and Policy Implications	60
References	62

List of Tables

Table 1. Caregiver’s Sociodemographic Characteristics	25
Table 2. Children’s Sociodemographic Characteristics at Baseline	26
Table 3. Average Cost Estimates of Healthcare Services Used to Calculate Individualized Costs	31
Table 4. Service Costs Among Each of the Family Members	36
Table 5. Predictor Variable and Covariate Correlations	37
Table 6. Service Costs Among the High and Low COVID-19 Distress Levels	38
Table 7. Service Costs Among the High and Low Family Functioning Groups	39
Table 8. Service Costs Among the High and Low Social Support Groups	40
Table 9. Service Costs Among the High and Low Caregiver Distress Groups	41
Table 10. Service Costs Among the High and Low Child Functional Impairment Groups	43
Table 11. Summary of Regression Analyses Predicting Service Utilization Expenditures of the Caregiver	46
Table 12. Summary of Regression Analyses Predicting Service Utilization Expenditures of the Youngest Child	48
Table 13. Summary of Regression Analyses Predicting Service Utilization Expenditures of the Oldest Child	50
Table 14. Summary of Regression Analyses Predicting Family Service Utilization Expenditures	52

Family Health Service Utilization Patterns: Analysis of Predictors, Economic Costs, and Preventative Factors

Literature Review

Introduction

Publicly funded healthcare and social services are one of the largest budgetary costs for most Western developed nations. Previous research has demonstrated that service utilization expenditures are primarily driven by a small number of persons who use most services. The costs of these disruptions internationally are estimated to be in the tens of trillions USD (United States Dollar; Cutler & Summers, 2020). In the case of mental health difficulties, there is evidence to suggest that utilization of multiple health and social services are higher when caregivers or children are experiencing psychological distress (Browne et al., 2010; Browne et al., 2013). Family relationships and social contexts play a central role in shaping the well-being of both caregivers and their children across the lifespan (Merz et al., 2009). Despite the importance and costs associated with mental health difficulties, there remains a relative paucity of literature that considers the multiple, multilevel predictors of service utilization expenditures for families. This need has become more pressing in recent years, as rates of telehealth care and mental health services have gone up in tandem with widespread social disruption related to the pandemic and post-pandemic recession (Suffren et al., 2021). This review aims to address the current state of research related to the studies of families, mental health, and the resulting service utilization expenditures through identification of the interrelationships between each of these elements.

Social and Health Service Utilization

Contact with social and health service providers is essential for meeting the needs of individuals and families undergoing mental or physical challenges. These types of services include, but are not limited to, psychologists, walk-in medical clinics, social workers, emergency rooms, family physicians, physician specialist services, and educational or occupational services. In the United States alone, healthcare spending totaled \$4.3 trillion, or \$12,914 per person during 2021, and has been growing every year (Center for Medicare & Medicaid Services., 2021).

Whether someone will engage in seeking and utilizing services is influenced by a host of interacting factors such as the availability of services, financial resources, and the health of individuals (Harouni et al., 2017). Barriers in availability may include individuals struggling to find services close to their home, having to be put on a long wait list, or having difficulties navigating the system after a referral. If the number of people seeking aid outnumbers the availability of services, deterioration in the quality of life and mental health outcomes can be seen during the increased wait times (Gagliardi et al., 2021). When individuals don't have their needs met the incurred societal costs are greater, especially for those with worse well-being (Thurston et al., 2011). In addition, affordability of care plays a significant role in the decision to seek services. For many, the cost of services is the most important reason for unmet health needs, especially in countries like the United States where there is no universal healthcare (Yang, et al., 2019). For others, such as Canada or the United Kingdom, healthcare or health insurance is available and covers or subsidizes certain services (e.g., emergency room visits), while leaving other services to be independently covered (e.g., psychological services). When coverage is available people are significantly more likely to use services and not delay in attaining healthcare treatment (Andersen et al., 2002; Brown et al., 2004). While this allows for greater service

utilization for families and individuals, the societal costs can be overlooked and require further inquiry.

Mental health disorders are a large contributor to societal costs and are conceptualized as conditions that impact an individual's cognition, emotion, and behaviour (Manderscheid et al., 2010). The most prevalent of these are depression and anxiety, though the range of mental illness can include a combination of internalizing symptoms (inward manifestations of emotion) or externalizing symptoms (outward expressions of behaviour). The experiences of an individual with a mental disorder are diverse and can vary in the range of symptoms, severity, and level of impairment. One in five Canadians experiences a mental illness in any given year and the resulting economic burden is estimated to be over \$50 billion yearly (Smetanin et al., 2015; Lim et al., 2008). These burdens include lost productivity, healthcare costs, and reductions in quality of life. It is hard to truly narrow down the broad financial impacts as there is a myriad of expenditures requiring consideration, including suicide-related costs and spending/activity engagement costs among others. Beyond the population of Canada, almost a billion people worldwide suffer from a mental health disorder, costing the world economy an average of \$2-5 trillion per year in the last decade (The Lancet Global Health, 2020).

Factors Contributing to Health and Social Service Utilization

Perhaps the most important contributing factor when considering variability in service utilization is the well-being of individuals. Of the \$4.3 trillion spent annually on healthcare expenditures in the United States, 90% of it originates from individuals with chronic physical or mental health conditions (Center for Medicare & Medicaid Services, 2021). Across most physical and mental health ailments, utilization of health services is inversely associated with functioning and duration of illness (Gelberg et al., 2000; Nabalamba & Millar, 2007). Research

has shown that this is true for various services, and individuals with functional impairments are more likely to engage in general practitioner and hospital service utilization (Gelberg et al., 2000; Vikum et al., 2012).

In addition to individual well-being, family functioning is a key aspect contributing to health and social service utilization. For example, families that have close emotional ties have a reduced likelihood of using mental health services (Hansen & Aranda, 2012). Better family functioning can not only contribute to using fewer health services but can also correspond to better medical adherence through more active participation in decision-making around treatments and greater parental responsiveness to their children, thereby reducing long-term costs by ensuring that appropriate plans of care are followed early in the course of illness (Leucht & Heres, 2006; Oltean et al., 2020). However, when challenges are presented within the family unit, such as family discord or dysfunction, there is a greater likelihood of families engaging in service utilization to meet their needs (Miller et al., 2015). There are cases when greater service utilization can be observed in families who are healthier or have improved in their family functioning with time (Wamser-Nanney & Campbell, 2022). This can be due to the family members regulating each other's behaviours by providing cues and encouragement to behave in a manner that prioritizes well-being and effective healthcare service utilization (Reczek et al., 2014). Well-functioning families may enhance their functioning through accessing care, further building resilience or bolstering their psychological and physical well-being. Thus, it is important to consider family functioning alongside functioning of individual members and other contextual risk and protective factors.

There appears to be a complex relationship in help-seeking behaviours across the family unit. For instance, higher levels of child trauma and psychological impairment have been linked

with caregivers (e.g., parents) seeking greater mental health services (Yampolskaya et al., 2017). This could be due to the mental health consequences of caregiver burden associated with taking care of a person with psychopathology (Mento et al., 2019). Children of parents with mental illness are also five times more likely to utilize services themselves, leading to greater societal costs (Hosman et al., 2009). Taken together, these findings show that each member can have a direct impact on the service utilization of other members, thereby increasing associated costs (Browne et al., 2011; Browne et al., 2013).

Individual characteristics also contribute to service-seeking behaviours. Among caregivers, non-relative foster parents seek more services than relatives of children with maltreatment experiences (Liao & White, 2014). Higher levels of caregiver education and income have been tied to greater service utilization (Thompson & May, 2006). Culture can also play an important role in shaping the perception of family members in their need for health services, as immigrants may have smaller social networks and have a greater reliance on family members rather than non-kin for support due to their beliefs (Ma, 1999). In summary, a multitude of individual and family factors contribute to social and health service engagement and resulting expenditures. As such, individual and family relationships need to be understood in greater detail and additional review will be provided on the potential mechanisms linking mental health, relationships, and service utilization.

Impact of a Pandemic on Families

Changes in the environment because of adverse or demanding circumstances contribute to the strain on both the cognitive and emotional capacities of caregivers and their families (Pearlin et al., 1981). Pandemics, which are global events associated with disease, can have great impacts on multiple areas of functioning through additional stressors such as increased childcare

responsibilities, psychological distress, or job loss. Previous research on pandemics, which included swine flu and the Ebola outbreak, has found increased mental and physical health difficulties in families when compared to before the pandemic (Hall et al., 2008; Rubin et al., 2010). Not only are there added stressors of worrying about one's own health, the health of one's family, and managing new responsibilities, there can be restrictions that are brought on to limit the spread of the infection which compromise support structures, limit access to services, and negatively impact mental well-being by diminishing engagement in activities (Van Bortel et al., 2016). These additional stressors can affect everyone, but groups especially susceptible to experiencing negative outcomes from these restrictions include families and children (Marques de Miranda et al., 2020).

The COVID-19 pandemic has posed disruptions in numerous areas and has had wide-reaching effects. It started in 2019 as a public health emergency in China, where restrictions included banning public transport and imposing a 14-day quarantine after travel (Li et al., 2020). During the early months of 2020 the disease quickly spread to countries all over the world, affecting billions. Various public health measures were employed, including social distancing, mandatory school closures, a transition from in-person work to telework for non-essential employees, and limited capacity in indoor settings. While cutting out the commute to various daily activities and saving time for many, parents were now faced with additional disruption in their day-to-day routines as they faced increased responsibilities in caring for their children, both during school time and time when they would normally be engaged in social or physical activities (Sanchez et al., 2021). Functioning across multiple domains decreased for caregivers, including worse parent mental health (e.g., anxiety, depression), increased alcohol use, parenting irritability, and verbal conflict with their partners (Westrupp et al., 2021). Family dynamics have

been affected by the increase in stressors, disrupting cohesion, effective communication, and increasing the risk of family violence (Campbell, 2020; Fosco et al., 2022; Lawson et al., 2020). Such disturbances in the child-rearing environment can result in children exhibiting higher levels of aggression, hyperactivity, conduct problems, anxiety, and depression (Cicchetti, 2016).

Mental health difficulties affect people of all ages across the world, but children and youth are especially vulnerable to developing mental illness (Findlay & Sutherland, 2014; Watkeys et al., 2022). This may be due to the cumulative effects of risk (genetic and early environmental factors) and the lack of protective factors that normally develop with age (Sroufe, 2013). The relationships children and youth have with their family members are especially important in shaping mental health outcomes and well-being (Modry-Mandell, et al., 2007). The relationship quality between each of the family members and family dynamics can influence the development of mental illness, or serve as a protective factor and source of resilience against life stressors and negative outcomes (Crosnoe & Cavanagh, 2010; Murphy & Flessner, 2015; Pearlin, 1999). The well-being of children and how they influence the other family members can then be a driving factor in service utilization and resulting expenditures (Knapp et al., 2015).

Understanding the Pandemic Effects on Well-Being Using a Conceptual Framework

The Stress Process Theory

Stressors can come in the form of disruptive events or more persistent challenges that threaten people's personal and social resources, straining their ability to function in multiple domains and can result in the development of mental illness (Pearlin et al., 1981). The amount of stress a caregiver experiences, whether it is related to increased responsibilities at home, work challenges, or financial stress, can change how they interact with their family and indirectly impact the well-being of others. When caregivers are overburdened by stress and unable to cope,

stressors can work to create a more negative family environment while lowering warmth towards others (Malinen et al., 2017). Greater discord because of increased caregiver distress can impact youth mental health and adjustment problems (Landers-Potts et al., 2015; Wong et al., 2022). Cultural stress experienced by caregivers (e.g, perceived discrimination, acculturative stress) can also negatively impact family functioning by limiting their involvement in childcare, lowering positive parenting, and disrupting family cohesion, resulting in youth having lower levels of self-esteem and higher substance use (Lorenzo-Blanco et al., 2017). Such challenges can lead the caregiver to believe they might not be effective in their abilities to care for and manage their children, hampering family function (Scaramella et al., 2008).

Stress process theory highlights how stressors can undermine well-being based on the interplay between environmental challenges and contextual factors (e.g., coping resources, social resources; Pearlin et al., 1981). However, factors such as social support can protect or lower the impact of the negative effects associated with stress-related challenges (Pearling, 1999). Social support can serve as a buffer against the impact of various stressors the members face both individually and as a family (Fukukawa et al., 2000). When family communication is effective and family members feel supported, positive outcomes can be seen in the areas of self-esteem, coping, mental health, and general well-being (Fukukawa et al., 2020; Symister & Friend, 2003). Mutually supportive co-parenting relationships can offset the impact of stressors and improve the caregiver's mental health and adjustment, indirectly improving children's well-being as well (Feinberg, 2003). Social support is a source of resilience through bolstering the self-esteem of family members, leading to greater optimism, positive affect, and well-being (Symister & Friend, 2003). When families show greater feelings of support and better communication, lower levels of

service utilization can be seen along with a decrease the length of hospital stays for children to treat their emotional and mental health challenges (Law & Crane, 2000; Oltean et al., 2020).

The COVID-19 Family Disruption Model

Prime et al. (2020) have proposed a theoretical model to understand the emergence of family challenges related to the pandemic called the COVID-19 Family Disruption Model, building on the effect stressors can have while considering other variables. This framework links social disruption to child adjustment through caregiver well-being and family processes, while accounting for family functioning and relationship quality as potential sources of resilience (Prime et al., 2020). This model is based on five key principles: 1. Child adjustment is multiply determined based on distal and proximal factors; 2. COVID-19 related stressors threaten caregiver well-being and thereby the functioning of other members; 3. How social disruption affects families is based on family connections; 4. There are within-family processes that modify risk to social disruptions; and 5. Pre-existing vulnerabilities and resilience factors play a role in how COVID-19 impacts families (Prime et al., 2020). Taken together, these principles consider the impact stressors can have on multiple subsystems, including relationships between each caregiver and child, the parental couple, as well as the siblings. They highlight the fact that changes in one family member can have direct effects on the other members and each one of these relationships is integral in their contribution to family functioning. When one member of the family suffers, it has direct impact on the well-being of every other member and the family unit. As such it is important to understand the contribution of these different dynamics and how they work together to affect mental health outcomes. Preliminary work during the early months of the pandemic has shown support for the proposed model and emphasizes the different components that come together to contribute to the well-being of the family (Browne et al.,

2021). Figure 1 shows the model adapted from Prime and colleagues (2020) to include health and social service utilization.

Determinants of Child Functioning

The first model component highlights that there are multiple determinants of child functioning based on distal (e.g., social disruption arising from COVID-19) and proximal factors (e.g., relationships with peers, family members, teachers; Prime et al., 2020). Throughout the pandemic, restrictions have limited school attendance or activity engagement. Children and youth could no longer engage with their friends, teammates, coaches, or teachers in a way that they were used to. In turn, greater emphasis was placed on the different relationships children have with their family members for guidance, support, and other needs. Each one of these subsystems is described in greater detail below.

Caregiver and Child Dynamics

Caregivers are important role models for children and provide an abundance of experiences that shape children's well-being. In most cases, the caregiver of a child is their parent but the role can be fulfilled by any person who provides direct care (e.g., grandparents, adoptive parents, aunts, uncles). Caregivers provide a breadth of experiences that a child learns from, including feeding, language, and social norms. Children use their caregivers as a secure base and haven from whom they explore, seek protection, and get comfort in times of distress (Bowlby, 1982). When caregivers provide support and communicate effectively with their children positive outcomes can be seen in the areas of self-esteem, coping, mental health, and general well-being (Fukukawa et al., 2020; Symister & Friend, 2003). They pass down the skills necessary to manage stress, which can serve as a protective function against deterioration in the caregiver-child relationships, indirectly preventing increases in child symptomatology (Hussong

et al., 2022). Just like a feedback loop, positive interactions feed into better individual well-being, leading to better relationships and communication between the caregiver and child. However, when communication breaks down and relationships are unsupportive, declines in physical and mental health, as well as increases in unhealthy coping behaviours can be seen (Graham et al., 2006; Ng & Jeffery, 2003). This is true not only in circumstances when there is a lack of communication but can also be present if the parent is critical or punishing in their interactions (Peris & Miklowitz, 2015).

Caregiver-Related Variables Affecting Child Functioning

The caregiver-child relationship is influenced by several caregiver-related variables that can be harmful to the child's well-being. When the caregivers are afflicted with their own mental illnesses the child's needs might not be recognized when seeking support or protection (Oyserman et al., 2000). Child mental health needs can be linked to the experiences of depression in their mothers during pregnancy, which are then associated with higher service costs (Bauer et al., 2015). Caregiver impairment can also result in children having an increased risk of experiencing neglect, separation, and interpersonal conflict with others (Weigand-Grede et al., 2011). This is especially important as youth who seek guidance and don't have their needs met might develop maladaptive patterns of coping and behaviour that could result in greater downstream burdens. Children of a parent with a mental illness have also a greater likelihood of developing their own mental health difficulties and seek a greater proportion of mental health services in comparison to those who do not have a parent with mental illness (Nicholson et al., 2002). Even when a caregiver does not have any diagnosable conditions but has poorer than average mental health their children show lower levels of adjustment to adversity and poorer physical and mental health (Silva et al., 2018). This can be understood in terms of the caregiver

not having enough resources beyond attending to their own struggles to then help their children through positive interaction and responsiveness.

Sibling Relationships Affecting Child Functioning

When relationships between a caregiver and child are compromised, siblings can often turn to each other for support (Milevsky & Levitt, 2005). The connection between siblings can provide a buffer when parental supportiveness is low and offer the opportunity for siblings to share greater intimacy with increased contact (Updegraff & Obeidallah, 1999). The effect may be multiplicative when there are more than two siblings present in the family, as there is a greater opportunity to form connections with those of different ages and experiences (Downey & Condon, 2004). However, sibling relationships can also be prone to experiencing both intimacy and conflict, especially during adolescence, and can add more hurdles to achieving healthy functioning (Pearlman & Ross, 1997). Siblings of children who have behavioural or developmental problems may be more likely to exhibit academic or conduct problems themselves, thereby lowering the possibility of supportive interactions (Aguilar et al., 2001). So, while sibling relationships can offer support, they can also add to the hardships a child experiences.

Increases in Stressors Impacting Family Functioning

The second key principle outlines that increases in daily stressors due to COVID-19 negatively impacts caregiver well-being, working as a gateway to affecting family functioning (Prime et al., 2020). Evidence has shown that caregiver stress is a central variable reflecting the impact of the pandemic on families (Calvano et al., 2021). The amount of stress a caregiver experiences, whether it is related to increased responsibilities at home, work challenges, or financial stress can impact how they interact with their children. These stressors play a role in

making a caregiver feel overburdened and at capacity in their emotional and mental resources, creating a more negative family environment while lowering warmth towards others (Malinen et al., 2017). Greater discord because of increased caregiver distress can impact youth mental health and adjustment problems (Landers-Potts et al., 2015; Wong et al., 2022).

Stressors from outside of the family environment are compounded by difficulties experienced within the family environment. Work during the early pandemic has suggested that COVID-19 related stress and child psychosocial functioning are interrelated in their influence on caregiver's well-being, so that child behavioural difficulties and caregiver pandemic-related stress are associated with worse caregiver mental health outcomes (Masten et al., 2020; Daks et al., 2020). Worsened caregiver mental health (e.g., anxiety, anger, depression) then has cascading effects on their children's temper, hyperactivity, and argumentativeness (Robertson et al., 2021). Being overloaded with stressors in one area, such as job- or health-related concerns, can diminish the ability of a caregiver to be effective in other areas of their life, thereby adding further allostatic load onto their capacity to be effective caregivers. Children have reported that during this time open family communication, support, and family satisfaction have all been negatively impacted (Hussong et al., 2022). Research has shown that the quality of family relationships deteriorated during the pandemic, with caregiver stress and mental health symptoms limiting their ability to effectively buffer against the impact of pandemic-related stress on children's mental health (Cohodes et al., 2021; Feinberg et al., 2022). The pandemic stressors then, indirectly, have an impact on how well children cope with their own negative life events by affecting caregiver and family functioning.

Family Connections and the Functioning of the Family as a Unit

The third component of the model outlines that during COVID-19, any stressors that impede the functioning of one family member may affect all of the other family members as well (Prime et al., 2020). How caregivers influence their children has been well established, but the well-being of the children exerts an influence on caregivers as well. A bidirectional process exists between child adjustment and behaviour, and their caregiver's adjustment and behaviour (Sameroff, 1975). Prior research has shown that having a child with mental illness or behavioural problems has been linked to greater levels of stress in their caregivers (Mazza et al., 2021; Rodriguez-Jenkins & Marcenko, 2014). The challenges not only affect the caregiver's emotional and cognitive distress levels but can also lead them to experience greater financial strain and employment challenges, or lead to caregiver relationship discord that ends in separation or divorce (Vohra et al., 2014; Wei & Yu, 2012). The relationship strain and its impact can then have downward effects, leading to harsher parenting and weakening parent-child relationships through emotional insensitivity, harsh parenting styles, and unresponsiveness (Fontanesi et al., 2020). The resulting impacts on children can be seen in substantially increased risks of developing behavioural and developmental disorders (Cohen & Weitzman, 2016). Relationship strain not only has the potential to be damaging to the well-being of children, but also models a "status quo" of expected social interactions and informs how children may interact with others henceforth. Interactions between caregivers and children also build on each other with time, impacting longer-term mental health outcomes (Brody et al., 2013). In addition, greater challenges and worse mental health outcomes can be seen for caregivers younger in age, as well as those who have younger children (Giannotti et al., 2021).

The functioning of separate family members is further complicated by the functioning of the family unit. As the family unit grows and the number of children in the household increases,

so do the levels of chaos and conflict in the family unit (Neubauer et al., 2021). When greater levels of chaos are present in families, children can also have greater fearfulness, acting out, and anxiety/withdrawal as a result (Zhang, 2022). As family cohesion declines and family conflicts increase, the risk of child externalizing and internalizing problems also rises (Fosco et al., 2022). And while siblings can offer support to each other, Cassinat and colleagues (2021) found that increased family chaos was linked to diminished sibling disclosure and intimacy, as well as increased sibling conflict. Family relationships are important sources of connection and have a great influence in shaping health trajectories of the individuals involved throughout their lives (Umberson et al., 2010).

Family Processes Modifying Risk to Social Disruption

The fourth key principle posits that the way in which families are affected by social disruption is shaped by family processes consisting of communication (e.g., problem-solving, emotional sharing), organization (e.g., connectedness, adaptability), and belief systems (e.g., spirituality, meaning-making), which can be disrupted or altered by pandemic-related factors (Prime et al., 2020). Family functioning can be understood as a family-wide process describing the nature in which the family members come together and operate as a whole, undertaking various physical, psychological, and emotional activities such as communication and problem-solving (Mosby, 2009). When families are accepting, open, and effective communication is employed, children can feel more comfortable communicating their mental health concerns to make sure their needs are addressed (Oltean et al., 2020). Open communication between family members, where reciprocal calm and honest interactions are present, can mitigate the development or onset of stress disorders (Roccella, 2020). Not only does better family

functioning mitigate risk, but it also is related to a higher probability of using health and social services during the pandemic to meet family needs (Waldmann et al., 2021).

When emotional bonding between family members, openness to change, and communication is hampered, challenges can arise in different areas. This includes increased behavioural problems (e.g., hyperactivity, aggression) and decreased mental well-being (Eshraghi et al., 2022; Russel et al., 2020). When communication breaks down and relationships are unsupportive, deterioration can be seen in the physical health, unhealthy coping behaviours, and mental health outcomes of the family members (Graham et al., 2006; Ng & Jeffery, 2003). This may lead to what some describe as “family chaos” (Olson, 2009), which is a state of affairs characterized by disorganization and instability that has been associated with children’s behaviour problems (e.g., conduct problems, hyperactivity), internalizing problems (e.g., anxiety disorders), and caregiver distress (Coldwell et al., 2006; Guo et al., 2015; Mills-Koonce et al., 2016). The presence of family chaos hinders the capacity of members to come together and overcome conflicts or meet their basic needs. For example, in a study of 105 children, negative coping behaviours, such as hair pulling to relieve stress, were seen in families with lower family support and greater conflict (Keuthen et al., 2013). For families who lack effective communication, loneliness can be experienced by the individual members and the feeling of being alone while surrounded by family members has been found to play a mediating role in the mental health of youth (Pan et al., 2021). If families lack the necessary skills to adapt, communicate, and grow together during such a stressful time they are vulnerable to experiencing the brunt impact of COVID-19 stressors. Worse family functioning, in turn, predicts engagement in several services, including specialist mental health and social care services while negatively

predicting engagement in others, such as primary care and special education services (Knapp et al., 2015).

Family Vulnerabilities and Protective Factors

Lastly, the fifth component outlines that the degree to which families are affected varies based on pre-existing vulnerabilities (e.g., low-income, mental health and/or special needs of the members) and resilience factors (e.g., quality of relationships; Prime et al., 2020). Caregiver mental health is a large contributor, as having a history of personal or family mental health difficulties increases the risk for family wide-vulnerabilities (Goodman et al., 2011). Families with higher levels of pre-pandemic parental depression and family chaos showed even greater hardships and child behavioural problems during the onset of the pandemic (Johnson et al., 2022). Caregiver mental health and family financial difficulties have also been highlighted as risk factors for increased child psychological difficulties (Moulin et al., 2021). The link between financial stress and compromised caregiver well-being is stronger for lower-income families, as there can be more severe consequences associated with not having adequate financial resources (Ponnet, 2014). Financial stressors may influence how positive families are in their daily interactions, disrupting communication between members by lowering sensitivity and responsiveness (Browne et al., 2016). Caregiver practices are also important, as harsh discipline can be predictive of later internalizing problems in children (Fosco et al., 2022). These vulnerabilities elevate the risk of various pandemic-related challenges as they may overburden the capacity to cope with any additional stressors.

Several resilience factors exist that can buffer against the strain-associated challenges of additional stress. Family-level resilience factors include adaptability to new challenges, family cohesion, and effective communication (Black & Lobo, 2008; Walsh, 1996). For families with

both parents present, children's experiences of stress and chaos resulting from COVID-19 disruption have been lower in comparison to single-parent households (Langmeyer et al., 2022). Adaptability and flexibility to changing situational demands, agreeing on strategies, and monitoring the efficacy of family members' actions are of paramount importance to deal with a wide range of challenges that have come about as a result of the pandemic (Chen & Bonanno, 2020). In addition, the quality of caregiver relationships is critical to the well-being of the caregivers and children (Feinberg, 2003). When caregivers are socially supported, decreases in family functioning can be mitigated (Hussong et al., 2022). These effects can be felt by all of the family members, as having positive parent-child and sibling relationships can offset and prevent the development of problematic childhood behaviours and familial socioemotional well-being (Campion-Barr et al., 2021; Martin-Storey et al., 2021). Sibling relationships can also facilitate resilience when children help each other cope (Langmeyer et al., 2022). When these protective factors are not enough, families can seek support from external sources, such as mental health treatment, when they are experiencing family dysfunction, emotional challenges, or stress.

Family Stress, Mental Health, and Resulting Service Utilization Expenditures

The rates of mental health challenges and associated costs have sharply risen during the COVID-19 pandemic. The proportion of adults reporting symptoms of depression and anxiety has risen by 29% in the United States during 2020 (Centers for Disease Control and Prevention, 2020). That equates to an estimated 80 million additional individuals with mental health conditions related to COVID-19 in the US alone. Given the sharp rise in various mental and physical health symptoms within families with the onset of the COVID-19 pandemic, consequences from a broader societal framework must be considered in terms of what it means when children and caregivers are impacted in such a way. As family functioning has worsened

with the onset of the COVID-19 pandemic, services that provide support have in some cases been discontinued or have been shaped by the pandemic to operate at limited capacity as a safety response. For families seeking support, the services might not have been there. And when individuals experiencing distress don't have their needs met, the long-term costs are increased by thousands for each individual (Thurston et al., 2011). During 2020 alone, government healthcare expenditures in the United States grew 36 percent, totaling trillions of dollars, to meet people's needs (Hartman et al., 2022). Similar rates of increase were seen in Canada and the United Kingdom, as services were developed to meet increasing demand (e.g., telehealth care). So, while initially the services available decreased in number, the actual rate of observed services used went up for both mental health services and telehealth care (Suffren et al., 2021). This is important to note, as for every 50 patients whose psychiatric distress is resolved, there is a potential savings of \$100,000 that could be re-invested into additional services or other infrastructure (Thurston et al., 2011).

The impact on society from an economic standpoint cannot be overstated and several factors contribute to greater costs. Spending on healthcare can make up 9.6-17.8% of total national gross domestic product for countries such as Canada, Australia, UK, and the US (Papanicolas et al., 2018). Based on current research, there are several aspects that may contribute to financial burdens placed upon society through increased health and social service utilization. These include child and adolescent mental health and behavioural difficulties, where greater impairment is a significant predictor of subsequent costs (Beecham et al., 2009). Child and parent related mental health characteristics have also been linked to the probability of using services, with the functional capacity and age of the child further predicting utilization expenditures (Waldmann et al., 2021). Lastly, families have been reporting greater unmet needs

for family mental health care during the pandemic, as well as a greater perceived need for services that target family well-being (Genevieve et al., 2022). The overwhelming necessity and demand for services grew during the COVID-19 pandemic, and so did the costs associated with meeting those needs.

The Present Study

Social and health services are used to improve or maintain function, diagnose, treat injury or disease, and obtain knowledge on an individual's well-being. The costs arising out of service utilization can vary based on the service provider, service length, specialty, and quality of care. These change with time as new research findings are incorporated into practice, as demand for different services varies, and as government funding grows or decreases in each of the service areas. For countries that provide universal healthcare, such as the United Kingdom, a large part of the economic burden arising out of service utilization is the responsibility of the government. Prior to the pandemic, these costs made up as much as 10% of the Gross Domestic Product for the United Kingdom every year (Office for National Statistics, 2018). With the new challenges posed to individual and family functioning during COVID-19, these numbers have seen a sharp rise to 12.4% in 2021 and have continued increasing thereafter (Office of National Statistics, 2023). The greater spending on healthcare takes away funding for other public services, such as housing, social care, and education. Understanding the contributors of these costs can aid in developing public policy, lowering the spending on services with less demand, and planning.

There are several influences that drive service utilization expenditures, including individual demographics, individuals' mental health, and family functioning (Hosman et al., 2009; Nabalamba & Millar, 2007; Waldmann et al., 2021). With the start of the COVID-19 pandemic, the well-being of individuals and family functioning has been negatively impacted

due to additional stressors such as job loss, increased responsibilities, and confinement within the home (Sanchez et al., 2021; Westrupp et al., 2021). Several services have been adapted or developed to meet the increasing demand, with a transition from in-person to virtual appointments. However, much is still unknown about the kinds of services that have been utilized by various family members and the family. Previous work has differentiated amongst some of the different services that are likely to be used because of decreases in well-being, including mental health, physician, social work, and special education service utilization (Knapp et al., 2015). Beyond that, limited studies have examined a range of services in both the health and social domains or have examined utilization as a single variable without having a breakdown of the services or their costs. Failing to parse apart the different services may not provide enough information of the patterns of use to plan for any remediation or policy developments. Understanding the necessity and meeting the demand for services can be preventative of long-term costs, even if the upfront costs may seem high (Knapp & McDaid, 2011). With ever-increasing economic costs of health and social services, a greater knowledge of how different well-being and family processes affect utilization and what services are being used can be the first step in lowering expenditures in the upcoming years.

When examining family and individual processes, researchers would benefit from considering multiple family subsystems simultaneously, as well as the outcomes in expenditures for each one. That is to say, child, caregiver, and family variables must be considered in tandem as looking at the influences of one family member (e.g., youngest child) may not account for the complex relationships that are present in a family and how they may each impact service utilization expenditures. Increases in service utilization have come about because of the pandemic, but there are variations in the services used and the driving factors, even within the

same country (Xin & Ren, 2023). While in some families greater service expenditures can come as a result of poorer family functioning, in others greater expenditures are seen due to better relationships and encouragement to seek help from each other (Wamsler-Nanney & Campbell, 2022). As such, more research is required to determine the driving factors behind service utilization expenditures that consider multiple influences of different family and individual factors that may be protective, or detrimental.

This study sought to build on the understanding of family functioning during the COVID-19 Pandemic. To date, there has been a focus on single-family subsystem (e.g., marital, parent-child, sibling) variables, limited protective factor identification, and a lack of data on service use expenditures. Multiple processes (e.g., resilience, family functioning, social disruption) work in tandem to influence service utilization, and this Master's thesis aims to be the first step in understanding the factors contributing to service utilization expenditures with an eye to the future of having more complicated models (e.g., growth curve models) that capture interactions and change over time between the variables of interest. We utilized data from the first six months of the pandemic to 1) identify the factors that predict higher health and social service use expenditures across numerous services (i.e. family functioning, child functional impairment, caregiver distress); and 2) evaluate the differences in types of services used by families in high/low scoring groups. As such, this study aimed to understand the family-wide and individual factors that influenced different service utilization patterns and expenditures during the pandemic, as well as the resulting societal costs.

Method

Participants and Procedure

The present data were gathered as part of a larger longitudinal project, the *Child Resilience and Managing Pandemic Emotional Distress in Families* study (CRAMPED), an international project that aims to examine stress and family processes during the COVID-19 pandemic and thereafter. The full data set includes a sample of caregivers ($n = 549$) from multiple countries with two or more children which included participants from Canada, United Kingdom, United States, and Australia. Though the study included some families with more than two children, the caregivers reported on two of their youngest children between 5-18 years of age ($n = 1098$) to limit the time required to answer the questionnaires. The current project focuses on those who reported residing in the United Kingdom, the majority group in our sample, and was used to gain an understanding of service expenditures. That is, focusing on a single country allows the simple translation of service utilization frequency into economic expenditures, which would be both complicated and confounded by comparing estimates across countries where utilization costs, currency, and healthcare funding policy significantly differ. As such, our current sample is made up of caregiver-reported assessments of 418 caregivers and their youngest two children between 5-18 years of age ($n = 836$) residing in the United Kingdom.

Caregivers reported on themselves, each of the children, and the whole family unit. The data collection began shortly after the beginning of the COVID-19 pandemic and included four bi-monthly assessments in May (Time 1 [T1]), July (Time 2 [T2]), September (Time 3 [T3]), and November 2020 (Time 4 [T4]). The present thesis includes data from the May and November time points. All predictors and demographic information were measured at T1, while service utilization was cumulative of the previous 6 months and measured at T4. Caregivers were

recruited via Prolific®, an online survey platform, and were compensated financially for their participation. Caregivers were included in the study if they had at least two children, five years of age or older, currently residing in the same household. All study procedures were approved by the Research Ethics Board at the University of Waterloo (ORE #42112) and informed consent was obtained from all study participants.

At baseline, caregivers were an average of 41.6 years old ($SD = 6.3$) with the youngest child (sibling one) being an average of 9.3 years old ($SD = 3.1$), and their next sibling closest in age (sibling two), 12.4 years old ($SD = 3.2$). Approximately 70% ($n = 292$) of the caregivers were female, most were married or common-law (90%, $n = 375$) and White (86%, $n = 318$), and approximately half were working full-time (49%, $n = 206$). The median 2020 income of families in the current study was £41,340 - £62,009 (converted from United States Dollars bands), which is higher than that of the 2020 Census (£31,461; Smith, 2020). All demographic information was based on caregiver reports. As such, there may be some inaccuracy when considering variables such as the gender of children (i.e., some children may not have felt comfortable sharing their identity, or caregivers might not have been fully accepting of their children identifying as non-binary). Table 1 and Table 2 show the full sociodemographic information.

Table 1***Caregiver's Sociodemographic Characteristics***

	<i>n</i>	<i>%</i>
Sex		
Female	292	69.9
Male	114	27.3
Unreported	12	2.9
Relationship Status		
Lone Parent	37	8.9
Couple Living Apart	6	1.4
Married/Common-Law	375	89.7
Ethnicity		
Asian (East, South, or Southeast)	21	5.7
Black (African, Caribbean, or North American)	11	3.0
First Nations	1	.3
White (European or North American)	325	87.8
Mixed Heritage	10	2.7
Turkish	1	.3
Unreported	1	.3
Past-Year Household Income (GBP)		
< £12,402	19	4.5
£12,403 - £20,669	44	10.5
£20,670 - £41,339	134	32.1
£41,340 - £62,009	106	25.4
£62,010 - £82,679	59	14.1
£82,680 - £103,349	33	7.9
£103,350- £124,019	8	1.9
£124,020- £144,689	7	1.7
£144,690+	7	1.7
Unreported	1	.2
Employment		
Full-Time	206	49.3
Part-Time	108	25.8
Unpaid Work	70	16.7
Unemployed	7	1.7
Due to Start Job in Next Month	2	.5
Other	13	3.1
Unreported	12	2.9

Note. Percentages may not add to 100% due to rounding.

Table 2

Children's Sociodemographic Characteristics at Baseline

	Sibling 1		Sibling 2	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Gender				
Female	191	45.9	206	49.3
Male	224	53.8	210	50.2
Transgender	0	0	1	.2
Unreported	1	.2	1	.2

Note. Percentages may not add to 100% due to rounding.

Measures

COVID-19 Disruption

Stressors related to the pandemic were assessed using the COVID-19 Family Stressor Scale (CoFASS; Prime et al., 2021). Disruption across numerous aspects of life was measured using 16-items and rated using a three-point scale from 1 (*Not True*) to 3 (*Very True*). The measure includes questions on basic needs, finances, family relationships, career/education and is made up of items asking the caregiver to rate the effects of the pandemic on questions such as “*required government assistance*” and “*anxiety about danger to self and family*”. Summing the items yielded a total score of how much families were impacted by the pandemic. Good internal consistency was found in the current sample (Cronbach’s $\alpha = .83$).

Family Functioning

Whole family functioning was assessed using the six-item version of the General Functioning Subscale of the McMaster Family Assessment Device (FAD-GF6+; Boterhoven de Haan et al., 2015; Epstein et al., 1983). The subscale focuses on one aspect of family life, general functioning, and includes questions assessing areas that include cohesiveness and support. Item responses are rated using a 4-point Likert scale ranging from 1 = *Strongly Agree* to 4 = *Strongly Disagree*. Total scores are derived by summing all the items in the measure and higher scores indicate poorer functioning, with scores greater than 2 indicating problematic functioning. Previous large-scale studies have indicated strong reliability and validity (Boterhoven de Haan et al., 2015; Byles et al., 1988). Internal consistency in the current sample was good (Cronbach’s $\alpha = .87$).

Caregiver Distress

Psychological distress in caregivers was assessed using the Kessler Psychological Distress Scale (K10; Kessler et al. 2002). The K10 is a ten-item measure yielding a global measure of distress based on a person's experience with anxiety and depressive symptoms in the last 4-week period. Sample items include "*In the last 30 days, about how often did you feel nervous?*" and "*During the last 30 days, about how often did you feel so restless you could not sit still?*". Item responses are rated using a 5-point Likert scale ranging from 1 = *None of the time* to 5 = *All of the time*. Clinical impairment is suggested when the total of the summed scores are greater than 20 (Andrews & Slade, 2001). High reliability and validity have been previously found for the measure (Easton et al., 2017). Internal consistency in the current sample was very good (Cronbach's $\alpha = .93$).

Social Support

Family social support was assessed using the Social Support Survey from the National Longitudinal Survey of Children and Youth (SSS; Statistics Canada, 2017). This six-item measure examined family support behaviours using items asking the degree to which family members are accepting of each other, how well they can make decisions to solve problems, or if they express feelings to one another. Item responses are rated on a four-point Likert scale ranging from 1 = *Strongly Agree* to 4 = *Strongly Disagree*. Internal consistency in the current sample was good (Cronbach's $\alpha = .89$).

Child Functional Impairment

Caregivers reported on their children's functional impairment across multiple domains using the Impairment Rating Scale (IRS; Fabiano et al., 2006). This seven-item scale examines caregiver perceptions of child impairment in academic, social, peer, and family contexts. Caregivers use a 7-point scale to signify their child's functioning ranging from 0 (*Not at all*.

Definitely does not need treatment or special services) to 6 (*Extreme problem. Definitely needs treatment and special services*). A score of 3 and above indicates impairment and was used for mean comparisons, while a total IRS score combining all of the domains was used in the models. The scale has been shown to be reliable and valid across previous studies (Girio-Herrera et al., 2015). Internal consistency in the current sample was good (Cronbach's $\alpha = .82$).

Social and Health Service Utilization Expenditures

Health and social service utilization was assessed through caregiver reports using an adaptation of the Health and Social Service Utilization Inventory (HSSUI; Browne et al., 2013). Nine items were used to assess the frequency of services used for the caregiver and each of their two children since the start of the COVID-19 pandemic. Items were made up of how often individuals used a particular service. The nine services were: a family physician, a non-physician at a family doctor's office (e.g., nurse, physician assistant), a physician specialist (e.g., cardiologist, dermatologist), a walk-in clinic, emergency room, COVID-19 test centre, a social worker, mental health services (e.g., psychologist, psychotherapist), and special education (e.g., school psychologist, IEP meeting). Caregivers were asked to input the frequency of use for each service, since the start of the pandemic, for each child and themselves. As the answers produced a count variable, the internal consistency of the measure is not reported. Table 3 shows the final values for each of the healthcare services used.

Analytical Approach

Descriptive statistics and correlations were assessed using the Statistical Package for the Social Sciences version 26 (SPSS; IBM Corp., 2022). Mplus was employed to conduct all further statistical analyses (Muthen & Muthen, 1998-2023).

Calculating Service Use Expenditures

To identify the costs associated with each of the health and social services, a societal perspective was used, where the cost of each service is calculated from the viewpoint of the cost to society (rather to one organization or individual). As several health services are covered in part or fully in the U.K. through taxation, examining the cost to the public from a societal perspective allows us to understand the total cost of each visit without missing a portion that might be covered by an incentive, insurance, or subsidy. Most services were based on an hourly rate, while the walk-in clinic cost and the rate for a family physician were based on average visit times (30 minutes and 9.22 minutes, respectively; UK Government Web Archive, 2020). Multiple sources were identified to get the most accurate cost, and the most up-to-date and accurate data was used to determine the respective value for each service. Whenever possible, figures from the National Health Service reference costs were used (NHS; UK Government Web Archive, 2020). Two other sources were used when it was required to supplement the NHS materials, specifically, the Personal Social Services Research Unit (PSSRU; Jones & Burns, 2021) and the Walk-In Clinic (Walk-In Clinic, 2022) were used to come up with the final costs. To fully capture the services in our questionnaire, costs from several different years were used, spanning 2014-2021. These numbers were then transformed using an inflation calculator from the Bank of England to all reflect the currency value during October 2022. The numbers were rounded to the nearest whole GBP for our analyses. Each occurrence of service use was then multiplied by the cost of each service to obtain our final expenditure cost estimates. Table 3 shows the final values for each of the healthcare services used to calculate individualized service expenditures.

Table 3***Average Cost Estimates of Healthcare Services Used to Calculate Individualized Costs***

	Cost
1. Walk-in Clinic	142.79
2. Specialist	139.15
3. Special Ed	81.24
4. Social Worker	99.70
5. Family Physician	45.26
6. Non-Physician Specialist	48.75
7. Mental Health	323.56
8. Emergency Room	190.63
9. COVID-19 Test Centre	108.74

Note. All values are in British Pounds and were calculated to reflect the impact of inflation on October 2022. These values were used to calculate individual utilization expenditures for each person in the family.

Normality and Missing Data

In terms of missing data, a total of 306 (73.21%) of the original $n = 418$ caregivers included at baseline had full data on measures of interest at the 6-month follow-up (November 2020). To explore the nature of the missing data, Little's (1998) Missing Completely at Random (MCAR) test was run and a non-significant result was found, suggesting that the MCAR assumption was not rejected, $\chi^2(1164) = 669.31, p = 1.000$, and that the data is missing completely at random. Data were examined to see if any demographic factors contributed to the drop-out across the study timeline using independent-sample t-tests. Results revealed that those who dropped out were more likely to identify as non-White in ethnicity ($p = .043$), but no other demographic differences were found between the individuals at baseline and those who remained. For our analyses in Mplus, full information maximum likelihood estimation was used to minimize any potential bias associated with missing data. This method is recommended when data are completely missing at random and yields the most unbiased estimates in comparison to other methods (Enders & Bandalos, 2009).

Service Utilization Costs Among Low and High Scoring Groups

Service utilization costs were examined among caregivers and children as a function of social support, COVID-19 disruption, caregiver distress, child functional impairment, and family dysfunction using Kruskal-Wallis tests (Kruskal & Wallis, 1952). This is a way to test non-normal data and is like a non-parametric one-way ANOVA. Utilization costs for parents and children were examined based on two groups for each predictor. For caregiver distress, groups were created by using the established clinical cutoff score of 20, with those scoring below being placed in the Low distress group. For child functional impairment, the scores for each child were averaged into a mean functional score across the two children. The established clinical cutoff

score of 3 was used to create groups. To create groups with high and low family dysfunction levels, the established cutoff score of 2 was used to split the groups. For caregiver social support and COVID-19 disruption, groups were created by using a median split to maintain continuity and allow for easy interpretation of the results in the tables. The cost variables had meaningful zeros and were not transformed. Total service utilization costs for the family-unit were considered as the dependent variable. All p -values are reported to three decimal places with those less than .001 reported as $p < .001$. All statistical tests were performed using two-sided tests at alpha = 0.05 level of significance. These analyses were performed using SPSS and the High/Low groupings were only utilized for group comparisons and not the main analyses.

Generalized Linear Models

Generalized linear models were used to assess the predictors of service utilization expenditures. Predictor variables of interest were measured at T1 and included COVID-19 distress, caregiver distress, social support, child functional impairment, and family dysfunction. Zero-inflated negative binomial regressions were used as they allow for the dependent variable to have a non-normal distribution with excessive zeros or a wide range between the lowest and highest values (Ridout et al., 2001). This analysis provides two sets of results: one that shows the extent to which each independent variable is a predictor of non-zero variability in the outcome, and another that shows the likelihood of belonging to the zero vs. non-zero group on the outcome as a function of the predictors. Predictor variables were grand mean centered to allow for a more meaningful interpretation of the relationships in the models (e.g., understanding service use of those scoring above the average on variables of interest; Bell & Fairbrother, 2018).

First, expenditures at T4 (during the first 6 months of the pandemic) for each service were examined for each member separately (e.g., physician or emergency services for caregiver,

older child, younger child). Second, a family-level expenditure variable was created for each service (e.g., total family spending on physician services). Third, services were combined into an expenditure variable to capture the total costs for each family member role (e.g., total spending for caregivers, total spending for older children). Lastly, total service expenditures for the entire-family unit were calculated and examined in an omnibus model (i.e., total costs per family). All models controlled for caregiver age (measured in years) and sex (dummy-coded with the female gender as the reference variable), ethnicity (dummy coded with White ethnicity as the reference variable), relationship status (dummy coded with married/common-law as the reference variable), and 2019 (annual) household income.

Results

Descriptive Statistics

Table 4 displays the descriptive statistics for each family member's service utilization expenditures, with higher numbers showing more of the service being used as well as greater total costs. Table 5 shows the correlations between our predictor variables and the covariates. Interestingly, the highest correlation shows a negative relationship between social support and family dysfunction ($r = -.42$). That is to say, higher family social support is related to lower family dysfunction.

Table 4***Service Costs Among Each of the Family Members***

	Caregiver	Younger Child	Older Child
	Mean (SD)	Mean (SD)	Mean (SD)
1. Walk-in Clinic	7.02 (38.19)	10.55 (80.99)	8.04 (45.93)
2. Specialist	29.43 (104.79)	13.35 (74.37)	17.65 (65.67)
3. Special Ed	5.50 (46.59)	9.27 (53.23)	10.08 (42.29)
4. Social Worker	2.15 (28.73)	1.55 (12.36)	.31 (5.59)
5. Family Physician	12.28 (28.76)	5.85 (27.66)	7.97 (31.63)
6. Non-Physician Specialist	32.10 (72.36)	15.58 (67.72)	12.85 (31.48)
7. Mental Health	30.87 (226.01)	9.97 (71.26)	47.25 (284.49)
8. Emergency Room	7.61 (42.96)	7.66 (37.54)	11.93 (50.96)
9. COVID-19 Test Centre	28.37 (108.36)	14.79 (43.67)	18.20 (53.87)
10. Total Services	155.33 (696.75)	88.57 (468.80)	134.28 (611.91)

Note. All values are in British Pounds.

Table 5***Predictor Variable and Covariate Correlations***

Variable	1	2	3	4	5	6	7	8	9	10
1. COVID Disrupt	-									
2. FAD	.13**	-								
3. Social Support	-.28**	-.42**	-							
4. K10	.51**	.20**	-.38**	-						
5. IRS	.30**	.21**	-.22**	.30**	-					
6. Age	.24**	.07	.07	-.20**	-.03	-				
7. Sex	.18*	.07	.08	.15**	-.03	-.23**	-			
8. Race	-.06	-.01	-.02	.04	.04	.09	-.12*	-		
9. Income	-.19*	-.01	.09	-.14**	-.05	.22**	-.11*	.12*	-	
10. Rel Status	-.07	.02	.06	-.07	-.07	.07	-.07	.02	.25**	-

Note.: FAD = Family Assessment Device, K10 = Kessler Psychological Distress Scale, IRS =

Impairment Rating Scale, * $p < 0.05$, ** $p < 0.001$.

Group Expenditure Comparison***High and Low COVID-19 Distress Groups***

Table 6 depicts the average service utilization expenditures among families with low and or high levels of COVID-19 disruption. There were no significant differences on service expenditures between the two groups.

Table 6***Service Costs Among the High and Low COVID-19 Distress Levels***

	Low Disruption Group (<i>n</i> = 153)		High Disruption Group (<i>n</i> = 165)		Kruskal-Wallis
	Mean	(<i>SD</i>)	Mean	(<i>SD</i>)	<i>H</i>
1. Walk-in Clinic	24.28	(121.26)	26.85	(91.42)	.11
2. Specialist	60.89	(167.97)	49.72	(132.10)	.86
3. Special Ed	17.50	(67.12)	26.07	(109.50)	.00
4. Social Worker	3.25	(28.97)	4.87	(41.08)	.27
5. Family Physician	57.23	(118.52)	61.60	(128.16)	.54
6. Non-Physician Specialist	22.86	(50.25)	28.17	(59.85)	.19
7. Mental Health	40.23	(145.43)	98.08	(387.22)	.53
8. Emergency Room	28.69	(94.84)	24.30	(76.48)	.85
9. COVID-19 Test Centre	68.55	(175.79)	54.42	(121.36)	.00
10. Total Services	322.56	(540.77)	356.94	(558.36)	.59

Note. Mean and standard deviation values for the groups are in British Pounds and are based on total family service use costs. Groups were split based on a median split. Kruskal-Wallis H test for group differences * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

High and Low Family Dysfunction Groups

Table 7 depicts the average service utilization expenditures among families with low and or high family dysfunction. There were no significant differences between the expenditures between the two groups. However, it is interesting to note that families in the high dysfunction group did not utilize any social worker services.

Table 7***Service Costs Among the High and Low Family Functioning Groups***

	Low Dysfunction Group (<i>n</i> = 242)		High Dysfunction Group (<i>n</i> = 64)		Kruskal-Wallis
	Mean	(<i>SD</i>)	Mean	(<i>SD</i>)	<i>H</i>
1. Walk-in Clinic	28.80	(116.86)	13.20	(48.78)	.36
2. Specialist	56.28	(149.69)	50.56	(153.61)	.00
3. Special Ed	22.77	(97.51)	18.72	(63.78)	.13
4. Social Worker	5.16	(40.04)	.00	(.00)	1.60
5. Family Physician	62.64	(135.09)	47.29	(59.12)	.05
6. Non-Physician Specialist	25.06	(54.9)	27.73	(57.75)	.04
7. Mental Health	70.66	(298.12)	68.67	(297.75)	.00
8. Emergency Room	28.03	(91.39)	20.26	(59.26)	.01
9. COVID-19 Test Centre	67.26	(163.48)	37.96	(75.16)	.78
10. Total Services	366.45	(595.18)	242.00	(305.73)	.43

Note. All values for the groups are in British Pounds and are based on total family service use costs. Groups were split based on clinical cut-offs on the Family Assessment Device. The high group had scores of 3 or greater, while the low group scored 2 or below. Kruskal-Wallis *H* test for group differences * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

High and Low Caregiver Social Support Groups

Table 8 shows the average family service costs among caregivers who reported low or high levels of family social support. Families of caregivers who reported low social support had significantly higher expenditures for walk-in clinics $H = 4.59$ ($p = .032$) and significantly higher expenditures for mental health services $H = 8.60$ ($p = .003$). No other significant differences were

found, even though caregivers of families who reported feeling less supported ($M = 76.83$, $SD = 186.54$) had expenditures more than doubling those who were highly supported ($M = 37.55$, $SD = 110.03$) for specialist services.

Table 8

Service Costs Among the High and Low Social Support Groups

	Low Support Group ($n = 136$)		High Support Group ($n = 169$)		Kruskal-Wallis H
	Mean	(SD)	Mean	(SD)	
1. Walk-in Clinic	39.25	(142.46)	14.70	(63.28)	4.59*
2. Specialist	76.83	(186.54)	37.55	(110.03)	2.98
3. Special Ed	26.85	(110.61)	18.09	(72.93)	.48
4. Social Worker	7.09	(50.14)	1.71	(16.82)	1.23
5. Family Physician	62.77	(123.55)	57.20	(123.89)	.28
6. Non-Physician Specialist	29.98	(59.58)	22.21	(51.85)	2.31
7. Mental Health	129.93	(427.53)	22.22	(89.16)	8.60**
8. Emergency Room	33.85	(97.55)	20.61	(74.88)	2.01
9. COVID-19 Test Centre	54.80	(120.29)	65.55	(170.48)	.22
10. Total Services	437.40	(675.20)	263.11	(409.66)	2.03

Note. Mean and standard deviation values for the groups are in British Pounds and are based on total family service use costs. Groups were split based on a median split. Kruskal-Wallis H test for group differences * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

High and Low Caregiver Distress Groups

Table 9 depicts the family service utilization expenditures among caregivers who reported low or high levels of distress. Families of caregivers with higher levels of distress spent significantly more money on special education services ($H = 4.41, p = .036$), and on mental health services ($H = 7.33, p = .007$), in comparison to families of caregivers who reported lower levels of distress. No other notable differences existed between the groups.

Table 9

Service Costs Among the High and Low Caregiver Distress Groups

	Low Distress Group ($n = 282$)		High Distress Group ($n = 24$)		Kruskal-Wallis H
	Mean	(SD)	Mean	(SD)	
1. Walk-in Clinic	27.63	(123.33)	23.12	(80.11)	.00
2. Specialist	42.48	(110.08)	72.00	(190.20)	1.71
3. Special Ed	11.20	(49.73)	36.40	(126.55)	4.41*
4. Social Worker	3.86	(39.88)	4.41	(29.48)	1.37
5. Family Physician	55.69	(107.83)	64.92	(141.94)	.77
6. Non-Physician Specialist	25.71	(57.28)	25.70	(53.36)	.37
7. Mental Health	28.94	(129.67)	124.33	(421.71)	7.33**
8. Emergency Room	21.22	(72.44)	33.44	(100.60)	.81
9. COVID-19 Test Centre	56.54	(157.42)	66.23	(139.91)	.35
10. Total Services	276.33	(413.27)	425.36	(682.33)	1.45

Note. Mean and standard deviation values for the groups are in British Pounds and are based on total family service use costs. Groups were split based on clinical cut-offs on the Kessler Psychological Distress Scale. The high group had scores of 3 or greater, while the low group scored 2 or below. Kruskal-Wallis H test for group differences * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

High and Low Child Functional Impairment Groups

Table 10 shows the family service utilization costs in families based on high or low child functional impairment. Child functional impairment was the most predictive of service costs in comparison to family dysfunction, caregiver distress, and caregiver support. Families who reported having higher child impairment had significantly higher service costs for specialist services ($H = 3.87, p = .049$), special education services ($H = 8.69, p = .003$), social worker services ($H = 6.33, p = .021$), family physician visits ($H = 6.99, p = .008$), mental health services ($H = 44.45, p < .001$), and when all of the service costs were combined ($H = 10.52, p = .001$) in comparison to the low impairment group. Families who had children with higher levels of impairment reported expenditures for mental health services that were, on average, five times higher ($M = 286.39, SD = 478.39$) compared to those who reported low impairment ($M = 51.00, SD = 268.80$).

Table 10***Service Costs Among the High and Low Child Functional Impairment Groups***

	Low Impairment Group (<i>n</i> = 173)		High Impairment Group (<i>n</i> = 132)		Kruskal-Wallis
	Mean	(<i>SD</i>)	Mean	(<i>SD</i>)	<i>H</i>
1. Walk-in Clinic	26.82	(109.829)	11.44	(57.20)	.89
2. Specialist	52.38	(149.14)	85.58	(162.62)	3.87*
3. Special Ed	16.06	(61.30)	90.92	(244.14)	8.69**
4. Social Worker	3.75	(36.31)	8.00	(27.69)	6.33*
5. Family Physician	57.66	(126.73)	80.15	(75.11)	6.93**
6. Non-Physician Specialist	23.04	(50.39)	54.54	(91.90)	3.91*
7. Mental Health	51.00	(268.80)	286.39	(478.39)	44.45***
8. Emergency Room	26.06	(85.45)	30.56	(90.26)	.06
9. COVID-19 Test Centre	62.56	(153.49)	46.04	(102.83)	.29
10. Total Services	312.83	(523.39)	664.58	(732.21)	10.52***

Note. Mean and standard deviation values for the groups are in British Pounds and are based on total family service use costs. Groups were split based on clinical cut-offs on the Impairment Rating Scale. The high group had scores of 3 or greater, while the low group scored 2 or below. Kruskal-Wallis H test for group differences * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Generalized Linear Models***Specific Caregiver Service Utilization Expenditures***

Factors associated with caregiver service utilization costs were examined separately for each service. There were no significant predictors of membership in the zero vs. non-zero categories for specific caregiver service utilization costs. In other words, none of the predictors differentiated caregivers who used none vs. any services, when examining specific services in

isolation. However, the ethnicity of the caregiver was a significant predictor of the amount of physician service expenditures ($\beta = -.37, p = .031$), and the amount of non-physician specialist service expenditures ($\beta = -.63, p = .002$) in the non-zero models. In other words, those who identify as White (European or North American) incurred fewer costs from physician and non-physician services compared to caregivers who identified as non-White. Additionally, those who reported higher average levels of child functional impairment incurred more mental health service costs ($\beta = .29, p = .043$). Stated differently, caregivers who viewed their children as having higher levels of impairment incurred greater costs for mental health services themselves.

Specific Younger Child Service Use Expenditures

Factors associated with younger child service utilization costs were examined separately for each service. There were no significant predictors of membership in the zero vs. non-zero categories for specific younger child service utilization costs. That is, none of the predictors differentiated who used none vs. any services, when examining specific services in isolation for the younger child. For the younger child, only non-physician service expenditures had significant predictors in the non-logit regressions. These included Covid distress ($\beta = .06, p = .000$), child impairment ($\beta = .25, p = .022$), social support ($\beta = .09, p = .017$), and caregiver ethnicity ($\beta = -1.03, p = .006$). In other words, caregivers who identified as White (European or North American) incurred lower costs from non-physician services for their youngest child compared to caregivers who identified as non-White. In addition, caregivers who viewed their children as having higher levels of impairment, who had higher COVID-19 related distress, and who felt better socially supported incurred greater non-physician service costs for their youngest child.

Specific Older Child Service Utilization Expenditures

Factors associated with older child service utilization costs were examined separately for each service. When considering the odds of belonging to the zero vs. non-zero group, older children with higher levels of impairment were less likely to have zero spending on special education ($\beta = -.65, p = .030$), and non-physician specialists ($\beta = -.41, p = .014$). In other words, caregivers who reported greater average child functional impairment had older children that were more likely to use any special education and non-physician specialist services than not. For the negative binomial regressions, caregiver ethnicity significantly predicted the amount of COVID-19 Test Centre expenditures ($\beta = -.65, p = .026$). This means that caregivers who reported their ethnicity as White had older children that incurred greater test center service costs in comparison to caregivers who identified as non-White.

Combined Generalized Linear Models

Caregiver Total Service Utilization Expenditures

Total service utilization expenditures for caregivers were considered as a function of predictor variables and are shown in Table 11. There were no significant predictors of membership in the zero vs. non-zero categories for combined caregiver service utilization costs. That is to say, none of the predictors differentiated caregivers who used none vs. any services, when examining all of the services combined. However, a few variables significantly predicted the amount of total caregiver expenditures in the non-zero models. Specifically, caregiver distress ($\beta = .03, p < .001$), caregiver sex ($\beta = .42, p = .027$), and caregiver relationship status ($\beta = .54, p = .023$) emerged as significant predictors. In other words, caregivers who reported greater distress, those who were female, and those who were married had more frequent service use, overall.

Table 11***Summary of Regression Analyses Predicting Service Utilization Expenditures of the Caregiver***

Predictor Variables	ZINB Regression Model				Logistic Regression Model			
	<i>B</i>	<i>SE</i>	CI ₉₅	<i>p</i>	<i>B</i>	<i>SE</i>	CI ₉₅	<i>p</i>
Intercept	-1.31	1.08	[-3.42,.80]	.225	5.10	.63	[3.87,6.33]	.000
COVID-19 Disruption	-.01	.02	[-.04,.03]	.731	.01	.03	[-.05,.06]	.854
Family Functioning	.02	.04	[-.06,.10]	.654	.04	.05	[-.06,.14]	.412
Caregiver Distress	.03	.01	[.01,.05]	.000	-.03	.02	[-.07,.01]	.157
Child Functional Impairment	.09	.06	[-.02,.20]	.120	-.17	.12	[-.40,.07]	.162
Caregiver Social Support	-.02	.03	[-.08,.04]	.471	-.04	.04	[-.12,.04]	.356
Caregiver Age	-.00	.01	[-.03,.02]	.783	.02	.02	[-.03,.06]	.493
Caregiver Sex (Female)	.42	.19	[.05,.80]	.027	-.35	.29	[-.91,.22]	.232
Family Income	.01	.03	[-.05,.06]	.834	-.04	.04	[-.12,.04]	.373
Caregiver Ethnicity	-.36	.21	[-.77,.06]	.090	.58	.39	[-.20,1.35]	.143
Caregiver Relationship Status	.54	.24	[.08,1.01]	.023	.44	.43	[-.40,1.29]	.304

Note. ZINB = zero-inflated negative binomial.

Younger Child Total Service Utilization Expenditures

Total service utilization expenditures for the younger child were examined and are shown in Table 12. COVID-19 disruption was a significant predictor of membership to the zero vs. non-zero categories for combined younger child service utilization costs ($\beta = -.09, p = .006$). In other words, when caregivers had higher pandemic-related disruption, their younger children were more likely to use the available health and social services than not. No significant predictors emerged for the younger child service utilization expenditure amount across the variables in the negative binomial regressions. In short, none of the caregiver, child, or family influences had a significant impact on the total amount of service costs for the younger child.

Table 12***Summary of Regression Analyses Predicting Service Utilization Expenditures of the Youngest Child***

Predictor Variables	ZINB Regression Model				Logistic Regression Model			
	<i>B</i>	<i>SE</i>	CI _{.95}	<i>p</i>	<i>B</i>	<i>SE</i>	CI _{.95}	<i>p</i>
Intercept	3.04	1.17	[.74,5.44]	.010	6.83	0.82	[5.22,8.45]	.000
COVID-19 Disruption	.00	.02	[-.03,.03]	.963	-.09	.03	[-.15,-.03]	.006
Family Functioning	-.08	.05	[-.18,.01]	.084	-.06	.05	[-.16,.05]	.263
Caregiver Distress	.01	.02	[-.03,.04]	.718	.01	.02	[-.03,.06]	.522
Child Functional Impairment	.18	.09	[-.01,.36]	.058	-.10	.13	[-.35,.14]	.412
Caregiver Social Support	-.02	.03	[-.08,.05]	.623	-.03	.05	[-.12,.07]	.595
Caregiver Age	-.02	.01	[-.05,.01]	.147	-.04	.02	[-.08,.01]	.090
Caregiver Sex (Female)	-.21	.24	[-.68,.25]	.364	-.11	.33	[-.76,.53]	.732
Family Income	-.01	.04	[-.08,.06]	.797	-.02	.05	[-.11,.07]	.625
Caregiver Ethnicity (White)	-.31	.31	[-.91,.30]	.319	-.24	.44	[-1.10,.61]	.580
Caregiver Relationship Status	-.13	.51	[-1.13,0.88]	.808	-.38	.47	[-1.30,.54]	.414

Note. ZINB = zero-inflated negative binomial.

Older Child Total Service Utilization Expenditures

Total service utilization expenditures for the older children were considered as a function of predictor variables and are shown in Table 13. Child functional impairment was a significant predictor of membership in the zero vs. non-zero categories for the combined older child service utilization costs ($\beta = .20, p = .001$). In other words, caregivers who reported greater average child functional impairment had older children that were more likely to use health and social services than not. For the non-logistic regressions, child functional impairment was also a significant predictor of the amount of older child service utilization expenditures ($\beta = -.42, p = .002$). That is to say, total service costs in the older child were predicted by higher average child impairments.

Table 13*Summary of Regression Analyses Predicting Service Utilization Expenditures of the Oldest Child*

Predictor Variables	ZINB Regression Model				Logistic Regression Model			
	<i>B</i>	<i>SE</i>	CI ₉₅	<i>p</i>	<i>B</i>	<i>SE</i>	CI ₉₅	<i>p</i>
Intercept	2.16	1.15	[-.08,4.41]	.059	5.68	.78	[4.16,7.21]	.000
COVID-19 Disruption	.01	.02	[-.02,.05]	.541	-.05	.03	[-.11,.01]	.115
Family Functioning	-.04	.04	[-.11,.03]	.213	-.01	.05	[-.11,.09]	.845
Caregiver Distress	-.01	.02	[-.04,.02]	.496	.01	.02	[-.03,.06]	.529
Child Functional Impairment	.20	.06	[.08,.32]	.001	-.42	.13	[-.68,-.16]	.002
Caregiver Social Support	-.05	.03	[-.12,.02]	.135	-.04	.05	[-.13,.06]	.483
Caregiver Age	.01	.01	[-.02,.03]	.648	-.04	.02	[-.09,.01]	.081
Caregiver Sex (Female)	-.14	.23	[-.59,.30]	.530	-.26	.31	[-.87,.35]	.401
Family Income	-.03	.40	[-.10,.04]	.359	-.03	.05	[-.12,.06]	.520
Caregiver Ethnicity (White)	-.24	.25	[-.74,.26]	.341	.50	.40	[-.27,1.28]	.203
Caregiver Relationship Status	-.03	.27	[-.56,.51]	.918	-.06	.44	[-.92,.81]	.899

Note. ZINB = zero-inflated negative binomial.

Combined Family Total Service Utilization Expenditures

Total service utilization expenditures across all members were considered as a function of predictor variables and are shown in Table 14. Child functional impairment was a significant predictor of membership in the zero vs. non-zero categories for the total family service utilization costs ($\beta = .43, p = .011$). That is, when caregivers reported greater average child functional impairment the family were more likely to use health and social services than not. For predictors in the non-zero model, child functional impairment was a significant predictor of the amount of total service utilization expenditures of the whole family ($\beta = .18, p = .034$). In other words, total service costs for the family were predicted by higher average impairments in the children.

Table 14*Summary of Regression Analyses Predicting Family Service Utilization Expenditures*

Predictor Variables	ZINB Regression Model				Logistic Regression Model			
	<i>B</i>	<i>SE</i>	CI _{.95}	<i>p</i>	<i>B</i>	<i>SE</i>	CI _{.95}	<i>p</i>
Intercept	-1.43	1.26	[-3.90,1.03]	.255	5.41	.90	[3.64,7.17]	.00
COVID-19 Disruption	.03	.02	[-.01,.06]	.158	.01	.03	[-.06,.07]	.841
Family Functioning	.00	.06	[-.11,.11]	.980	.03	.06	[-.09,.15]	.639
Caregiver Distress	.31	.01	[-.01,.04]	.272	-.03	.03	[-.08,.02]	.210
Child Functional Impairment	.18	.09	[.01,.35]	.034	-.43	.17	[-.76,-.10]	.011
Caregiver Social Support	-.02	.04	[-.11,.06]	.565	-.07	.05	[-.16,.03]	.201
Caregiver Age	.01	.02	[-.02,.05]	.517	-.01	.03	[-.06,.04]	.605
Caregiver Sex (Female)	.10	.26	[-.40,.61]	.687	-.29	.33	[-.94,.36]	.378
Family Income	.00	.04	[-.08,.08]	.928	-.01	.05	[-.10,.09]	.898
Caregiver Ethnicity (White)	-.22	.25	[-.70,.27]	.387	.91	.55	[-.12,1.98]	.097
Caregiver Relationship Status	.12	.35	[-.57,.81]	.736	.20	.54	[-.85,1.26]	.709

Note. ZINB = zero-inflated negative binomial.

Discussion

This project sought to explore family processes and social and health service utilization expenditures of different family members and the family unit as a whole during the first year of the COVID-19 pandemic. Differences in service expenditures were also compared among low and high-scoring groups on the predictor variables. Results revealed several significant predictors of service expenditures reflective of different family factors. These findings offer important considerations for policymakers and clinicians about the necessary services to meet family needs and family factors driving this demand.

Service Utilization Expenditures of Families and Family Members

Family functioning during the COVID-19 pandemic has been disrupted in several areas, and the functional impairment of children at school, home, and other environments was found to be the greatest influence of total family service use expenditures. The relationship between the members of the family unit is complex, but children's degree of impairment can be a driving influence in determining whether the family seeks services (Choi et al., 2018). When children experience behavioural and emotional problems, their caregivers have additional responsibilities and added stress in helping their children (Mazza et al., 2021). As greater child impairments are seen, stress levels experienced by the family unit increase as well. The finding that greater spending is seen for families where child impairment is present in academic, social, and family contexts is unsurprising. Caregivers may be relying on professionals to aid the recovery and well-being of the family, thereby leading to greater spending across all services. During the pandemic families have been more restricted to the home, with online work and school requiring caregivers to spend more time involved in their child's learning. Perhaps due to the greater

frequency of time spent together, these child impairments then affect how the family functions and lead to greater health and social service utilization expenditures for society.

For caregivers, findings showed that those who reported worse mental health outcomes, reported being female, and reported being in a marriage had the greatest total costs associated with their service utilization. These findings echo previous research, as worse mental health can contribute to greater service use, female caregivers may be more open to seeking help, and those who are married may have additional resources single parents do not (Coley et al., 2021). For specific services, caregivers spent the most on seeking mental health care, and this was higher when caregivers viewed their children as higher levels of impairment. This result complements pre-pandemic findings of child impairment negatively impacting caregivers resulting in greater mental health service use (Hosman et al., 2009). Cultural factors have been highlighted to play a role in service utilization, and we saw that individuals that identified as non-White had incurred greater costs when it came to using physician and non-physician services. We speculate that this can be attributed to individuals relying on physicians rather than mental health services when they are distressed if they come from cultures where mental health literacy is lower (Alegria et al., 2012). Our results are contrary to previous findings, where less service utilization was seen in those who identified as Asian (Ma, 1999). It is possible that the context of the pandemic has shifted who might be seeking services, whether that is a change in who feels comfortable seeking services at such a time or because of the worsening well-being requiring outside support.

Older children's total service utilization expenditures were most affected by the functional impairments in both children, just as the family overall. When functioning is impaired in one of the siblings, functional deficits may arise in the other through lower sibling support and increased conflict (Cassinat et al., 2021). In cases where one of the siblings has problems either

behaviourally or developmentally, the other sibling is also more likely to exhibit academic or behavioural problems themselves (Aguilar et al., 2001). How one family member is doing has effects on the other members and child well-being can be an important variable in predicting service utilization in the older child. Our study also focused on caregivers, who could be grandparents, close family members, and those who are not defined as biological parents. Findings have shown that non-biological caregivers may be more likely to seek therapy or other services for children who exhibit functional impairment (Wamser-Nanney & Campbell, 2022). For specific service utilization, child impairment was most linked to special education and non-physician specialist services. This is an interesting finding, given that special education services are covered up to a specific amount (based on needs and can exceed tens of thousands of British Pounds) in the UK. For most caregivers, this would not result in any out-of-pocket costs, and so the resulting expenditures are incurred by society. While our data did not differentiate the areas of impairment, it would be important to understand how functioning in a specific area (e.g., school, home) has an effect on service utilization.

Young children's total service expenditures were affected most by COVID-19-related stressors, such that with greater disruption, younger children were more likely to use services than not. With how easily influenced younger children are, the disruption associated with the pandemic stressors may bear a greater influence on how children are doing. They are most impressionable during their development and can be significantly affected by outside stressors, leading to greater service utilization expenditures (Findlay & Sutherland, 2014; Watkeys et al., 2022). Based on the stress process theory, children would have the least resources (e.g., coping skills, social support) and would therefore be more affected by the effect of any stressors in their life (Pearlin et al., 1981). The pandemic came along with significant disruptions and the changes

in these distal factors may have had a strong influence on children's well-being, resulting in greater service expenditures (Prime et al., 2020). For specific services, non-physician services were the most sought after and were affected by levels of child impairment, COVID-19 distress, and social support. Few works have differentiated the services likely to be used when deterioration is seen in different areas, but functional impairment has previously been linked with increased engagement in hospital and general practitioner services (Gelberg et al., 2000; Vikum et al., 2012). Our study did not measure the reasons for why individuals sought particular services, but we speculate it may be that non-physician services were sought due to the lack of availability of other healthcare professionals (e.g., specialists, family physicians).

Across all services and family members, family functioning was not a significant predictor of service utilization expenditures. That is surprising, given the important role of family functioning has in affecting the well-being of individual members and the likelihood that individuals will engage in service utilization (Coldwell et al., 2006; Guo et al., 2015; Keuthen et al., 2013; Knapp et al., 2015; Mills-Koonce et al., 2016). Prime et al (2020) outlined that multiple processes contribute to affecting the well-being of family members and it is possible that family functioning increases symptomology in different areas, such as caregiver distress and child adjustment, indirectly leading to greater engagement in different services. In addition, the surge in stressors associated with COVID-19 pandemic was a significant predictor of service use in younger children, but not for the caregiver or the sibling. This could be due to adults and older children having greater coping and social resources that protect against the impact of negative effects associated with stress-related challenges (Pearling, 1999). However, it would be important to see if the patterns seen here could be replicated with a larger and more diverse sample as there is indeterminacy as to why these results might have been seen.

Group Differences in Expenditures

We found that low and high-scoring groups did not differ in their service utilization expenditures based on COVID-19 distress or family dysfunction. That is surprising given that there has been a surge in service use associated with the increased stress of the pandemic, and that family functioning has been linked with families engaging in service utilization (Miller et al., 2015). Perhaps there was no great difference as families were all highly impacted by the pandemic and the average scores on the family functioning measure were sub-clinical. However, families with higher social support, poorer caregiver mental health, and child functional impairment ended up utilizing several different services to a greater extent than the low-scoring families. Specifically, families with higher social support had higher expenditures for walk-in clinics and mental health services. In general, similar patterns have been identified previously, with supportive families encouraging their members to seek outside help, and those with greater mental health difficulties in caregivers and children requiring additional assistance from beyond close support (Reczek et al., 2014; Yampolskaya et al., 2017). We found that families with greater caregiver distress had higher special education and mental health expenditures. This is in line with prior research that has shown how important caregiver well-being is to family functioning (Cohodes et al., 2021; Feinberg et al., 2022). Finally, families with higher child impairment had greater expenditures for specialist, special education, social worker, family physician, and mental health services. Child impairment had the most links with greater service utilization and resulting societal costs, suggesting that there is an association between how well children are and the costs of family service use. When children experience difficulties in one or more areas (e.g., home, school), this can add to caregiver experiences of stress and lead to weaker parent-child relationships and family functioning (Fontanesi et al., 2020). Worse family

functioning then leads to engagement in greater services, including mental health and specialist services (Knapp et al., 2015). We saw differences between specific groups, but not others, such as families with greater family dysfunction or COVID-19 distress. Perhaps there was no significant family dysfunction or distress associated with service utilization due to families having coping strategies, effective communication, and social support in place to buffer pandemic-related stressors (Hussong et al., 2022; Pearlin et al., 1981). We cannot ascertain the reasons why, but several protective variables exist that were not measured in this study that could contribute to the lack of differences between certain groups.

In summary, we found several family and individual processes work in tandem to influence service utilization, as outlined in the COVID-19 Family Disruption Model (Prime et al., 2020). We found that the service utilization in our sample is based on variables such as social support, child impairment, and caregiver mental health. The services used by individuals in our sample varied, but the greatest costs arose from mental health utilization for the older children and the caregiver. Given that mental health disorders are a large contributor to societal costs, it is no wonder that the expenditures resulting from mental health treatment would surpass other services (Manderschied et al., 2010). When stressors are increased, family functioning can deteriorate and lead to greater service utilization to meet families' needs (Miller et al., 2015). Our findings show that caregivers' and children's well-being both deserve consideration when examining service utilization and associated costs. Even though pandemic-related restrictions have been lifted, the COVID-19 pandemic has left lasting impacts on the lives and well-being of families. Our findings highlight that family members may be affected differently based on various proximal and distal factors. As such, there is a need to support families with prevention

early intervention initiatives that consider the idiosyncratic experiences of each family member to reduce societal health and social service expenditures.

Limitations and Future Directions

This study has limitations that might have affected the findings and their interpretation. First, the data used in the present study were limited to participants living in the United Kingdom. Different service utilization expenditures may be seen in other countries based on the services covered by insurance, the affordability of the services, and the services that are available. In addition, the demographic characteristics of our sample were broadly representative of the national census but is not representative of the wide cultural backgrounds of the families in other parts of the world. Families from different cultures might prioritize certain services over others when seeking help or abstain from seeking certain services altogether in comparison to the UK sample. As such, future studies could benefit from a more diverse international sample that includes families from an array of cultural backgrounds. Secondly, the timeline of our study focuses only on the first six months of the pandemic, specifically measuring family variables during the start of the pandemic and the service utilization during the following six months without examining the interactions between the different predictors. Therein, the changes that might have occurred for families during the following months and years is not captured, both for the family variables and the resulting service utilization. How families might have been impacted across time with different restrictions, challenges, or reduction of restrictions could help get a better picture of the dynamic processes that happen within families in their journey to take on new or recurring COVID-19-related adversity. Future studies could explore more long-term longitudinal outcomes and more sophisticated statistical techniques, such as growth curve modeling, to understand trajectories of change over time. Longitudinal research that covers a

longer time can yield data that is more representative of actual utilization and resulting expenditures. This is necessary for long-term planning and understanding service utilization that is representative of actual use. In addition, interactions between the different family, individual, and contextual variables require integration into the longitudinal models to understand the complex dynamics of the contributing factors. The reasons behind why someone might engage in services are inconclusive based on the analyses and data presented in our study. Having more in-depth analyses of the possible relationships and how variables interact would be beneficial in furthering understanding of the driving forces behind service utilization expenditures.

Finally, while our study included several measures looking at various aspects of family functioning, we were limited in the number of processes we could examine that could have significant impacts on service utilization expenditures. Future research could benefit from using a greater number of measures examining more specific constructs, such as resilience, pre-existing vulnerabilities, children's mental health outcomes, and family processes as they all contribute to the well-being of families during the pandemic (Prime et al., 2020). In summary, future directions suggest gathering a more diverse international sample, using more long-term longitudinal data, and employing a greater number of measures. Future research should also explore what kind of family processes and individual outcomes are impacted by the family members' service utilization and if there are improvements.

Clinical and Policy Implications

These findings highlight that multiple factors must be considered for the different family members when it comes to shaping their service utilization outcomes in the context of the COVID-19 pandemic. Any clinical treatment that targets a subset of the family system may see improvements in a part of the family (e.g., a caregiver or a child), but interventions targeted at

the family as a whole that consider multiple relationship influences (e.g., caregivers, siblings, children) are necessary for change the family unit. The family working together can provide social support to the members and may enhance their resilience in the face of adversity. It is also important to address ways to ease caregiver burdens that have come because of additional stressors arising from pandemic challenges and restrictions. These can involve additional financial aid or subsidies for services that families may not currently have access to, as well as increasing the sheer number of services available to shorten waitlists and make sure needs of families are met in a timelier manner. Affordability, above and beyond family functioning, has been shown to be predictive of service use (Guo et al., 2019). Policy makers must then consider who can access services and how to make them more widely available. Costs accumulate and grow exponentially when the needs of families are not met, whether that is access to services or the quality of services offered (Thurston et al., 2011). Additional research is required on the effectiveness of measures that have been developed to meet healthcare demands and the necessary infrastructure to build a more resilient health system and prepare for future crises (Thomas et al., 2020). Investing in the infrastructure that supports the well-being of others (e.g., training of professionals, additional healthcare funding, more accessible online services) is necessary for the continued functioning of our society.

References

- Aguilar, B., O'Brien, K. M., August, G. J., Aoun, S. L., & Hektner, J. M. (2001). Relationship quality of aggressive children and their siblings: A multiinformant, multimeasure investigation. *Journal of Abnormal Child Psychology*, 29(6), 479–489. <https://doi.org/10.1023/A:1012273024211>
- Alegria, M., Lin, J., Chen, C.-N., Duan, N., Cook, B., & Meng, X.-L. (2012). The impact of insurance coverage in diminishing racial and ethnic disparities in behavioral health services. *Health Services Research*, 47(3), 1322–1344. <https://doi.org/10.1111/j.1475-6773.2012.01403.x>
- Andersen, R. M., Yu, H., Wyn, R., Davidson, P. L., Brown, E. R., & Teleki, S. (2002). Access to medical care for low-income persons: how do communities make a difference?. *Medical Care Research and Review*, 59(4), 384-411. <https://doi.org/10.1177/107755802237808>
- Annual Survey of Hours and Earnings - data.gov.uk*. (2020). Retrieved Oct 17, 2022, from <https://www.data.gov.uk/dataset/a105abd6-65ef-4792-b2f6-391a7b8a75f5/annual-survey-of-hours-and-earnings>
- Bauer, A., Pawlby, S., Plant, D. T., King, D., Pariante, C. M., & Knapp, M. (2015). Perinatal depression and child development: exploring the economic consequences from a South London cohort. *Psychological medicine*, 45(1), 51–61. <https://doi.org/10.1017/S0033291714001044>
- Beecham, J. K., Green, J., Jacobs, B., & Dunn, G. (2009). Cost variation in child and adolescent psychiatric inpatient treatment. *European Child & Adolescent Psychiatry*, 18(9), 535–542. <https://doi.org/10.1007/s00787-009-0008-9>
- Bell, A., Jones, K., & Fairbrother, M. (2018). Understanding and misunderstanding group mean centering: A commentary on Kelley et al.'s dangerous practice. *Quality & quantity*, 52, 2031-2036. <https://doi.org/10.1007/s11135-017-0593-5>

- Black, K., & Lobo, M. (2008). A conceptual review of family resilience factors. *Journal of Family Nursing, 14*, 33–55. <https://doi-org.proxy.lib.uwaterloo.ca/10.1177/1074840707312237>
- Bowlby. (1982). Attachment and loss: Retrospect and prospect. *American Journal of Orthopsychiatry, 52*(4), 664–678. <https://doi.org/10.1111/j.1939-0025.1982.tb01456.x>
- Brody, G., Yu, T., Chen, Y., Kogan, S., Evans, G., Beach, S., Windle, M., Simons, R., Gerrard, M., Gibbons, F., & Philibert, R. (2013). Cumulative socioeconomic status risk, allostatic load, and adjustment: A prospective latent profile analysis with contextual and genetic protective factors. *Developmental Psychology, 49*(5), 913–927. <https://doi.org/10.1037/a0028847>
- Bronfenbrenner, U., & Morris, P. (2006). The bioecological model of human development. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6th ed., pp. 793–828). Hoboken, NJ: Wiley
- Brown, E. R., Davidson, P. L., Yu, H., Wyn, R., Andersen, R. M., Becerra, L., & Razack, N. (2004). Effects of community factors on access to ambulatory care for lower-income adults in large urban communities. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 41*(1), 39-56. https://doi.org/10.5034/inquiryjrnl_41.1.39
- Browne, D. T., Verticchio, D., Shlonsky, A., Thabane, L., Hoch, J., & Byrne, C. (2011). The family standpoint of investigation: Examining the correlates and costs of parental stress in a sample of families involved with Ontario child welfare. *Canadian Journal of Community Mental Health, 29*(2), 131-154. <https://doi.org/10.7870/cjcmh-2010-0027>
- Browne, D. T., Rokeach, A., Wiener, J., Hoch, J. S., Meunier, J. C., & Thurston, S. (2013). Examining the family-level and economic impact of complex child disabilities as a function of child hyperactivity and service integration. *Journal of Developmental and Physical Disabilities, 25*(2), 181-201. <https://doi.org/10.1007/s10882-012-9295-z>

- Browne, D. T., Leckie, G., Prime, H., Perlman, M., & Jenkins, J. M. (2016). Observed sensitivity during family interactions and cumulative risk: A study of multiple dyads per family. *Developmental Psychology*, 52(7), 1128-1138. <https://doi.org/10.1037/dev0000143>
- Browne, D. T., Wade, M., May, S. S., Jenkins, J. M., & Prime, H. (2021). COVID-19 disruption gets inside the family: A two-month multilevel study of family stress during the pandemic. *Developmental Psychology*, 57(10), 1681–1692. <https://doi.org/10.1037/dev0001237>
- Broyles, R. W., McAuley, W. J., & Baird-Holmes, D. (1999). The medically vulnerable: their health risks, health status, and use of physician care. *Journal of Health Care for the Poor and Underserved*, 10(2), 186-200. <https://doi.org/10.1353/hpu.2010.0498>
- Calvano, C., Engelke, L., Di Bella, J., Kindermann, J., Renneberg, B., & Winter, S. M. (2022). Families in the COVID-19 pandemic: parental stress, parent mental health and the occurrence of adverse childhood experiences—results of a representative survey in Germany. *European Child & Adolescent Psychiatry*, 31(7), 1–13. <https://doi.org/10.1007/s00787-021-01739-0>
- Campbell. (2020). An increasing risk of family violence during the Covid-19 pandemic: Strengthening community collaborations to save lives. *Forensic Science International. Reports*, 2, 100089–100089. <https://doi.org/10.1016/j.fsir.2020.100089>
- Campione-Barr, N., Rote, W., Killoren, S. E., & Rose, A. J. (2021). Adolescent adjustment during COVID-19: The role of close relationships and COVID-19-related stress. *Journal of Research on Adolescence*, 31(3), 608-622. <https://doi.org/10.1111/jora.12647>
- Cassinat, J. R., Whiteman, S. D., Serang, S., Dotterer, A. M., Mustillo, S. A., Maggs, J. L., & Kelly, B. C. (2021). Changes in family chaos and family relationships during the COVID-19 pandemic: Evidence from a longitudinal study. *Developmental Psychology*, 57(10), 1597–1610. <https://doi.org/10.1037/dev0001217>

- Centers for Disease Control and Prevention. (2020). *Mental Health - Household Pulse Survey - COVID-19*. <https://www.cdc.gov/nchs/covid19/pulse/mental-health.htm>
- Center for Medicare & Medicaid Services. (2021). *National Health Expenditure Data: Historical*. <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsHistorical>
- Chen, S., & Bonanno, G. A. (2020). Psychological Adjustment During the Global Outbreak of COVID-19: A Resilience Perspective. *Psychological Trauma, 12*(S1), S51–S54. <https://doi.org/10.1037/tra0000685>
- Cheung, Y. B. (2002). Zero-inflated models for regression analysis of count data: a study of growth and development. *Statistics in Medicine, 21*(10), 1461-1469. <https://doi.org/10.1002/sim.1088>
- Choi, K. R., Briggs, E. C., Seng, J. S., Graham-Bermann, S. A., Munro-Kramer, M. L., & Ford, J. D. (2018). Service usage typologies in a clinical sample of trauma-exposed adolescents: A latent class analysis. *Psychological trauma: theory, research, practice, and policy, 10*(6), 652. <https://doi.org/10.1037/tra0000340>
- Cicchetti D. (2016). Socioemotional, personality, and biological development: Illustrations from a multilevel developmental psychopathology perspective on child maltreatment. *Annual Review of Psychology, 67*, 187–211. <https://doi.org/10.1146/annurev-psych-122414-033259>
- Cohen, G. J., & Weitzman, C. C. (2016). Helping children and families deal with divorce and separation. *Pediatrics, 138*(6), 1– 9. <https://doi.org/10.1542/peds.2016-3020>
- Coldwell, J., Pike, A., & Dunn, J. (2006). Household chaos – links with parenting and child behaviour. *Journal of Child Psychology and Psychiatry, 47*(11), 1116–1122. <https://doi.org/10.1111/j.1469-7610.2006.01655.x>

- Coley, R. L., & Baum, C. F. (2021). Retracted: Trends in mental health symptoms, service use, and unmet need for services among US adults through the first 9 months of the COVID-19 pandemic. *Translational behavioural medicine*, 11(10), 1947-1956. <https://doi.org/10.1093/tbm/ibab030>
- Crosnoe, R., & Cavanagh, S. E. (2010). Families with children and adolescents: A review, critique, and future agenda. *Journal of Marriage and Family*, 72(3), 594–611. <https://doi.org/10.1111/j.1741-3737.2010.00720.x>
- Cutler, D. M., & Summers, L. H. (2020). The COVID-19 pandemic and the \$16 trillion virus. *JAMA*, 324(15), 1495-1496. <https://doi.org/10.1001/jama.2020.19759>
- Daks, J. S., Peltz, J. S., & Rogge, R. D. (2020). Psychological flexibility and inflexibility as sources of resiliency and risk during a pandemic: Modeling the cascade of COVID-19 stress on family systems with a contextual behavioural science lens. *Journal of Contextual Behavioural Science*, 18, 16-27. <https://doi.org/10.1016/j.jcbs.2020.08.003>
- Downey, D. B., & Condron, D. J. (2004). Playing well with others in kindergarten: The benefit of siblings at home. *Journal of Marriage and Family*, 66(2), 333-350. <https://doi.org/10.1111/j.1741-3737.2004.00024.x>
- Easton, S. D., Safadi, N. S., Wang, Y., & Hasson, R. G., 3rd (2017). The Kessler psychological distress scale: translation and validation of an Arabic version. *Health and quality of life outcomes*, 15(1), 215. <https://doi.org/10.1186/s12955-017-0783-9>
- Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling*, 8(3), 430–457. https://doi.org/10.1207/S15328007SEM0803_5
- Eshraghi, A. A., Cavalcante, L., Furar, E., Alessandri, M., Eshraghi, R. S., Armstrong, F. D., & Mittal, R. (2022). Implications of parental stress on worsening of behavioural problems in

children with autism during COVID-19 pandemic: “the spillover hypothesis”. *Molecular Psychiatry*, 27(4), 1869-1870. <https://doi.org/10.1038/s41380-021-01433-2>

Feinberg, M. E. (2003). The internal structure and ecological context of coparenting: A framework for research and intervention. *Parenting, Science and Practice*, 3(2), 95–131.

https://doi.org/10.1207/S15327922PAR0302_01

Feinberg, M. E., Mogle, J., Lee, J., Tornello, S. L., Hostetler, M. L., Cifelli, J. A., Bai, S., & Hotez, E. (2022). Impact of the COVID-19 Pandemic on Parent, Child, and Family Functioning. *Family Process*, 61(1), 361–374. <https://doi.org/10.1111/famp.12649>

Findlay, L. C., & Sunderland, A. (2014). Professional and informal mental health support reported by Canadians aged 15 to 24. *Health Reports*, 25(12), 3–11. <http://www.statcan.gc.ca/pub/82-003-x/2014012/article/14126-eng.pdf>

Fontanesi, L., Marchetti, D., Mazza, C., Di Giandomenico, S., Roma, P., & Verrocchio, M. C. (2020). The effect of the COVID-19 lockdown on parents: A call to adopt urgent measures. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(S1), S79-S81.

<https://doi.org/10.1037/tra0000672>

Fosco, G. M., LoBraico, E. J., Sloan, C. J., Fang, S., & Feinberg, M. E. (2022). Family vulnerability, disruption, and chaos predict parent and child COVID-19 health-protective behaviour adherence.

Families Systems & Health, 40(1), 10–20. <https://doi.org/10.1037/fsh0000649>

Fukukawa, Y., Tsuboi, S., Niino, N., Ando, F., Kosugi, S., & Shimokata, H. (2000). Effects of social support and self-esteem on depressive symptoms in Japanese middle-aged and elderly people.

Journal of Epidemiology, 10(1sup), 63–69. https://doi.org/10.2188/jea.10.1sup_63

Gagliardi, A.R., Yip, C.Y., Irish, J., Wright, F.C., Rubin, B., Ross, H., Green, R., Abbey, S.,

McAndrews, M.P. & Stewart, D.E. (2021). The psychological burden of waiting for procedures

and patient-centred strategies that could support the mental health of wait-listed patients and caregivers during the COVID-19 pandemic: A scoping review. *Health Expectations*, 24(3), 978-990. <https://doi.org/10.1111/hex.13241>

Gelberg, L., Andersen, R. M., & Leake, B. D. (2000). The Behavioral Model for Vulnerable Populations: application to medical care use and outcomes for homeless people. *Health Services Research*, 34(6), 1273-1302.

Genevieve, G., Baiden, P., Latocia, K., & Boyd, G. (2022). Barriers to mental health services for parents and siblings of children with special health care needs. *Journal of Child and Family Studies*, 31(3), 881-895. <https://doi.org/10.1007/s10826-022-02228-x>

Giannotti, M., Mazzoni, N., Bentenuto, A., Venuti, P., & Falco, S. (2022). Family adjustment to COVID-19 lockdown in Italy: Parental stress, coparenting, and child externalizing behaviour. *Family Process*, 61(2), 745–763. <https://doi.org/10.1111/famp.12686>

Girio-Herrera, E., Dvorsky, M. R., & Owens, J. S. (2015). Mental health screening in kindergarten youth: A multistudy examination of the concurrent and diagnostic validity of the Impairment Rating Scale. *Psychological Assessment*, 27(1), 215. <https://doi.org/10.1037/a0037787>

Graham, J. E., Christian, L. M., & Kiecolt-Glaser, J. K. (2006). Marriage, health, and immune function: A review of key findings and the role of depression. In S. Beach & M. Wamboldt (Eds.), *Relational processes in mental health, Vol. 11*. Arlington, VA: American Psychiatric Publishing, Inc.

Guo, M., Li, S. J., Liu, J. Y., & Sun, F. (2015). Family relations, social connections, and mental disorders among Latino and Asian older adults in a US national sample. *Research on Aging*, 37(2), 123– 147. <https://doi.org/10.1177/0164027514523298>

- Guo, M., Sabbagh Steinberg, N., Dong, X., & Tiwari, A. (2019). Is family relations related to health service utilisation among older immigrants: Evidence from Chinese elderly in the United States. *Health & Social Care in the Community*, 27(1), 215-225. <https://doi.org/10.1111/hsc.12642>
- Hall, R. C., Hall, R. C. W., & Chapman, M. J. (2008). The 1995 Kikwit Ebola outbreak: lessons hospitals and physicians can apply to future viral epidemics. *General Hospital Psychiatry*, 30(5), 446–452. <https://doi.org/10.1016/j.genhosppsy.2008.05.003>
- Hansen, M. C., & Aranda, M. P. (2012). Sociocultural influences on mental health service use by Latino older adults for emotional distress: Exploring the mediating and moderating role of informal social support. *Social Science & Medicine*, 75(12), 2134– 2142. <https://doi.org/10.1016/j.socscimed.2012.06.029>
- Harouni, G. G., Sajjadi, H., Rafiey, H., Mirabzadeh, A., Vaez-Mahdavi, M., & Kamal, S. H. M. (2017). Current status of health index in Tehran: A multidimensional approach. *Medical Journal of the Islamic Republic of Iran*, 31(1), 29. <https://doi.org/10.18869/mjiri.31.29>
- Hartman, M., Martin, A. B., Washington, B., & Catlin, A. (2022). National health care spending in 2020: Growth driven by federal spending in response to the COVID-19 pandemic. *Health Affairs*, 41(1), 13-25. <https://doi.org/10.1377/hlthaff.2021.01763>
- Hosman, C. M., van Doesum, K. T., & van Santvoort, F. (2009). Prevention of emotional problems and psychiatric risks in children of parents with a mental illness in the Netherlands: I. The scientific basis to a comprehensive approach. *Australian e-Journal for the Advancement of Mental health*, 8(3), 250-263. <https://doi.org/10.5172/jamh.8.3.250>
- Hussong, A. M., Midgette, A. J., Richards, A. N., Petrie, R. C., Coffman, J. L., & Thomas, T. E. (2022). COVID-19 life events spill-over on family functioning and adolescent adjustment. *The Journal of Early Adolescence*, 42(3), 359–388. <https://doi.org/10.1177/02724316211036744>

- Iacobucci, D., Schneider, M. J., Popovich, D. L., & Bakamitsos, G. A. (2016). Mean centering helps alleviate “micro” but not “macro” multicollinearity. *Behaviour Research Methods*, 48(4), 1308–1317. <https://doi.org/10.3758/s13428-015-0624-x>
- Johansen, M. E. (2017). Comparing medical ecology, utilization, and expenditures between 1996–1997 and 2011–2012. *The Annals of Family Medicine*, 15(4), 313-321. <https://doi.org/10.1370/afm.2084>
- Johnson, A. D., Martin, A., Partika, A., Phillips, D. A., Castle, S., & Tulsa SEED Study Team*. (2022). Chaos during the COVID-19 outbreak: Predictors of household chaos among low-income families during a pandemic. *Family Relations*, 71(1), 18-28. <https://doi.org/10.1111/fare.12597>
- Jones, K. & Burns, A. (2021) *Unit Costs of Health and Social Care 2021*. Personal Social Services Research Unit, University of Kent, Canterbury. <https://doi.org/10.22024/UniKent/01.02.92342>
- Keuthen, N. J., Fama, J., Altenburger, E. M., Allen, A., & Raff, A. (2013). Family environment in adolescent trichotillomania. *Journal of Obsessive-Compulsive and Related Disorders*, 2(4), 366–374. <https://doi.org/10.1016/j.jocrd.2013.07.00>
- Knapp, M., Snell, T., Healey, A., Guglani, S., Evans-Lacko, S., Fernandez, J.-L., Meltzer, H., & Ford, T. (2015). How do child and adolescent mental health problems influence public sector costs? Interindividual variations in a nationally representative British sample. *Journal of Child Psychology and Psychiatry*, 56(6), 667–676. <https://doi.org/10.1111/jcpp.12327>
- Knapp, M., McDaid, D., & Parsonage, M. (2011). Mental health promotion and mental illness prevention: The economic case. *IDEAS Working Paper Series from RePEc*.

- Kruskal, W. H., & Wallis, W. A. (1952). Use of Ranks in One-Criterion Variance Analysis. *Journal of the American Statistical Association*, 47(260), 583-621.
<http://dx.doi.org/10.1080/01621459.1952.10483441>
- Landers-Potts, M. A., Wickrama, K. A. S., Simons, L. G., Cutrona, C., Gibbons, F. X., Simons, R. L., & Conger, R. (2015). An extension and moderational analysis of the family stress model focusing on African American adolescents. *Family Relations*, 64(2), 233–248.
<https://doi.org/10.1111/fare.12117>
- Langmeyer, A. N., Guglhör-Rudan, A., Winklhofer, U., Chabursky, S., Naab, T., & Pötter, U. (2022). Resources of families adapting the COVID-19 pandemic in Germany: A mixed-method study of coping strategies and family and child outcomes. *Journal of Family Research*, 34(1), 333-366.
<https://doi.org/10.20377/jfr-708>
- Law, D. D., & Crane, D. R. (2000). The influence of marital and family therapy on health care utilization in a health-maintenance organization. *Journal of Marital and Family Therapy*, 26(3), 281– 291. <https://doi.org/10.1111/j.1752-0606.2000.tb00298.x>
- Lawson, M., Piel, M. H., & Simon, M. (2020). Child maltreatment during the COVID-19 pandemic: Consequences of parental job loss on psychological and physical abuse towards children. *Child Abuse & Neglect*, 110(Pt 2), 104709–104709. <https://doi.org/10.1016/j.chiabu.2020.104709>
- Leucht, S., & Heres, S. (2006). Epidemiology, clinical consequences, and psychosocial treatment of nonadherence in schizophrenia. *Journal of Clinical Psychiatry*, 67(5), 3–8.
- Lim, K. L., Jacobs, P., Ohinmaa, A., Schopflocher, D., & Dewa, C. S. (2008). A new population-based measure of the economic burden of mental illness in Canada. *Chronic Diseases in Canada*, 28(3), 92–98. <https://doi.org/10.24095/hpcdp.28.3.02>

- Li, X., Zhao, X., & Sun, Y. (2020). The lockdown of Hubei Province causing different transmission dynamics of the novel coronavirus (2019-nCoV) in Wuhan and Beijing. *MedRxiv*.
<https://doi.org/10.1101/2020.02.09.20021477>
- Liao, M., & White, K. R. (2014). Post-permanency service needs, service utilization, and placement discontinuity for kinship versus non-kinship families. *Children and Youth Services Review*, *44*, 370–378. <https://doi.org/10.1016/j.childyouth.2014.07.007>
- Lorenzo-Blanco, E. I., Meca, A., Unger, J. B., Romero, A., Szapocznik, J., Piña-Watson, B., Cano, M. Á., Zamboanga, B. L., Baezconde-Garbanati, L., Des Rosiers, S. E., Soto, D. W., Villamar, J. A., Lizzi, K. M., Pattarroyo, M., & Schwartz, S. J. (2017). Longitudinal effects of Latino parent cultural stress, depressive symptoms, and family functioning on youth emotional well-being and health risk behaviours. *Family Process*, *56*(4), 981-996. <https://doi.org/10.1111/famp.12258>
- Ma, G. X. (1999). *The culture of health: Asian communities in the United States*. Westport, CT: Ergin & Garvey.
- Malinen, K., Rönkä, A., Sevón, E., & Schoebi, D. (2017). The difficulty of being a professional, a parent, and a spouse on the same day: Daily spillover of workplace interactions on parenting, and the role of spousal support. *Journal of Prevention and Intervention in the Community*, *45*(3), 156–167. <https://doi.org/10.1080/10852352.2016.1198121>.
- Manderscheid, R. W., Ryff, C. D., Freeman, E. J., McKnight-Eily, L. R., Dhingra, S., & Strine, T. W. (2010). Evolving definitions of mental illness and wellness. *Preventing chronic disease*, (1), A19.
- Mosby, C. V. (2009). *Mosby's medical dictionary*. (8th ed.). Mosby Elsevier.
- Martin-Storey, A., Dirks, M., Holfeld, B., Dryburgh, N. S., & Craig, W. (2021). Family relationship quality during the COVID-19 pandemic: The value of adolescent perceptions of change. *Journal of Adolescence*, *93*(1), 190-201. <https://doi.org/10.1016/j.adolescence.2021.11.005>

- Masten, A. S., & Motti-Stefanidi, F. (2020). Multisystem Resilience for Children and Youth in Disaster: Reflections in the Context of COVID-19. *Adversity and Resilience Science, 1*(2), 95–106. <https://doi.org/10.1007/s42844-020-00010-w>
- Mazza, C., Marchetti, D., Ricci, E., Fontanesi, L., Di Giandomenico, S., Verrocchio, M. C., & Roma, P. (2021). The COVID-19 lockdown and psychological distress among Italian parents: Influence of parental role, parent personality, and child difficulties. *International Journal of Psychology, 56*(4), 577-584. <https://doi.org/10.1002/ijop.12755>
- Marques de Miranda, D., da Silva Athanasio, B., Sena Oliveira, A. C., & Simoes-e-Silva, A. C. (2020). How is COVID-19 pandemic impacting mental health of children and adolescents? *International Journal of Disaster Risk Reduction, 51*, 101845–101845. <https://doi.org/10.1016/j.ijdrr.2020.101845>
- Mento, C., Rizzo, A., & Settineri, S. (2019). Caregivers help-seeking related to physical and mental burden. *Clinical Neuropsychiatry, 16*(3), 135.
- Merz, E.-M., Consedine, N. S., Schulze, H.-J., & Schuengel, C. (2009). Well-being of adult children and ageing parents: Associations with intergenerational support and relationship quality. *Ageing & Society, 29*(5), 783–802. <https://doi.org/10.1017/s0144686x09008514>
- Milevsky, A., & Levitt, M. J. (2005). Sibling support in early adolescence: Buffering and compensation across relationships. *European Journal of Developmental Psychology, 2*(3), 299–320. <https://doi.org/10.1080/17405620544000048>
- Mills-Koonce, W. R., Willoughby, M. T., Garrett-Peters, P., Wagner, N., Vernon-Feagans, L., & the Family Life Project Key Investigators. (2016). The interplay among socioeconomic status, household chaos, and parenting in the prediction of child conduct problems and callous-

unemotional behaviours. *Development and Psychopathology*, 28(3), 757–771.

<https://doi.org/10.1017/s0954579416000298>

Miller, I., Epstein, N. B., Bishop, D. S., & Keitner, G. I. (1985). The McMaster Family Assessment Device: Reliability and validity. *Journal of Marital and Family Therapy*, 11(4), 345–356.

<https://doi.org/10.1111/j.1752-0606.1985.tb00028.x>

Moulin, F., El-Aarbaoui, T., Bustamante, J., Héron, M., Mary-Krause, M., Rouquette, A., Galéra, C., & Melchior, M. (2021). Risk and protective factors related to children’s symptoms of emotional difficulties and hyperactivity/inattention during the COVID-19-related lockdown in France: Results from a community sample. *European Child & Adolescent Psychiatry*, 1–12.

<https://doi.org/10.1007/s00787-021-01752-3>

Neff, L. A., & Karney, B. R. (2004). How does context affect intimate relationships? Linking external stress and cognitive processes within marriage. *Personality and Social Psychology Bulletin*,

30(2), 134-148. <https://doi.org/10.1177/0146167203255984>

Neubauer, A. B., Schmidt, A., Kramer, A. C. & Schmiedek, F. (2021). A little autonomy support goes a long way. Daily autonomy-supportive parenting, child well-being, parental need fulfillment, and change in child, family, and parent adjustment across the adaptation to the COVID-19 pandemic. *Child Development*, 92(5), 1679-1697.

<https://doi.org/10.1111/cdev.13515>

Nicholson, J., Biebel, K., Katz-Leavy, J., & Williams, V. (2002). *The prevalence of parenthood in adults with mental illness: Implications for state and federal policymakers, programs, and providers*. <http://hdl.handle.net/20.500.14038/45624>

- Ng, D. M., & Jeffery, R. W. (2003). Relationships between perceived stress and health behaviours in a sample of working adults. *Health Psychology, 22*(6), 638–642. <https://doi.org/10.1037/0278-6133.22.6.638>
- Office for National Statistics. (2018). *UK Health Accounts: 2016*.
<https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthcaresystem/bulletins/ukhealthaccounts/2016>
- Office for National Statistics. (2023). *UK Health Accounts: 2021*.
<https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthcaresystem/bulletins/ukhealthaccounts/2021>
- Olson, D. H. (2000). Circumplex model of marital and family systems. *Journal of Family Therapy, 22*(2), 144-167. <https://doi.org/10.1111/1467-6427.00144>
- Oltean, I. I., Perlman, C., Meyer, S., & Ferro, M. A. (2020). Child mental illness and mental health service use: Role of family functioning (family functioning and child mental health). *Journal of Child and Family Studies, 29*(9), 2602-2613. <https://doi.org/10.1007/s10826-020-01784-4>
- Oyserman, D., Mowbray, C. T., Meares, P. A., & Firminger, K. B. (2000). Parenting among mothers with a serious mental illness. *American Journal of Orthopsychiatry, 70*(3), 296-315.
<https://doi.org/10.1037/h0087733>
- Pan, Y., Yang, Z., Han, X., & Qi, S. (2021). Family functioning and mental health among secondary vocational students during the COVID-19 epidemic: A moderated mediation model. *Personality and Individual Differences, 171*, 110490. <https://doi.org/10.1016/j.paid.2020.110490>
- Papanicolas, I., Woskie, L. R., & Jha, A. K. (2018). Health care spending in the United States and other high-income countries. *JAMA, 319*(10), 1024-1039.
<https://doi.org/10.1001/jama.2018.1150>

- Pearlin, L. I., Menaghan, E. G., Lieberman, M. A., & Mullan, J. T. (1981). The stress process. *Journal of Health and Social Behavior*, 337-356. <https://doi.org/10.2307/2136676>
- Pearlin, L. I. (1999). Stress and mental health: A conceptual overview. In A. V. Horwitz & T. Scheid (Eds.), *A Handbook for the study of mental health: Social contexts, theories, and systems* (pp. 161–175). Cambridge: Cambridge University Press.
- Peris, T. S., & Miklowitz, D. J. (2015). Parental expressed emotion and youth psychopathology: New directions for an old construct. *Child Psychiatry & Human Development*, 46(6), 863-873. <https://doi.org/10.1007/s10578-014-0526-7>
- Perlman, M., & Ross, H. S. (1997). The benefits of parent intervention in children's disputes: An examination of concurrent changes in children's fighting styles. *Child Development*, 68(4), 690–700. <https://doi.org/10.1111/j.1467-8624.1997.tb04230.x>
- Ponnet, K. (2014). Financial stress, parent functioning and adolescent problem behaviour: An actor-partner interdependence approach to family stress processes in low-, middle-, and high-income families. *Journal of Youth and Adolescence*, 43, 1752–1769. <http://dx.doi.org/10.1007/s10964-014-0159-y>
- Prime, H., Wade, M., & Browne, D. T. (2020). Risk and resilience in family well-being during the COVID-19 pandemic. *American Psychologist*, 75(5), 631. <https://doi.org/10.1037/amp0000660>
- Reczek, C., Beth Thomeer, M., Lodge, A. C., Umberson, D., & Underhill, M. (2014). Diet and exercise in parenthood: A social control perspective. *Journal of Marriage and Family*, 76(5), 1047-1062. <https://doi.org/10.1111/jomf.12135>
- Ridout, M., Hinde, J., & Demétrio, C. G. (2001). A score test for testing a zero-inflated Poisson regression model against zero-inflated negative binomial alternatives. *Biometrics*, 57(1), 219-223. <https://doi.org/10.1111/j.0006-341X.2001.00219.x>

- Rizeq, J., Korczak, D. J., Cost, K. T., Anagnostou, E., Charach, A., Monga, S., Birken, C. S., Kelley, E., Nicolson, R., Spit for Science, Burton, C. L., & Crosbie, J. (2021). Vulnerability pathways to mental health outcomes in children and parents during COVID-19. *Current Psychology*, 1-11. <https://doi.org/10.1007/s12144-021-02459-z>
- Robertson, E. L., Piscitello, J., Schmidt, E., Mallar, C., Davidson, B., & Natale, R. (2021). Longitudinal transactional relationships between caregiver and child mental health during the COVID-19 global pandemic. *Child and Adolescent Psychiatry and Mental Health*, 15(1), 1-14. <https://doi.org/10.1186/s13034-021-00422-1>
- Robles, T. F., Slatcher, R. B., Trombello, J. M., & McGinn, M. M. (2014). Marital quality and health: a meta-analytic review. *Psychological Bulletin*, 140(1), 140. <https://doi.org/10.1037/a0031859>
- Roccella, M. (2020). Children and coronavirus infection (Covid-19): What to tell children to avoid Post-traumatic stress disorder (PTSD). *The Open Pediatric Medicine Journal*, 10(1), 1-2. <https://doi.org/10.2174/1874309902010010001>
- Rodriguez-JenKins, J., & Marcenko, M. O. (2014). Parenting stress among child welfare involved families: Differences by child placement. *Children and Youth Services Review*, 46, 19–27. <https://doi.org/10.1016/j.childyouth.2014.07.024>
- Rubin GJ, Potts HWW, Michie S (2010). The impact of communications about swine flu (influenza A H1N1v) on public responses to the outbreak: Results from 36 national telephone surveys in the UK. *Health Technology Assessment*, 14(34), 183–266. <https://doi.org/10.3310/hta14340-03>
- Russell, B. S., Hutchison, M., Tambling, R., Tomkunas, A. J., & Horton, A. L. (2020). Initial challenges of caregiving during COVID-19: Caregiver burden, mental health, and the parent–child relationship. *Child Psychiatry & Human Development*, 51, 671-682. <https://doi.org/10.1007/s10578-020-01037-x>

- Sameroff, A. (1975). *The transactional model of development: How children and contexts shape each other*. Washington, DC: American Psychological Association
- Sanchez-Ramirez, D. C., Normand, K., Zhaoyun, Y., & Torres-Castro, R. (2021). Long-term impact of COVID-19: A systematic review of the literature and meta-analysis. *Biomedicines*, 9(8), 900-. <https://doi.org/10.3390/biomedicines9080900>
- Scaramella, L. V., Sohr-Preston, S. L., Callahan, K. L., & Mirabile, S. P. (2008). A test of the family stress model on toddler-aged children's adjustment among Hurricane Katrina impacted and nonimpacted low-income families. *Journal of Clinical Child & Adolescent Psychology*, 37(3), 530-541. <https://doi.org/10.1080/15374410802148202>
- Silva, N., Bullinger, M., Sommer, R., Rohenkohl, A., Witt, S., & Quitmann, J. (2018). Children's psychosocial functioning and parents' quality of life in paediatric short stature: the mediating role of caregiving stress. *Clinical Psychology & Psychotherapy*, 25(1), e107-e118. <https://doi.org/10.1002/cpp.2146>
- Smetanin, P., Briante, C., Khan, M., Stiff, D., & Ahmad, S. (2015). *The life and economic impact of major mental illnesses in Canada*. Canadian Electronic Library. Ottawa, Ontario. <https://policycommons.net/artifacts/1218759/the-life-and-economic-impact-of-major-mental-illnesses-in-canada/1771835/>
- Smith, R. (2020). *Employee earnings in the UK - Office for National Statistics*. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/bulletins/annualsurveyofhoursandearnings/2020>
- Sroufe, L. A. (2013). The promise of developmental psychopathology: Past and present. *Development and Psychopathology*, 25(4pt2), 1215-1224. <https://doi.org/10.1017/S0954579413000576>

- Symister, P., & Friend, R. (2003). The influence of social support and problematic support on optimism and depression in chronic illness: A prospective study evaluating self-esteem as a mediator. *Health Psychology, 22*(2), 123–129. <https://doi.org/10.1037/0278-6133.22.2.123>
- Suffren, S., Dubois-Comtois, K., Lemelin, J. P., St-Laurent, D., & Milot, T. (2021). Relations between child and parent fears and changes in family functioning related to COVID-19. *International Journal of Environmental Research and Public Health, 18*(4), 1786. <https://doi.org/10.3390/ijerph18041786>
- The Lancet Global Health (2020). Mental health matters. *The Lancet. Global Health, 8*(11), e1352. [https://doi.org/10.1016/S2214-109X\(20\)30432-0](https://doi.org/10.1016/S2214-109X(20)30432-0)
- Thomas, S., Sagan, A., Larkin, J., Cylus, J., Figueras, J., & Karanikolos, M. (2020). *Strengthening health systems resilience: Key concepts and strategies*. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559803>
- Thompson, R., & May, M. A. (2006). Caregivers' perceptions of child mental health needs and service utilization: an urban 8-year old sample. *The Journal of Behavioural Health Services & Research, 33*(4), 474–482. <https://doi.org/10.1007/s11414-006-9021-7>
- Thurston, S., Paul, L., Loney, P., Ye, C., Wong, M., & Browne, G. (2011). Associations and costs of parental symptoms of psychiatric distress in a multi-diagnosis group of children with special needs. *Journal of Intellectual Disability Research, 55*(3), 263-280. <https://doi.org/10.1111/j.1365-2788.2010.01356.x>
- UK Government Web Archive. (2020). *Archived reference costs*. <https://webarchive.nationalarchives.gov.uk/ukgwa/20200501111106/https://improvement.nhs.uk/resources/reference-costs/>

- Umberson, D., Crosnoe, R., & Reczek, C. (2010). Social relationships and health behaviour across the life course. *Annual Review of Sociology*, 36, 139-157. <https://doi.org/10.1146/annurev-soc-070308-120011>
- Updegraff, K. A., & Obeidallah, D. A. (1999). Young adolescents' patterns of involvement with siblings and friends. *Social Development*, 8(1), 52–69. <https://doi.org/10.1111/1467-9507.00080>
- Van Bortel T, Basnayake A, Wurie F, Jambai M, Koroma AS, Muana AT, Hann K, Eaton J, Martin S, Nellums LB (2016). Psychosocial effects of an Ebola outbreak at individual, community and international levels. *Bulletin of the World Health Organization* 94(3), 210–214. <https://doi.org/10.2471/BLT.15.158543>
- Vikum, E., Krokstad, S., & Westin, S. (2012). Socioeconomic inequalities in health care utilisation in Norway: the population-based HUNT3 survey. *International Journal for Equity in Health*, 11(1), 1-9. <https://doi.org/10.1186/1475-9276-11-48>.
- Vohra, R., Madhavan, S., Sambamoorthi, U., & St Peter, C. (2014). Access to services, quality of care, and family impact for children with autism, other developmental disabilities, and other mental health conditions. *Autism*, 18(7), 815-826. <https://doi.org/10.1177/1362361313512902>
- Waldmann, T., Stiawa, M., Dinc, Ã., Saglam, G., Busmann, M., Daubmann, A., Adema, B., Wegscheider, K., Wiegand-Grefe, S., & Kilian, R. (2021). Costs of health and social services use in children of parents with mental illness. *Child and Adolescent Psychiatry and Mental Health*, 15(1), 10–10. <https://doi.org/10.1186/s13034-021-00360-y>
- Walk-in Clinic. (2022). *Medical Tests & GP Consultation Cost*. Walk in Clinic. <https://walkin-clinic.co.uk/pricing>

- Wamser-Nanney, R., & Campbell, C. L. (2022). Factors associated with caregiver help seeking behaviour among at-risk children. *Child Abuse & Neglect*, *134*, 105937–105937. <https://doi.org/10.1016/j.chiabu.2022.105937>
- Watkeys, O. J., O'Hare, K., Dean, K., Laurens, K. R., Harris, F., Carr, V. J., & Green, M. J. (2022). Early childhood developmental vulnerability associated with parental mental disorder comorbidity. *Australian & New Zealand Journal of Psychiatry*, 486742211168–48674221116806. <https://doi.org/10.1177/00048674221116806>
- Wei, X., & Yu, J. W. (2012). The concurrent and longitudinal effects of child disability types and health on family experiences. *Maternal and Child Health Journal*, *16*(1), 100-108. <https://doi.org/10.1007/s10995-010-0711-7>
- Westrupp, E. M., Bennett, C., Berkowitz, T., Youssef, G. J., Toumbourou, J. W., Tucker, R., Andrews, F. J., Evans, S., Teague, S. J., Karantzas, G. C., Melvin, G. M., Olsson, C., Macdonald, J. A., Greenwood, C. J., Mikocka-Walus, A., Hutchinson, D., Fuller-Tyszkiewicz, M., Stokes, M. A., Olive, L., Wood, A. G., McGillivray, J. A., & Sciberras, E. (2023). Child, parent, and family mental health and functioning in Australia during COVID-19: comparison to pre-pandemic data. *European Child & Adolescent Psychiatry*, *32*(2), 317–330. <https://doi.org/10.1007/s00787-021-01861-z>
- Williamson, H. C., Karney, B. R., & Bradbury, T. N. (2013). Financial strain and stressful events predict newlyweds' negative communication independent of relationship satisfaction. *Journal of Family Psychology*, *27*(1), 65-75. <https://doi.org/10.1037/a0031104>
- Xin, Y., & Ren, X. (2023). Determinants of province-based health service utilization according to Andersen's Behavioral Model: a population-based spatial panel modeling study. *BMC Public Health*, *23*(1), 1-14. <https://doi.org/10.1186/s12889-023-15885-4>

- Yampolskaya, S., Sharrock, P. J., Clark, C., & Hanson, A. (2017). Utilization of mental health services and mental health status among children placed in out-of-home care: A parallel process latent growth modeling approach. *Child Psychiatry and Human Development, 48*(5), 728–740. <https://doi.org/10.1007/s10578-016-0699-3>
- Yang, J. C., Roman-Urrestarazu, A., McKee, M., & Brayne, C. (2019). Demographic, socioeconomic, and health correlates of unmet need for mental health treatment in the United States, 2002–16: evidence from the national surveys on drug use and health. *International Journal for Equity in Health, 18*(1), 1-11. <https://doi.org/10.1186/s12939-019-1026-y>
- Zhang, X. (2022). Household chaos and caregivers' and young children's mental health during the COVID-19 pandemic: A mediation model. *Journal of Child and Family Studies, 31*(6), 1547-1557. <https://doi.org/10.1007/s10826-022-02283-4>