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Migration and early childhood health in Cambodia: A mixed-methods analysis

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Migration and early childhood health in Cambodia: A mixed-methods analysis

by

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DISSERTATION

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"Love your children one tao. Love your grandchildren two taos."

Khmer Proverb

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Abstract

As migration rates rise globally, this population change has profound health consequences, including for children left behind. The degree to which migration advantages or disadvantages children's health is determined in part by factors such as migrant parents' ability to remit, children's living arrangements in the face of parental absence, and caregiver characteristics, among others. The migration and child health literature has largely failed to examine care-seeking processes and child health behaviors, important dimensions of children's well-being that are likely influenced by parental out-migration. Moreover, it has generally excluded skipped-generation households, an increasingly prevalent living arrangement that may have specific implications for the health and well-being of children. I address these gaps using a mixed-methods approach that leverages data from Cambodia, a high-migration setting. Using qualitative data, I identify the social process of care seeking for children's health in skipped-generation households, including familial dynamics for decision-making, the agency of and constraints faced by grandparent caregivers, and the role of absent migrant parents. I find migration shifts familial roles whereby grandparents direct care seeking for children, but face distinct barriers to care. I use three waves of the Cambodia Socio-Economic Survey to examine whether families invest remittances in their children's health. I use an instrumental variables approach to estimate whether acutely ill children whose households receive remittances are more likely to attend care with quality providers than children in non-migrant households. I find no evidence that remittances affect children's access to curative care. Finally, I use four waves of the Cambodia Demographic and Health Survey to examine how children's living arrangements associate with acute malnutrition in a period of increasing migration. I find children in skipped-generation households consistently experienced lower odds of acute malnutrition compared to

children in nuclear families and other types of households. However, this relative advantage diminished over time as the diversity of children's living arrangements increased. Together, these analyses illuminate the multiple mechanisms through which parents' out-migration shapes their children's access to care, and the strategies migrant-sending families employ to manage children's health. This dissertation highlights the importance of understanding demographic context for child health interventions and policies.

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Chapter 1: Introduction

I. Introduction

This dissertation examines the effects of migration on young children's health in Cambodia, a country in Southeast Asia. Over the past two decades, Cambodia has undergone rapid social, demographic, and economic change, contributing towards high rates of internal and international migration. In order to improve children's health and health equity, it is critical to first understand the social and demographic phenomena in which health systems operate, and the social context in which children seek health services.

Three papers each address a specific issue concerning the intersection of young children's health, migration, and familial living arrangements. I use an interdisciplinary perspective, bringing together theory and methods from sociology, demography, epidemiology, and public health. Throughout the dissertation, I pay particular attention to skipped-generation households, that is, households comprised of grandparents and grandchildren but no middle generation. This living arrangement is becoming increasingly prevalent in migrant-sending areas as parents migrate out and leave their children behind, and may have specific implications for children's health in high migration contexts.

A. Significance

Migration, internally or internationally, presents an opportunity for parents to improve their family's socio-economic status (SES) and well-being as they seek new work and education opportunities for themselves and their children. Remittances to children and other family members left behind allow for increased household spending on nutrition, health care, and education. However, there are negative aspects to migration as well. Not all migrants are

economically successful, and many are unable to remit until they have successfully adapted to their destination and secured work. Children left behind experience parental absence when their parents migrate, which may result in a lower quality of care or other deleterious effects. The experiences and outcomes of children left behind are linked to their caregivers, their living arrangements, and the resources available in their households and communities, among other factors. At a population level, migration results in significant demographic change that potentially impacts health services, and the social and economic consequences of migration may drive an intensification of social and health disparities.

With increasing socioeconomic development in Phnom Penh, the capital city, and across the country, the current Cambodian environment encourages internal migration and urbanization. Internal migration and urbanization are now by far the most consequential demographic phenomena occurring in Cambodia today. While child health indicators in Cambodia have seen significant overall improvement in the past two decades, many inequalities still exist. These include differences by wealth status, parents' education, and between urban and rural areas. In order to address child health disparities and maintain recent improvements, it is critical to understand how migration drives access to and utilization of care for young children, affects children's chances for health and nutrition, and privileges and disadvantages certain children. However, research on the impacts of migration on health outcomes of young children in developing country contexts is under-developed globally, requiring further examination. Despite the importance of migration and urbanization in generating demographic change across Asia, evidence on their impact on the health of young children is lacking in mainland Southeast Asia, with almost no research on Cambodia specifically.

Given its level of socio-economic development, demographic characteristics, and rates of migration, Cambodia presents an important case study for child health in a high-migration, lower-middle income country. Migration and urbanization are closely intertwined in Cambodia, as elsewhere, with both phenomena directly impacting the lives of young children and their families across the country. Recent economic development has provided an opportunity to address prevailing health and social disparities, with targeted efforts to reduce child mortality and improve child health and nutrition.

In this dissertation, I examine these issues in Cambodia with reference to several theoretical perspectives. These include theories of migration, social determinants of health, and care seeking frameworks (Aday and Andersen 1974; Akin and Hutchinson 1999; Bengtson and Roberts 1991; Bourdieu 2010; Colvin et al. 2013; Lucas and Stark 1985a; Marmot 2005; Wilkinson 1996). Social determinants frameworks conjecture upon how certain social structures, socio-demographic characteristics, or social phenomena may advantage or disadvantage certain people in health care seeking and health outcomes (Marmot 2005; Marmot et al. 2008). Theories of social capital and health developed in the sociology and social epidemiology literatures theorizes mechanisms through which social capital, social status, and social networks influence health outcomes (Berkman, Kawachi, and Glymour 2014; Bourdieu 2010; Wilkinson and Pickett 2006). These concepts are important in an examination of how migration impacts child health care seeking and outcomes, as is understanding the role of place, family, and community. That is, an understanding of a child's social world is required to understand how his or her health outcomes are shaped, and on a population level, how health disparities arise. Migration and caregiving theories, along with related literature from family demography, provide insights into why families migrate and separate, and how they function together across borders (Baldassar and

Merla 2014; Massey 1990; Massey et al. 1993; Stark and Lucas 1988). Care-seeking frameworks put forth by Andersen, Akin and Hutchinson, and Colvin et al. inform an analysis of how socio-demographic, physical and social structures, and other social characteristics shape parents' and caregivers' decisions, strategies, and investments in accessing health care for young children (Aday and Andersen 1974; Akin and Hutchinson 1999; Andersen 1995; Colvin et al. 2013).

B. Rationale

Significant demographic change in Cambodia has taken place over the last several decades, much of which is a direct consequence of its genocide and civil war in the 1970s and early 1980s (Heuveline and Poch 2007). Specifically, fertility rates increased in the post-war era in the 1980s, creating a Cambodian baby boom, while mortality rates declined. The result is a population that is concentrated in young adult ages, with an echo boom underway today. Neonatal, infant, and child mortality have decreased dramatically in Cambodia since 2000 (National Institute of Statistics, Directorate General for Health, and ICF International 2015a), yet important gaps remain in terms of healthcare access and utilization, and quality (Dingle, Powell-Jackson, and Goodman 2013; Fujii 2013; Jimenez-Soto, Durham, and Hodge 2014; National Institute of Statistics et al. 2015a). Gains in maternal and child health are not enjoyed equally by all Cambodians. Nationally, the gaps in equity between the richest and poorest wealth quintiles have increased for childhood immunization and nutritional status (Grundy et al. 2014). It is unclear how increasing migration and associated demographic changes have contributed towards these inequalities, though demographic theory suggests such changes are consequential in health outcomes (Marmot, Adelstein, and Bulusu 1984; Montgomery and Ezeh 2005; Weeks 2008).

Early childhood is a critical development phase, setting a trajectory for physical and mental health throughout the life course. Health and economic circumstances in childhood affect adult educational attainment, SES, and mortality and health status in middle and later life (Blackwell, Hayward, and Crimmins 2001; Case, Fertig, and Paxson 2005; Haas 2008). Thus, investments in child health pay dividends throughout the life course. Globally, children in low- and middle-income countries remain extremely disadvantaged compared to their peers in high income countries, experiencing a disproportionate burden of mortality and morbidity (United Nations Children's Fund (UNICEF) 2014). Child health indicators have improved globally in recent decades in part due to concerted public health efforts to address vaccination, sanitation, delivery with skilled providers, and infection prevention (Black et al. 2010). Yet, in higher mortality settings such as Cambodia, children are still relatively likely to die from infectious diseases, including pneumonia, diarrhea, and malaria (Liu et al. 2015). Additionally, pre-term birth and other causes of death in the neonatal period remain an important cause of under-five mortality in Cambodia and globally (Liu et al. 2015; National Institute of Statistics et al. 2015a).

Empirical studies of the impacts of migration on young children present conflicting evidence as to the consequences for children's physical and mental health. These conflicting results may be due to the variation in settings where they were conducted, as well as the fact that many of these studies do not appropriately account for potential types of bias related to migrant selectivity. Prior studies show migration may impact children's physical, intellectual, social, and emotional development through multiple mechanisms, but these mechanisms are not yet well understood. Much of the literature focuses on international migration, though internal migration may have similar effects on children's health. Further research is necessary to understand the experiences and outcomes for families affected by internal migration. Additionally, there is a

need for further research to better understand the mechanisms of impact on the physical and mental health of children left behind. With regard to children's health, care-seeking behaviors for preventive and curative care must be better understood to ensure that children are able to access available services. Health knowledge and behaviors, and how these are affected by alternate caregivers and living arrangements when children are left behind, also require further research. In general, a deeper understanding of the barriers and opportunities migration creates for children and their health in Cambodia will help improve policies and programs targeted to support these families.

C. Impact

In examining child health outcomes, this dissertation explores the impacts of multiple social phenomena on young children: migration, family structure, socio-economic status (SES), social capital, and their intersections that drive social determinants of children's health. This dissertation seeks to contribute an improved understanding of the impacts of parental out-migration on child health, with attention to demographic, sociological, and public health literatures. Sociologically, the role of household structure, SES, and relative inequalities and deprivation on children's health and well-being are of interest, as determined by migrant status. In the public health literature, how these factors impact children's access to quality care and their health outcomes is of interest, as well as an understanding of how health disparities are perpetuated in this environment. These questions require understanding of the demographic landscape, and the interplay between demographic change and child health equity.

This dissertation examines these issues using a mixed-methods approach. There are several advantages to using such an approach. Two quantitative chapters examine the effects of

migration on child health at a population level, allowing for inferences about how macro-level demographic changes affect children's health access, outcomes, and equity. A qualitative chapter uses a grounded theory approach to examine the dynamics of skipped-generation households, and the specific mechanisms through which parental out-migration affects children's health in these families. Together, these analyses serve to illuminate both the macro and micro-level consequences of migration for children.

II. Theoretical motivations

As described above, this dissertation draws upon theoretical perspectives and empirical studies from several fields, including demography, sociology, and public health. In this section, I outline key theories of migration, social determinants of health, and care seeking for child health. Next, I present an overview of the Cambodian context, including current demographic trends and a description of the Cambodian health system.

A. Migration

Migration affects household and community structures, dynamics, and opportunities. It is a major area of inquiry in sociology and demography, as well as in other social science disciplines, including economics and social epidemiology. To date, migration research within sociology and demography has focused on migration flows, selection of migrants, assimilation, migrant identities, and networks. Migration may be internal, that is, where people move within the same country, or international. Internal migration is often closely tied to process of urbanization, with migration flows in many countries predominantly rural-urban (Weeks 2008). International migration is driven by regional and global labor opportunities, and, in the

developing world, continues to be impacted by post-colonial policies. While movement from the Global South to the Global North is common, South-South migration has increased among international migrants (United Nations Department of Economic and Social Affairs, Population Division 2012). Migrants move from "sending" households, those left behind in their communities of origin, to "receiving" communities in their destination. Migrants may move seasonally, returning to their community of origin in between migration episodes, termed "circular migration." The same person may migrate both internally and internationally at different times, lending complexity to understanding migration.

Motivations for migration and the selection of migrants

Historically, early work on migration focused on where and why people migrated (Ravenstein 1885). Through the 1960s, migration researched continued in this line of work; a major theory still cited today is the "push-pull" theory (Lee 1966). Migrants are motivated by factors that "push" them from their community of origin, or they are "pulled" to a receiving community for economic, social, or other reasons. Migration is the result of a series of factors related to both origin and destination, and personal characteristics, which either motivate or discourage migration for the individual. This early work forms the basis for the study of selectivity factors of migrants (Lee 1966), which include age (Weeks 2008), education (Shryock and Nam 1965), and gender (Cortes 2015; Kaur 2010), among others. Globally, young adults are most likely to migrate (Weeks 2008). Thus, migrants are likely inherently different from non-migrants in both observable and unobservable ways. This type of selection is an important consideration in empirical studies of migration and child health. Parents who decide to migrate

may be fundamentally different from those who do not, and these differences may be related to different types of caregiving and care seeking practices that affect their children's health.

Globally, women comprise an increasing proportion of internal and international migrants (United Nations Department of Economic and Social Affairs, Population Division 2016). This feminization of migration and the resulting increase in the proportion of children who are not co-resident with their mothers has led to "mothering from a distance" in many families (Cortes 2015; Levitt and Jaworsky 2007). Transnational motherhood, and transnational fatherhood, can be emotionally stressful for both parents and children as it challenges traditional norms and patterns of caregiving, parenting, and existing emotional bonds between parent and child (Levitt and Jaworsky 2007). Given the distance from their household of origin, many internal migrants may have similar experiences as transnational migrant parents.

Depending on the division of reproductive labor in a household, the migration of a mother may result in a greater disruption in care where women generally take on the majority of childrearing and domestic tasks (Cortes 2015; Lam et al. 2013). These domestic burdens are often assumed by caregivers left behind (Hoang, Yeoh, and Wattie 2012). The feminization of migration also challenges gender norms as migrant women take on new roles in the labor force and society, as well as within their families (Cortes 2015; Rhacel Salazar Parreñas 2005). The new opportunities brought about by migration may grant women greater empowerment, including increased agency and resources (Kabeer 1999). Such shifts in autonomy and decision-making power may translate to gains for their children's health. Women with greater earning and decision-making power within the household are more likely to invest in their children's health and nutrition (Schmeer 2005), and their children experience better health outcomes (Kishor 2000; Shroff et al. 2009; Thorpe et al. 2015).

The impact of migration on child health

Migration impacts young children through multiple mechanisms: through changes in their household wealth, changes in their living arrangement, the potential absence of one or both parents, and their ability to access key services for their development, health and education. Globally, research suggests that the effects of migration on children likely differ by age depending on the child's age and intellectual, social, and emotional development (Adhikari et al. 2014; Graham and Jordan 2011; Graham, Jordan, and Yeoh 2015; Jampaklay and Vapattanawong 2013). Migration affects family and household dynamics, household wealth and resources, and makes information about different health behaviors, treatments, and care practices available, which impact child health outcomes (Cortes 2007). The interaction of these factors is complex, and with limited, often conflicting empirical evidence, not well understood, especially for young children.

There is a rich literature documenting potential health selection effects among migrants (Acevedo-Garcia et al. 2012; Lu 2008; Mehta and Elo 2012; Ro and Fleischer 2014). Where migrants self-select on the basis of better health status, the biological or social characteristics that lead these migrants to have better health are generally shared with their children. Thus, the children of migrants may be pre-disposed to have better health or nutritional status than children in non-migrant households in migrant-sending areas. However, health-related selection processes may shift over time as out-migration increases. In Mexico, the differences in health between migrant and non-migrant women grew over time as out-migration increased, though this trend is muted among men (Ro and Fleischer 2014). Given the increasing feminization of migration globally (Cortes 2015) and the specific roles of mothers and female caregivers in providing nutrition, this trend is notable.

B. Social capital, social determinants of health, and health disparities

Sociology, social epidemiology, and public health recognize the critical role of wealth, resources, social status, and social networks on health and social outcomes. Research over the past several decades in each of these fields has sought to elucidate the effects of these social factors on health and well-being (Berkman et al. 2014; Glanz, Rimer, and Viswanath 2015; Mosley and Chen 1984; Pickett and Wilkinson 2015). In this dissertation, each analysis considers the role of social determinants in children's health access and outcomes, with the aim of contributing towards an improved understanding of children's health disparities.

An extensive, cross-disciplinary literature has identified social characteristics that affect health status, termed social determinants of health. Broad-scale social determinants of health, areas in which different levels of support or success can advantage or disadvantage certain individuals or populations, include employment and wages, social protection, the health care system, economic markets, gender equity, political empowerment, and global governance (Marmot et al. 2008). These determinants refer to an individual's and a population's ability to meet basic needs; participate in discourse, society, and the workforce; seek care when needed; and, to address global inequalities. Certain individuals have a higher propensity towards good health by way of higher social status and greater social capital, that is, the actual or potential resources available to an individual through social networks and institutional memberships (Berkman et al. 2014; Bourdieu 2010; Wilkinson and Pickett 2006). Social determinants operate to impact child health outcomes. As a result, children experience disparities in health outcomes across the socio-economic spectrum, disadvantaging children in poorer households, children in neighborhoods or communities with poor physical and social infrastructure, and children whose parents and caregivers have low educational attainment. These disparities can be observed for a

variety of health outcomes in low- and middle-income countries, including child mortality, nutritional status, access to care, and vaccination (Black et al. 2010; Boerma et al. 2008; Fotso 2006; Lichter 1997).

C. Care seeking for child health

Multiple social and structural determinants influence patients' ability to seek appropriate, quality care and access effective treatments. In addition to theorizing the role of social capital and social determinants on health outcomes, several theories address the process of accessing care. These include Andersen and Aday's access to care (Aday and Andersen 1974; Andersen 1995); Akin and Hutchinson's bypassing theory (Akin and Hutchinson 1999); and a framework of the social process of seeking care developed by Colvin and colleagues (Colvin et al. 2013). These theories, which draw from sociology, public health, and economics, outline the social processes around treating illness. Care seeking for children's health often involves input from multiple family members, who work together to recognize illness, mobilize resources for care, and decide on a trajectory of care (Colvin et al. 2013; Scott et al. 2014). Because migration alters familial dynamics and resources, it may shift the ways in which these families access care, and the array options available to them.

III. The Cambodian context

Cambodia is a country in Southeast Asia of nearly 16 million inhabitants. Its rich history can be traced to the ancient Khmer empire, which dominated mainland Southeast Asia from about 800 AD to the mid 1400s, the Angkorian era (Strangio 2014). The French colonized Cambodia in 1863, and the country became independent in 1953. Phnom Penh, its capital city,

flourished in the 1950s and 1960s under the rule of King Sihanouk, yet this was also a period of political and military instability across the country (Strangio 2014; Zimmer et al. 2006).

A military coup in 1970 marked the beginning of civil war. Cambodia's recent history has been dominated by the Khmer Rouge genocide, which lasted from 1975 to 1978. It is estimated that about 2.5 million Cambodians died in this period under the rule of Pol Pot (Heuveline 1998). Consequences of the war included forced migration and family separation. Intellectuals and urbanites were specifically targeted for killing, resulting in the country losing much of its skilled labor force (Strangio 2014; Zimmer et al. 2008). From 1979 through the late 1980s, the country experienced violence and uprisings while occupied by neighboring Vietnam, with little institutional recovery from the previous decade (Strangio 2014). In 1993, the United Nations (UN) supported elections in its largest ever operation, bringing the arrival of NGOs and foreign aid. While neighboring Thailand and Vietnam saw rapid socio-economic development and improvements in health indicators in the 1990s, Cambodia stagnated, and much of its population remained impoverished. Recent foreign investment has created jobs in Phnom Penh, and encouraged concentrated development in the city. In particular, the garment, construction, and real estate sectors are driving economic growth in Phnom Penh (World Bank 2015a). Simultaneously, tourism to Siem Reap, Cambodia's second city, and the nearby ancient temple of Angkor Wat, has contributed towards job creation there. However, development in rural areas continues at a slower pace (Strangio 2014). The proportion of households living below the poverty line has decreased in the last decade to 17.7% in 2012, though almost all of these households are in rural areas, and most of those who graduated above the poverty line still face economic insecurity, living on less than $2 per day (World Bank 2015a). Among urban areas, the poverty rate especially high in Phnom Penh. Income inequality increased in Cambodia beginning

in the 1990s (Grundy et al. 2014), but has fallen in recent years as absolute incomes have increased among the poor (Asian Development Bank 2014).

Demographically, Cambodia is experiencing a dividend, or a surplus of young adults. This is the result of a baby boom in the 1980s following the Khmer Rouge regime (Heuveline 1998). At older ages, there is a surplus of women due to high mortality among men during the Khmer Rouge (Zimmer et al. 2006). The current cohort ages 35-39 is small due to low fertility and high infant and child mortality during the Khmer Rouge (Heuveline 1998; Zimmer et al. 2006). In the past two decades, Cambodia has undergone a demographic transition as the life expectancy at birth has increased, while infant and child mortality rates have decreased (National Institute of Statistics et al. 2015a). Fertility is decreasing. Currently, the total fertility rate (TFR) is 2.7, with rates of 2.1 in urban areas and 2.9 in rural areas (National Institute of Statistics et al. 2015a). As recently as 2000, the TFR was 4.0; improvements in access to contraceptives and reduction in unmet need over the past decade have contributed toward the decline in fertility.

In Cambodia, most households are nuclear, with extended kin residing in close proximity, often on the same plot of land in rural areas (Ovesen, Trankell, and Ojendal 1996). A majority of elderly co-reside with or live near at least one adult child in their village of origin, even if other children have migrated (Zimmer et al. 2008). Elderly adults tend to co-reside with their youngest daughter (Zimmer and Kim 2001).

Cambodia is a relatively homogenous country in terms of ethnicity and religion. Over 95% identify as Theravada Buddhists, and over 90% as ethnically Khmer (National Institute of Statistics et al. 2015a). The Vietnamese and Muslim Cham populations are prominent minority populations, and there is a small but growing Chinese minority (Strangio 2014).

Migration in Cambodia

Migration is occurring across Cambodia on a large scale, in part due to its large age cohort of young adults (Heuveline and Poch 2007). Combined with labor opportunities in Phnom Penh and neighboring Thailand, and a lack of employment in rural areas, a majority of migrants in Cambodia are young adults seeking work opportunities internally or internationally. Findings from a household survey of rural areas in Cambodia, the Cambodia Rural-Urban Migration Project (CRUMP), show that a majority of migrants are ages 15 to 34 (Ministry of Planning 2012). Rural sending households report approximately half of migrants moved to Phnom Penh, while 30.3% moved internationally, 13.0% moved to another rural area in the same or another province, and the remainder moved to other areas. Among those who migrated internationally, about 80% moved to Thailand.

Similar to other countries in the region (Cortes 2015), Cambodia has experienced a feminization of migration. Over half of all migrants are female (Ministry of Planning 2012). Female migrants to Phnom Penh seek employment at garment factories, as domestic workers or small business owners, selling goods or food, or in the burgeoning service and entertainment sector (Kheam and Treleaven 2013; Ministry of Planning 2012). Male migrants often find employment in construction labor, as *motodop* or *tuk-tuk* drivers, or in other forms of labor, though women are increasingly taking on these types of work as well. Such shifts in the demographics and experiences of migrants are closely intertwined with other social changes underway in Cambodia, granting women greater autonomy and opportunities.

These changes in the demographic profile of migrants have implications for children's living arrangements. As out-migration becomes more common, fewer children reside in nuclear families. Increasingly, children reside in multigenerational households or in skipped-generation

households; the increase in skipped-generation households from 2000 to 2014 is a notable demographic trend (National Institute of Statistics et al. 2015a). Examining four waves of the Cambodia Demographic and Health Survey, I find that in 2000, less than 1% of households in Cambodia were skipped-generation; by 2014, they comprised 8.6% of all households. These households are concentrated in high-migration provinces, particularly those near the Thai border and near Phnom Penh (Figure 1.1). Among migrants to Phnom Penh, the majority of Cambodian children left behind are cared for primarily by a grandparent (84.4%), The remainder are cared for by a non-migrant parent (12.7%), and or another caregiver (2.9%) (Ministry of Planning 2012).

Migrant remittances have been an important factor in the reduction of poverty of rural areas in Cambodia (Kimsun 2011). Migrants who have children left behind in their rural community of origin are especially likely to remit (Ministry of Planning 2012). Cambodian migrants also provide important economic support to their elderly parents left behind via remittances (Zimmer and Knodel 2013). Female migrants are more likely to remit than male migrants (Kheam and Treleaven 2013). Most migrants remain in touch with their families left behind, communicating by phone daily or weekly. Those who have migrated internally return for short visits, while migrants to Thailand may return only once per year for an important Khmer holiday (Ministry of Planning 2012). Examining the profile of migrants from rural sending households in the CRUMP survey, migrants tend to be more educated than non-migrants, and more educated migrants tend to migrate to Phnom Penh versus international destinations, where less educated migrants are more likely to move.

Urbanization in Cambodia

In concert with high rates of migration to Phnom Penh, the capital city doubled in size between the 1998 and 2008 censuses, generally the result of massive in-migration rather than natural population growth (Ministry of Planning 2012). Examining the age composition of Phnom Penh reveals the city's population growth among young adults; the city's population is concentrated in ages 15 to 29. Cambodia's population is projected to continue to urbanize. The proportion of its total population residing in urban areas is expected to nearly double by 2050, with most of this growth in Phnom Penh (United Nations Department of Economic and Social Affairs, Population Division 2014). While a majority of urban growth has taken place in Phnom Penh and Siem Reap, the country's two largest cities, small and midsize towns have experienced significant growth in the past decade as well (Asian Development Bank 2012). All urban areas, large and small, are projected to continue to experience some of the fastest rates of urbanization in East Asia (World Bank 2015b). However, smaller cities and towns tend to have higher rates of poverty than large cities, lack the physical and health infrastructure to accommodate large population growth, and often face shortages of health workers (Montgomery 2009; Montgomery and Ezeh 2005).

Child health in Cambodia

Cambodia has a pluralistic health system with services available in the public and private sectors, which include traditional healers, called *Kru Khmer*. Beginning in the 1990s, the government, foreign donors, and non-governmental organizations made concerted efforts to improve the health system through direct investments, subsidies, policies, and other types of health programs (Strangio 2014). However, socio-demographic changes have outpaced these investments, contributing to entrenched health disparities (Grundy et al. 2009).

The public health system requires user fees and is organized hierarchically, ranging from local health posts to commune-level health centers, district and provincial hospitals, and national-level tertiary referral hospitals in Phnom Penh. Pediatric tertiary care is also available in Siem Reap, in western Cambodia, though unavailable elsewhere. The private sector is heterogeneous, as in many developing countries, and ranges from informal drug sellers to tertiary private hospitals (Soeung et al. 2008). Previously, outreach services for vaccination and other child health services were common, but these have ceased in the last five years due to funding limitations. The use of traditional healers is still common across rural Cambodia. Evaluating care seeking and child healthcare access in Cambodia requires consideration of the public sector, private sector, and *Kru Khmer*.

Since 2000, the improvements in child health and mortality shown by the Cambodia Demographic and Health Survey are striking (National Institute of Statistics et al. 2015a). Under-five mortality, neonatal, and infant mortality have declined significantly during this period. From 2000 to 2014, infant mortality declined from 95 deaths per 1,000 live births to 28 deaths per 1,000 live births. In this same period, under-five mortality declined from 124 deaths per 1,000 live births to 35 deaths per 1,000 live births. Overall, vaccination coverage has improved since 2000, though it has stagnated in the past several years. Nutritional status has improved in this same time period, yet several malnutrition indicators remain troubling. The prevalence of stunting (low height-for-age), wasting (low weight-for-height), and underweight (low weight-for-age) decreased since 2000, but in 2014, only 24% of children met the minimum acceptable diet for children ages six to 23 months (United Nations Children's Fund (UNICEF) 2014). Food insecurity remains problematic for many Cambodians, especially the urban poor (McKinney and Walters 2014; Soeung et al. 2012). Diarrhea and dengue are prevalent among young children

(Lover et al. 2014; National Institute of Statistics, Directorate General for Health, and ICF International 2015b). This finding is unsurprising given low rates of access to improved sanitation: in 2012, 71% of children had access to clean water, and just 37% used an improved sanitation facility, with rural children greatly disadvantaged (United Nations Children's Fund (UNICEF) 2014). Regionally, Cambodia lags behind most other Southeast Asian nations in key child health indicators, including neonatal mortality, vaccination coverage, and malnutrition (United Nations Children's Fund (UNICEF), 2014).

Several important health and economic interventions have taken place since 2000, contributing towards improvements in child health indicators. These include the introduction of health equity funds (HEF) to subsidize user fees for the poorest Cambodians, supported by NGOs and foreign aid. HEF allow Cambodians identified as the poorest poor to access various forms of social assistance, including subsidized or free health care services under a program in which providers are reimbursed directly for their services. In some cases, patients are reimbursed for transportation costs. Similarly, a government scheme seeks to reduce healthcare costs for the poorest poor. If a household is identified by the Government to participate in the "ID Poor" program, all members residing in the household enjoy subsidized healthcare user fees. Many NGOs, multilateral, and bilateral aid organizations operate in Cambodia, and have implemented targeted interventions to address child health. General socioeconomic development across the country has also positively impact children's health. An analysis of factors contributing to a reduction in stunting from 2000 to 2010 highlighted increased household wealth, access to improved sanitation facilities, higher parental educational attainment, and longer birth spacing as important determinants (Ikeda, Irie, and Shibuya 2013).

Conclusions

The literature reviewed in this introduction suggests parental out-migration has countervailing effects on children's health. However, this research has neglected to examine several important aspects of the relationship between parental out-migration and child health. In particular, how their parents' migration affects children's access to and utilization of care, and health equity, requires further examination. Skipped-generation households are increasingly common globally, yet rarely included in empirical studies of migration and child health. To address these gaps, this dissertation examines several dimensions of the health of children left behind in Cambodia, a high-migration setting with a growing prevalence of skipped-generation households.

The overarching research questions in this dissertation are: in what ways does parental out-migration affect the health of their children, and how does migration affect the health of children over time in the context of rapid social, economic, and demographic change, such as that found in contemporary? In order to explore the answers to these questions, I conducted three analyses, including two quantitative analyses and one qualitative analysis. These are in presented in three distinct chapters:

Chapter 1: Using primary qualitative data collected in rural Cambodia, this paper characterizes how migrant parents and grandparent caregivers make decisions for the health of and seek care for children left behind using a grounded theory approach;

Chapter 2: With secondary data from three waves of the Cambodia Socio-Economic Surveys conducted between 2009 and 2011, this chapter analyzes how child health care seeking and investments in care vary in households benefitting from migrant remittances compared to non-migrant households; and,

Chapter 3: This chapter uses data from four waves of the Cambodia Demographic and Health Survey from 2000 to 2014 to assess how increasing diversity in children's living arrangements impacts child nutrition and health equity over time during a period of increasing out-migration.

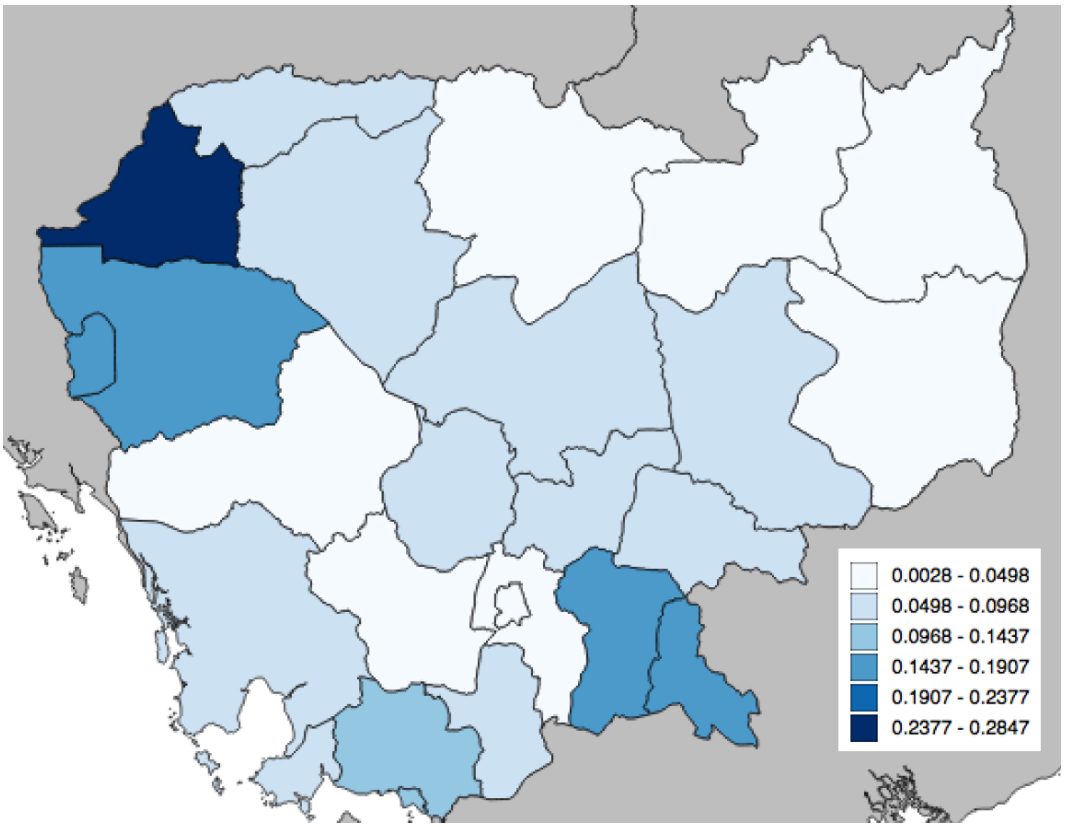

Figure 1.1. Proportion of skipped-generation households in Cambodia by province, 2014.

Chapter 2: Decision-making dynamics for young children's health and illness in rural Cambodia's skipped-generation households

Cambodia is experiencing high rates of migration, both internally and internationally. Over the last two decades, this has led to a growing prevalence of young children left behind in rural areas in the care of grandparents or other relatives as their parents migrate to Phnom Penh, Thailand, or other destinations for work. As of 2014, almost one-tenth of children in Cambodia resided in skipped-generation households (National Institute of Statistics et al., 2015). While the literature on health outcomes among children left behind is growing, the process of how skipped-generation households access curative and preventive health care and health information for children has not been examined in previous studies. Moreover, the role of the absent migrant parent(s) in these decision-making and care-seeking processes is also poorly understood, for both daily and major decisions about children's health, nutrition, and other areas related to their development and well-being.

The literature on children's health in skipped-generation households is very limited globally, as is the literature on care-seeking for children's health for Cambodia in particular. This paper describes the social process of care seeking for young children in skipped-generation households using primary qualitative data from migrant-sending areas in rural Cambodia. I analyze in-depth interviews conducted with grandparent caregivers to understand their experiences of seeking care for ill children, financial considerations for children's health, and decision-making dynamics with absent migrant parents. I identify how grandparent caregivers left behind and parents who have migrated out make decisions about health care for young children in skipped-generation migrant households. Specifically, this paper characterizes the processes for caregiving and seeking curative care for children ages ten and under who have

experienced acute illnesses and injuries. I identify forms of support, resources, and knowledge utilized by their grandparent caregivers. I outline where grandparents seek care for ill children, how various actors are involved in decisions about care, and how this differs for different types of illness. Finally, I aim to understand the specific role(s) of absent migrant parents in providing financial, emotional, and informational support to grandparent caregivers, especially related to their children's health. This study includes children of internal migrants, those who have migrated within Cambodia, as well as children of international migrants. For the purposes of this paper, I refer to grandparent caregivers as grandparents; grandchildren as children or grandchildren, and the middle generation as migrant parents or parents.

I. Background

Migration is an important familial economic strategy, with potential benefit to both the migrant and family members left behind (Lucas and Stark, 1985; Stark and Lucas, 1988). Indeed, a key motivation for many parents who migrate is the possibility to improve their children's well-being, education, and life opportunities (Dreby, 2010; Suarez-Orozco and Suarez-Orozco, 2009), which arises from opportunities for increased income. The new economics of labor migration theory posits rural households may send a migrant to an urban area with the aim of providing economic benefit to all members of the household (Lucas and Stark, 1985). This allows each member of the household, including the urban migrant and the rural members left behind, to take on greater economic risk, leading to economic gains for the family over time. Migrants are motivated to remit to the left behind household by a combination of altruism and self-interest. At the destination, the migrant may increase his or her income. Concomitantly, with remittance income, the left behind family may increase their access to education, improve their

diet, increase health expenditures, or take on increased economic risk themselves in agriculture or other economic endeavors in the rural area. Stark and Lucas propose that rather than fracturing the family, migration is evidence of its strength; "migration may thus be fruitfully viewed as an inter-temporal proposition generating streams of various benefits to both migrants and their families" (1988, p. 478). Thus, a parent's decision to migrate may be part of a household strategy to improve the quality of life or economic status for the entire family. The decision to leave children behind in the care of other family members is an important part of this strategy, as it allows parents to maximize their earning potential in their destination.

Changing roles and caring structures in migrant-sending households

Familial roles, structures, and household living arrangements shift with migration, impacting children left behind. Daily caregiving tasks previously provided by migrant parents must be assumed by the child's new caregiver(s), creating a new distribution of caregiving labor within the family. Several theoretical perspectives offer insight into decision-making processes in migrant-sending households after migration.

The perspective of "intergenerational solidarity" suggests that cohesion exists between generations within the family, leading to different forms of solidarity, or support, provided within the family across generations to benefit the family unit as a whole (Bengtson and Roberts, 1991; Chen et al., 2011). For example, parents support children in their childhood, adult children support elderly parents, and siblings provide support to one another; these supports are provided throughout the lifespan in multiple domains. If grandparents provide care for young children, parents can migrate for work and provide the family with increased income, benefiting each generation. Often, family members who are not co-resident still provide financial and emotional

support to one another, which reinforces familial bonds even in the face of migration, creating a "modified extended family" (Knodel and Saengtienchai, 2007). They maintain familial ties despite physical distance (Litwak, 1960). Following this framework, decisions about migration and labor are often made at the family level with the aim of benefiting all members of the family. While there is physical distance between parent and child, they continue to operate as a modified family unit despite this distance. Similarly, Caces et al. describe the "shadow household," which includes family or household members who reside elsewhere, but continue to participate in daily decisions and actions (1985). In this model, parents remain active in the lives of their children left behind.

The flows of caregiving labor in migrant-sending households have been conceptualized in several ways. Tobo and Gorfinkel theorize a "care triangle" with relationships between the child left behind, his or her migrant parent, and his or her primary caregiver (2007). The triangle is useful for conceptualizing how the physical distance between parent and child due to migration shift their relationships, and the social roles of each member in caregiving. It also gives voice to the child as an active member of the family. Building on Tobo and Gorfinkel's work, Baldassar and Merla conceive of care as circulating throughout migrant families, with care flowing bi-directionally between the migrant and the left-behind (2014). They posit because families maintain their bonds despite physical distance, migrants and the left-behind each provide certain types of support to the other throughout the family's migration experience and life course. However, this care, though reciprocal, is often asymmetrical; it flows across family networks, rather than within dyads. Care might be financial, emotional, practical, or symbolic, though all types serve to reinforce the notion and solidarity of the family across distance. This characterization of care is particularly relevant for understanding the motivations, structure, and

dynamics of the skipped-generation household. For example, while migrant parents provide financial support to the left behind, grandparents provide practical care to their children, who in turn will one day provide financial and practical care to the older generations.

Given that migration restructures roles in the family, especially in the left-behind household, shifts in familial power dynamics might follow. Migrant parents, as the primary earners in the family, generally control financial resources. However, grandparent caregivers also hold a form of power due to their prerogative to upkeep negotiated caregiving commitments (Merla, 2014). Following Baldassar and Merla's theory of care circulation, those who currently provide care often have greater power in the family than those who are expected to reciprocate in the future. Intra-familial power dynamics are also governed by gender norms and a gendered division of labor (Connell, 1987); in the skipped-generation household, this may result in different expectations and power of male and female migrants, as well as male and female caregivers of children left behind.

Quality of care for children left behind

Many studies highlight the importance of the quality of care a child left behind receives, that is, the quality of caregiving practices such as emotional, developmental, and physical support. Receiving high quality care may mitigate many of the negative effects of parental absence. The well-being of children left behind is affected by the child's age, the quality of his or her care and caregiver, the financial support or remittances the left behind household receives, and links to or cohesion in their community (Adhikari et al., 2014; Hoang and Yeoh, 2012; Jampaklay et al., 2012; Jampaklay and Vapattanawong, 2013; Lam et al., 2013). In Vietnam, Hoang and Yeoh explored emotional ties between left behind children and their migrant parents

(2012). They find that over time, maintaining transnational bonds between parent and child proves difficult because of the nature of telephone communications and the inability of some migrant parents to call or visit often due to their employment. They find that the quality of care and emotional support provided by children's caregivers can help reinforce these bonds and maintain ties despite the distance. Many caregivers in Southeast Asia, especially grandparents, already provide some degree of care for the child before his or her parents migrate, so the emotional disruption for the child is not always significant or problematic (Hoang et al., 2012).

The quality of caregivers, the generational differences and specific hardships experienced by the current elderly cohort in Cambodia must be considered when examining grandparents as caregivers in the Cambodian context. The current generation of elderly has faced deprivation throughout their lives, to the extreme of the Khmer Rouge genocide in the 1970s and subsequent civil war through the 1980s. Elderly in rural Cambodia have generally experienced a lack of education, infrastructure, and economic opportunity or development (Zimmer, 2008; Zimmer et al., 2006). Most Cambodian women over age 60 have had no formal education, and few men of this age have attended any schooling beyond (Zimmer, 2008). As caregivers' education is significantly associated with child health outcomes (Hobcraft, 1993; Rammohan et al., 2012; Wiysonge et al., 2012), children whose primary caregiver has little or no formal education are potentially disadvantaged compared to other children. This may contribute towards a lower quality of care in these households than a parent might provide, as the current generation of parents has, on average, greater educational attainment (National Institute of Statistics et al., 2015). Indeed, children in migrant-sending households in the Philippines and Vietnam whose caregivers have low education are significantly more likely to be malnourished than children in

non-migrant households and those whose caregivers have higher educational attainment (Graham and Jordan, 2013).

Migration impacts caregivers as well. Several studies have examined the impact of caregiving on caregivers' mental health. As their mental health is related to the quality of care they are able to provide, it is an important consideration in an examination of children left behind. In Thailand, most caregivers receive support in providing care or other household tasks, with one-parent migrant households most likely to receive this type of in-kind support (Jampaklay et al., 2012). Overall, most Thai caregivers report adequate or high life satisfaction. However, caregivers in poorer households were significantly more likely to experience mental health problems. Graham, Jordan, and Yeoh evaluated the prevalence of depression and other common mental disorders among primary caregivers of children left behind in Vietnam, Indonesia, and the Philippines (Graham et al., 2015). They find that among households with an international migrant, greater household wealth is protective, while not receiving remittances and infrequent contact with the migrant are significantly predictive of caregiver mental health disorders. Notably, the duration of migration does not influence the caregiver's likelihood of mental health problems. These findings suggest financial and social support for caregivers of children left behind contribute towards their ability to provide quality care and promote their own well-being.

Decision-making processes for children's health

Children's illness provides an excellent case for examining decision-making processes within migrant-sending households. Acute illnesses such as fever, cough, and diarrhea are common among young children in Cambodia (National Institute of Statistics et al., 2015), and

require parents and caregivers to take action and manage resources to return their children to health. The physical distance between migrant parents and their children, changes in caregiver roles, and availability of resources may shift care-seeking and decision-making processes in migrant-sending households.

Parents and caregivers use multiple metrics when deciding where to seek care for a sick child, which include distance, cost, quality, prior care experiences, and local understandings of disease etiologies, among others (Aday and Andersen 1974; Akin and Hutchinson 1999; Andersen 1995; Colvin et al. 2013). While distance is an important determinant of access (Ettarh et al., 2011), parents and caregivers also consider other factors in deciding where to seek care. These include cultural norms and beliefs around specific illnesses and appropriate healthcare, cost, perceived severity of illness, perceived quality of services and providers, provider reputation, and their own and others' past experiences with care and the medical system, further supported by other empirical work (Colvin et al., 2013; Kahabuka et al., 2011; Leonard, 2007; Rutherford et al., 2010).

Parents and caregivers commonly utilize multiple treatment strategies within the same care-seeking episode, which delays a child's entry into formal care as families engage in a process of trial and error. After recognizing illness, parents and caregivers may first pursue home- or community-based treatment options, such as through informal drug sellers or traditional healers, and later access formal care in public or private facilities (Colvin et al., 2013; Geldsetzer et al., 2014; Scott et al., 2014). In general, care seeking moves from within the home to outside, especially as the severity of illness increases (Akin and Hutchinson, 1999; Colvin et al., 2013). Along this care-seeking trajectory, parents or caregivers may consult with others for advice, wait to see if symptoms resolve on their own, or be required to negotiate access to care

with others, especially due to gender or cultural norms that do not permit women to make decisions on their own. When these additional steps delay entry to formal care, children may experience worse health outcomes. However, each illness episode is unique, and not all illnesses require each step. The authors acknowledge that parents or caregivers may engage in these steps in any order, and if the child does not improve, may engage in certain steps more than once as different treatment options are sought. Essentially, seeking care for child health is a complicated process that may involve multiple family or community members, and multiple points of care within a single illness. Care seeking for children is a dynamic process, especially when the cause of the illness is unknown. Different actors in this process have varying degrees of agency to make decisions for the child's health, and face different constraints in accessing care.

Throughout the care-seeking process, parents and caregivers make use of a number of resources. These include various forms of social capital and social support. Social capital theory, as conceived by Bourdieu, and further developed in the social epidemiology and sociology literatures, suggests that social networks and community-level factors influence health outcomes (Berkman et al., 2014; Bourdieu, 2010). Bourdieu conceptualized that it is not only economic or physical capital that determines relative social status; social and cultural capital are also important in determining the social hierarchy. In a Bourdieusian framework, social capital impacts health at the individual and network levels. An individual might access his or her social network to gain information about where health services are available or the quality of a specific provider or medicine, or for support or resources that help him or her avoid risk of illness or injury. Social networks comprise social ties across kinship groups, villages and communities, and organizations (Berkman and Krishna, 2014). Social networks also influence an individual's beliefs and behaviors, including for health (Glanz et al., 2015). These types of social capital may

facilitate care-seeking processes for grandparent caregivers by granting them greater access to health information and support for practices that promote their grandchildren's health. Other forms of social support, such as providing assistance to caregivers in carrying out daily tasks, may also aid grandparent caregivers in seeking care for a sick grandchild. Psychosocial support, related to their social networks and social participation, may also be an important form of support for grandparents, both in daily life and as they seek care for their grandchildren.

Examining care seeking for child health in Cambodia specifically, parents often engage with both public and private sector providers, as well as traditional healers, or *Kru Khmer*, in the same illness episode (Khun and Manderson, 2007). Khun and Manderson find parents' perceptions of the quality and utility of a specific provider, cost, and accessibility are primary drivers of where they seek treatment. Trust in a provider is important to Cambodian patients, and drives patients to seek out specific public or private sector providers based on their own or others' prior experiences (Ozawa and Walker, 2011). User fees in the public sector, especially at secondary and tertiary hospitals, prove problematic for many Cambodian parents; beyond the cost of services and medicines, parents must consider costs associated with transportation, food, accommodations, and lost income, which are especially challenging for the poor (Khun and Manderson, 2008). An analysis of parents' and providers' perceived barriers to newborn care in Cambodia and other Southeast Asian countries identified cost, low education among parents, trust in and use of traditional healers, and a lack of support for families of hospitalized infants as barriers to accessing appropriate biomedical care (Martinez et al., 2012). These studies suggest that in Cambodia, multiple structural and social factors present barriers to care. In turn, these barriers shape the agency and constraints faced by parents and caregivers, driving care-seeking decisions for parents and caregivers of sick children.

The present study contributes an improved understanding of the social processes, negotiations, and decision-making for young children's health in skipped-generation left-behind households, a critical research gap. It addresses the lack of knowledge around care-seeking trajectories in these households, and identifies care-seeking processes given the altered family structures brought about by migration. This study is situated in Cambodia, a country with high rates of out-migration and a growing number of skipped-generation families. The use of qualitative methods allows for a deeper understanding of grandparent caregivers' decision-making processes, the psychosocial impacts of migration on the left behind, and the social processes of accessing and navigating care.

II. Methods

From March to June 2015, we interviewed 25 grandparents who serve as primary caregivers for one or more grandchildren under ten years of age in migrant-sending households. We include households where both of the grandchild's parents migrated out of the village of origin and have a different primary residence at least half of the time. There were no age or gender restrictions for grandparents.

Data collection

This study is sited in three provinces in eastern Cambodia: Kampong Cham, Kandal, and Prey Veng. These provinces were chosen for their prevalence of out-migration, diversity in migrant destinations, and variations in migration in terms of length and circularity. There is great variation in migration patterns in eastern Cambodia, particularly by distance to the capital city and access to major roads. Migrants who reside closer to the capital city tend to return to their

households of origin more frequently, while those who reside far from major roads or migrate to Thailand may only return once per year. Migration to Phnom Penh, the capital city, and to Thailand is common in each of these provinces.

Kandal province surrounds Phnom Penh and is more urbanized than the other two provinces, Kampong Cham and Prey Veng. Kampong Cham is the most populous province of Cambodia and has a large provincial town and several small market towns along national highways. Prey Veng is the most rural of the three provinces, and borders Vietnam, though migration to Vietnam is very rare (Ministry of Planning, 2012).

Within the three provinces, districts with high rates of migration were identified based on a previous nationally representative survey of migration (Ministry of Planning, 2012). Where these districts could not be identified due to irregular Romanization of Khmer place names, alternate districts were selected from the country's commune database based on their location. The purposive sample of districts aimed to capture areas that ranged in distance from provincial capitals and major highways. In each province, two geographically distinct districts were visited, and households from at least two villages within each district were interviewed.

Conducting research in Cambodia requires obtaining official permissions at all levels of government, from national ministries to sub-provincial district and village officials. Within districts, we approached officials to introduce the study and its objectives, and obtain assistance in identifying specific villages for sampling. We aimed to identify villages that were likely to include skipped-generation households, and where village chiefs would be amenable to allowing research to take place. District officials recommended specific villages, and in most cases, helped approach village chiefs. An interviewer introduced the study and its objectives to village chiefs, and obtained assistance in identifying specific households. In cases where the village chief did

not recommend specific households (approximately one-third of villages), an interviewer approached a worker at the closest shop or restaurant, and asked about skipped-generation households in the village. In each village where this procedure was used, households were located with the assistance of a shop worker or customer. Interviewers then approached households identified as eligible, accompanied by the village chief in about one-quarter of the sample. The interviewer introduced the study to the head of household using an IRB-approved script. If interested, potential participants were administered informed consent by the interviewer, who also gave the participant a written copy of informed consent in Khmer. Prior to beginning the interview, the interviewer obtained explicit verbal consent to tape record the interview.

Participants were purposefully sampled by the destination of the migrant parent to capture a sample that included the different locations to which Cambodians migrate. In a grounded theory study design, purposeful sampling is conducted until the point of data saturation, when additional interviews no longer contribute new information or themes. Saturation often occurs with fewer than 20 participants (Guest, 2006). We conducted additional interviews in order to stratify results by different factors, such as socio-economic status and the age of children of left behind.

Interviews lasted approximately 60 to 90 minutes, and were conducted in or near participants' homes in a quiet setting. One grandparent was interviewed per household. In households where two grandparents were present, grandparents self-selected who would complete the interview. All interviews were conducted by trained Cambodian interviewers in the Khmer language. At the close of the interview, participants completed a short demographic questionnaire that included a household census, and questions about children's school attendance

and socio-demographic characteristics of the migrant parent(s). Field notes were written after each interview to document the context of the interview, notes about the participant and his or her household not captured in the interview, and other reflections on the interview. Each interviewer participated in a four-day training that included information on informed consent, qualitative methods, and interviewing techniques. All interviewers were native speakers of Khmer with advanced or fluent English proficiency.

The interview guide used a semi-structured format. It was piloted iteratively in two rural districts in Phnom Penh and Kandal provinces. Topics included the history of the parents' migration, daily life in a skipped-generation household, care-seeking trajectories for their grandchildren's recent illnesses, financing care, and sources of support and health knowledge. Participants were also asked about migrant parents' involvement in decision-making for health as well as other domains, and about the receipt and use of remittances. Interviews were transcribed in Khmer, and then translated to English. All English-language transcripts were reviewed for accuracy by the interviewer, translator, and the author.

Sample

The sample consists of 20 women and five men. The sample includes households across the socio-economic spectrum for rural Cambodia, as evidenced by the households' structures and possession of durable goods, and self-reported wealth in the interview. There is also variation in migrant destination. Approximately half of the households in the sample sent at least one migrant to Phnom Penh. Two households sent a migrant to other rural areas within Cambodia; one household sent a migrant to Malaysia; and ten to Thailand. The circular nature of migration in Cambodia is evident in the sample, as several households reported the parent(s) had migrated to

a different destination prior to their current destination. In several of these cases, the parent(s) had previously migrated to Thailand, and returned to work in Cambodia in 2014 after the Thai government threatened to expel undocumented Cambodian workers (Fuller, 2014).

Grandparents ranged in age from 42 to 84, with a mean age of 62. All households in the sample identified as ethnically Khmer. Over half of grandparents are married; the rest are widowed. About half of grandparents care for more than one grandchild under ten. In a majority of households, grandparents have more than one adult child who migrated, but only a few care for grandchildren from more than one adult child. Almost all grandparents provided some level of care to their grandchildren prior to their parents' migration. Over half of grandparents note other adult children or other relatives living in the same village. Grandchildren ranged in age from a year and half to age ten, though grandparents reference children as young as two months being left behind in interviews. Households range from very poor to middle class by rural Cambodian standards, with most in the sample considered poor. A small number of households report food insecurity.

About three-quarters of grandparents reported receiving some form of financial support from the migrant parent, though the level and regularity of remittance support varies widely. A few families count on monthly remittances of $50 up to $200. In others, the monthly remittance was less than $10, and a number of grandparents were unsure when they would next receive a remittance. Some grandparents reported additional in-kind support from migrant parents, such as clothing, toys, or medications for children. In general, migration to Thailand represents a greater financial risk than migration to Phnom Penh, as well as a greater financial reward: the richest and poorest families in the sample all sent migrants to Thailand.

Data analysis

The analytical approach follows the contemporary grounded theory tradition (Charmaz, 2006). English language transcripts were uploaded to Atlast.ti. Interview transcripts were coded line-by-line using an open coding method. A codebook was created during this process, applied to new interviews, and refined throughout coding. Code groups included barriers to care and sources of support; decisions about children's health and care seeking methods of financing healthcare; impacts of migration on grandparents and grandchildren; use of traditional medicine; progression and trajectories of care; and, grandparent attitudes towards raising grandchildren, children's health and nutrition, and care seeking. Codes also included descriptions of socio-demographic characteristics of grandparents, grandchildren, and migrant parents; migration histories and destinations; and, receipt and use of remittances.

A sub-sample of three interviews was coded by a second coder to refine the codebook, assess reliability, and reduce coding errors. A third coder reviewed five transcripts in Khmer and English, and identified emerging themes in the data; this further contributed to refining the codebook and served to reduce potential issues of translation. Using the query tool in Atlas.ti, specific codes and code families were examined and analyzed in detail, including variation among households and relationships between codes.

In addition to line-by-line coding, I wrote descriptive profiles for each household. This included the household's migration and financial history, a narrative of children's illnesses, and descriptions of daily life in the household post-migration, as described by the participant. These profiles provided context for grandparents' attitudes towards migration and caregiving, motivations and decisions around migration, and the broader social and cultural context in which they live. The profiles aided in identifying broader commonalities across households and

trajectories, the intersections of different phenomena of interest, and in highlighting differences of experience (Dubbin et al., 2016). As a part of these profiles, decision models for specific illnesses were mapped to identify care-seeking trajectories and points of differentiation for children's illnesses (Miles et al., 2014).

Throughout the data analysis, I wrote analytic memos to identify emerging themes and phenomena in the data. Analytic memos were informed by analysis using specific codes and code families based on Atlas.ti queries, as well as analysis using the descriptive household profiles and decision models. These analytic memos form the basis of the findings presented in this chapter.

Data validity

In qualitative research, validity or trustworthiness is established by building credibility throughout the data collection and analysis process, ensuring data include various viewpoints and are representative of respondents, and presenting findings are in a neutral way, with consensus among researchers and participants (Graneheim and Lundman, 2004; Guba, 1981). Reflexivity about the researcher's own positionality (Krefting, 1991; Lincoln and Guba, 1985) and active consideration of the power relationships between researcher and participant throughout the research process (Karnieli-Miller et al., 2008) are also critical. Triangulation throughout the qualitative research process builds credibility as processes and findings are cross-referenced with other data sources (Krefting, 1991). In this analysis, I have taken several steps to ensure the data collected are trustworthy. First, in sampling, I aimed to capture multiple viewpoints and experiences by ensuring the sample includes grandparents who vary by the age of their grandchildren, the types of places they live, household socio-economic status, and migrant

destination. I worked with a Cambodian professor and research assistant to develop, pilot, and refine the interview guide, as well as to interpret findings. We paid particular attention to issues around language and translation as I am not fluent in Khmer. To avoid my presence influencing respondents in any way, I was not present during interviews. Finally, throughout the analysis, I triangulated the findings presented in this analysis with multiple data sources, including the Cambodia Rural-Urban Migration Project (Ministry of Planning, 2012) and the Cambodia Socio-Economic Survey.

Protection of Human Subjects

The study protocol was approved by the Committee on Human Research at the University of California, San Francisco (Study # 14-15489) and the National Ethics Committee for Human Research at the Cambodia National Institute of Public Health (Study # 091). All participants were administered informed consent, and provided consent prior to study interviews. Due to the low literacy rates among the target population, verbal consent was sought. The research presented no more than minimal risk of harm to subjects and involved no procedures for which written consent is normally required outside of the research context. Participants received bars of soap worth approximately $1 USD as a token of appreciation for their time, which is typical compensation for study participation in this setting.

III. Results

In this chapter, I explore how decisions about and the process of seeking care for acutely ill children left behind come about in migrant-sending households, given the altered caring structures in these families. First, I describe how parents' out-migration affects the division of

labor and caring structures in households left behind. Next, I examine care-seeking trajectories for children, describing sites of care and caregivers' points of decision making during children's illness. I identify how grandparents manage this process given increased domestic burdens and the physical absence of parents, focusing on the roles of social capital and social support. Finally, I examine how migration shifts decision-making and care seeking from a financial perspective, with attention to the role of remittances and consequences of financial vulnerability.

A. Restructured responsibilities in skipped-generation households

Though almost all grandparents helped care for their grandchildren on a regular basis before their parents migrated, they were not the primary decision maker when the grandchild was ill. However, after migration, it is up to grandparent caregivers to recognize and respond to their grandchildren's illness. This new responsibility for caregiving and decision-making reflects the changing roles and responsibilities of the left behind.

After migration, both parents' and grandparents' roles shift significantly. Most grandparents report that migrant parents have little to no role in daily decisions for their children. Accordingly, grandparents take on new and expanded roles within the household when parents migrate, including additional domestic tasks and greater involvement in their grandchildren's daily lives. Many work as farmers, and must continue to plant, manage their crops, and manage livestock in addition to preparing meals for and bathing their grandchildren, ensuring their health and safety, and preparing them for school. A number of these tasks were previously managed by their migrant children, and now must be managed by grandparents alone. An extremely poor grandmother caring for two young grandchildren reflected on the changes in her household after her daughter migrated to Thailand: "when my child lived here, she helped me with all the

housework and helped to wash her child's clothes. She also cooked the food for me and for her child. [Now] I do all these things alone, even sometimes when I was sick." These burdens take a toll on grandparents' physical and mental health. Several grandparents note that taking care of their grandchildren reduces their own social activities and participation in religious ceremonies. Serving as a primary caregiver for young children potentially impacts grandparents' connectedness to their communities. However, some grandparents, such as the grandmother above, recognize a tradeoff between the ways their child's migration impacts their own daily life and well-being, and the potential benefits of that migration for the family as a whole.

Once they migrate, parents play little role in dictating their children's day-to-day life. Grandparents are almost exclusively responsible for daily decisions, such as children's diet. In most households, the division of childcare labor is clearly defined: while grandparents take on the vast majority of caring tasks, parents are responsible for securing a livelihood that provides for the three generations. For the left behind, these divisions follow a traditional gendered division of labor. In most households with two grandparents, grandfathers are responsible for agricultural and income-generating activities, while grandmothers take on household tasks such as cooking, cleaning, and caregiving for young children. However, these gender norms are upended in single-grandparent households and for the migrant generation. In the few households where grandfathers live alone with grandchildren, and in one household where the grandmother is blind, grandfathers assume the domestic tasks typically performed by women. Migrant mothers (and fathers) take on responsibility for providing economically for the family as they give up daily caregiving tasks.

Parents' roles in healthcare decisions is similarly limited in most households. While many parents are actively involved in helping to pay for their children's healthcare, fewer

actively participate in decisions about where their children should be taken for treatment. In the following section, I describe how grandparents involve parents in their children's care and navigate illnesses as primary caregivers.

B. Managing children's health when no parent is present

Parent's out-migration shifts caring structures in skipped-generation households, placing grandparents at the center of healthcare decisions for their grandchildren. Grandparents become responsible for recognizing illness, accruing resources for care, and ensuring their grandchild access the care he or she needs. Because of the physical distance, parents now play a supporting role if they are able and accessible, with grandparents managing their involvement.

Care-seeking trajectories and lines of differentiation: how do grandparents select sites of care?

The care-seeking trajectories described by grandparents reflect the diversity of health care options in Cambodia's pluralistic health system. Grandparents seek care for their grandchildren at a variety of facilities, including pharmacies and informal drug sellers, primary health centers and public hospitals, private clinics, and from private providers operating in local markets. They tend to select sites of care by weighing their available resources and the needs of their grandchild. While there is no single common trajectory, care-seeking generally begins in or near the home. It progresses to more distant and higher-level facilities if illnesses become more serious and require new treatment strategies or more advanced care. Grandparents deviate from their usual trajectories when their grandchild's illness becomes severe, or when the timing of illness limits their options for care.

Grandparents frequently mentioned the cost of care and medications is as a consideration in care-seeking decisions. Cost does not necessarily drive or dissuade grandparents to utilize a specific site of care. However, for some grandparents, especially those who rely on migrant parents to send money to cover the costs of care, the method of payment is important: that is, whether a provider will accept deferred payment drives where they seek care. In rural Cambodia, some private providers are willing to accept delayed payment for services. In comparison, public sector facilities require user fees at the time of treatment. A grandmother of four whose daughter migrated to Phnom Penh recalled, "sometimes I had no money and needed to ask the doctor for late payment…I told the doctor to inject medicine for my grandchildren, and I would pay the money to him later when my child came." Such flexibility allows grandparents to avoid delaying care for their grandchild. Thus, the option for deferred payment makes the potentially overall higher cost of private sector care acceptable for some.

In addition to cost, the decision to use private providers in closer proximity to the home is also based on barriers to transportation; for most families, public sector facilities are farther away. Many grandparents express a preference for providers and facilities where they had prior successful experiences or otherwise deemed to be quality. Finally, decisions to visit specific providers or facilities are determined by their availability; public sector facilities often have more limited hours. Therefore, a number of factors lead grandparents to seek care in the private sector, despite the increased cost.

When embarking on a trajectory of care, two main points of differentiation emerge: severity and timing of grandchildren's illnesses. Many grandparents describe a more involved approach for care when they deem an illness serious, or when a minor illness does not improve. When asked about where she seeks care for her grandchildren when they are ill, a grandmother

caring for two grandchildren with her husband in rural Prey Veng describes how she makes these decisions:

> I observe [his] symptoms. If it is not severe disease, I will not bring him to the hospital. I sometimes buy from the small medicine stall in the village. I just take my grandson to visit the doctor and then the doctor provides medicine for my grandson…If the symptoms are not severe, I buy only medicine. [When he got meningitis] I took him to go to Phnom Penh and then his mother took him to Kantha Bopha Hospital.

While most grandparents feel comfortable managing treatment for minor illnesses such as fever themselves, they recognize the need for more intensive or higher level care in cases of "serious" illness or symptoms, such as dengue, typhoid, and seizures, for acute injuries such as burns, or when a child does not recover after the first steps of treatment. In this family, minor illnesses or those which the grandmother feels competent to treat are managed at home or in the village. However, when illness escalates or in for more serious cases, they seek care at higher-level facilities, even involving the migrant mother in Phnom Penh if necessary.

For a number of grandparents, the timing of illness plays an important role in determining where and how they will seek care for a sick grandchild, as the array of care options is more limited at night and on weekends. These grandparents describe one trajectory of care if a child fell ill during the daytime, and a second set of steps if a child became ill during the night, when primary care centers are generally closed and alternate strategies may be required. Because almost all grandparents desire to provide some form of treatment immediately upon recognizing illness, many describe alternate strategies for care if the usual site is not open. Rather than wait until morning, grandparents seek out private-sector providers with evening or weekend hours, or those who will make house calls, often at greater expense. Therefore, when grandchildren fall ill during the night, many grandparents deviate from their normal care-seeking processes to access immediate care despite the cost.

Deciding to engage: When do parents enter the trajectory of care for their children's health?

Most grandparents make decisions about where or how to initiate care for a sick grandchild by themselves or in consultation with their spouse. Occasionally, they consult other nearby relatives, or a neighbor. Very few grandparents consult with migrant parents at the onset of illness or in the early stages of seeking care. Parents may be engaged at later points if the child does not improve or if additional resources for care are needed.

Grandparents undertake decisions for their grandchild's healthcare without the child's parent for several reasons. Often, grandparents feel capable of managing illness without input from the parent, especially for minor or common illnesses, including fever, diarrhea, and cough. Other grandparents are limited by distance. In a family that sent migrants to Malaysia, the grandmother felt that she held sole responsibility for ensuring the child's care because the parent was so far away: "actually, his parents stayed far so that they did not know [the situation] well. I am responsible for caring." In this case, the grandmother felt her daughter was not available to participate in any decisions. Often, grandparents who wanted to consult with others sought advice from other nearby relatives or neighbors, rather than contacting the child's parents.

Because of the physical distance, grandparents manage parents' involvement in their children's healthcare. Without notifying parents, parents are unlikely to be aware of their child's illness. Whether grandparents can reach a migrant parent to discuss a child is determined by the migrant's distance, the time of illness, and cost and ability to call. Almost all families communicate with migrants with some regularity by cellular phone, but the high price of international calls limits communications to Thailand and Malaysia. All grandparents know how to contact the migrant parent, although those whose children migrated internationally face more

difficulty in doing so. When their grandchild is ill, most grandparents choose only to contact parents in specific situations.

Some grandparents actively weigh whether they should contact a migrant parent when their child falls ill, but a majority do not hesitate to contact in serious cases. Most grandparents report that they had or would call the child's parents if he or she had a serious illness or injury, generally defined as a condition that requires higher-level care beyond the village. More than seeking advice on where and when to seek care, grandparents contact parents for financial support for treatment. When asked about whether she contacts the child's parents, who are in rural Cambodia, a grandmother in Kampong Cham caring for two boys with her husband says,

> If my grandson just got normal flu and fever, I did not call to tell my grandson's parents. But, if my grandson got sick and needed to inject serum; I called to my grandson's parents and asked them to send money to treat their child… I called to inform them and asked them to transfer money to me because I did not have money.

For many of these grandparents, securing financial support is the primary goal of contacting parents, while informing them of the illness is a secondary aim. Often, these calls are placed when the grandparent needs to make a decision about how to proceed with the child's healthcare. Several grandparents noted that they do not want "worry" a migrant parent for minor illnesses, recognizing the lack of control migrant parents yield from a distance. Many grandparents do, however, later relay news of the child's illness after the child has recovered. For some, this is an opportunity to ask for additional money to cover the costs of illness. For others, it is simply to keep parents up-to-date on their child's well-being. A minority of grandparents do not notify migrant parents when the child is ill or after the fact; several other grandparents report that they always notify their child's mother, even for minor illnesses such as cough or fever.

In a minority of families, migrant parents became physically involved in taking their child for care. This occurs when the child is severely ill and the parent migrated internally in

Cambodia. In most of these cases, the grandparent or another relative living nearby will bring the child to Phnom Penh to seek the highest level of care, and the parent will meet them at a hospital to manage the child's care. In two cases, grandparents requested that the parent return to the village to help care for the child at home. These illnesses were deemed serious enough by the grandparents that they did not want to care for the child themselves, but neither family sought care at a higher-level facility.

Several grandparents described scenarios where they actively ignored a migrant parent's preferences. This generally occurs when grandparents face constrained agency, that is, when they do not have the resources at hand to carry out these requests immediately. Grandparents bring in their own experience as parents and caregivers to make these evaluations, and in these few cases, grandparents expressed confidence in the trajectory they had chosen. These scenarios highlight the limitations of the parent's role after migration, and the ways in which migrant parents lack the ability to actively manage their children's healthcare.

Doing whatever it takes: Risk, blame, and responsibility

Despite the many barriers to care that skipped-generation households face, many grandparents express that they will "do whatever it takes" to return their grandchild to health. This approach involves progressing to higher-level care when treatments are not effective and taking financial risks to access care. A grandfather describes how he found his grandson gravely ill with what was later diagnosed as meningitis; at the time, the child's father was living in Malaysia and impossible to reach. After seeking care at the district hospital, the child did not improve.

> Cousins said 'don't delay any longer. If we don't do anything, this kid will die.' That's why we just called a car and then went to Kantha Bopha [a national pediatric referral

> hospital in Phnom Penh] because that place treats kids. We just risked it. I said if the grandchild stopped breathing, [we would] ask the ambulance to stop anywhere so that we didn't need to spend a lot of money. Luckily, it reached the hospital.

In this case, the grandfather's decision was entirely driven by severity of illness, tabling considerations of cost and distance. This household was one of the poorest in the sample, and the cost of transportation to Phnom Penh represents a significant financial sacrifice. For a minority of grandparents, this attitude is specifically driven by a fear that their children would blame them for their grandchild's illnesses, or for failing to treat appropriately. A grandmother in Kandal caring alone for her grandchildren whose parents migrated to Malaysia explains, "In case of serious illness for their children, I want them to be near the children. Therefore, they can take care [of the] baby by themselves. I don't want be blamed if anything wrong happens." Such concerns may cause grandparents to take financial or other risks to seek care.

Grandparents begin care at or near home, and progress to higher level facilities if their grandchildren do not improve. Because of their experience as parents and grandparent caregivers, many feel capable of managing common illnesses such as fever and cough on their own. They notify parents when they need additional financial support, or when they need advice for how to proceed for serious illnesses, which are unfamiliar. Even as grandparents face significant financial or transportation barriers to care, they navigate these barriers to seek care quickly for their grandchildren.

C. Safety nets, social capital, and the role of remittances: Supports for children's health

Given that they are forced to take on the daily and domestic tasks of parents who migrate, grandparents face specific burdens as caregivers. As they navigate their own health issues and

face the challenges of subsisting in rural Cambodia, they accept the additional obligations of raising young children. In many families, this is further complicated by financial vulnerabilities. Grandparents make use of various types of support to care for their grandchildren in daily life and during times of illness. These include advice from neighbors as well as institutionalized forms of support such as subsidized user fees at public sector facilities. Remittances from migrant parents play a particularly important role in care-seeking decisions, and facilitate new possibilities for care. These sources of support aid grandparents in navigating and managing their grandchildren's illnesses, and shape the ways these children utilize care.

In-kind and institutional support mechanisms

About half of grandparents rely on other relatives who live nearby for additional support in caring for grandchildren, most often other adult children. Relatives assist grandparents by watching grandchildren so grandparents can work in fields, attend religious ceremonies, or rest. They provide food on occasion, or consult with grandparents to make healthcare or other decisions for the grandchild. In some families, especially those where the grandparent has poor health or mobility issues, relatives will be responsible for bringing children to a health facility or procuring medicine to treat the child at home. A 66-year-old grandmother in Prey Veng lives alone with her four-year-old grandson whose parents migrated to Phnom Penh. When asked about what she did the last time her grandson fell ill, she said, "when my grandson got sick, I asked his aunty or uncle to take him to the hospital or to the health care center…I could not go by myself, only his aunty and uncle are able to go there." Though the level and specific types of support vary widely across families, such support shifts the possible trajectories of care for sick grandchildren. In the example above, the child likely would not have the opportunity to attend

the primary health center without the assistance of the nearby relative, and instead might have been brought for care with an informal provider closer to the home. More broadly, day-to-day support from other relatives can improve the overall quality of care for children in these households. This is especially true in food insecure households where relatives supplement meals.

Deciding what to do for a sick grandchild engenders stress for some grandparents, who felt this stress acutely when grandchildren experienced sudden illnesses requiring immediate care. A grandfather in rural Prey Veng whose wife is blind is the primary caregiver for three grandchildren under ten. His child has not had financial success as a migrant in Thailand, leaving the grandfather financially responsible for the grandchildren. He reflected, "when my grandchild got sick seriously, I was very panic[ked] because, firstly, it was at night and secondly I did not know where I should send my grandchild for treatment and I did not have much money. It was very difficult." He was aware that the severity of illness required immediate attention, but had no one to aid him in deciding where to seek care. Relationships with trusted neighbors provide additional social support for grandparents when they must make decisions about where to take their grandchildren for care. A grandmother in a wealthier household in Prey Veng is raising her three-year-old grandson with her husband. She stated:

> I went to the hospital based on the recommendation from my neighbors. I asked them which hospital is good and which hospital is bad. I asked them and if they said that this place is good, I would follow them to take care my grandson to get treatment at that place.

Neighbors offer additional information about the quality of facilities and services. Many grandparents seem uncomfortable attending unknown facilities without such a recommendation. In cases where grandchildren are severely ill and require higher-level care, this type of network

proves especially important as it instills greater confidence in grandparents to seek out the necessary care.

Grandparents' social networks within the village, comprised of kin and neighbors, represent a form of social capital for health. Specifically, these social networks provide health-related information and improve access to health services and financial resources for child health care seeking. By reducing stress, grandparents' social networks provide a form of psychosocial support.

Several families receive subsidized healthcare in the public sector through a government support scheme for the poorest poor. These families noted the benefits of free care, and reported that they utilize this benefit for their grandchildren. However, care subsidies are not sufficient to address two critical barriers faced by these families: transportation and domestic burdens. One grandfather reported that he was often unable to pay for the cost of gasoline to get to the primary health center, so he paid for his grandchildren to attend a nearby private provider instead. In another family, the distance to the primary health center also outweighed the benefits of the subsidy. In this family, the grandparents care for one school age grandchild and his three-year-old sister. Previously, their mother migrated to Malaysia, where distance and circumstance posed many financial challenges for the family: the daughter earned a low salary and could only remit once per year. Now, she has returned to Cambodia to work in Phnom Penh, but her salary remains low and the family is quite poor.

> We could access the public hospital because we could be treated even though we don't have enough money. We are unable to pay for the private clinic. However, we are very busy and have to take care [of our] home. That's why we decided to go to the private clinic.

For this family, the subsidy alone is not sufficient to provide for their grandchildren's healthcare. Therefore, this case highlights the importance of social support in care seeking. Weighing cost

and convenience, the grandparents prefer to pay out-of-pocket to remain closer to home, where they must guard their livestock and attend to other domestic duties. Without addressing the barriers of distance and transportation faced by grandparents, subsidy programs do not alleviate the burdens or potential financial catastrophe of a grandchild's illness. However, various forms of social support and social capital help grandparents navigate these challenges in accessing care.

Remittances as health insurance: Allowing new possibilities for care

Families use remittances to finance grandchildren's health care in two ways. In some families, grandparents pay for health expenditures using the remittance income previously sent to them by the migrant parent. In other families, grandparents notify the child's parent about recent health expenditures, and parents send money to cover the costs of care. For some, this is a reimbursement to the grandparents; for others, these delayed funds are paid directly to providers who accept deferred payments. Among families where regular remittances are used to cover care, or where grandparents are reimbursed for care, grandchildren enjoy access to a greater number of facilities because grandparents can pay at the time of service. This allows grandparents to make decisions about where to seek care based on factors other than cost: they can decide based on convenience and perceived quality.

Where grandparents rely on migrant parents to send funds for the grandchild's health expenditures, their options become more limited as they may not be able to pay at the time of service. Such arrangements are not accepted in the public sector, driving these families to use private sector providers who offer more flexible terms of payment. This can result in an overall higher cost of care. While some migrants are able to transfer funds the same day, other grandparents reported that they did not receive such funds quickly. This forced them to incur

debts with providers or seek loans from other family members or other sources. However, they did not wait to seek care until funds came through. Several grandparents without reliable remittance income have incurred debts with local providers, and in a few families, such debts were a primary motivation for the parent's migration.

Remittances, or the ability to call a migrant parent and request financial support for a child's treatment, provides a financial safety net that allows families to avoid incurring health-related debts. Families with regular remittances or where migrant parents reliably remit money for their children's health expenditures fund care from these remittances. These grandparents are less likely to express stress or anxiety related to financing healthcare. In comparison, families with irregular remittances or unreliable funding for health expenditures rely on borrowing to cover the costs of care. This engenders a great deal of stress and uncertainty around care seeking. A grandmother in Kandal lives with her husband, her own elderly father, and two grandchildren; the household is poor and regularly experiences food insecurity. As their migrant daughter does not earn enough in Phnom Penh to remit to the family left behind, the grandmother faces financial challenges when her grandchildren fall ill:

> I cannot owe money [to the pharmacist for] so long. If the pharmacist injects the medicine today, they will [come] to get money tomorrow about 7 or 8 am… I borrow money from my neighbor and when I have money, I will pay them back. I will let my daughter send me money. Sometimes, my daughter asks her boss to get salary [advanced]. It is so difficult for my family.

Thus, reliable remittances can open the array of options of care for children in these families. With remittance income, grandparents are not limited to the least expensive provider, or providers that will accept deferred payment. Grandparents use remittance money to access providers that reduce burdens on their time, which is limited given their additional household duties. Moreover, these families are no longer at risk of incurring health-related debts.

Several respondents expressed that migration might allow their families to build savings in the future, but they had not done so yet. Only one grandparent mentioned saving remittance incomes for future household expenses, including medical. For most, severe or sudden illnesses represent a financial shock to the household. However, for households that previously incurred debts due to medical expenses, being able to rely on financial support from a migrant parent presents a benefit of migration. As these families gain access to reliable remittance income, migration creates increasing levels of financial security in times of children's illness. Yet, the financial difficulties described by many grandparents suggests these benefits are not as deep or far-reaching as families imagined at the outset of migration.

The tradeoffs between various types of support

Across the sample, households ranged in the level of social and financial support they received. While some grandparents rely on regular remittance income and assistance from other relatives and/or neighbors, other grandparents only enjoyed one or the other. A small number of grandparents had neither remittance support nor other types of support from family or neighbors.

The hierarchy of these families' well-being is clear. Those with both financial and social capital or support report that caring for their grandchildren is not a difficult undertaking, and these grandparents are not stressed when their grandchildren fell ill. They are confident in their ability to navigate options for care, and in their ability to pay for the care they deem most appropriate for their grandchild. It is the combination of financial and social resources that allow them to access an array of options for care, giving grandparents the ability to choose the most appropriate site of care based on factors other than cost. In other families who have not benefited financially from migration, social support still buffers some of the negative impacts of migration:

these grandparents are able to rely on various types of support from other family and neighbors that facilitates access to care.

In comparison, families without financial or social support experience a number of challenges. These families are the most vulnerable; grandparents cannot rely on financial support from migrant parents, forcing them to cover costs for their grandchildren. These grandparents must try to earn a sufficient living for themselves and their grandchildren, impacting their ability to provide care for young children. Illness further complicates the situation, as grandparents must outlay additional resources for treatment and navigate decisions alone, while managing their increased domestic burdens.

IV. Discussion

This study describes decision-making processes for child health care seeking in skipped-generation migrant-sending households, given the changing caring structures and parental absence in these families. I argue skipped-generation living arrangements limit parents' ability to participate in daily decisions for their children, including healthcare-related decisions. Grandparent caregivers direct the care-seeking process, and rely on their own experience as parents and caregivers to guide decisions for their grandchildren. Grandparents are capable caregivers, though they face specific barriers to care given the additional domestic tasks they have assumed as a result of their children's migration. Care-seeking trajectories for children's illnesses are differentiated by the severity of the illness, the availability of remittance support, and the proximity to potential sites of care. Despite the additional financial support migrant parents provide to grandparents and grandchildren left behind, sudden illnesses and injuries continue to present a financial shock to the household for many. I find grandparents utilize both

financial and social supports to improve their grandchildren's health, engaging social networks and resources throughout decision-making and care-seeking processes. In combination, these resources enable grandparents to quickly and reliably access quality care for their grandchildren, while the absence of both financial and social resources leaves skipped-generational households particularly vulnerable.

The restructuring of caregiving roles after parents migrate out is evident in the daily life and care-seeking processes in skipped-generation households. As a result of their absence, grandparent caregivers take on routine caregiving and domestic tasks previously performed by migrant parents. They also gain decision-making power, which is applied in the case of their grandchildren's illness. When a grandchild falls ill, grandparent caregivers largely manage care seeking in on their own. As a part of seeking care, grandparents mobilize resources, including financial and social, and rely on their own experience as a parent. Their ability or inability to mobilize these resources for care drives decisions around healthcare, including decisions regarding the involvement of the migrant parent. Their inability to access financial and/or social resources engenders stress among grandparent caregivers as it limits their ability to do whatever it takes to return their grandchild to health. In turn, this reduces their ability to provide quality care for their grandchildren.

This analysis highlights the limitations of parents' roles in the left-behind household, with the exception of financial support. Grandparents control parents' involvement in their children's illness by controlling the flow of information, and by nature of their ability to carry out or ignore parents' expressed preferences for child health care-seeking. Yet, parents exert power through their provision of remittance—or lack thereof. Returning to Baldassar and Merla's theory of circulation of care, parents' primary type of care for their children left behind

is financial, while grandparents control the present flow of care for grandchildren and to migrants. This shift in power has implications for children's access to health where parents and grandparents differ in opinion or approach. However, shifts in power dynamics and flows of care vary along several axes, including gender and distance, among others (Baldassar and Merla, 2014). The burdens of care fall more heavily on grandmothers, as described above; I find that only when no female caregiver is present do grandfathers assume caregiving tasks traditionally taken up by women. With respect to distance, differences in households that send internal and international migrants are evident. Compared to migrant parents in Thailand or other countries, migrant parents in Phnom Penh remain more actively involved. In several instances, these parents are able to return to the household of origin to provide care for a sick child, or the left-behind household traveled to seek care in Phnom Penh with assistance from the migrant parent. On the other hand, grandparents rarely involved international migrant parents, even internalizing their physical distance to create emotional separation. However, where grandparents are competent, quality caregivers, and have access to the resources necessary to seek care, children generally access care in a timely manner to recover from illness. The variation in these familial processes and dynamics highlights the diversity of ways to "do family" across distance (Baldassar and Merla, 2014; Dreby, 2010). That parents retain ties and remain involved in the left behind household, even if only to provide financial support, is evidence of intergenerational solidarity.

Grandparent caregivers utilize financial and social capital throughout their care-seeking trajectories. Financial support, discussed in greater detail below, is especially relevant. However, grandparents' utilization of social capital and reliance on other forms of social support is also a noteworthy finding. Even in the absence of financial support, social capital and social support aid

in facilitating children's access to care. Grandparents primarily rely on two types of social support: first, information about children's health from informal ties in their social networks, a form of social capital for health, and instrumental social support from relatives and neighbors, a form of social support that facilitates their access to care. Strong social networks are positively associated with a range of positive health outcomes; these networks affect health outcomes through psychosocial mechanisms including emotional support and reduced stress (Ferlander, 2007). In this study, the ability to consult with neighbors for information about child health facilities and providers served to reduce stress among grandparent caregivers, an important benefit of this form of social capital. Instrumental support to grandparent caregivers augments their ability to manage care seeking for grandchildren in tandem with other daily tasks, reducing barriers to care in the face of the additional domestic burdens they have assumed after migration.

In skipped-generation families that have an improved financial situation, especially among those who also are able to utilize various forms of social capital, remittances allow for new possibilities for children's healthcare. Where migrant parents are able to cover the costs of care, grandparents are more likely to access higher-level or higher-quality facilities, without incurring catastrophic debts. As user fees or other child health care costs present a financial shock to poor Cambodian families (Khun and Manderson, 2008), labor migration may allow these families to access needed care without the threat of financial ruin. Health equity schemes were explicitly mentioned by a few grandparents as enabling their access to public sector facilities. Thus, the reduction of user fees for poor families does appear to translate to higher utilization of these facilities among poorer families who might not reach them otherwise. However, to ensure the most vulnerable households are able to make use of subsidized care, these programs must address other barriers to care such as transportation. In other settings, the

use of multiple care-seeking strategies despite the removal of user fees indicates parents and caregivers retain concerns about quality of care (Scott et al., 2014). Grandparents are rarely included in child health programs, despite their important role in caring for children in many settings (Aubel, 2012). Grandparents' reliance on their social networks suggests they might especially benefit from targeted health information messages or other types of child health interventions.

Though unsurprising, a notable finding of this study is that the care-seeking patterns and preferences described by grandparent caregivers are similar to those reported by mothers and families in other low-income settings. I find cost and distance are important drivers of care seeking, but the quality of care matters as well (Jacobsen et al., 2012; Scott et al., 2014). Grandparents were willing to bypass closer facilities when illnesses were severe, or required more advanced care (Akin and Hutchinson, 1999; Kahabuka et al., 2011). Grandparents actively consider their own and others' past experience with specific providers and treatments when weighing decisions about where or how to treat a sick grandchild (Leonard, 2014). These grandparents do not express preferences for seeking care that are inherently different from parents—with the occasional exception of combining traditional remedies and biomedicine—but rather, the financial dynamics and realities of their households play an important role in determining grandchildren's access to care. This suggests these households should be included in child health interventions, though policymakers should pay attention to the specific needs of skipped-generation households, especially regarding transportation and other non-financial barriers to care.

Several limitations should be considered in the interpretation of these results. While the sample was theoretically driven to mirror the diversity of Cambodian migration patterns, these

results are not generalizable to Cambodia more broadly, nor to skipped-generation households in general. The experience of the Khmer Rouge genocide in the 1970s has specific implications: all grandparent caregivers are survivors of the genocide, though its intensity varied across the country (Strangio, 2014). Many in this generation have very limited formal education (Zimmer, 2008), and post-traumatic stress disorder and other anxiety disorders are common in this population (De Jong et al., 2003). Therefore, the quality of care provided and psychosocial well-being among grandparent caregivers may vary more in this sample than in other settings.

Considering the perspectives of migrant parents would provide additional insight into relationship and power dynamics in the skipped-generation household, especially for the types of decision-making processes described in this study. Rigorous quantitative evaluations comparing health access, outcomes, and equity among children in skipped-generation households with those in multigenerational, nuclear, and other family forms will further shed light on the specific impacts of residing in this type of household, especially in terms of the potential support and resources grandparent caregivers provide to their grandchildren.

Conclusions

This qualitative study provides important insights into decision-making processes for child health care seeking in skipped-generation migrant-sending households, a family form that has received little attention to date in the literature despite its growing prevalence in Cambodia and elsewhere. While migrant parents provide financial support for care seeking, they play a limited role in daily decision-making and determining courses of treatment for minor illnesses. Rather, grandparents direct and control care-seeking for their grandchildren, often only involving migrant parents once illness becomes severe. Given that the increased family income from

successful labor migration reduces barriers to care among children, policymakers and health program implementers should take advantage of this opportunity to promote access to care, while addressing the vulnerabilities faced by children in migrant-sending households that lack financial support. Efforts to improve child health in rural migrant-sending areas should explicitly target grandparent caregivers, and identify ways to support these types of families.

Table 2.1. Characteristics of grandparent caregivers interviewed.

	N
Province	
Kampong Cham	8
Kandal	7
Prey Veng	10
Grandparent sex	
Male	5
Female	20
Number of co-resident grandchildren under 10	
1	13
2	9
3	3
4+	1
Migrant destination	
Phnom Penh	12
Rural Cambodia	2
Thailand	10
Malaysia	1
Marital status	
Married	15
Widowed	10
Mean size of household (SD)	5.1 members

Chapter 3: Migration and investments in health of children left behind: The role of remittances in children's healthcare utilization

I. Background

Targeted interventions, health system improvements, and socio-economic development have contributed to significant improvements in child health since 2000 in a majority of developing countries (Black et al. 2010). Yet, social and structural barriers persist that prevent many children from accessing necessary medical care. Socio-economic disparities remain across many child health indicators, disadvantaging the poor globally and locally (Watkins 2014).

Internal and international migration is both a response to this social and economic disadvantage, and a potential strategy to improve children's livelihoods and opportunities. As migrants gain access to new labor opportunities, they may provide financial support, or remittances, to family members left behind in households of origin. This additional financial support may favorably impact children's health, especially if remittance income serves to facilitate access to higher quality healthcare. With increased labor migration across the Global South (United Nations Department of Economic and Social Affairs, Population Division 2016), and the feminization of migration and a growing cohort of "transnational mothers" (Cortes 2015; Hondagneu-Sotelo and Avila 1997), a greater proportion of children globally are left behind as one or more of their parents migrate. Children left behind may benefit from additional household income, yet they are exposed to changing living arrangements and parental absence under the care of alternate caregivers.

While the impacts of migration on children's health status have been examined in multiple settings, prior research has rarely extended to care-seeking behaviors for child health.

Changes in household income, transitions in living arrangements, and other impacts of migration may affect children's access to and utilization of healthcare. Using data from the Cambodia Socio-Economic Survey (CSES), a repeated cross-sectional survey, this paper examines whether children whose households receive monetary remittances from a migrant family member differ in their utilization of higher quality healthcare compared to children in non-migrant households. Cambodia is a country with high internal and international migration rates and a pluralistic health system. I aim to identify whether households receiving remittances invest this money in children's healthcare, and if so, how. Given that households' propensity to migrate and decisions about children's healthcare may be jointly determined, approaches to address endogeneity resulting from migrant selectivity are necessary (McKenzie and Sasin 2007). Therefore, I implement an instrumental variables (IV) approach. Understanding the roles of migration and remittances in child healthcare utilization sheds light on familial decision-making for children's health, and holds important implications for the design of policies and interventions seeking to improve child health, particularly in high-migration settings.

A. Parental migration and child health

Many parents who migrate are motivated to do so in order to improve their children's well-being, education, and life opportunities by providing additional monetary support to children left behind (Suarez-Orozco and Suarez-Orozco 2009). Migration represents a chance for social mobility, translating to expected longer-term benefits for migrants' children (Dreby 2010). It is a familial economic strategy that allows the migrant to take on increased economic risk, increasing earnings for the whole family over the long term and contributing to an improved livelihood for all members (Lauby and Stark 1988; Lucas and Stark 1985a). Familial resource

sharing allows for a division of labor between generations to achieve shared goals, namely, increased income and opportunities. For example, grandparents may care for grandchildren left behind, while parents migrate to attain a more secure livelihood for all three generations.

While many parents cite the possibility of an improved livelihood for their children as their primary motivation, migration rarely translates to immediate financial benefits for families left behind. Migrants face social and structural barriers to adapting to their destination, including perceived and structural discrimination, and challenges to their physical health and emotional well-being, impeding their ability to earn and remit upon arrival (Acevedo-Garcia et al. 2012). Where migrants incur debt associated with the costs of migration, their ability to provide remittances may be further delayed. For many migrants, these barriers to remitting are mitigated over time as they adapt to their new surroundings. However, rural inequalities are often replicated in urban destinations as migrants with lower socio-economic status (SES) face greater challenges in building productive networks or accumulating assets in their destination (Parsons 2016). Thus, the potential benefits of parental migration may not translate equitably for all children left behind.

Parental out-migration affects several domains of health and development for children left behind. Previous research has examined prevalence of illness (Ponce, Olivié, and Onofa 2011) and infant and child mortality (Kanaiaupuni and Donato 1999; Yabiku, Agadjanian, and Cau 2012), among other outcomes. For example, in Mexico, children left behind who receive remittances have lower rates of infant mortality (Hildebrandt et al. 2005), and community receipt of remittances is associated with a decreased risk of low birth weight (Hamilton and Choi 2015). However, remittances do not result in lower prevalence of pneumonia or diarrhea among children in Ecuador (Ponce et al. 2011), and evidence of the impacts of remittances on children's

nutritional status is conflicting (Antón 2010; Carletto, Covarrubias, and Maluccio 2011; Viet Nguyen 2016). Similarly, studies of remittances and educational attainment among children left behind show mixed effects (Cortes 2015; Lu 2012; Viet Nguyen 2016). These results suggest remittances differentially impact various aspects of children's health and development depending on the ways in which remittances are invested. The conflicting results may also be attributable to the diversity of settings in which this research was conducted.

The limited evidence on the impacts of migration and remittances on child healthcare utilization indicates remittances may increase children's access to care. In Ecuador, children left behind who receive remittances are more likely to access preventive care services, such as vaccination and deworming, than children in non-migrant households (Ponce et al. 2011). In Vietnam, remittances are associated with a greater number of outpatient healthcare visits per year among children in migrant-sending households (Nguyen and Nguyen 2015). However, these studies use dichotomous measures of children's access to care, and do not examine characteristics of care utilized, which have important implications for quality of care and children's health outcomes.

B. Care-seeking for child health

In the pluralistic health systems found in many low- and middle-income countries, caregivers might access a range of possible sources of care for a sick child. While quality of care is generally low in many facilities in Cambodia, it is often higher in the public sector than in the private sector. Public-sector providers are formally trained, tend to work in better equipped facilities, and are more closely regulated than the private sector, where providers are less likely to be formally trained (Meessen et al. 2011). Pharmacies in low and middle income Asian countries suffer from a range of issues that engender persistently low quality of care (Miller and

Goodman 2016). These include poor referral linkages, frequent provision of clinically inappropriate drugs or dosages, sales of incomplete courses of antibiotics, and limited instructions or counseling. Low quality of care among informal drug sellers and other informal providers is also problematic (Sudhinaraset et al. 2013). Thus, in Cambodia, children are more likely to experience positive treatment outcomes if they access care with a formally-trained provider, and in the public sector.

In navigating this health landscape, parents and caregivers consider multiple factors when deciding where to seek care for their children, including cost, distance, perceived quality, provider reputation, and prior experience (Leonard 2014; Scott et al. 2014). User fees discourage the poor from utilizing public sector services, though this has been mitigated to some extent where health subsidies are in place (Bigdeli 2009). While many parents and caregivers consider community-based sources of care such as informal drug sellers and traditional healers to be less effective, they are easily accessible and more likely to accept alternate or deferred payment arrangements (Geldsetzer et al. 2014). The sudden cost of care for an emergently ill child is a financial shock to many households, especially the poor. In Cambodia and other low- and middle income countries, even moderate health expenditures can lead to catastrophic debts for households (Van Damme et al. 2004). The additional income provided by remittances may mitigate cost-related barriers to care. In Mexico, households with remittances are less likely than other households to incur debts related when a family member is hospitalized (Ambrosius and Cuecuecha 2013). The financial benefits of remittances may extend to shape household decisions for children's healthcare.

In addition to considerations of cost, quality, and convenience, social negotiations are often involved as parents and families make decisions for children's health. Familial

relationships and gender roles and dynamics are intimately tied to recognition and response to children's illness (Colvin et al. 2013). In many settings, mothers or female primary caregivers are the first to recognize a child's illness, but must seek permission or money to access treatment from fathers or male relatives. Other relatives may participate by mobilizing resources for care, offering advice, and shaping social understanding of the child's illness (Colvin et al. 2013; Scott et al. 2014). How these decision-making and care-seeking processes shift when the child's parents are absent due to migration is unclear. Alternate caregivers may interact with medical systems differently, hold different preferences, values, or beliefs about treatment, or experience distinct barriers to care. In Cambodia and many parts of Asia, grandparents commonly serve as primary caregivers for children left behind. Cambodian grandparents' poor education, especially relative to the current generation of parents (Zimmer 2008), may be pertinent when considering how healthcare decisions are made for young children in this setting. Finally, the presence of other young children in the household may also affect decisions for children's health. Children with siblings may experience consequently poorer health outcomes as already limited resources are strained to seek care (Blake 1981; Bronte-Tinkew and DeJong 2004).

Drawing upon this literature, I hypothesize that out-migration shifts care seeking for children, resulting in differential utilization of healthcare among children who do and do not receive remittances. Specifically, because remittances represent additional household income, I expect remittances to result in a higher likelihood of attending public-sector care, and of attending care with a formally-trained provider as the barrier of cost is diminished. However, preferences and social negotiations for care may vary in households where children are not co-resident with both parents, and parental absence may attenuate the potential benefits of remittance income, regardless of the household's socio-economic status. Therefore, I

hypothesize that controlling for children's alternate living arrangements will attenuate the relationship between remittances and care-seeking outcomes.

II. Methods

Data and sample

This study uses data from three waves of the Cambodian Socio-Economic Survey (CSES), a nationally representative repeated cross-sectional survey designed to estimate population well-being. CSES collects information on individuals' and households' socio-demographic characteristics, labor, consumption, income, and health through four interviews with the head of household, conducted weekly over a four-week period. In each sampled village, a village leader provides information on village characteristics, such as health and education infrastructure, employment opportunities, natural disasters, agricultural production, and wages and retail prices. I use CSES data for years 2009, 2010, and 2011, which include information about migration and health expenditures. Data from multiple survey waves are pooled to increase the power of the analysis.

CSES uses a multistage random sampling technique. In the first stage, villages, the primary sampling unit (PSU), are randomly selected within each province of Cambodia. In the second stage, an enumeration area within the village is randomly selected, and in a third stage, households within the enumeration area are randomly sampled. Appropriate sampling weights are calculated for each survey wave. In 2009, CSES included 57,105 individuals, residing in 11,971 households in 720 PSUs. In 2010 and 2011, the sample included 3,592 households in 360 PSUs; this includes 16,511 individuals in 2010 and 16,327 individuals in 2011.

This analysis is restricted to children under age ten who reported illness in the month preceding the survey and sought care outside the home (96.6% of all children under ten who reported illness in the month preceding the survey). The final analytical sample includes 3,320 children, residing in 2,436 households in 562 PSUs. I exclude 73 children who reside in households that sent a migrant but report no remittance income. Children whose households sent a migrant but do not receive remittances likely systematically differ from children in non-migrant households who do not receive remittances. The exclusion of these children allows for an examination of the causal effect of sending a migrant and receiving remittances versus residing in a non-migrant household with no remittance income. An additional 170 children are excluded because the location of their village of residence is missing.

Measures

CSES includes 16 distinct categories for facility or provider type, allowing for specificity in understanding where a child was brought for care. Places of care include public-sector hospitals; primary health centers and health posts; other public health facilities, such as rehabilitation centers; private hospitals and clinics; pharmacies and informal drug shops; home visits by a trained health professional; and informal, untrained providers, such as traditional healers, monks, and religious leaders.

I use two dichotomous outcome variables to assess type of care sought for sick children: (1) whether the child was brought for care with a formally-trained provider, and (2) whether the child was brought for care in the public sector. A child is considered to have visited a formal provider if he or she attended any public sector facility or a private hospital or clinic, which are generally staffed by at least one formally-trained health worker (World Health Organization and

Ministry of Health 2012). Children who had a home visit from a trained health provider are also considered to have sought care with a formal provider. Alternately, children who sought care at pharmacies, informal drug shops, with traditional healers or religious leaders, or elsewhere are considered to have sought care with informal providers. Children who attended any public facility are categorized as seeking care in the public sector, versus all other sites.

Heads of household report expenditures for treatment and transportation for all recent illnesses in Cambodian Riel, converted to US dollars (4000 Riel = $1). In the 2010 and 2011 waves, source of expenditure is reported as savings, from household income, borrowed, or other, such as selling assets or product in advance.

If a child resides in a migrant-sending household that reports any remittance income from at least one migrant in the preceding year, he or she is coded as receiving remittances, versus children in non-migrant-sending households. The head of household reports all household members who have currently migrated from the household for any reason, including labor, education, or marriage. I impose no time restriction on the definition of a migrant; that is, anyone who is reported as an out-migrant by the head of household is considered a migrant, regardless of when he or she migrated.

Regression models control for the following covariates: child's age, child's sex, child's living arrangement, education of the household member with the highest educational attainment, household wealth, family access to subsidized medical care, village distance to the district center, and whether there is a public primary health center in the village.

Child sex is measured dichotomously as male or female. Child age is measured in years. Dummy variables account for children's living arrangements. Children who co-reside with both parents and no grandparents serve as the reference category. Alternative household structures

include co-residence with grandparent(s) and one or two parents, residing with only one parent, and residing with neither parent. These household structure categories do not account for siblings or other children, or other relatives (i.e., parents' siblings) residing in the household. The number of other children in the household is entered as a separate variable.

CSES calculates a continuous measure of household wealth for all households in each survey wave using an aggregate score of household consumption, standardized to Phnom Penh prices. For each survey year, I determine separate wealth quintile rankings for households based on urban versus rural residence using this aggregate consumption score. Urban and rural living standards in Cambodia are dissimilar in terms of wages and spending; therefore, a separate wealth index more accurately reflects households' relative wealth. Household wealth across all survey years is standardized to a 2009 Riel benchmark, creating a ranked household wealth score per survey year. A dichotomous measure of whether the household has access to subsidized medical care is included. Educational assessment is assessed at the household level, measured as number of years of completed education of the household member with the highest educational attainment. This measure is categorized as none; any primary; any junior secondary; any secondary, technical, vocational, or post-secondary; or missing.

Type of place of residence is categorized as urban Phnom Penh, other urban areas, or rural. Children who reside in an urban area of the province of Phnom Penh are classified as living in Phnom Penh, versus residence in any other urban area or residence in a rural area, the reference category. Phnom Penh has a wider array of medical services available in the city, and all national-level referral hospitals are located in the capital (World Health Organization and Ministry of Health 2012), creating a health landscape distinct from other urban areas. Distance from the village center to the district center, the sub-provincial administrative area and urban

hub, is reported in kilometers. Whether the village has a public primary health center is measured dichotomously.

Analytical approach

I estimate mixed-effects logistic regressions to assess how bivariate relationships between remittance incomes and care-seeking behaviors change when controlling for relevant physical and socio-demographic characteristics, accounting for the hierarchical structure of the data. I use instrumental variables regression to estimate the causal impact of remittances on child health care-seeking behaviors, accounting for potential endogeneity of decisions to migrate and child healthcare practices. Analysis was conducted in STATA 14.1.

For each outcome of interest, a first model assesses the outcome by migrant and remittance status. A second model enters child- and household-level physical and socio-demographic characteristics, including child age and sex, number of children in the household, household educational attainment and access to subsidized care, type of place of residence, village distance to the district center, and whether the child resides in a village with a primary health center. A final model adds household wealth and family structure, which may be mediated by migration.

Care-seeking behaviors for children in the same household are likely to be related as they share many characteristics. Within villages, there is likely a high degree of homogeneity in care-seeking behaviors due to structural factors such as distance to specific health facilities, as well as unmeasured factors such as shared preferences for child health practices. To account for between-household and between-village heterogeneity, I employ multilevel mixed effects models

with random effects (Raudenbush and Bryk 2002). Covariates at all levels are included as fixed effects, while household and village of residence are entered as random effects.

I use the proportion of households in each village that report out migrants as an instrument for likelihood of receiving remittances, an instrument used elsewhere in the migration and child health literature (Acosta, Fajnzylber, and Lopez 2007; Amuedo-Dorantes, Sainz, and Pozo 2007; Antón 2010; Davis and Brazil 2016). This is calculated as the proportion of all households in each PSU per survey wave that report any migrant household members. This approximates the strength of migrant-sending networks in different villages, which is related to a household's likelihood of receiving remittances, but unrelated to decisions about children's healthcare utilization.

I use the two stage least squares (2SLS) method, implemented in STATA using the *ivreg2* command (Baum, Schaffer, and Stillman 2016). Huber-White standard errors are clustered by PSU in each IV analysis. The final IV estimating equation is as follows:

$$Y = \beta_0 + \beta_1 \widehat{\text{AnyRem}}\text{ıt} + \beta_2 X_{ijk} + \varepsilon^2$$

where $\widehat{\text{AnyRem}}\text{ıt}$ represents the predicted values of whether the child's household receives remittances obtained in the first stage of IV estimation, X_{ijk} represents a vector of individual, household, and community covariates, and ε^2 represents the second-stage composite error term. The coefficient β_1 represents the causal influence of receiving remittances on the child health utilization outcomes of interest, seeking care with a formally-trained provider and in the public sector.

III. Results

The sample includes 3,320 children under ten reporting illness in the preceding month (Table 3.1). The mean age of children in the sample is 3.7 years (SD=2.7 years). The majority of

children live in rural areas (86.2%), and household educational attainment is generally low. Compared to the overall distribution of households, many children reside in poorer or middle-income households. About 15% of children reside in households that experienced food security in any month in the preceding year, and about 12% in households that received subsidized healthcare in the preceding year. Most children with recent illness live in households with both parents (71.5%). The second most common living arrangement is living with grandparents and one or two biological parents (21.6%). About 3% of children live in single-parent households, and 3.6% of children are not co-resident with either parent, including children in skipped-generation households.

The availability of various types of healthcare within villages is generally low. For example, 8.3% of children have a public primary health center or post in their village, and 9.6% have a private clinic in their village. Access to shops selling drugs is greater: 14.9% of children reside in a village with a pharmacy, and over a quarter have an informal drug seller in their village (29.0%).

Among all children under ten reporting recent illness, 444 reside in migrant-sending households that receive remittance income (Table 3.2). These households received a mean of $166.29 of remittances in the year preceding the survey (SD=$395.05). A majority of migrants migrated internally, while 14.2% of these households sent a migrant to another country. Children whose households receive remittances do not differ significantly from the overall sample of children in terms of household wealth (data not shown). Over half of children whose households receive remittances reside in multi-generational households (57.3%), and almost 20% do not co-reside with either parent. Single parent households are uncommon (3.7%).

Less than half of children first sought care with a formally-trained provider (Table 3.3). Overall, 18.6% of children first attended care in the public sector, 29.5% in the private sector, and 51.9% with an informal provider. Children whose households received remittances were less likely to attend public-sector facilities, and tended to seek care with informal providers more frequently than children in non-migrant households. Most households financed care using household income or savings, with no significant differences in the source of funding between households with and without remittance income. Health expenditures do not vary by remittance status, but vary significantly by household wealth status, with wealthier households incurring higher expenditures for treatment (p=.000) and transport (p=.05, data not shown). Children in poorer households are significantly less likely to attend formally-trained providers than the richest children (p=.03, data not shown), although the poorest children are significantly more likely to attend public-sector care than children in poor, middle, and rich households (p=.001, data not shown). Children's living arrangements are not significantly associated with likelihood of seeking care with a formally-trained provider or in the public sector.

Results of mixed-effects multilevel models are shown in Tables 3.4 and 3.5. Remittances are not associated with seeking care with a formally-trained provider in unadjusted or adjusted models (Table 4). In a mixed-effects model that adjusts for child-, household-, and village-level covariates (Model 2), children are significantly less likely to seek care with a formally-trained provider for each additional year of age (p=.000) and for each additional child in the household (p=.002). Children who reside in Phnom Penh and other urban areas are also significantly less likely to attend care with a formally-trained provider (p=.001 and p=.043, respectively). Model 3 adds household wealth and children's living arrangements. The poorest children are least likely to attend care with a formally-trained provider (p=.000). In this model, children who receive

subsidized care are significantly more likely to attend a formally-trained provider (p=.039). However, the addition of controls for wealth and living arrangements attenuates the relationship between attending a formally-trained provider, and number of other children in the household and residing in urban areas outside Phnom Penh.

In unadjusted and adjusted models, remittances have no significant association with the likelihood of public-sector care (Table 3.5). In Model 2, additional years of age are significantly and negatively associated with a child's likelihood of receiving care at a public facility (p=.000). Greater household educational attainment and living in a village with a primary health center (p=.042) are significantly associated with a higher likelihood of public-sector care. When added in Model 3, children's living arrangements and being in the poorest or poor wealth quintiles are not significantly associated with public-sector care. Children in the middle and rich wealth quintiles are significantly less likely to attend public-sector care than the richest children (p=.045 and p=.013, respectively).

Unadjusted and adjusted IV estimates are compared to unadjusted and adjusted (Model 3) mixed-effects regression models (Table 3.6). The reported mixed-effects estimates treat remittance income as exogenous, while the IV estimates treat it as endogenous. No IV models show a statistically significant impact of remittances on either outcome of interest. With the exception of the adjusted IV estimate for attending public-sector care, all estimates show a negative relationship between receiving remittances and the outcomes of interest.

A number of sensitivity analyses undertaken suggest robustness of the results described above. These analyses tested alternate categorizations of covariates such as household wealth, as well as restricting the sample and adding additional controls, such as year of survey and type of illness. In regression analyses, use of a log-transformation of the total remittance amount in

USD, rather than a dichotomous measure of any remittance, does not affect findings. Tests for a threshold effect of remittances, that is, whether families who received annual remittances of at least $50, $100, or $200 significantly differed from other families in care seeking, showed no such effect and did not substantively alter findings.

IV. Discussion

This paper assesses the impact of remittance income on the type and quality of healthcare sought for children under ten with recent illness in Cambodia, a country with high rates of internal and international migration. I compare two dimensions of care seeking for child health, use of formally-trained health providers and public-sector care, among children whose households receive remittances from migrant family members, and children in non-migrant sending households. An IV approach accounts for the potential endogeneity of migrant selectivity and decisions for children's health. Contrary to the hypothesized relationships, I find no causal effect of remittance income on children's utilization of formal or quality healthcare; that is, children who receive remittances are not significantly more likely to access care with formally-trained providers, nor more likely to access care in the public sector than children in non-migrant households. Additionally, I find no difference in expenditures for treatment or transportation among children who receive remittances and children in non-migrant families. This suggests remittances do not result in a willingness to incur higher health expenditures for children, nor in differential investments in child health in migrant-sending households.

A growing literature has explored the consequences of parental migration and the effects of remittances on the health, development, and well-being of children left behind. Yet, there has been little examination of how remittances drive children's access to and utilization of quality healthcare to date. This analysis extends our understanding of the ways in which migration and

remittances shape health of children left behind by examining child health care-seeking behaviors, a critical determinant of children's health and mortality. Identifying the impact of remittances on behaviors related to children's health provides insight into how remittances are—and are not—used in migrant-sending households, and highlights considerations for child health policies and programs in high migration contexts.

While remittances improve children's access to preventive care (Ponce et al. 2011) and increase use of any care outside the home (Nguyen and Nguyen 2015), in contrast, they do not impact utilization of specific sites of care when children are ill, or increase children's likelihood of accessing formal biomedical care. Because the mechanisms of access to and costs of preventive and curative care vary, it is plausible that remittances shape decisions about children's preventive and curative care differently. Preventive care in Cambodia and other low and middle income countries is often subsidized, and may be viewed as an investment, in contrast to the unexpected costs associated with curative care. I find subsidized care results in a significantly higher likelihood of utilization of both public-sector care and care with a formally-trained provider, suggesting cost is a particularly important barrier to care.

However, given the number of factors that parents and caregivers consider when accessing care for children, including distance, perceived quality, and prior experience in addition to cost, addressing cost alone is likely not sufficient to affect care-seeking preferences or behaviors. Family instability, transitions in living arrangements and parental absence are potentially important consequences of parental out-migration for children left behind. Children's living arrangements are a potential mediator of the relationship between migration, remittances, and child health, as changes in living arrangements may be induced by migration. The absence of a significant association between children's living arrangements and care-seeking outcomes may

be in part because circular migration is common in Cambodia, and many internal migrants are able to return to their households of origin frequently (Ministry of Planning 2012). Such migration patterns creates a circulation of care within the family that allows migrant parents to maintain intimate involvement in their children's daily lives (Baldassar and Merla 2014). Furthermore, the widespread availability of communication technologies allows many migrants to remain in close contact with children and caregivers left behind even when they are unable to return (Asis 2006). Maintaining frequent communication may allow migrants to participate in or make decisions for their children's healthcare, even where parenting from a distance strains familial intimacy (Dreby 2010; Rhacel Salazar Parreñas 2005). These families may rely on prior experience when making decisions for care. Moreover, if migration fails to affect parents' and/or caregivers' perceptions of quality or care-seeking preferences, children may continue to seek care at the same sites despite the influx of additional income via remittances.

In migrant-sending households, the left behind must take up the household tasks of the migrant(s), which can strain caregivers, especially when caring for multiple young children (Baldassar and Merla 2014; Rhacel Salazar Parreñas 2005). In these households, distance may present an acute barrier to care, especially where caregivers are elderly. However, households with remittances and non-migrant households do not differ in their expenditures on transportation to care nor in their likelihood of accessing public sector facilities, which often require further travel than private providers (Ozawa and Walker 2011). The lack of evidence of a resource dilution effect when controlling for household wealth suggests households may utilize various forms of social or kin support to reduce the impacts of such burdens on access to children's healthcare (Rutherford et al. 2010).

Remittances may be used in other ways to benefit children's health. Migrant-sending families may prioritize other domains of child development and well-being for remittances, such as education and nutrition (Antón 2010; Lu 2012). In line with new economics of labor migration perspectives, using remittances to benefit children's education and development illustrates an investment in the child's future. In particular, many migrant parents emphasize the ability to provide for their children's education as a benefit of migration (Dreby 2010). However, this analysis suggests children's illness episodes continue to present a financial shock to migrant households, despite additional income provided by remittances. Households with remittances did not differ significantly from non-migrant households in their method of financing care, and less than a quarter of households rely on savings. For many families, remittances may not provide sufficient insulation against the high costs of care for children's illness. In Mexico, households tend to consume remittance income rather than save (Massey and Parrado 1994). If migrant-sending households do not set aside remittances, they may be no more prepared than non-migrant households to handle the financial shock of a child's illness.

While this analysis found no significant relationship between remittances and children's healthcare utilization, the findings regarding socio-demographic characteristics and care-seeking outcomes are generally consistent with the child health literature globally. For example, I find older children are less likely to be taken for care outside the home, while children of higher socio-economic status and those whose parents have higher educational attainment are more likely to be taken for quality, appropriate care (Gao et al. 2012; Pillai et al. 2003; Srivastava and McGuire 2015). Children in urban areas such as Phnom Penh enjoy access to a greater array of health services, especially pharmacies and drug shops, which may explain their lower propensity to use formally-trained providers or public sector facilities. Household educational attainment

and wealth are closely intertwined, yet the mixed-effects regression results demonstrate education and wealth lead to different child health care-seeking preferences: while wealth is significantly and positively associated with utilization of formally-trained providers, education is significantly and positively associated with public-sector care. Greater proximity to private providers is a factor in their utilization in rural Cambodia (Van Damme et al. 2004), while public sector facilities may require greater investments in transportation and time. Better-educated parents and caregivers may recognize and prefer additional dimensions of quality that lead them to bypass closer formally-trained private providers in favor of the public sector (Akin and Hutchinson 1999; Leonard 2014). Parents and caregivers with higher education may also be better equipped to navigate the more complex public sector system (Samuelsen, Pinkowski Tersbol, and Said Mbuyita 2013).

This analysis holds several implications for the delivery of equitable children's healthcare in the context of migration. Poor children are especially disadvantaged, and may need special support in accessing formal providers and public-sector care. Subsidies have a protective effect for children in the poorest households who benefit from such health equity schemes; these could be extended to slightly more well-off households, who still face many challenges in paying for healthcare (Khun and Manderson 2008; Van Damme et al. 2004). Extending current health subsidy schemes would likely result in more children utilizing public-sector care (Axelson et al. 2009), and explicitly addressing non-financial barriers as a part of these schemes may further improve health equity (Meessen et al. 2007). These strategies may be especially important for children left behind, whose households may be especially reliant upon remittances to meet daily needs, limiting their ability to access facilities that are farther away, or that do not accept flexible payment mechanisms. Payment flexibility is cited as a primary driver of use of informal

providers in Cambodia and elsewhere (Khun and Manderson 2008; Sudhinaraset et al. 2013). Within the public sector, where fees are required for children's care, the design and implementation of flexible payment schemes may increase access for families dependent upon remittances. Proximity to a primary health center also increases use of public-sector care. Where possible, the Government of Cambodia should seek to facilitate access to these centers while ensuring a high quality of care. Finally, increasing health literacy among parents and other caregivers may help reduce disparities in access to care by education, an important predictor of utilization of public-sector care. This may be especially important in the Cambodian context, where the current generation of grandparents has little to no formal education, yet often serve as primary caregivers for children left behind.

This analysis is not without limitations. In CSES, it is not possible to know with certainty whether an out-migrant is the parent of a child versus other relative. The reason for parental non-co-residence with children is not reported. Thus, it is unknown whether parents who do not co-reside with their children have migrated, divorced, or died, though divorce is rare in Cambodia. Education and other socio-demographic characteristics are not reported for out-migrants; thus, there is a high degree of missingness of parental education data in migrant-sending households. Parental education may have a different impact on care-seeking behaviors than the educational attainment of other household members, even where parents have migrated. Given the low proportion of children who reside in single parent or skipped-generation households, failure to detect a significant effect for these types of living arrangements may be due to Type II error.

Despite its limitations, this study has several strengths. Previous studies of migration, remittances, and child health have not examined characteristics of children's healthcare utilization and care-seeking behaviors for child illnesses. This paper provides further insights on

the effects of migration on child health in Asian contexts, where the literature has been limited to date. Importantly, this study addresses potential endogeneity of household decisions to migrate and household care practices for children by using an instrumental variables approach.

Future research should explore the potentially mediating roles of household wealth and children's living arrangements; to do so requires longitudinal data that can account for transitions in living arrangements and transformations in households' SES over time as they receive remittances. Understanding variations in the timing of care seeking and sources of delay among migrant-sending and non-migrant families will improve the design of effective interventions to increase timely access to quality, appropriate care. As children and families often use multiple treatment strategies in the same illness episode (Colvin et al. 2013), studying the full trajectory of care seeking, beyond the first site of care, will further contextualize children's care seeking.

V. Conclusions

In Cambodia, children whose households receive remittances are no more likely than children in non-migrant households to access formally-trained providers or care in the public sector when ill. While migration and remittances may provide some important benefits for children's physical and intellectual development, these positive aspects of parental out-migration do not extend to care seeking for child illnesses. Given increasing rates of migration in Cambodia and other low- and middle-income countries globally, and the concomitant increased prevalence of children left behind (Piotrowski 2009), the lack of effect of remittance income on access to quality child healthcare is an important consideration for stakeholders seeking to improve child health and health equity. As migration shifts children's and families' living

arrangements, opportunities, and livelihoods globally, policymakers should address the specific needs of these children and families to promote their access to care.

Table 3.1. Socio-demographic characteristics of children under 10 reporting recent illness (N=3,320).

	N	% (weighted)
Age		
0-1	960	27.5
2-3	802	24.1
4-5	632	20.4
6-7	528	15.9
8-9	398	12.1
Mean age in years (SD)	3.7 years (2.7)	
Child sex		
Male	1725	52.1
Female	1595	47.9
Place of residence		
Phnom Penh	282	5.7
Other urban area	417	8.3
Rural	2621	86.0
Mean distance to district center in kilometers (SD)	11.2 km (12.5)	
Wealth quintile		
Poorest	803	21.5
Poor	705	22.9
Middle	675	22.1
Rich	620	18.9
Richest	517	14.8
Household experienced food insecurity in any month during the preceding year	569	15.2
Household received any subsidized healthcare during the preceding year	318	12.3
Household living arrangements		
Child is co-resident with both parents	2314	71.5
Child is not co-resident with mother (single parent)	20	0.7
Child is not co-resident with father (single parent)	106	2.6
Child is co-resident with grandparent(s) and at least one parent (multigenerational)	775	21.6
Child is not co-resident with either parent (skipped-generation and other)	108	3.6
Mean size of household (SD)	5.3 members (1.8)	
Mean number of other children in household (SD)	1.6 children (1.3)	

Table 3.1 (continued). Socio-demographic characteristics of children under 10 reporting recent illness (N=3,320).

	N	% (weighted)
Highest educational attainment in household		
None	573	17.9
Primary	1149	35.0
Junior secondary	947	28.8
Secondary or pre-secondary technical/vocational	430	12.9
Post-secondary or post-secondary technical/vocational	104	2.3
Missing	117	3.1
Child resides in migrant-sending household	444	14.6
Healthcare availability in village		
Primary health center or post (public)	326	8.3
Private clinic	377	9.6
Pharmacy	551	14.9
Informal drug shop	970	29.0

Table 3.2. Characteristics of remittance receiving households with children under 10 (N=444).

	N	% (weighted)
Mean amount of total remittances received in preceding year in USD (SD)	$166.99 (395.05)	
Total number of out-migrants from household[a]		
1	168	35.7
2	114	29.9
3	74	14.1
4	42	9.4
5+	46	10.8
Mean number of migrants (SD)	2.4 migrants (1.5)	
Migrant location[b]		
Phnom Penh	87	21.7
Other internal (Cambodia)	357	82.4
International	63	14.2
Wealth quintile		
Poorest	112	25.4
Poor	98	22.5
Middle	87	23.7
Rich	89	17.7
Richest	58	10.6
Household structure		
Child is co-resident with both parents	91	21.0
Child is not co-resident with mother (single parent)	3	0.6
Child is not co-resident with father (single parent)	16	2.9
Child is co-resident with grandparent(s) and at least one parent (multigenerational)	259	57.3
Child is not co-resident with either parent (skipped-generation or other)	77	18.8
Mean size of co-resident household members (SD)[c]	6.0 members (1.9)	
Mean number of other children in household (SD)	1.6 children (1.3)	

[a]Includes non-remitting migrants
[b]Proportion of households sending at least one migrant to location among all migrant-sending households receiving remittances
[c]Excludes out-migrants

Table 3.3. Description of care-seeking outcomes among children under 10 reporting illness in the last 30 days (N=3,320).

	Total		Non-migrant (N=2,876)		Migrant (N=444)		p-value[a]
	N	%	N	%	N	%	
Attended a formally-trained provider	1659	48.1	1456	49.0	203	43.3	0.14
Sector of facility attended first							0.17
Public	635	18.6	565	19.2	70	15.2	
Private	1024	29.5	891	29.8	133	28.4	
Informal	1661	51.9	1420	51.0	241	56.7	
Attended secondary or tertiary facility first	257	7.3	233	7.5	24	6.1	0.06^{+}
Mean expenditure on treatment in USD (SD)	$5.48 (12.88)		$5.55 (13.30)		$5.10 (10.07)		0.37
Mean expenditure on transport in USD (SD)	$1.18 (7.93)		$1.18 (8.12)		$1.20 (6.78)		0.79
Financing of care (N=1,490)			N=1,271		N=219		0.22
Household income	1130	72.6	973	73.1	157	70.0	
Savings	271	20.0	220	19.3	51	24.2	
Borrowing	46	3.9	43	4.3	3	14.9	
Other (including selling assets)	43	3.5	35	3.4	8	4.3	

***p<.001, **p<.01, *p<.05, $^{+}$p<.10

[a]Comparing non-migrant and remittance-receiving households using unadjusted linear, logistic or multinomial regression with standard errors clustered by primary sampling unit.

Table 3.4. First place sought care: Formal provider (vs. informal) (N=3,320).

	Model 1		Model 2		Model 3	
	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)
Household received remittance	-0.21	(0.23)	-0.29	(0.20)	-0.15	(0.26)
Child's age (years)			-0.10***	(0.03)	-0.11***	(0.03)
Child is female			0.02	(0.14)	0.01	(0.14)
Number of other children in household			-0.19**	(0.06)	-0.11^{+}	(0.07)
Highest household educational attainment: primary (*vs. none*)			0.04	(0.23)	0.11	(0.24)
Highest household educational attainment: junior secondary (*vs. none*)			-0.22	(0.24)	-0.27	(0.24)
Highest household educational attainment: secondary or post-secondary (*vs. none*)			0.29	(0.28)	0.17	(0.28)
Highest household educational attainment: missing (*vs. none*)			0.48	(0.46)	0.59	(0.48)
Household receives subsidized healthcare			0.44	(0.28)	0.59*	(0.28)
Village has a primary health center			-0.26	(0.39)	-0.32	(0.40)
Kilometers to district center			0.01	(0.01)	0.02	(0.01)
Resides in urban Phnom Penh (*vs. rural*)			-1.63*	(0.50)	-1.60**	(0.51)
Resides in other urban area (*vs. rural*)			-0.86	(0.42)	-0.65	(0.43)
Poorest wealth quintile (*vs. richest*)					-1.14***	(0.30)
Poor wealth quintile (*vs. richest*)					-1.24***	(0.29)
Middle wealth quintile (*vs. richest*)					-0.90**	(0.27)
Rich wealth quintile (*vs. richest*)					-0.68*	(0.27)
Child co-resides with one parent (*vs. two parents*)					-0.06	(0.40)
Child co-resides with grandparents and one or two parents (*vs. two parents*)					-0.14	(0.20)
Child resides with no parents (*vs. two parents*)					-0.25	(0.47)
PSU-level variance	5.90	(1.02)	5.93	(1.04)	6.20	(1.09)
Household-level variance	4.90	(1.00)	5.08	(1.04)	5.30	(1.07)
Constant	0.19		0.96		1.68	
Log likelihood	-1990.28		-1960.90		-1949.17	

***p<.001, **p<.01, *p<.05, +p<.10

Table 3.5. First place sought care: Public sector (vs. private or informal) (N=3,320).

	Model 1		Model 2		Model 3	
	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)
Household received remittance	-0.17	(0.27)	-0.22	(0.29)	-0.30	(0.32)
Child's age (years)			-0.18***	(0.04)	-0.17***	(0.03)
Child is female			-0.30^{+}	(0.18)	-0.30^{+}	(0.17)
Number of other children in household			-0.06	(0.08)	-0.12	(0.08)
Highest household educational attainment: primary (*vs. none*)			1.07**	(0.31)	1.05**	(0.31)
Highest household educational attainment: junior secondary (*vs. none*)			0.53^{+}	(0.31)	0.55^{+}	(0.31)
Highest household educational attainment: secondary or post-secondary (*vs. none*)			0.93**	(0.36)	0.98**	(0.36)
Highest household educational attainment: missing (*vs. none*)			1.87**	(0.56)	1.81**	(0.55)
Household receives subsidized healthcare			0.61^{+}	(0.32)	0.56^{+}	(0.32)
Village has a primary health center			0.82*	(0.40)	0.88*	(0.40)
Kilometers to district center			0.02	(0.01)	0.02	(0.01)
Resides in urban Phnom Penh (*vs. rural*)			-0.87^{+}	(0.52)	-0.91^{+}	(0.50)
Resides in other urban area (*vs. rural*)			-0.22	(0.43)	-0.34	(0.42)
Poorest wealth quintile (*vs. richest*)					0.09	(0.33)
Poor wealth quintile (*vs. richest*)					-0.28	(0.32)
Middle wealth quintile (*vs. richest*)					-0.64*	(0.32)
Rich wealth quintile (*vs. richest*)					-0.79*	(0.32)
Child co-resides with one parent (*vs. two parents*)					-0.15	(0.48)
Child co-resides with grandparents and one or two parents (*vs. two parents*)					0.16	(0.24)
Child resides with no parents (*vs. two parents*)					0.11	(0.55)
PSU-level variance	3.67	(0.81)	3.83	(0.89)	3.55	(0.83)
Household-level variance	6.07	(1.62)	6.97	(1.90)	6.45	(1.74)
Constant	-2.99		-3.28		-2.85	
Log likelihood	-1460.97		-1418.70		-1411.96	

***p<.001, **p<.01, *p<.05, +p<.10

Table 3.6. Summary of instrumental variables results for first place care sought: formal vs. informal, public sector (N=3,320).

	Formal provider (unadjusted)	Formal provider (adjusted)	Public sector (unadjusted)	Public sector (adjusted)
	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)
Remittance receiving households (Multilevel logistic regression estimate)	-0.21 (0.23)	-0.15 (0.26)	-0.17 (0.27)	-0.30 (0.32)
Remittance receiving households (IV estimate)	-0.27 (0.28)	-0.33 (0.39)	-0.03 (0.23)	0.10 (0.32)
F (IV first stage)	38.06	27.41	38.06	27.41
Partial R^2 (IV first stage)	0.023	0.015	0.023	0.015

***p<.001, **p<.01, *p<.05, +p<.10

Chapter 4: Children's living arrangements and health in the context of migration: An analysis of skipped-generation households in Cambodia over time

I. Background

Internal and international migration rates have increased across Asia over the last two decades, including in Cambodia (Charles-Edwards et al., 2016). Out-migration is concentrated among young adults ages 15 to 35, about a quarter of whom have young children (Ministry of Planning, 2012). As more parents migrate away from rural villages and leave their children behind, an increasing number of young children are directly impacted by migration, including undergoing transitions in their living arrangements. After their parent(s) migrate, these young children left behind reside in households with alternative family structures, at times with one or both parents absent. Migrating parents may leave children in multigenerational households, with a single parent, or in skipped-generation households, comprising a grandparent(s) and grandchild(ren). In migrant-sending areas, increasing out-migration generates greater diversity in children's living arrangements over time.

Children's living arrangements are known to affect their health, well-being, and development (Bronte-Tinkew and DeJong, 2004; Desai, 1992; Gage et al., 1997; Omariba and Boyle, 2007). In migrant-sending households, both the absence of parents and the presence of alternative caregivers such as grandparents may shape the health of young children in various ways. The literature presents conflicting evidence as to whether children left behind in migrant-sending households are better or worse off than their peers in non-migrant households in terms of health, mortality, and well-being (Hildebrandt et al., 2005; Kanaiaupuni and Donato, 1999; Kiros and White, 2004; Yabiku et al., 2012). Among those left behind, a child's living arrangement

plays an important role in determining how a parent's absence will affect his or her health. Beyond the nuclear family, children commonly live in multigenerational households, with one or both parents and at least one grandparent; in single-parent households, with one parent; or skipped-generation households, with neither parent and at least one grandparent. While living in a multigenerational household may be beneficial for children, living in a skipped-generation household often has adverse associations, and this relationship holds across diverse settings (Baker and Mutchler, 2010; Monserud and Elder, 2011; Schmeer, 2013). One potential explanation for explaining these different findings is household wealth. Migrants tend to self-select based on wealth, among other characteristics (Constant and Massey, 2003). In part due to this selection, wealth is often closely tied to family structure. Wealth is also a key determinant of children's health: the relationship between children's living arrangements and their health is generally moderated by wealth (Gorman and Braverman, 2008; Heaton et al., 2005; McLanahan, 1997). The effects of children's living arrangements on their health may differ across the wealth spectrum, as increasing economic resources may differentially benefit children in different types of households.

As more children globally reside in alternative living arrangements due to parental out-migration, understanding how different family structures affect child health holds important implications for population health and health policy. Changes in household socio-economic status after migration and the reorganization of familial roles among those left behind may hold specific consequences for children's health. Such changes may be particularly important for children's nutrition, which is in part determined by familial socio-economic status and food security, and caregiving practices (Charmarbagwala et al., 2004). Over time, as migration itself and alternative living arrangements in migrant-sending households become more common, the

effects of specific types of living arrangements on children's health may shift, impacting health equity. Therefore, examining the relationship between children's living arrangements and their nutritional status over a period of increasing migration sheds light on how this type of demographic change associates with children's health and well-being, and illuminates potential mechanisms through which living arrangements impact upon child nutrition in high-migration contexts.

Building on prior studies that examine the links between young children's living arrangements and their health, I examine how children's nutrition varies by different types of living arrangements in a high migration setting, Cambodia. I identify the effects of children's living arrangements on their nutritional status, and how these effects have changed over time during a period of rapid out-migration and increasing diversity in household structures. Additionally, I examine how the relationship between specific living arrangements and child health outcomes varies across the wealth spectrum. To examine these questions, I use data from four waves of the Cambodia Demographic and Health Survey (CDHS), a nationally representative repeated cross-sectional survey conducted in 2000, 2005, 2010, and 2014. CDHS includes data from a range of household types, including skipped-generation households. Skipped-generation households are an increasingly prevalent living arrangement in migrant-sending areas, yet are rarely examined in the literature. Children in skipped-generation households may be particularly vulnerable to the potentially negative effects of parental absence, yet may be most likely to benefit from their migrant parents' remittance income.

Children's living arrangements and their health

Who a child does—or does not—reside with can affect multiple domains of his or her health and development, throughout childhood and into adulthood. Parents and caregivers determine children's access to household and community resources, and shape children's health through their allocation of these resources and investments of time. Children's health and nutrition is proximately determined by their access to food and healthcare, receipt of other caregiving practices, and access to clean water and sanitation; these are in turn determined by household structure, parental and caregiver education, and household socio-economic status, among other factors (Schmeer, 2013).

Intra-household resource allocation and investment is an important mechanism linking children's living arrangements, as well as their health and nutrition. In many settings, single parent and skipped-generation households are more likely to be financially disadvantaged than nuclear or multigenerational households (Baker and Mutchler, 2010; McLanahan and Percheski, 2008). Beyond the overall level of income, the distribution of resources within the household plays a key role in determining children's health and access to food. Therefore, the gender and power dynamics that grant specific family members greater control over familial resources are directly relevant for children's well-being. Mothers are more likely than fathers to invest familial income in their children (Handa, 1996), including through increased food expenditures (Schmeer, 2005). However, where mothers or other female caregivers earn less and/or have less control over family resources, these resources may be directed towards other financial priorities. Children in households with other young children may be less likely to benefit individually from household resources where these are distributed to address the needs of multiple children (Blake, 1981; Bronte-Tinkew and DeJong, 2004).

Parents' and caregivers' time use is a second mechanism through which children's health and nutrition are shaped by their living arrangements. In nuclear households, parents can divide earning and caregiving activities. In multigenerational households, grandparents are able to direct more time towards caregiving activities for their grandchildren as parents earn to support the family (Hong, 2013). In contrast, parents and caregivers in single-parent and skipped-generation households may be responsible for both earning and caregiving activities, constraining the amount and quality of time devoted to caring for young children in the household.

Most evidence in developed and developing countries globally points to nuclear married households as beneficial for children. In the United States, evidence points towards detrimental effects of father absence throughout childhood, with effects on educational attainment and mental health persisting into adulthood (McLanahan et al., 2013). Similarly, children living in skipped-generation households are more likely to be living in poverty, less likely to have health insurance, and more likely to have adverse health outcomes than children in nuclear families (Baker and Mutchler, 2010; Bramlett and Blumberg, 2007). Studies of household structure and child health in Latin America, the Caribbean, and Sub-Saharan Africa find children who reside in nuclear households with two married parents are less likely to be malnourished than children who live in single-parent households or those whose parents cohabitate or have otherwise informal unions (Bronte-Tinkew and DeJong, 2004; Desai, 1992; Gage, 1997; Schmeer, 2013). The addition of grandparents to form multigenerational households may further benefit children's health status (Schmeer, 2013). In contrast, children in single-parent households tend to be especially disadvantaged. In six Sub-Saharan African countries, children born to single mothers have a higher risk of mortality than children born to married women, and the children of

divorced mothers face especially poor health outcomes (Clark and Hamplová, 2013). However, research on the health of children in skipped-generation households globally is very limited.

The links between living arrangements and child nutrition in migrant-sending areas

Empirical examinations of the relationship between parental migration and child nutrition in other migrant-sending areas provide conflicting evidence (Carletto et al., 2011; Mu and de Brauw, 2015; Viet Nguyen, 2016). Remittances specifically are associated with improved short- and medium-term growth among children in migrant-sending households in Ecuador, though these children do not enjoy long-term benefits (Antón, 2010). Similarly, remittances have no effect on children's nutritional status in left-behind households in Guatemala (Davis and Brazil, 2016). While several of these studies examine differences in nutritional status by which parent migrates, none examine the effects of the living arrangements of children left behind. That these results are conflicting may be in part due to variation in the living arrangements of children left behind, largely unaccounted for in these studies, and the diversity of experiences of these migrant-sending households. Few studies to date have specifically addressed the role of children's living arrangements in their nutritional status. However, the limited evidence available suggests that living arrangements are an important determinant of children's nutrition in migrant-sending families. In Mexico, family structure is closely tied to children's risk of anemia, although paternal out-migration specifically is not significantly associated with anemia (Schmeer, 2013). In the Philippines and Vietnam, caregiver education is significantly associated with children's risk of malnutrition, and the relationship between parental migration and child nutrition is mediated by household wealth (Graham and Jordan, 2013).

The relationship between children's living arrangements and their health and nutrition may be distinct for households affected by migration compared to households affected by parental death or other forms of absence, such as incarceration or substance use. Many migrant parents retain ties to their children through telecommunications and other means, and many provide financially for their children (Asis, 2006; Dreby, 2010). At the household level, migrant-sending families may receive remittance income, reducing their financial vulnerability despite the absence of working-age adult family members. These changes may also affect migrant-sending families' food security, and force a restructuring of caregiving responsibilities and familial roles. Yet the effects of migration on the left behind are not static; changes in the household of origin often vary over time as the migrant secures work in his or her destination, builds networks, and saves and remits (Acevedo-Garcia et al., 2012). Change over time in the relationship between living arrangements and child health may also apply at the community level.

Within families, migration may affect children left behind in several ways that contribute to their health and nutritional status. For many families, sending a migrant affects income and wealth for the whole family in the short and long term. The links between higher household socio-economic status and improved child health outcomes are well documented in many settings (Aber et al., 1997; Barros et al., 2012; Marmot, 2005). Family members left behind may lose income shortly after a migrant leaves as the loss of a productive family member may lead to decreased earnings. Migration often requires a capital investment for brokers or other associated costs. However, over time, many migrants are able to provide remittance support to family members left behind. Those with children left behind in their household of origin are especially likely to remit (Carling, 2008). Yet, many migrants face challenges in generating sufficient

income in their destination to provide regular remittances for family left behind, or may require a lengthy amount of time to do so (Acevedo-Garcia et al., 2012). Thus, many children and families left behind may experience a significant period where they receive little or irregular remittance support. For other families, migration provides financial security and an improved livelihood when migrant family members are able to remit regularly. Because migration is so closely tied to changes in families' socio-economic status, wealth may be an especially important mediator in the relationship between children's living arrangements and their health. Among migrant-sending families in Mozambique, children whose fathers are economically successful experience the lowest risk of mortality, while children of unsuccessful migrant father face a higher risk of mortality than children in non-migrant households (Yabiku et al., 2012).

Food security is a specific aspect of familial well-being that is closely tied to socio-economic status, and is impacted by out-migration (Zezza et al., 2011). Migration can directly impact households' ability to purchase food through remittances; households might also be more likely to be food secure after migration with fewer households present. However, the loss of these household members represents a loss of productive labor, including agriculture labor. Moreover, the potential financial vulnerabilities and loss of income related to migration might make households more at risk for food insecurity. In Vietnam, migration results in higher food expenditures among left-behind households in the short term, although these returns are diminished over the long term (Nguyen and Winters, 2011). This suggests the effects of parental out-migration on children's nutrition may vary over time in migrant-sending households.

Migration shifts familial roles, particularly from the perspective of children left behind (Mazzucato, 2015; Rhacel Salazar Parreñas, 2005). This change in roles affects time use among parents and caregivers left behind. Family members left behind must assume the domestic tasks

of the migrating family member, creating additional demands on their time (Baldassar and Merla, 2014). For single parents and grandparent caregivers in skipped-generational households, this may be especially stressful as they assume both income-generation and caregiving responsibilities. Given the increased demands on their time, these parents and caregivers may not be able to devote the requisite time or resources to procuring or growing sufficient food for the household, or preparing a diverse diet that promotes adequate micronutrient intake.

Finally, the relationship between children's living arrangements and their nutrition may change over time as the community composition of households changes with out-migration. Changes in the broader social and structural environment may affect household-level determinants of nutrition, and may do so differentially for different types of households. Specifically, as a larger proportion of households send migrants in a given area, community health infrastructure and mechanisms of social support may be affected to the benefit or detriment of children's health and well-being. Where remittance income leads to improvements in the infrastructure of sending communities (Taylor et al., 1996), children's nutritional status may improve. However, were social networks are eroded due to high rates of out-migration, children's nutritional status and food security may decline.

Child nutrition in context: The case of Cambodia

Malnutrition is a persistent child health problem in many areas globally, and a lens through which to examine children's health equity. Malnutrition underlies about half of child deaths in low- and middle-income countries, illustrating its direct impacts on child mortality and morbidity in these settings (Pelletier et al., 1993). Malnutrition is especially prevalent in Asia,

which has the highest rates of wasting, or low height-for-weight, worldwide (United Nations Children's Fund et al., 2016).

Malnutrition among young children has decreased substantially in Cambodia since 2000. This decrease is due to several factors, including socio-economic development, targeted nutritional and food fortification programming, improvements in sanitation, increased access to clean water, and other improvements in healthcare access (Ikeda et al., 2013). In general, household income and education have improved in the country over the past two decades (National Institute of Statistics et al., 2015, 2001). Given that higher household wealth allows families to reduce food insecurity, improve dietary diversity and nutrient intake, and increases the likelihood of improved sanitation and a clean water supply, it is unsurprising that higher socio-economic status is consistently associated with lower rates of malnutrition globally (Charmarbagwala et al., 2004; Petrou and Kupek, 2010). Wealthier households are more likely to have consistent access to sanitation and clean water, which are associated with reduced child morbidity and mortality (Esrey et al., 1991). Children whose parents have higher educational attainment are less likely to be malnourished (Semba et al., 2008). In addition to these social characteristics, children's age and sex are related to their risk for malnutrition. While the prevalence of stunting, or chronic malnutrition, generally increases with age, wasting, or acute malnutrition, tends to decrease with age. Boys or girls may be more likely to be malnourished depending on the setting; while girls face a higher risk of stunting and wasting in many parts of in India, a 2013 analysis of Cambodia found boys at higher risk for stunting (Ikeda et al., 2013).

Despite interventions to address the proximate and distal determinants of malnutrition, such as food security, diet quality, and health literacy, malnutrition rates remain persistently high in Cambodia. Across urban and rural areas, many children are anemic and/or experience

micronutrient deficiencies, and rates of stunting have remained above 40% (Chaparro et al., 2014; National Institute of Statistics et al., 2015) In 2014, more than 10% of Cambodian households reported food insecurity (Chaparro et al., 2014).

Migration is an important feature of the Cambodian demographic landscape that has contributed to increased diversity of children's living arrangements. Historically, the nuclear family has been the predominant family form in Cambodia (Demont and Heuveline, 2008). Divorce is rare (Heuveline and Hong, 2016). Notably, previous studies on family structure and child nutrition have not included children in skipped-generation households, nor examined the effect of this particular type of living arrangement on child nutrition. Given high rates of migration and malnutrition with low rates of divorce, Cambodia offers an appropriate context for identifying how children's living arrangements associate with their likelihood of malnutrition in a migration-sending area, especially the skipped-generation household.

Given the existing literature and the demographic and health landscape in Cambodia, I hypothesize children's living arrangements are significantly associated with their risk of acute malnutrition. Specifically, I hypothesize that children in two-parent multigenerational and nuclear families are least likely to be acutely malnourished, with children in two-parent multigenerational households experiencing the lowest odds of acute malnutrition given the demonstrated benefits of grandparental co-residence. In comparison to children in two-parent households, I hypothesize those in single-parent and skipped-generation families have greater odds of acute malnourishment. I hypothesize children in multigenerational households with one parent will be worse off than children residing with two parents, though less likely to be acutely malnourished than children in single-parent or skipped-generation households. With regard to household wealth, I hypothesize that wealth moderates the relationship between living

arrangements and acute malnutrition such that children with alternative living arrangements in the poorest two wealth quintiles are significantly more likely to be acutely malnourished than all other children.

II. Methods

Data and sample

CDHS captures a demographic profile of Cambodia, as well as information about reproductive, maternal, and child health, water and sanitation access, and HIV, among other topics. The survey has been previously used to analyze reproductive, maternal, and child health outcomes and equity in Cambodia (Dingle et al., 2013; Hong et al., 2007; Hong and Chhea, 2010; Jimenez-Soto et al., 2014; Van de Poel et al., 2014; Wang and Hong, 2015).

CDHS includes a module with information about all household members, including a census. This module provides information on the socio-demographic characteristics of each household member, such as age, education, marital status, and employment status, as well as household characteristics, including an asset index of durable goods. Children's anthropometric data is included in this module. The head of household is also asked about housing characteristics, access to water and sanitation, and household health behaviors. In a separate module, women of reproductive age (15 to 49) are asked about their fertility preferences, use of family planning, antenatal and delivery practices, knowledge of health-related information and access to media, and children's health, nutrition, and vaccination. Because the women's module excludes children who do not reside with a woman of reproductive age, I use data from the household member module.

CDHS uses a two-stage stratified sampling frame. In the first stage, a random sample of villages is selected with probability proportional to size, where village size is measured as the number of households in the village. In the second stage, each selected village is mapped, and households within the village are systematically sampled. For each household selected, the head of household is interviewed. All women ages 15 to 49 that are residents of the household, or a visitor to the household on the night before the survey, are eligible to complete the women's survey. Individual and household survey weights that account for the multi-stage sampling design are calculated for each survey wave.

The survey design for each wave of CDHS is based on a master sampling frame derived from the most recent census. The sampling frame for the 2000 CDHS was derived from the 1998 General Population Census. In 2005, additional villages enumerated by the National Institute of Statistics (NIS) were added to the General Population Census to create the sampling frame. The 2010 and 2014 CDHS waves were based on the 2008 General Population Census. For the household survey module, response rates were 98.0% or higher in each survey wave. Further information on the sample design for particular survey waves are available in the corresponding CDHS final report (National Institute of Statistics et al., 2015, 2011, 2006, 2001).

This analysis includes children under five in the four survey waves. The sample is restricted in several ways. First, only children with completed anthropometric measures within a plausible range are included. Anthropometric measures are discussed in further detail below. Second, only children who report that both biological parents are alive are included. Because the aim of this analysis is to identify the effects of children's living arrangements on acute malnutrition with a specific focus on migration, I exclude 447 children whose parent(s) have died in order to strengthen the assumptions that particular living arrangements are due to

migration rather than parents' mortality. Across all years, 134 children reside with neither a parent or grandparent. These children are excluded from analysis because it is not possible to draw conclusions given the diversity of their living arrangements and the small size of the group. I also exclude 770 children with missing information on their living arrangement, as well as 76 children with missing information on their head of household's educational attainment, and five children with missing information about household sanitation. CDHS excludes institutionalized populations; therefore, children residing in orphanages, pagodas, or other institutions are not included in the sampling frame. The final analytical sample includes 15,774 children under age five.

Measures

The primary outcome measure is a dichotomous measure of acute malnutrition, or wasting (weight-for-height). Interviewers measure children's weight and height at the time of household interview using standardized equipment and procedures (National Institute of Statistics et al., 2015, 2011, 2006, 2001). Weight-for-height anthropometric z-scores are determined for each child based on these measures. Children whose weight-for-height z-scores fall above or below six standard deviations from a reference population are considered to have implausible anthropometric measurements. They are thus excluded from the analysis.

Children are considered wasted if their weight-for-height z-score is more than two standard deviations below the mean of a reference population for their age and sex. I use the World Health Organization's 2006 reference population for child growth standards, which includes a sample of children from six countries (Bloem, 2007). In descriptive and bivariate statistics, I distinguish between moderate and severe wasting. Moderate wasting is defined as

more than two standard deviations to three standard deviations below the mean. Severe wasting, or severe acute malnutrition, is defined as more than three standard deviations below the mean of the reference population.

The primary independent variable of interest is children's living arrangements, specifically, whether they reside with their parents and grandparents. Living arrangements are represented by a categorical variable with five categories. Children who live in nuclear families, that is, a household with two parents and no grandparents, represent the reference category. Children are alternately categorized as living in a multigenerational household with two parents, a multigenerational household with one parent, a single parent household, or a skipped-generation household with at least one grandparent and without either biological parent. A child is considered to live in a multigenerational household if he or she lives with at least one parent(s) and one or more grandparent(s). Children who live with either their mother or father only, and no grandparents, are considered to live in a single parent household. Children who live with one or more grandparent(s) and neither parent are considered to live in a skipped-generation household. The number of other children under age five in the household is calculated as a continuous measure of the total number of children under age five minus one.

A number of socio-demographic characteristics are included in the analysis, representing child and household characteristics that are associated with children's living arrangements and their risk of acute malnutrition. These include child age and sex, household wealth and education, type of location of residence, and number of co-resident children under five years of age. Given that children whose households have access to clean water and improved sanitation are less likely to be acutely malnourished, I include these measures. These variables are self-reported by the head of household, with the exception of location of residence. The Government

of Cambodia designates survey areas as urban or rural in each CDHS wave, which are maintained for this analysis.

Child's age is measured in years. Child's sex is measured dichotomously, with boys serving as the reference group. A dummy variable for survey year is entered in regression analyses, with 2000 used as a reference category. The educational attainment of the head of household is included. This measure is used in place of mother's educational attainment as maternal education information is not available for children who do not reside with their mother. Educational attainment is categorized as incomplete primary, complete primary, incomplete secondary, or complete secondary or any post-secondary, with no formal education as the reference group.

Households are dichotomized as having access to improved sanitation and an improved water source, versus unimproved sanitation and water. Those with a flush toilet or pit latrine with ventilation or a slab are considered to have improved sanitation, versus pit latrines without slabs, open pits, and all other types of unimproved toilets. Households with piped water, tube wells or boreholes, protected wells or springs, or rainwater are considered to have access to clean water; households with unprotected wells or springs, open water sources such as rivers or lakes, or other sources are considered to have unimproved water sources. These are defined in accordance with sanitation standards defined by the World Health Organization (World Health Organization et al., 2006).

At the household level, wealth index quintiles are constructed using asset scores reported in the survey. Household asset scores are estimated by standard principal components analysis of reported possession of durable goods, access to services, and physical housing characteristics (Filmer and Pritchett, 2001). Separate wealth quintiles are constructed for each survey wave

based on the reported household asset score. Within each survey wave, I estimate separate wealth quintiles for all urban and all rural households respectively, to account for differences in wages and costs of living in urban and rural Cambodia.

Analytical approach

This analysis includes descriptive statistics, and bivariate and regression analyses. CDHS uses a complex survey design with a two-stage sampling frame. Without accounting for the hierarchical nature of the data, standard errors may be underestimated (Rabe-Hesketh and Skrondal, 2012). Nutritional outcomes within households are likely to be highly correlated, and may be correlated within villages depending on agricultural yields, and the proximity of markets, other food sellers, and health services. In bivariate analyses, I use survey weights (`svy`) to estimate linear, logistic, and multiple logistic regressions depending on the nature of the dependent variable. I estimate odds of children's acute malnutrition adjusted for child age and sex, accounting for the hierarchical structure of the data. I next estimate adjusted odds of acute malnutrition controlling for relevant physical, household, and socio-demographic characteristics. To address between-household and between-village heterogeneity, I employ multilevel mixed-effects models with random effects for village and household (Raudenbush and Bryk, 2002). Statistical analyses are performed using the `melogit` command in Stata 14, which fit multilevel models for complex surveys. This modeling strategy accounts for heteroskedascity caused by the multi-stage survey design. All other covariates are entered as fixed effects.

Regression models adjusted for child age and sex estimate odds of wasting by children's living arrangements and other socio-demographic characteristics included in the final adjusted regression model. A series of four adjusted models are calculated. The first includes controls for

child's living arrangement, the number of other children under age five residing in the household, child's age and sex, household wealth, type of place of residence, and educational attainment of the head of household. Controls for whether the household has an improved toilet and access to clean water are also included in this model. Because socio-economic development, increased aid and health spending, and other secular trends contributed to improvements in child health in Cambodia since 2000, a second adjusted model adds a control for year of survey.

To estimate how the effects of specific living arrangements on children's likelihood of being acutely malnourished have changed over time, I add an interaction term to the second adjusted model described above. This term interacts type of living arrangement with year of survey. Residing in a nuclear family and survey year 2000 are the reference categories.

In a fourth model, I identify the effects of children's living arrangements across the wealth spectrum by adding an interaction term for living arrangement by household wealth to the second adjusted model. The reference categories are residing in a nuclear family and being in the richest wealth quintile.

For each adjusted model, a hierarchical logit model defining three levels is estimated, as follows:

1. *i*, for a given child; and,
2. *j*, for a given household; and,
3. *k*, for a given village.

Individual-level and household-level covariates are included as fixed effects, as shown in the following set of equations. Village and household of residence are entered as random effects.

$$\text{Level 1: } \Pr(y_{ijk}) = \beta_{0jk} + \beta_1 X_{ijk} + \varepsilon_{ijk}$$

$$\text{Level 2: } \beta_{0jk} = \gamma_{00k} + \upsilon_{0jk}$$

$$\text{Level 3: } \gamma_{00k} = \delta_{000} + \zeta_{00k}$$

In the Level 1 equation, y_{ijk} represents the probability of acute malnutrition for the *i*th child in the *j*th household in the *k*th village. X represents a set of child-level covariates, and β_1 represents the coefficients for this set of child-level covariates. ε_{ijk} is the child-level error term, with variance σ^2. In the Level 2 equation, γ_{00k} is the household-level intercept, and υ_{0jk} represents the household-level error term with variance τ^2. In the Level 3 equation, δ_{000} represents the province-level intercept, and ζ_{00k} is the province-level error term with variance φ^2.

After estimating the hierarchical logit models, I estimate the average marginal effect of each type of alternate living arrangement compared to residing in a nuclear family household using the `margins` command. The marginal effect is calculated for all members of the population and averaged across all observations, with all other covariates held at their observed values, rather than at population mean values. I estimate average marginal effects for the adjusted model that accounts for survey year. The marginal effect represents the average effect on the probability of wasting for a one-unit change in the exposure of interest, that is, a change from nuclear to each alternate living arrangement, estimated for all observations.

Protection of Human Subjects

This study involves secondary analysis of an existing dataset. Therefore, no ethical approval was sought. In the initial study, all respondents provided informed consent prior to beginning the study.

III. Results

Characteristics of children under five

The sample includes 15,774 children under five years of age across four survey waves (Table 4.1). Children have a mean age of 2.0 years (SD=1.4 years). The sample is predominantly rural (86.0%). Across all survey years, most children live in nuclear families (60.8%), followed by multigenerational families (31.6%). About 27% of children reside in a multigenerational family with both parents, while 4.5% of children reside in a multigenerational household with only one parent. Few children live in single parent families (2.4%) or skipped-generation households (5.1%). Children live in households with a mean of 6.0 people (SD=2.3), and these households have a mean of 1.6 children under age five (SD=0.7). Compared to all households in Cambodia, households with at least one child under five tend to be poorer, as almost one quarter of households in the sample are in the poorest wealth quintile. Less than 20% are in each of the middle, rich, and richest wealth quintiles. Almost half of children live in households where the head of household has not completed primary school (44.4%), and a further 19.3% live in a household where the head has no formal education. In comparison, a little over one-quarter of children under five reside with a head of household who has completed any secondary or post-secondary education. While over two-thirds of children under five have access to clean water (68.9%), less than one-third have access to an improved toilet (32.9%).

The prevalence of various living arrangements among children under five has changed over time (Figure 4.1). The majority of children live in nuclear family households with both biological parents. However, the proportion of children under five living in a nuclear family household has declined over time. Almost three-quarters of children lived in a nuclear family in 2000, while just over 50% did in 2014. The most common living arrangement after the nuclear

family is the multigenerational family with two parents. This type of family has increased over time from 20.8% in 2000 to 33.3% in 2014. The proportion of children residing in multigenerational families with one parent also increased over time, from 1.9% in 2000 to 4.9% in 2014. Few children live with a single parent, with a prevalence of less than 4% in all survey years. In contrast, the proportion of children residing in skipped-generation households has increased steadily over time from 2000 to 2014. In 2000, less than 1% of children lived in skipped-generation households. By 2014, almost 9% of children reside in skipped-generation households. These living arrangements vary significantly across survey years (p=.000).

In Table 4.2, socio-demographic characteristics of these different types of households are summarized. Each of these characteristics is statistically significantly associated with children's living arrangements. Younger children are significantly more likely to reside in multigenerational households, and significantly less likely to reside in skipped-generation households. Multigenerational two-parent households are more common in urban areas, while skipped-generation households are more common in rural areas. However, differences in children's living arrangement by type of location are not statistically significant. Nuclear and single-parent households are significantly poorer than other households, while skipped-generation and multigenerational households with two parents are least likely to be poor. While they are poorer, nuclear families have significantly higher educational attainment than all other types of households. Skipped-generation households have the lowest educational attainment of all household types. Skipped-generation households are most likely to have an improved toilet and clean water, while nuclear families are least likely to have access to either.

Bivariate associations of children's nutritional status and socio-demographic characteristics

Table 4.3 shows the prevalence of moderate and severe wasting by child and household socio-demographic characteristics. Among all children in the sample, 11.1% are wasted. On average, moderate and severe wasting have declined significantly over time. Notably, the prevalence of severe wasting has declined from 7.2% among children under five in 2000 to 2.2% in 2014.

Moderate and severe wasting vary significantly by household type. Overall, children in skipped-generation have the lowest prevalence of wasting, and are least likely to be severely wasted. Children in nuclear families are most likely to be severely wasted, while those in single-parent households have the lowest prevalence of moderate wasting. Moderate and severe wasting is higher among younger children; infants experience the highest prevalence of both. Rates of wasting tend to be higher in rural areas and among boys, though these differences are not statistically significant. The prevalence of wasting declines as household wealth increases. Finally, children with improved sanitation and access to clean water are significantly less likely to experience moderate or severe wasting.

Unadjusted odds of acute malnutrition

Table 4.4 shows odds of acute malnutrition among children under five by children's living arrangements, year of survey, type of place of residence, household wealth, household education, number of co-resident children under age five, and improved sanitation and water, adjusted for child's age and sex. Children in skipped-generation households have the lowest odds of wasting compared to children in nuclear households (OR=0.52, 95% CI 0.37-0.73). In this and all regression analyses, children in nuclear households serve as the reference category. Children in multigenerational two-parent households are also significantly less likely than children in

nuclear households to be wasted (OR=0.82, 95% CI 0.77-0.94). Wasting has decreased significantly over time; in all other survey years, children are significantly less likely to be wasted than children in 2000. Children in the poorest households have significantly higher odds of being wasted than the richest children (OR=1.22, 95% CI 1.00-1.49), though the difference for children in other wealth quintiles is not statistically significantly different from those in the richest quintile. Rural children are significantly more likely than their urban counterparts to be wasted (OR=1.19, 95% CI 1.02-1.39). The odds of being wasted decrease significantly with greater household education attainment: children whose head of household have incomplete primary education have 0.76 times the odds of being wasted as children whose head of household has no formal education (95% CI 0.65-0.88). Children whose head of household has completed secondary or any post-secondary education have 0.70 times the odds of being wasted as children whose head of household has no formal education (95% CI 0.52-0.94). Children with access to improved sanitation and clean water have significantly lower odds of wasting than those without (OR=0.74, 95% CI 0.66-0.86 and OR=0.81, 95% CI 0.72-0.92 respectively).

Adjusted odds of acute malnutrition

The odds of acute malnutrition among children under five adjusted for children's living arrangements, age, sex, type of place of residence, household wealth, household education, and improved sanitation and water are reported in Table 4.5. Controlling for these socio-demographic characteristics, children residing in skipped-generation households have 0.55 times the odds of wasting than children in nuclear households (Model 1, 95% CI 0.39-0.78). Children in multigenerational households with two parents also have significantly lower odds of wasting than children in nuclear households (OR=0.84, 95% CI 0.73-0.97). Older age and having a head

of household with any level of formal schooling are also significantly associated with a lower likelihood of wasting. Having access to an improved toilet and water source are significantly associated with lower odds of wasting (OR=0.83, 95% CI 0.70-0.99; OR=0.86, 95% CI 0.76-0.98, respectively). Household-level variation is higher than village-level variation, though the standard errors for both levels suggest significance.

A second adjusted model adds a control for year of survey (Table 4.5, Model 2). When survey year is added to the model, children in skipped-generation households have 0.62 times of the odds of being wasted compared to children in nuclear households (95% CI 0.44-0.87). Residing in a household where the head of household has any primary education or incomplete secondary education versus no formal education remain statistically significant (OR=0.78, 95% CI 0.67-0.91; OR=0.81, 95% CI 0.67-0.98, respectively). Age remains significantly associated with wasting, with older children less likely to be wasted (OR=0.85, 95% CI 0.81-0.88). Controlling for socio-demographic characteristics, children in the 2005 survey wave have the lowest odds of wasting (OR=0.42, 95% CI 0.35-0.51); children in the 2014 wave have 0.51 times the odds of being wasted compared to children in 2000 (95% CI 0.42-0.61). Overall, these estimates are similar to the previous model, although improved sanitation and clean water are no longer significantly associated with wasting, likely to due increases in their prevalence over time. Household-level variation is similar to the previous model, though village-level variation is diminished once year of survey is accounted for. This model is a significant improvement in fit over the base adjusted model (p=.000).

When an interaction term for living arrangements by survey year is added to the model, the main effects for types of children's living arrangements are no longer statistically significantly associated with wasting (Table 4.6). Interaction terms for living arrangement by

survey year are not significant, though the trend suggests children in skipped-generation households may have an increased risk for wasting over time compared to children in nuclear households in 2000. The addition of the interaction term does not significantly improve model. Year of survey remains statistically significant.

A final model tests an interaction term for children's living arrangements by household wealth quintile (model not shown). Again, the main effects for children's living arrangements on wasting are not significant, and this model is not a significant improvement of fit compared to the final adjusted model without an interaction term. Interaction terms are also insignificant, though several trends are notable. Children in the poorest skipped-generation households have greater odds of being wasted compared to children in the richest nuclear households, though children in skipped-generation households in all other wealth quintiles have lower odds of wasting. Children in single parent households have high odds of being wasted compared to children in the richest nuclear households regardless of their wealth status, while children in multigenerational households do not differ in a meaningful way from children in the richest nuclear households.

Several sensitivity checks suggest these results are robust. A model that only includes random effects for the primary sampling unit produces similar results to those reported above. Models excluding household wealth and household educational attainment, which may be affected by children's living arrangements, also produce consistent results suggesting significantly reduced odds of wasting among children in skipped-generation households. Finally, alternate categorizations of child's age, the education attainment of the head of household, and household wealth produce substantively similar results.

The average marginal effects (AMEs) of children's living arrangement are shown in Figures 4.2 and 4.3. Figure 4.2 shows the AMEs of each type of alternate living arrangement estimated from the final adjusted model without interaction terms. Estimated from the same model, Figure 4.3 shows AMEs of each non-nuclear living arrangement by survey year.

In Figure 4.2, the marginal change in the probability of wasting for residing in a skipped-generation household compared to a nuclear household is -0.044 (SE=0.010). In comparison, the marginal effect of residing in multigenerational household with either one or two parents from a nuclear household is smaller (AME=-0.015, SE=0.012; AME=-0.015, SE=0.006, respectively). This suggests both types of multigenerational households have smaller advantage in risk of malnutrition than children in skipped-generation households when compared to children in nuclear households.

In Figure 4.3, the marginal effect of living in a skipped-generation household represents a lower probability of wasting compared to children in nuclear and other household types in all survey years. Yet, the magnitude of this marginal effect diminishes over time. The AME of skipped-generation households in 2000 is -0.05 (SE=0.016); however, in 2014, the AME of skipped-generation households compared to nuclear households is -0.032 (SE=-0.01). While the difference in the skipped-generation AME from 2000 to 2014 is 0.018, it is 0.05 for children in multigenerational households with two parents, and 0.03 for children in multigenerational households with one parent.

IV. Discussion

This analysis examines how risk of children's acute malnutrition varies across different types of living arrangements in a high-migration setting, Cambodia. Since 2000, rates of acute

malnutrition have decreased significantly. I find that the proportion of children residing outside of nuclear families has increased significantly over time, parallel to increases in out-migration among young adults. In particular, skipped-generation households are increasingly common, now comprising almost one-tenth of Cambodian households. Compared to children in other living arrangements, children in skipped-generation households consistently have a lower risk of acute malnutrition. Yet, this advantage appears to have diminished over time as this type of living arrangement has become more prevalent: the average marginal effect for skipped-generation households is lower in 2014 than in 2000. Surprisingly, children in nuclear families have a greater risk of acute malnutrition than children in all alternative living arrangements. Thus, parental migration may explain some improvements in child nutrition.

In a period of high migration, the proportion of children residing in nuclear families has declined, while both multigenerational and skipped-generation households have become more common. These are common living arrangements among migrant-sending families in Cambodia and elsewhere (Lloyd and Desai, 1992; Ministry of Planning, 2012; Settles et al., 2009). Thus, understanding the implications of growing up in a skipped-generation household for children's health is indeed a priority in Cambodia and other high-migration settings. In contrast to other living arrangements, the proportion of single-parent households has remained relatively steady over the past two decades. Other analyses of Cambodian demographic data posit this is due to a countervailing effect of declining adult mortality on other forces that might increase the proportion of single-parent households, including migration (Heuveline and Hong, 2016). Heuveline and Hong estimate that as of 2004, about 12% of Cambodian children under age 18 resided with a single parent. My estimates are lower because my sample is restricted to children

under five, who by definition have less exposure to parental mortality, and to children with two living parents.

The relationship between children's living arrangements and their nutritional status is consistent over time; that is, living arrangements remained an important determinant of child nutrition from 2000 to 2014. In high-migration settings, children's living arrangements may be an important proxy for other household characteristics, both observed and unobserved: children in migrant-sending households may be more likely to experience improvements in wealth over time that lead to a lower likelihood of acute malnutrition. Migrant parents may hold specific values or beliefs related to children's health and nutrition that result their children having better nutrition. I explore the relationships between living arrangements, children's nutrition, and other household characteristics below.

That household wealth is not significantly associated with children's living arrangements and malnutrition in this setting is a notable finding. Rather than household wealth, this suggests other mechanisms mediate the relationship between children's living arrangements and child health. In high-migration settings, the way in which parents and caregivers allocate resources within the household may be a more important determinant of children's nutritional status than the level of resources itself. For example, in Chapter 1, many grandparents stated that migrant remittances are used specifically for expenses related to the migrants' children rather than for the benefit of the full household. As in other settings, these remittances are commonly used to purchase food, improving children's food security (Jampaklay et al., 2012).

In Cambodia and other migrant-sending areas, left behind households commonly rely on migrant remittances, as well as social and other forms of support from kin and neighbors (Dreby, 2010; Ministry of Planning, 2012; Rhacel Salazar Parreñas, 2005). Non-financial supports,

including forms of social capital such as support from individuals and trust in others, are positively associated with improved child nutrition (De Silva and Harpham, 2007). Where socio-economic status is measured by the possession of durable goods, as in the CDHS, such measures may not accurately reflect non-financial forms of support or remittance income. Rather than savings, a majority of migrant remittances in Mexico are spent on consumption (Massey and Parrado, 1994). In southern Thailand, migrant remittances are poorly correlated with changes in household assets (Ford et al., 2009). Moreover, these measures do not capture in-kind supports to households. For example, a number of grandparents in Chapter 1 report that they rely on supplementary food from family and neighbors, which improves their food security and likely their grandchildren's nutritional status. Thus, where such support mechanisms are common, the relationship between household socio-economic status and nutrition may be weaker. In the rural migrant-sending areas of Cambodia, three-quarters of the population works in agriculture, including adult members of households left behind (Scheidel et al., 2013). Several grandparents interviewed in Chapter 1 grow a portion of the food their households consume. Again, this suggests the links between household socio-economic status and child nutrition may be weaker in these areas, also supported by the finding that rural Cambodian children are no worse off than their urban counterparts, who often have higher household incomes.

In contrast to household wealth, these findings show the importance of household educational attainment in determining children's nutritional status, potentially a more relevant mechanism than household wealth. Other studies confirm the importance of education for children's nutritional status and health more broadly (Alderman and Headey, 2017; Bicego and Boerma, 1993; Hobcraft, 1993; Moestue and Huttly, 2008), though the relative importance of education over wealth does not hold in all settings (Frost et al., 2005). Parental or caregiver

education may be particularly important for child nutrition in migrant-sending areas, where educational attainment may better approximate socio-economic status than asset indices as described above. Higher education among parents and caregivers is proximately related to improved child nutritional status in several ways: first, these parents may have a higher health literacy, leading them to seek greater dietary diversity and provide a more nutritious diet; additionally, these parents and caregivers may also be more likely to treat drinking water and ensure hygienic and sanitary conditions in the households, which also contribute to improved child nutrition (Charmarbagwala et al., 2004).

That education is stronger determinant of child nutrition than income speaks to the importance of caregivers' education in migrant-sending households. In addition to parental educational attainment, grandmothers' education is also linked to children's nutrition (Moestue and Huttly, 2008). Even where they are not a child's primary caregiver, grandmothers often assist with caregiving tasks, and advise and influence mothers about nutritional practices (Aubel, 2012). Their role is likely even stronger in migrant-sending households, where grandmothers tend to assume additional childcare tasks (Dreby, 2010; Rhacel Salazar Parreñas, 2005). This underscores the importance of caregiver quality: a high-quality non-parental caregiver may counteract the potentially negative effects of parental absence due to migration. In several Southeast Asian countries, low educational attainment among caregivers in migrant-sending households is associated with child malnutrition, although children whose caregivers have moderate or high education have no such disadvantage (Graham and Jordan, 2013).

Time use is another mechanism through which children's living arrangements might influence their health. Grandparents left behind in rural China increase the amount of time spent on both childcare and agricultural activities when their adult children migrate (Chang et al.,

2011). In Cambodia, children in multigenerational households receive more caregiving time than children in nuclear households (Hong, 2013). However, my findings do not support an argument for the importance of time use on children's nutrition: were this an important determinant of nutritional status, we would expect multigenerational households, which have the most time to dedicate to childcare activities, to be better off than single-parent or skipped-generation households, which likely have the least. However, I find the reverse. In skipped-generation households, remittance outcome that allows grandparents to purchase higher quality food may offset grandparents' reduced agricultural output. If so, children in these households would gain an improved diet despite the additional caregiving demands on their grandparents.

The model interacting children's living arrangement with survey year does not produce statistically significant models, though this is likely due to the small proportion of children residing in skipped-generation and single-parent households in the first two waves of the survey. The potential diminishing nutritional advantage of skipped-generation households over time is an interesting finding. It may be that as a greater proportion of left-behind households in sending areas rely on or require support from kin or other types of social support, individual households receive less financial or social support, and are less likely to receive supplementary food from neighbors. That is, as more households in a given area need support, the available resources are distributed across more households, benefiting individual children less. Such a pattern may hold both within extended families, as well as within communities. This finding may also provide evidence for a migrant health selectivity hypothesis. Alternately, socio-economic development in this period may have especially benefited nuclear families, thus reducing the gap in risk of acute malnutrition across living arrangements.

Other household characteristics are shown to significantly influence children's likelihood of wasting in this analysis. Before adding controls for year of survey, access to sanitation and clean water are shown to be associated with a significantly lower likelihood of wasting. That these are no longer significant when controlling for year of survey most likely reflects the large increase in access to clean water and improved toilets across Cambodia, in parallel with general socio-economic development and investments in health (Chaparro et al., 2014; National Institute of Statistics et al., 2015).

Compared to studies of living arrangements and child nutrition in other settings, I find children in nuclear household are at greater risk of malnutrition than children in alternative living arrangements. This is in contrast to the advantage children in nuclear households experience relative to children in multigenerational and single parent households in other countries (Bronte-Tinkew and DeJong, 2004; Schmeer, 2013). However, these studies find notable differences in children's nutrition by their parents' marital status, including in nuclear households: compared to children in nuclear households whose parents are married, those whose parents are cohabiting or in otherwise unstable unions experience worse nutritional outcomes. In Cambodia, cohabitation is rare, and most unions are considered marriages, regardless of their formality (Brickell and Platt, 2015). Therefore, a similar relationship between formality of union and children's nutrition may exist in Cambodia, but it is not possible to detect with available survey data. In Mexico, also a high-migration setting, Schmeer estimates the relationship between living arrangements and child anemia using panel data; she finds no significant risk of anemia among children with a migrant father (2013). However, the study does not include maternal migrants or skipped-generation households. Assuming that the majority of skipped-generation living arrangements in the present study are due to parental out-migration, my findings suggest a positive relationship

between parental out-migration and children's acute malnutrition. That these findings are for acute malnutrition and not longer-term chronic malnutrition must be underscored. The mechanisms between parental out-migration and nutrition discussed above may interact differently over time, giving greater complexity to the determinants of longer-term malnutrition. Although there is some evidence for beneficial effects of parental out-migration on children's stunting, or chronic malnutrition (Carletto et al., 2011), other studies point towards a negative effect of out-migration on stunting (Antón, 2010; Davis and Brazil, 2016). However, a study of the impact of migrant remittances on children's acute malnutrition risk in Ecuador lends further support to my findings on the link between living arrangements and acute malnutrition (Antón, 2010).

This analysis has several limitations. The primary limitation is that due to the cross-sectional nature of the data, there is no information about the length of time children have been in their current living arrangement, nor information about parents' migration. Therefore, it is not possible to examine children's nutritional outcomes by specific characteristics of migration, such as length, timing, or destination. While divorce is rare, abandonment may be more common, though it has not been systematically measured in Cambodia. However, the use of a short-term health outcome, acute malnutrition, should reflect the effects of the current living arrangement for the majority of children in the sample. About 5% of children in all survey years with anthropometric data are excluded due to missing data, the majority of whom are missing information on their living arrangement. These children may systematically differ from other children, and may be more likely to live in alternate living arrangements. Due to the nature of the DHS data collection, there is no information about socio-demographic characteristics of parents in skipped-generation households, or other parents who were not present in the household at the

time of the survey. Because of small sample sizes, I am unable to examine the effects of having a migrant father versus migrant mother. However, over 90% of children in single-parent and multigenerational households with only one parent reside with their mother. The proportion of single-parent and skipped-generation households is small, especially for the latter in the first two waves of the survey. Therefore, I suspect the interaction analyses may be hampered by Type II errors. Children are not randomly assigned to specific types of living arrangements. There may be unobserved factors that drive selection into specific household types that are also correlated with child health behaviors, a significant limitation of this analysis. These may include social support, risk acceptance, and caregiving practices for children. Finally, twins face a greater risk for mortality and malnutrition, especially in the first year of life (Justesen and Kunst, 2000). Therefore, controlling for multiple births would eliminate this potential confounder. However, this information is not available for all children and is therefore not included in the analysis.

Despite these limitations, this study has several strengths and makes an important contribution to the migration and child health literature. Limiting the analysis to children with two living biological parents in a context with low divorce rates improves confidence that the majority of these absences are indeed due to migration. A primary strength of this paper is its inclusion of children in skipped-generation households, who have not been previously included in analyses of living arrangements and child health. Anthropometric measures were completed by trained interviewers using standardized equipment and following international protocols, thus reducing potential recall error or other types of bias related to other measures of child health, such as those related to care or treatment.

This analysis highlights several avenues for future research, programs, and policies. First, accounting for the timing of transitions in children's living arrangements may reveal effects of

the length children remain in specific living arrangements, and whether specific critical periods exist in early childhood. Such an analysis could also identify whether there are different effects for acute versus chronic malnutrition, and how children recover from early nutritional deficits in relation to transitions in living arrangements. Identifying the role of timing of transitions may shed further light on the mechanisms driving the relationship between children's living arrangements and their health. More complex analytical designs that explicitly address selection into household types may also aid in identifying the specific mechanisms that underlie the relationship between children's living arrangements and their nutritional status. Finally, further specification of the types of parental migration, such as international versus internal, and the role of remittances, may improve our understanding of the ways parental out-migration shapes early childhood nutrition among children left behind.

From a policy and programmatic perspective, this analysis has several implications. Acute malnutrition rates remain problematic across all types of living arrangements, despite gains made in Cambodia since 2000. Child nutrition, including food security and dietary diversity, must be a programmatic priority. In particular, child health programmers might address feeding practices and nutrition issues relevant to particular living arrangements, which includes targeting interventions towards the specific decision-makers, food purchasers, and food preparers in these various types of households. Few child health interventions target grandparents (Aubel, 2012). That children in skipped-generation and multigenerational households have lower risks of malnutrition suggests grandparents may play a positive role in their nutrition and growth, which could be leveraged in an intervention. This analysis highlights the importance of household educational attainment in children's health outcomes. Over the long term, policies improving access to education will contribute to improved outcomes; in the short term, targeting households

with low education may prove fruitful in improving child nutrition. Finally, it is important to understand how existing policies and programs affect children in different types of households. An alternate explanation for the diminishing relative risk of children in nuclear households over time is that these children may receive a greater benefit from policies and programs enacted in the previous decade.

In conclusion, this paper demonstrates the growing prevalence of skipped-generation households in Cambodia, a high-migration setting. Children in skipped-generation households, as well as children in single-parent and multigenerational households, have a lower risk of acute malnutrition than children in nuclear families. However, an important finding in this analysis is that this relative advantage has diminished over time as children's living arrangements have become more diverse. Addressing the different needs of these family types is critical to improving health equity and maintaining gains in nutritional status for all children in Cambodia.

Table 4.1. Socio-demographic characteristics of children under five, 2000-2014 (N=15,774).

	N	% (weighted)
Survey year		
2000	3,408	21.0
2005	3,726	22.8
2010	3,880	24.8
2014	4,760	31.4
Age (years)		
0	3,039	19.2
1	3,160	20.1
2	3,129	20.0
3	3,264	20.7
4	3,182	19.2
Mean age in years (SD)	2.0 years (SD=1.4)	
Child sex		
Male	7,995	50.7
Female	7,779	49.3
Place of residence		
Urban	3,507	14.0
Rural	12,267	86.0
Household living arrangements		
Nuclear family	9,803	60.8
Multigenerational family (two parents)	4,215	27.1
Multigenerational family (one parent)	671	4.5
Single parent family	359	2.4
Skipped-generation family or other (no co-resident parents)	726	5.1
Mean size of household (SD)	6.0 members (SD=2.3)	
Mean number of children under 5 in household (SD)	1.6 children (SD=0.7)	
Wealth quintile		
Poorest	4,477	24.4
Poor	3,495	20.9
Middle	2,915	18.5
Rich	2,608	19.0
Richest	2,279	17.2
Educational attainment of head of household		
None	3,244	19.3
Incomplete primary	6,897	44.3
Complete primary	1,185	8.1
Incomplete secondary	3,610	23.6
Complete secondary or post-secondary	838	4.7
Water source		
Improved	10,584	68.9
Not improved	5,190	31.1
Toilet		
Improved	5,257	32.9
Not improved	10,517	67.1

Table 4.2. Child and household characteristics by living arrangements (N=15,774).

	Nuclear (N = 9,803) %	Multi-generation two parents (N = 4,215) %	Multi-generation one parent (N = 671)	Single parent (N = 359) %	Skipped-generation (N = 726) %	p-value
Age (years)						p=.000
0	17.2	25.5	25.2	13.9	7.1	
1	18.5	23.5	24.8	16.1	19.3	
2	19.4	19.5	18.3	25.3	28.4	
3	22.5	16.8	14.2	23.8	24.8	
4	22.4	14.8	17.5	20.9	20.3	
Place of residence						p=.540
Urban	12.3	18.3	14.8	14.0	10.9	
Rural	87.7	81.7	85.2	86.0	89.1	
Household wealth						p=.000
Poorest	28.7	16.1	25.0	25.2	16.7	
Poor	22.8	17.5	16.5	24.5	17.3	
Middle	18.0	19.4	19.2	18.7	20.4	
Rich	16.9	23.0	21.6	18.7	21.0	
Richest	13.7	24.0	17.7	12.9	24.6	
Educational attainment of head of household						p=.000
None	15.8	24.1	26.3	29.3	23.2	
Incomplete primary	42.9	44.9	52.6	47.4	50.0	
Complete primary	8.4	7.6	6.1	4.5	9.7	
Incomplete secondary	27.3	19.4	13.4	15.9	15.1	
Complete secondary or post-secondary	5.5	4.0	1.6	2.9	2.0	
Water source						p=.000
Improved	64.8	73.2	80.5	73.2	83.5	
Not improved	35.2	26.8	19.5	26.8	16.5	
Toilet						p=.000
Improved	24.2	47.5	42.3	29.8	52.9	
Not improved	75.8	52.5	57.7	70.2	47.1	

Table 4.3. Acute malnutrition among children under five by socio-demographic characteristics (N=15,774).

	Moderate wasting (N=1,221)	Severe Wasting (N=505)	Total Wasting (N=1,726)	
	%	%	%	p-value
Survey year				p=.000
2000	9.8	7.2	17.0	
2005	6.8	1.7	8.5	
2010	8.3	2.4	10.7	
2014	7.3	2.2	9.4	
Age (years)				p=.000
0	9.8	5.5	15.3	
1	8.9	3.0	11.9	
2	7.1	2.4	9.5	
3	7.3	2.6	9.9	
4	6.8	2.4	9.2	
Sex				p=.246
Male	8.1	3.4	11.5	
Female	7.8	2.9	10.7	
Place of residence				p=.820
Urban	7.6	3.1	10.7	
Rural	8.0	3.2	11.2	
Household living arrangements				p=.006
Nuclear	8.0	3.6	11.6	
Multigenerational two parents	8.5	2.7	11.2	
Multigenerational one parent	8.4	2.5	10.8	
Single parent	5.1	3.0	8.1	
Skipped-generation	5.7	1.7	7.4	
Household wealth				p=.007
Poorest	8.7	3.9	12.6	
Poor	8.3	3.7	12.0	
Middle	7.3	2.5	9.8	
Rich	7.7	2.8	10.5	
Richest	7.5	2.6	10.1	
Educational attainment of head of household				p=.183
None	9.3	3.7	13.1	
Incomplete primary	7.6	3.1	10.7	
Complete primary	7.3	2.7	10.0	
Incomplete secondary	7.7	3.1	10.8	
Complete secondary or post-secondary	7.8	3.0	10.8	
Water source				p=.000
Improved	7.6	2.7	10.3	
Not improved	8.6	4.2	12.8	
Toilet				p=.000
Improved	7.1	2.2	9.3	
Not improved	8.4	3.6	12.0	

Table 4.4. Unadjusted odds of acute malnutrition (N=15,774).

	OR	(SE)	OR	(SE)	OR	(SE)	OR	(SE)
Multigenerational two parent *(vs. nuclear)*	0.82**	(0.02)						
Multigenerational one parent *(vs. nuclear)*	0.82	(0.13)						
Single parent *(vs. nuclear)*	0.68^{+}	(0.15)						
Skipped-generation *(vs. nuclear)*	0.52***	(0.09)						
Poorest wealth quintile (*vs. richest*)			1.22*	(0.12)				
Poor wealth quintile (*vs. richest*)			1.13	(0.12)				
Middle wealth quintile (*vs. richest*)			1.01	(0.11)				
Rich wealth quintile (*vs. richest*)			1.01	(0.11)				
Resides in rural area (*vs. urban*)					1.19*	(0.09)		
Num. other children under 5 in household							0.98	(0.04)
Village-level variance	0.37	(0.07)	0.36	(0.07)	0.38	(0.07)	0.39	(0.07)
Household-level variance	0.93	(0.22)	0.93	(0.25)	0.92	(0.25)	0.91	(0.25)
Constant	0.12		0.10		0.10		0.11	
χ^2 (versus intercept-only model)	79.12		66.03		63.44		59.52	

***p<.001, **p<.01, *p<.05, $^{+}$p<.10

Table 4.4 (continued). Unadjusted odds of acute malnutrition (N=15,774).

	OR	(SE)	OR	(SE)	OR	(SE)	OR	(SE)
Year of survey: 2005 *(vs. 2000)*	0.40***	(0.04)						
Year of survey: 2010 *(vs. 2000)*	0.56***	(0.05)						
Year of survey: 2014 *(vs. 2000)*	0.45***	(0.04)						
Incomplete primary education (*vs. none*)			0.76***	(0.06)				
Complete primary (*vs. none*)			0.77*	(0.10)				
Incomplete secondary (*vs. none*)			0.76**	(0.07)				
Complete secondary or higher (*vs. none*)			0.70*	(0.11)				
Improved toilet					0.74***	(0.05)		
Clean water							0.81**	(0.05)
Village-level variance	0.26	(0.07)	0.38	(0.07)	0.38	(0.07)	0.38	(0.07)
Household-level variance	0.94	(0.25)	0.92	(0.25)	0.93	(0.25)	0.94	(0.25)
Constant	0.20		0.14		0.12		0.13	
χ^2 (versus intercept-only model)	159.52		72.96		75.26		68.62	

***p<.001, **p<.01, *p<.05, $^{+}$p<.10

Table 4.5. Adjusted odds of acute malnutrition (N=15,774).

	Model 1		Model 2	
	OR	(SE)	OR	(SE)
Multigenerational household with two parents *(vs. nuclear)*	0.84*	(0.06)	0.88^{+}	(0.06)
Multigenerational household with one parent *(vs. nuclear)*	0.84	(0.13)	0.91	(0.14)
Single parent household *(vs. nuclear)*	0.66^{+}	(0.15)	0.72	(0.16)
Skipped-generation household *(vs. nuclear)*	0.55**	(0.10)	0.62**	(0.11)
Number of other children under five	0.95	(0.04)	0.93^{+}	(0.04)
Child's age (years)	0.85***	(0.02)	0.85***	(0.02)
Child is female	0.91	(0.05)	0.92	(0.05)
Poorest wealth quintile (*vs. richest*)	0.97	(0.12)	1.09	(0.14)
Poor wealth quintile (*vs. richest*)	0.95	(0.11)	1.04	(0.12)
Middle wealth quintile (*vs. richest*)	0.88	(0.10)	0.93	(0.11)
Rich wealth quintile (*vs. richest*)	0.93	(0.11)	0.96	(0.11)
Resides in rural area (*vs. urban*)	1.04	(0.10)	1.06	(0.10)
Highest household educational attainment: Incomplete primary education (*vs. none*)	0.76***	(0.06)	0.78**	(0.06)
Highest household educational attainment: Complete primary (*vs. none*)	0.78^{+}	(0.10)	0.82	(0.11)
Highest household educational attainment: Incomplete secondary (*vs. none*)	0.78*	(0.07)	0.81*	(0.08)
Highest household educational attainment: Complete secondary or higher (*vs. none*)	0.75^{+}	(0.12)	0.82	(0.13)
Improved toilet	0.83*	(0.07)	0.93	(0.09)
Clean water	0.86*	(0.06)	0.93	(0.06)
Year of survey: 2005 *(vs. 2000)*			0.42***	(0.04)
Year of survey: 2010 *(vs. 2000)*			0.60***	(0.06)
Year of survey: 2014 *(vs. 2000)*			0.50***	(0.05)
Village-level variance	0.35	(0.07)	0.24	(0.07)
Household-level variance	0.93	(0.25)	0.94	(0.25)
Constant	0.19		0.26	
Log likelihood	-5346.83		-5299.47	

***p<.001, **p<.01, *p<.05, $^{+}$p<.10

Table 4.6. Adjusted odds of acute malnutrition (N=15,774).

	OR	(SE)
Multigenerational household with two parents *(vs. nuclear)*	0.86	(0.12)
Multigenerational household with one parent *(vs. nuclear)*	0.96	(0.42)
Single parent household *(vs. nuclear)*	1.52	(0.63)
Skipped-generation household *(vs. nuclear)*	0.24	(0.26)
Number of other children under five	0.93^{+}	(0.04)
Child's age (years)	0.85***	(0.02)
Child is female	0.92	(0.05)
Poorest wealth quintile (*vs. richest*)	1.09	(0.14)
Poor wealth quintile (*vs. richest*)	1.03	(0.12)
Middle wealth quintile (*vs. richest*)	0.93	(0.11)
Rich wealth quintile (*vs. richest*)	0.96	(0.11)
Resides in rural area (*vs. urban*)	1.05	(0.10)
Highest household education: Incomplete primary education (*vs. none*)	0.78**	(0.06)
Highest household education: Complete primary (*vs. none*)	0.82	(0.11)
Highest household education: Incomplete secondary (*vs. none*)	0.81*	(0.08)
Highest household education: Complete secondary or higher (*vs. none*)	0.81	(0.13)
Improved toilet	0.92	(0.08)
Clean water	0.93	(0.06)
Year of survey: 2005 *(vs. 2000)*	0.43***	(0.05)
Year of survey: 2010 *(vs. 2000)*	0.58***	(0.06)
Year of survey: 2014 *(vs. 2000)*	0.52***	(0.06)
Multigenerational two parents x 2005	1.01	(0.22)
Multigenerational two parents x 2010	1.21	(0.24)
Multigenerational two parents x 2014	0.92	(0.18)
Multigenerational one parent x 2005	1.10	(0.59)
Multigenerational one parent x 2010	0.78	(0.40)
Multigenerational one parent x 2014	1.01	(0.51)
Single parent x 2005	0.25*	(0.16)
Single parent x 2005	0.63	(0.36)
Single parent x 2005	0.26^{+}	(0.18)
Skipped-generation x 2005	1.68	(2.09)
Skipped-generation x 2010	2.63	(3.05)
Skipped-generation x 2014	2.96	(3.36)
Village-level variance	0.24	(0.06)
Household-level variance	0.93	(0.25)
Constant	0.26	
Log likelihood	-5293.33	

***p<.001, **p<.01, *p<.05, $^{+}$p<.10

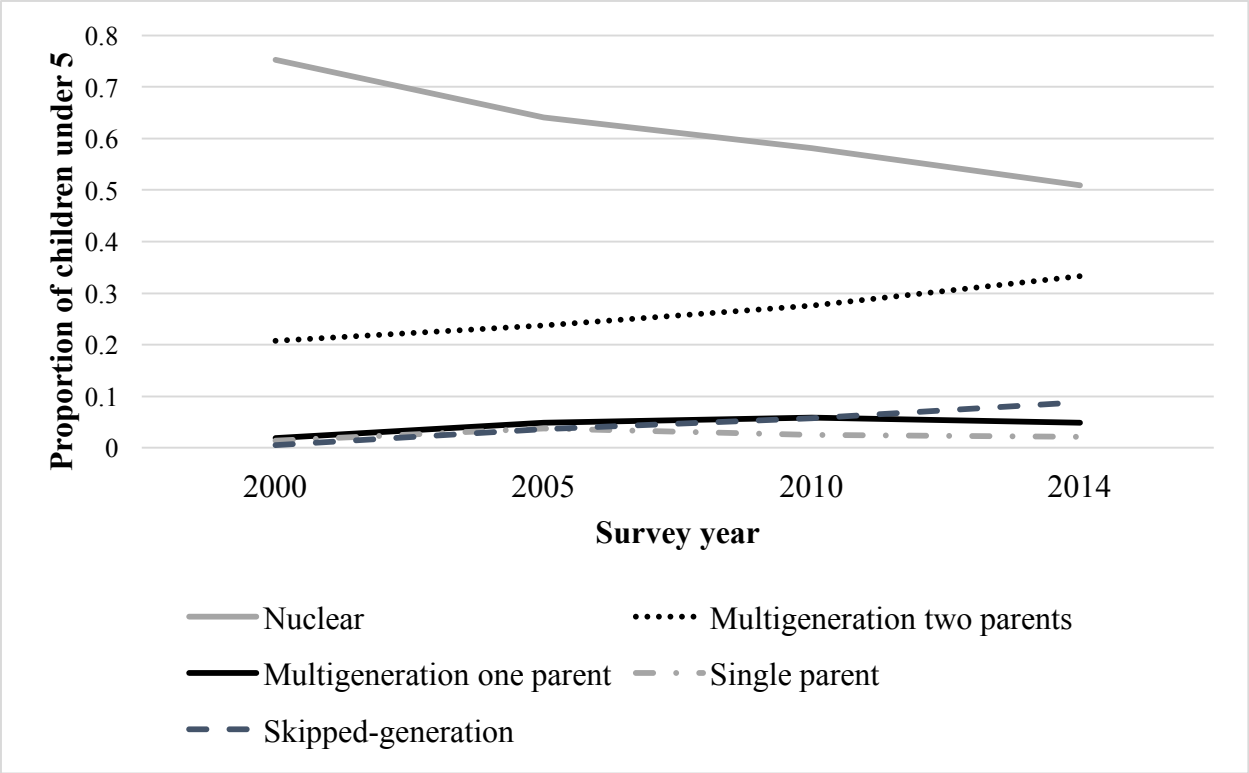

Figure 4.1. Living arrangements of children under five with two living parents, CDHS 2000 to 2014 (N=15,774).

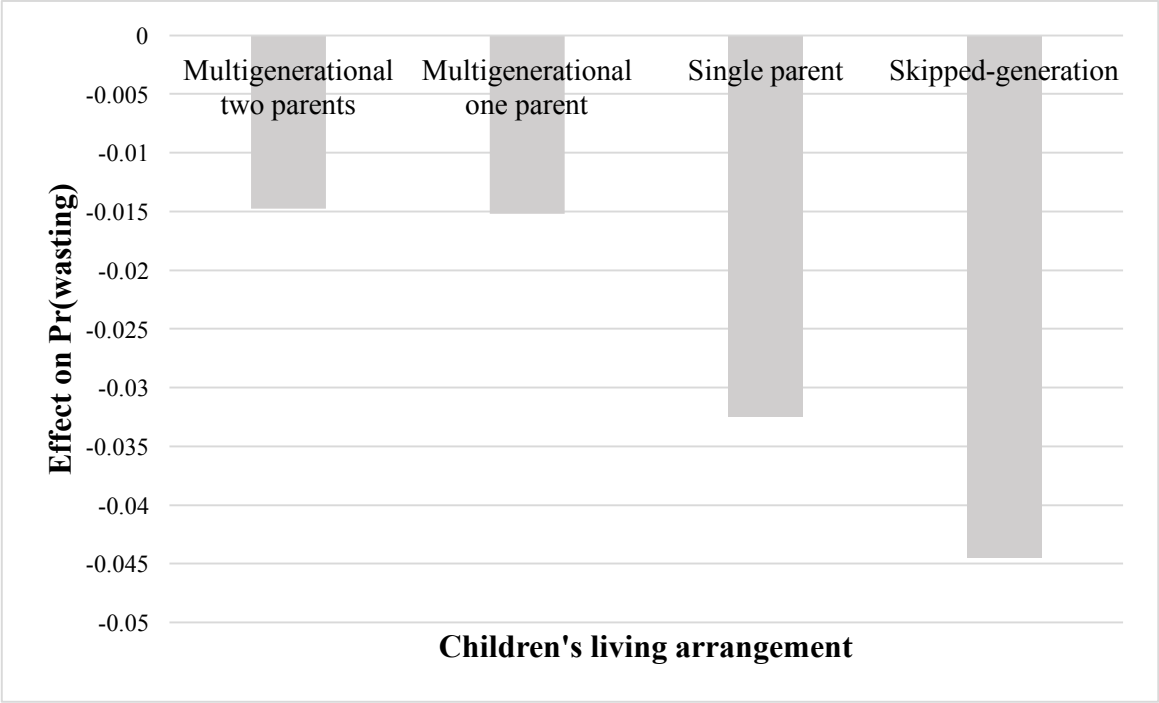

Figure 4.2. Average marginal effects of living arrangements on wasting among children under five in CDHS 2000 to 2014 (N=15,774).

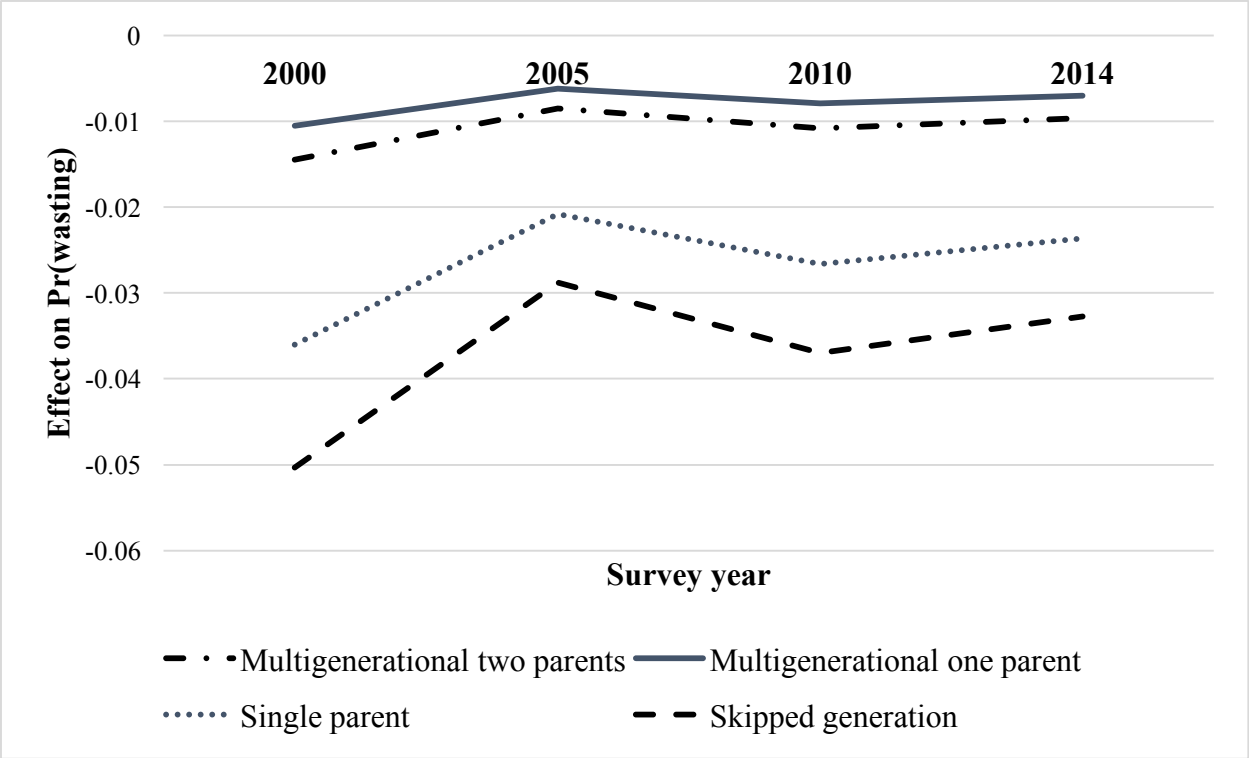

Figure 4.3. Average marginal effects of living arrangements on wasting by survey year among children under five in CDHS 2000 to 2014 (N=15,774).

Chapter 5: Conclusion

This dissertation analyzed the effects of migration on young children's health in Cambodia, a lower-middle income country experiencing rapid socio-economic development, demographic change, and high rates of internal and international migration. I incorporated theoretical perspectives on migration, social determinants of health, and social processes of care seeking, drawing upon the sociological, demographic, and public health literatures. In three distinct analyses, I examined the ways in which parents' out-migration shifts their children's access to healthcare, health outcomes and equity, and decision-making processes for children's health. I used a mixed-method approach to identify macro and micro-level consequences of migration on child health, with qualitative and quantitative analyses iteratively informing each other to create a detailed understanding of these issues. To address a significant gap in the demographic and public health literatures, I paid particular attention to the experiences and outcomes of children in skipped-generation households. For each analysis, I drew upon the findings to make policy and programmatic recommendations to improve children's health and health equity in high-migration settings.

Summary of research motivation, context, and strategy

Migration is a large-scale, dynamic global phenomenon with direct consequences for health. There are an estimated 240 million international migrants worldwide, and a further 740 million internal migrants (International Organization for Migration 2015; United Nations Department of Economic and Social Affairs, Population Division 2016), including many who support children left behind in their households of origin. Whether international or internal, migration takes many forms: it may be seasonal or long term; it may be for labor, education, or

other reasons. Given the complexities and transitions in the global economy that drive increasing labor migration, it is important for policymakers to understand how changing population dynamics affect children's health, development, and wellbeing. Identifying consequences of parental out-migration on child health also provides insight into how changes in underlying mechanisms of structural and social support, both within and beyond the family, shape children's health and development.

Migration is often a response to disadvantage, as well as a potential strategy for families to improve their livelihoods and opportunities (Lauby and Stark 1988; Stark and Lucas 1988; Suarez-Orozco and Suarez-Orozco 2009). Migration allows both the migrant and family members left behind to take on increased economic risk in the short term, eventually increasing earnings for the family as a whole (Lucas and Stark 1985b; Stark and Lucas 1988). This additional household income is often used to further the health and education of children left behind (Binci and Giannelli 2016; Hildebrandt et al. 2005; Ponce et al. 2011). However, migrants may not be able to provide remittances until several months or years after migration, and even then, economic support cannot substitute for a parent's presence in the household. A parent's absence requires other family members to take on his or her roles in daily life, creating additional physical, emotional, and financial stress for those left behind (Dreby 2010; Yabiku, Agadjanian, and Sevoyan 2010). From the child's perspective, a parent's migration and consequent separation results in a disruptive transition to a new reality (Dreby 2010), and often impacts these children emotionally (Dreby 2007; Levitt 2001).

Given the countervailing effects of remittance support and parental absence, it is unsurprising that previous research finds conflicting evidence as to whether children left behind experience improved health outcomes (Antón 2010; Graham and Jordan 2013; Kanaiaupuni and

Donato 1999; Viet Nguyen 2016; Yabiku et al. 2012). Previous research on migration and child health has examined this relationship in a variety of settings globally, focused on child health outcomes such mortality, nutritional status, and vaccination. However, this research has largely failed to consider how migration affects household decisions and processes for children's health, including child health care seeking. Moreover, because most household surveys collect child health information from their mothers, many previous studies of migration and child health exclude children who do not reside with their mothers, including children in skipped-generation households.

Cambodia, a developing country in Southeast Asia, has several notable socio-demographic characteristics which make it a particularly useful context in which to examine migration and child health. It currently has a demographic dividend, or surplus of young adults, who are migrating out of rural areas at a high rate (Ministry of Planning 2012). Cambodia's rapid socio-economic development over the last two decades, in parallel with a rise in foreign investment, have brought new labor opportunities to Phnom Penh, its capital. Migrants seek work in Phnom Penh, neighboring Thailand, and other countries in the region. This has led to increased diversity for children's living arrangements, with a rising number of children left behind in rural households of origin as their parents migrate. Examining the Cambodia Demographic and Health Survey, I find that since 2000, the proportion of children in skipped-generation households has greatly increased. In this period, the government, multilateral organizations, foreign aid organizations, and non-governmental organizations have made targeted efforts to strengthen Cambodia's pluralistic health system and service delivery (Grundy et al. 2009). With these investments, Cambodia has made important gains in its child health indicators: infant mortality, child mortality, and malnutrition have significantly decreased, while

vaccination coverage has significantly increased (National Institute of Statistics et al. 2015a). However, these gains are not equitable, with poorer children remaining significantly disadvantaged (Jimenez-Soto et al. 2014; Soeung et al. 2012). Moreover, several key child health indicators have stagnated in recent years (National Institute of Statistics et al. 2015a).

To analyze the effects and mechanisms of parental out-migration on several dimensions of children's health in Cambodia, I undertook a mixed-methods analysis across three chapters. I used qualitative data I collected in 2015 in rural Cambodia in a qualitative analysis, and used two repeated cross-sectional surveys in quantitative analyses: the Cambodia Socio-Economic Survey, and the Cambodia Demographic and Health Survey. The research strategy was designed to address identified gaps in the migration and child health literature, while leveraging multiple perspectives to develop a more holistic understanding of the research questions. Given the dearth of previous studies of migration and child health in Cambodia specifically, such a holistic perspective is especially important for policymakers and other stakeholders there. I focused on two primary literature gaps: first, skipped-generation households, which are often excluded from studies of migration and child health, and secondly, the effects of migration on child health care seeking and behaviors. To do so, I included skipped-generation households in quantitative analyses, and focused on the dynamics and processes related to children's health in these households in the qualitative analysis. I examined child health care seeking trajectories and decision-making in the qualitative analysis, and on child health expenditures and utilization of specific sites and providers of care in a quantitative analysis. Together, these analyses shed light on the effects of migration for individual children and their families, as well as the Cambodian population as a whole. Both perspectives are important for understanding the multiple ways in which parental out-migration affects children's health.

Findings

Chapter 2 used a grounded theory approach to examine qualitative data collected in rural Cambodia. In 2015, I worked with a team of Cambodian researchers and students to interview 25 grandparent caregivers of young children left behind in skipped-generation households. I aimed to identify process of care seeking for children in these households, including decision-making dynamics with grandparent caregivers and absent migrant parents, as well as forms of support utilized by these households to access care. I used an open coding process to code interviews line by line, developing code groups to identify themes. I also developed household biographical profiles, which I analyzed in parallel to the interviews. Throughout this coding process, I wrote analytic memos, which formed the basis of the results presented in the chapter. I found grandparent caregivers take on additional roles in the household, which leads them to direct the care-seeking process and control parents' involvement in decisions. Migrant parents are primarily involved in their children's healthcare as financiers. Grandparents make decisions for their grandchildren's healthcare based on the severity of illness, availability of remittances to cover the costs of care, and proximity to various providers or facilities. In order to access care, grandparent caregivers rely on both financial and social supports. Access to both types of capital allow grandparents to act quickly to seek their preferred type of care. A number of grandparents rely on their social networks to gain information about the availability and quality of different health providers. However, skipped-generation households without remittance or social support are particularly vulnerable; children in these households experienced multiple barriers to care. These findings suggest skipped-generation households may benefit from interventions to address non-financial barriers to care, especially transportation and health knowledge.

In Chapter 3, I used secondary data from three waves of the Cambodia Socio-Economic Survey (CSES) to assess the impact of migrant remittances on children's health care utilization. In this chapter, I aimed to identify whether children whose households benefit from remittance income are more likely to access formally-trained or public sector providers for acute illnesses; that is, whether migrants' remittance support is invested in higher quality healthcare for children left behind. I employed mixed-effects logistic regressions to assess the relationship between remittance income and care-seeking outcomes. I then used an instrumental variables approach to estimate these associations while addressing issues related to the selection of migrants. Examining a sample of 3,320 children in the 2009, 2010, and 2011 CSES waves, I found no significant differences in care-seeking outcomes between children whose households received remittance income and those in non-migrant households. This suggest migrant-sending households do not invest remittance income to access higher quality care, although they may use remittances for other health-related investments, such as children's nutrition. Thus, economic gains for migrant-sending households may not be sufficient to improve access to care or to address child health disparities.

Chapter 4 utilized secondary data from four waves of the Cambodia Demographic and Health Survey to analyze how the relationship between children's health and their household structure changed over time in a period of increasing out-migration. I examined how children's odds of acute malnutrition vary by their living arrangements, and how this relationship shifted from 2000 to 2014. The aim of this chapter was to identify how specific living arrangements associate with risk of acute malnutrition, and how increasing diversity of living arrangements affects children's nutritional status. I estimated mixed-effects logistic regressions using a sample of 15,774 children in the 2000, 2005, 2010, and 2014 survey waves. I found children's living

arrangements are significantly associated with their risk of malnutrition, with children in skipped-generation having the lowest risk of acute malnutrition. However, the relative advantage of children in skipped-generation households compared to children in nuclear households has diminished over time as migration increased. These findings suggest that children's nutrition may be a primary area of investment in migrant-sending households, with remittances used to reduce children's risk of acute malnutrition. However, as an increasing proportion of households send migrants, these households may be less likely to receive social or other forms of support that benefit children's nutrition, leading to the observed decreasing benefit of alternative living arrangements over time.

These findings highlight the complicated relationship between parental out-migration and child health. In Chapter 1, I find that children whose families have benefited financially from migration no longer accrue health-related debts, allowing them to make decisions for care based on factors other than cost. However, migrant-sending families who do not receive remittances are particularly vulnerable. The findings in Chapter 2 suggest that the increased household income from migrant remittances is not used to access higher quality healthcare for children; though in Chapter 3, I find that children in skipped-generation households enjoy a nutritional advantage over other children. Thus, the relationship between parental out-migration and children's health is very much dependent on the situation and characteristics of specific households. For example, where families left behind enjoy higher income, their children's health may improve. However, families whose social support is eroded after a parent migrates may face poorer child health outcomes.

My findings support previous studies of migration and child health that find this relationship is contingent upon the experiences of specific migrants and their households. For

example, in Mozambique, child mortality is higher among migrant-sending households than non-migrant households (Yabiku et al. 2012). However, once remittances are accounted for, child mortality is found to be lowest among migrant-sending households where the migrant has experienced economic success, while migrant-sending households who do not receive financial support are significantly worse off than non-migrant households. An examination of infant mortality in migrant-sending and non-migrant households in Mexico found corresponding nuances in the relationship between migrants' economic support and child health (Kanaiaupuni and Donato 1999). Similarly, a cross-national comparison of children's nutritional status in the Philippines and Vietnam finds that the risk of chronic malnutrition among children left behind compared to children in non-migrant households varies by their caregiver's education (Graham and Jordan 2013). While children left behind whose caregivers are poorly educated face a higher risk of chronic malnutrition, the nutritional status of children left behind whose caregivers have greater educational attainment do not differ significantly from that of children in non-migrant households. The overall nutritional advantage of children in alternative living arrangements I find in Chapter 4 is in line with studies in China, Ecuador, and Guatemala, which also find a nutritional advantage among children in migrant-sending households compared to those in non-migrant households (Antón 2010; Carletto et al. 2011; Mu and de Brauw 2015). Another study in Guatemala finds no significant difference in nutritional status between children left behind in migrant-sending households and children in non-migrant households (Davis and Brazil 2016). However, this study uses cross-sectional data at a single time point. This lack of difference might be attributed to the specific migration context, as I find the advantage of non-nuclear households diminished over time. In Guatemala, which has a longer history of out-migration, it may be that the role of community infrastructure and social support diminished over time, mitigating a prior

nutritional advantage among children in migrant-sending households. With regard to child health care seeking, prior literature is very limited. Unlike a previous study in Ecuador, I find no significant effect of remittances on health care expenditures (Ponce et al. 2011). This study also finds children in migrant-sending households are significantly more likely to utilize preventive care services such as deworming and vaccination. This difference in findings may be because the mechanisms that drive familial responses to preventive and curative care for children significantly differ. Additionally, differences in the health systems in these contexts likely underscore these results.

These chapters shed light on the multiple mechanisms through which parental out-migration shape children's health in Cambodia. Across the three chapters, I focused on children's living arrangements, especially skipped-generation households, as a mechanism through which migration affects child health. I emphasized access to healthcare as a critical outcome, which has not been previously studied in analyses of migration and child health. Together, these analyses make two key contributions to the migration and child health literature. First, given my attention to skipped-generation households, I am able to identify specific consequences of migration for children's health experienced in these households, including in comparison to other living arrangements. Second, with my examination of child health care-seeking processes and outcomes in Chapters 2 and 3, I extend the literature to analyze health-related behaviors and decision making, which are critical for understanding health disparities by migrant status, and the mechanisms through which parental migration shapes children's health. I also draw conclusions for child health equity, as a goal of this work was to understand how migration affects children's health equity over time.

Among children left behind, changes in their living arrangements are one of the most consequential ways in which they are impacted by migration. Alternate caregivers determine their access to care, make decisions for their health, and manage aspects of their daily life that contribute to their overall health and nutrition. Thus, the quality of children's caregivers is important for their health. In particular, as shown in Chapter 2, their caregivers' social capital and other forms of social support shape children's access to timely, quality healthcare. Social capital allows grandparents to gain information about available healthcare, and may also aid grandparents in decision-making for nutrition. The links between greater social capital and improved health outcomes have been established in a number of settings and for a range of health outcomes (De Silva and Harpham 2007; Ferlander 2007; Kawachi et al. 1997; Veenstra et al. 2005). This dissertation lends provides further evidence for this relationship. Chapter 4 underscores the importance of children's caregivers for their health by demonstrating a significant relationship between their living arrangements and nutritional status. That I find diminishing gains for alternate living arrangements over time as migration increased lends further support for the benefits of social support for child health (Kana'Iaupuni et al. 2005; Mulvaney-Day, Alegría, and Sribney 2007). In migrant-sending areas such as Cambodia, individual families may experience diminishing social support over time as an increasing number of families send migrants, leading to a loss of productive labor and social support in the sending area over time.

Access to quality care in a timely manner is critical for children's health. In Chapter 3, I hypothesized that increased household income from migrant remittances would allow children to access higher quality care. However, I failed to detect such a relationship, even accounting for potential selection factors related to parents' decisions to migrate. In Chapter 2, grandparent

caregivers who received significant remittance income underscored that this income allowed them to access providers or facilities closer to home. They chose to invest in more convenient providers, without necessarily considering quality. Because of their augmented role in the household as a primary caregiver for young children, they face additional barriers to care. Therefore, additional remittance income alone is not sufficient to allow access to higher quality care.

Turning to health equity, which I examined as a part of the quantitative analyses in Chapter 3 and 4, my findings suggest that migration itself does not lead towards improved health equity. That is, remittance income does not improve children's likelihood of attending formally-trained providers or higher-quality public sector facilities. However, my findings suggest several avenues through which migration might be leveraged to better target vulnerable children, which would contribute towards improved equity over time.

Lessons learned

I draw several policy and program recommendations from the three chapters. First, policymakers may be able to improve health equity by actively considering the demographic implications and changes brought about by migration. In Chapter 2, I find grandparents utilized social capital to gain health information. Grandparents are rarely targeted in child health interventions, yet they are important decision-makers for child health within the household (Aubel 2012). Grandparent caregivers should be included in interventions for child health, which will particularly benefit children residing in multigenerational or skipped-generation households. Given that I find a diminishing benefit of these household types for children's nutrition over time in Chapter 4, this may be increasingly important. Notably, children in all types of households

that include grandparents have, on average, significantly lower risks of acute malnutrition than children in nuclear families, further supporting their potential role in child health and nutrition interventions. The skipped-generation households included in the sample for Chapter 2 varied greatly in their socio-economic status, barriers to care, food security, and experiences. Targeting grandparents would greatly benefit the most vulnerable of these households. Similarly, the findings in Chapters 2 and 3 highlight the need to provide non-financial support for migrant-sending families. While remittances may allow these families to avoid catastrophic health-related debts, they are not sufficient to improve access to higher quality care if families face other barriers to care, such as a lack of transportation. Finally, broadening access to health subsidy schemes such as the ID Poor program will aid migrant-sending families who do not receive sufficient remittance support.

Though the three analyses are sited in Cambodia, the lessons learned in this dissertation are relevant for many low and middle-income countries globally, especially those with high or increasing rates of internal and international migration. Because the predominant living arrangement for migrants in Cambodia is to leave children behind in the household of origin with another parent, grandparent caregiver, or with another relative (Ministry of Planning 2012), these findings are especially relevant for other high-migration settings such as Mexico, Central America, and other Southeast Asian countries where such arrangements are also common (Dreby 2010; Nobles 2013; Rhacel Salazar Parreñas 2005). There are also parallels for Sub-Saharan Africa, where child fostering is common (Gaydosh 2015; Grant and Yeatman 2014).

The use of a mixed-methods approach was particularly beneficial in this dissertation. By examining the same phenomena from several methodological angles, I was able to address questions related to both the pathways and the effects of migration on child health. The

qualitative approach used in Chapter 2 underscores the mechanisms through which parents' absence and the changing realities of the household left behind affect children's health status and their access to care. The use of quantitative methods in Chapters 3 and 4 sheds light on how migration affects child health at a population level. It also allowed me to estimate the increasing proportion of children affected by migration over time in Cambodia. Both types of questions are critical for policymakers seeking to understand how demographic change affects child health, and for those who hope to maintain gains in child health indicators as the social and demographic context changes. In addition to identifying how many children are impacted by migration, policymakers must understand the ways in which children are affected. The findings in this dissertation can be used to benefit the delivery of child health programs in Cambodia and similar settings globally.

Future research

The analyses in this dissertation suggest a number of avenues for future research in the field of migration and child health. First, the use of longitudinal data would allow researchers to identify the effects of the timing of parental migration, whether and how these effects vary over time, and whether specific critical periods exist. Given that the experiences of left behind families are not static, understanding how children are affected throughout the months and years after their parents' migration is important. Additional exploration of changes in household wealth among the left behind over time will also shed further light on the links between wealth and children's health in migrant-sending families, given that remittance income tends to vary greatly over time (Acevedo-Garcia et al. 2012). From a qualitative perspective, gaining migrant parents' perspectives on decision-making processes will shed further light on how care is sought

for children left behind, especially if their interviews can be triangulated with grandparent caregivers. Finally, the role of community—both social and structural—requires further examination. Migration alters communities' composition, infrastructure, and social norms and networks (Massey, Goldring, and Durand 1994; Taylor et al. 1996). However, the migration and child health literature to date has focused on individual and family effects, and has largely ignored the role of community context. Yet, community infrastructure and social and demographic characteristics are known to impact children's health (Luke and Xu 2011; Sastry 1996), and dynamically shape migration patterns (Frankenberg, Laurito, and Thomas 2015; Massey et al. 1993). Identifying the role of community in the relationship between parental migration and child health will further inform public health and policy efforts to address child health in high migration settings globally.

Conclusion

This dissertation has examined novel aspects of the relationship between migration and child health using mixed methods in three analyses. In particular, I advance understanding of child health in skipped-generation migrant-sending households, and the ways in which parental out-migration affects child health care seeking through both proximate and distal social determinants. These findings further support the complicated nature of the relationship between parents' migration and children's health. Yet, they also highlight opportunities to support children's health in migrant-sending families, and to leverage the social and demographic change brought about by migration to improve child health equity. Migration presents an opportunity for children, families, and communities; where children, their migrant parents, and their caregivers

are supported, migration may provide an avenue to improve children's health in Cambodia and globally.

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