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West, Heidi Sierra

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The Effects of Migration on

Healthcare Decision-Making, Access, and Expenditures

A dissertation submitted in partial satisfaction of the

requirements for degree of Doctor of Philosophy

in Health Policy and Management

by

Heidi Sierra West

2023

ABSTRACT OF THE DISSERTATION

The Effects of Migration on

Healthcare Decision-Making, Access, and Expenditures

by

Heidi Sierra West

Doctor of Philosophy in Health Policy and Management

University of California, Los Angeles, 2023

Professor Corrina Moucheraud, Co-Chair

Professor Ninez Ponce, Co-Chair

Filling gaps in our understanding of how the effects of migration extend through families and impact healthcare decisions, access, and expenditures, this dissertation examined how migration is associated with health services in contexts that send a high number of migrants and a major migrant destination. The first study (Chapter 2) evaluated the impact of male spousal migration on the healthcare use and access for left-behind women and children using a quantitative cross-country comparison of four countries in South and Southeast Asia. Results showed that male spousal migration was positively associated with barriers to healthcare use across Bangladesh, Indonesia, Nepal, and the Philippines through a reduction in both economic and social (gender-

related) barriers to care - adding new evidence to the literature showing that migration can contribute to the health and wellbeing of those left-behind. The second study (Chapter 3) quantitatively measured receipt of international migrant remittances and healthcare expenditures to show how this important source of income for families and for the economy of the Philippines related to spending on healthcare. We found that remittance receiving households spent significantly more on healthcare than non-remittance receiving households in both absolute and proportional measures. Additionally, remittances did not provide financial protection against catastrophic health expenditures (CHE) and a significantly higher proportion of remittance-receiving households experienced CHE compared to non-remittance households. The third study (Chapter 4), based in the United States, examined the role of family structures and immigration factors in health services decision-making. Through quantitative analyses of the interaction between migration related characteristics and family structure, this study found that immigrants had a higher probability of seeking healthcare when they needed it compared to their US born counterparts who delayed or forewent needed care at higher rates, but that family structure affected immigrant families differently and this was especially true for more newly arrived immigrants and those on temporary visas or who were undocumented. The three papers of this dissertation expand our understanding of the relationship between the migration and health systems and demonstrate that relational frameworks can help capture some of the nuance of the complicated migration and health relationship.

The dissertation of Heidi Sierra West is approved.

James Macinko

Randall Kuhn

Ninez A. Ponce, Committee Co-Chair

Corrina Moucheraud, Committee Co-Chair

University of California, Los Angeles

2023

DEDICATION

This dissertation is dedicated to my daughters, Hope and Vivian.

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CURRICULUM VITAE

Education

Certificate	Global Health, Dornsife School of Public Health Drexel University, Philadelphia, PA	2013
MA	Ethics Peace and Global Affairs, School of International Service American University, Washington, DC	2009
BA	Political Science, College of Letters and Sciences University of California, Berkeley	2003

Publications

Peer-Reviewed

1. **West, H**., Robbins M., Moucheraud C., Razzaque A. G., Kuhn R. (2021). Effects of spousal migration on access to healthcare for women left behind: A cross-sectional follow-up study. PLOS ONE, 16(12): e0260219.

2. **West, H**., Than, M., Win, T., Oo, K.T., Khaing, K., Aye, T.T., Yi, S.M., Myo S.Y., Milkowska-Shibata, M., Ringstad, K.M., Meng, C., Shibata, T. (2021). Internal migration as a social determinant of occupational health and WASH access in Myanmar. Annals of Global Health, 87(1).

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Non-Peer-Reviewed

Maver, D., **West, H.** (2012). International ethical leadership: The power of diversity in ethics. *International Journal of Ethical Leadership*, 1(1):96 (invited)

Grants, Traineeships, and Research Fellowships

NICHD: California Center for Population Research Traineeship (T32HD007545 PI: Patrick

Heuveline and Hiram Beltran-Sanchez), 2021-2022, 2022-2023

Dissertation Year Fellowship: UCLA, 2022-2023

Graduate Research Mentorship Fellowship: UCLA, 2020-2021

Graduate Summer Research Mentorship Fellowship: UCLA, 2020

Center for the Study of Women Travel Grant: UCLA, 2020

AHRQ: Health Services Research Traineeship (2T32HS000046 PI: Thomas Rice), 2018-2020

Honors and Awards

University of California, Los Angeles: Dr. Ursula Mandel Scholarship; Samuel J. Tibbitts
     Award for Academic Excellence; Eugene and Sallyann Fama Fellowship

American University: Brady Tyson Award for Excellence in Human Rights; Distinction and
     Academic Honors Master's Comprehensive Exam; Initiative for Inclusive Security:
     Gender & Post-Conflict Reconstruction Trainee Award

University of California, Berkeley: Academic All American, Distinction in General
     Scholarship; Class of 1938 Chet Carlisle Memorial Alumni Scholar; Carol Holleuffer
     Alumni Scholar; Sierra Club Award; California Alumni Scholarship: Roy D. Sifford
     Scholarship; Monticola Club Hazel Bronson Memorial Scholarship; Xerox Award in the
     Social Sciences

Research and Teaching Positions

University of California, Los Angeles, CA
Graduate Research Assistant, Community Health Sciences
     Research & Empirical Analysis of Labor Migration (PI: Randall Kuhn)   2020-2021
     Matlab Health and Socioeconomic Survey (PI: Randall Kuhn)   2019-2021

Teaching Assistant, Health Policy and Management
     Advanced Evaluation Theory and Methods for Health Services (MS/PhD)   2021, 2022
     Practices of Evaluation in Health Services: Theory and Methodology (MPH)   2020

Global Environmental Health LAB, Myanmar; Indonesia; USA
Researcher: Co-PI Myanmar survey (N=997), Indonesia survey (N=300)   2016-present

Practicum and Internship Supervisor (MPH, MD/MPH, MA)   2016-present

Workshop Instructor: Research Ethics, Methods, Writing Abstracts, Migration   2016-present
     Research, Measuring Social Determinants, Field Experience Orientation

CMMB, New York, NY (Zambia, Kenya, Peru, Haiti, South Sudan)   2016-2018
Senior Specialist, Consultant

Drexel University, Philadelphia, PA; Honduras; The Gambia

Director Office of International Programs   2011-2015

Faculty/Staff Field Program Advisor, Office of International Programs   2011-2015

Global Health Field Practicum Leader, Dornsife School of Public Health   2013

Adjunct Faculty, College of Arts & Sciences, MS Public Policy Program   2009-2011

Chapter 1 : Introduction

Evidence has documented the wide-ranging health impacts of immigration, from access and utilization disparities, to differential health outcomes across occupational health, mental health, and communicable and non-communicable diseases (Adia et al. 2020; Alvarez-del Arco et al. 2017; Carrara et al. 2013; Castañeda et al. 2015; Lee et al. 2013; McAuliffe and Khadria 2019; Porteny et al. 2020; Sudhinaraset et al. 2020a; Sudhinaraset et al. 2017; West et al. 2021b). Migration and health researchers have largely sought to understand these disparities through individual or policy-centric lenses. Focusing our attention on either the individual immigrant or on broad systemic explanations such as exclusionary policies, this approach has expanded our understanding of social and structural determinants of health (Bustamante et al. 2019; Leung et al. 2018; Okie 2007; Ortega et al. 2007; Potochnick et al. 2017; Sudhinaraset et al. 2020b; Wallace et al. 2019; Young et al. 2019). Adding in a different domain, this dissertation focused on how specific social circumstances and family structure may influence different aspects of health services.

The relationships between migrants and their communities of origin, expressed and reinforced through remittances, social contact, and changes in family structure, form an important nexus that has implications for access to affordable health services for both migrants and their families. In expanding study populations beyond immigrants in their destination, research has begun to consider how the impacts of migration extend to migrants' sending communities (Fellmeth et al. 2018), but specific attention to how transnational relationships impact health services remains understudied (Fernández-Sánchez et al. 2020; Wickramage et al. 2018). With increasing labor migration, transnational families are a growing phenomenon. However, studies have tended to focus on labor market and economic outcomes for the left-behind (Amuedo-

Dorantes and Pozo 2006; Hadi 1999; Koc and Onan 2004; Taylor 1999) or looked at the impact on family in terms of the children or parents of migrants (Asis 2006; Battistella and Conaco 1998; Chang et al. 2011; Kuhn 2006; Kuhn et al. 2011; Thapa et al. 2018; Wang Sophie 2014).

Looking at healthcare access, utilization, and expenditures through the lens of these transnational relationships can inform health system interventions that operate in the context of both emigration (sending countries) and immigration (receiving countries). Yet, there is inadequate literature connecting these two realms. A research agenda that includes both sides of the migration equation can contribute a more nuanced and comprehensive view of the relationship between migration and health systems. As posited by the New Economics of Labor Migration framework, migration is a family and community process that implies a very high degree of dependence between migrants and families left behind (Stark and Bloom 1985). The United Nations Sustainable Development Goals and The Global Compact for Safe, Orderly and Regular Migration point to a few policy avenues that recognize this interdependence, including reducing the cost of financial transfers, making a greater proportion of remittances available to left-behind families, and improving bilateral cooperation to address the gendered nature of many push and pull migration factors such as those that do not allow for labor migrants to bring their families (Solomon and Sheldon 2018; United Nations 2015; Xiang and Lindquist 2014).

Gender and migration are intimately intertwined to reflect the social, cultural, and political experiences of men and women as they embed themselves into new societies for work or adjust to new family structures when loved ones migrate (Desai and Banerji 2008; Herrera 2013). Most gender and migration literature can be characterized as focusing on the influence of gendered structures on migration at the macro level or gender and agency in individual migration decision-making (Bastia and Busse 2011; Lokshin and Glinskaya 2009; Pessar 2005). Studies from

Morocco, India, Nepal and Bangladesh look at the left-behind spouses of migrants and focus on changes in women's status, autonomy, labor force participation, and well-being (De Haas and Van Rooij 2010; Desai and Banerji 2008; Gartaula et al. 2012; Hadi 2001). Household composition matters in whether the effects of spousal migration for women encompass increased autonomy alongside increased responsibility and financial resources (De Haas and Van Rooij 2010; Gartaula et al. 2012; Khan and Valatheeswaran 2016). As a result of migration, women have the potential to face both increasing family barriers and decreasing financial barriers to healthcare utilization (Ghose et al. 2017; West et al. 2021c). Drawing a distinction from studies that take a descriptive or comparative approach to demonstrating the scale and diversity of gender in international migration, or focus directly on gender equality or empowerment, these dissertation studies make a unique contribution through using a critical feminist lens, that of relational care ethics (Held 2006; Robinson 2011). Throughout the studies, we focused on the family, a highly gendered domain, and interactions between family abroad and those left-behind. Through this focus and elevating the experiences and voices of women exclusively in paper two, we highlighted the importance of gendered family roles in the relationship between migration and health.

In this three-paper dissertation, we examined the relationships between migration, family, and health services through exploring the question: How do migration and family relationships affect healthcare decisions, access, and expenditures for migrants, their families, and their communities? The objective of this study was to bring a new lens to questions of migration's broad global impacts and produce evidence on how the migration and health systems intersect in the everyday lives of immigrant families. This relational lens prioritizes things such as family roles, caregiving, and transnational financial support in explaining how migration may have downstream effects on health. It also brings a more holistic approach to migration indicators by

measuring impacts in sending and destination contexts. Each paper addressed a unique domain of health services (decision-making, healthcare access/use, expenditures), and presented the relational aspects of migration from a different perspective (migrants in receiving countries, wives of migrants in sending countries, migrant households in sending countries).

The first study examined the effects of spousal migration on women's and children's healthcare access and utilization across four countries in South and Southeast Asia. This comparison helps us to understand how the impacts of migration vary across sending contexts through answering the research question:

- Is spousal migration associated with barriers to healthcare access and healthcare utilization for women and children in high out-migration contexts in South and Southeast Asia?

The second study leveraged unique remittances and household expenditure data from the Philippines to evaluate if households were using remittances as protection against catastrophic health expenditures. The research question for the second study was:

- Does international migration influence household healthcare expenditures for the left-behind, and are migrant remittances associated with reduced incidence of catastrophic health expenditures?

The third study, focused on immigrants in the US, uses California Health Interview Survey data to understand how healthcare decision-making differs across immigrant and non-immigrant groups in a major immigrant destination. Through a quantitative evaluation of the associations between immigration and family characteristics and care-seeking decisions, we described how local and transnational relationships inform health services decision-making and address the research question:

- How do immigration factors and family structure affect health services decision-making for immigrants and non-immigrants in the US?

All three studies approached the migration experience and its effects on healthcare as a family experience, looking beyond the migrant themselves to more fully capture the relationships between migration and health. We identified important limitations in the dominant individual-focused frameworks and proposed advanced interdisciplinary approaches to better understand how migration contributes to both advantages and disparities in health services. Using migration and health services data from both the sending and receiving context, we were able to uncover associations and make important connections between individual, familial, and household outcomes.

This work built on earlier studies we conducted using binational data on migrants and their families from Bangladesh and a social determinants analysis of internal migration in Myanmar (West et al. 2021a; West et al. 2021b; West et al. 2021c). We make contributions in the migration and health space by examining how relationships across borders at a variety of levels (familial, community, provincial, national) impact access to and interactions with health systems, while adding complexity and nuance to migration indicators. We empirically demonstrated that migration can simultaneously play a role in some of the individual pre-disposing and enabling characteristics for health care utilization, and also paid direct attention to the relational and fundamental causes of health and health inequities (Andersen 1995; Babitsch et al. 2012; Link and Phelan 1995; Marmot 2005).

The following pages include a visual conceptualization of the three-paper dissertation (Figure 1.1) and a sample model (Figure 1.2) that shows the intersection of the different theoretical and analytical frameworks we employed. The model (Figure 1.2) maps factors that are specific to

migrants and families left-behind on the macro-structural, predisposing, enabling, and need domains of the Yang and Hwang version of the Andersen model (Yang and Hwang 2016). Yang and Hwang adapted the Andersen model to the case of immigrants in the United States. We build on their adaptation to demonstrate that in order to capture the full impact of migration, we need to expand the macro-level, pre-disposing, enabling, and need factors to include the familial and relational aspects of migration. The general factors are not sufficient to explain for example, why women or children left behind by migration experienced realized access to care and/or barriers to care differently than families without migrants. The factors considered in the adaptation of the model draw from feminist relational ethics and the WHO Universal Health Coverage framework.

Figure 1.1: Visual Conceptualization of the three dissertation studies
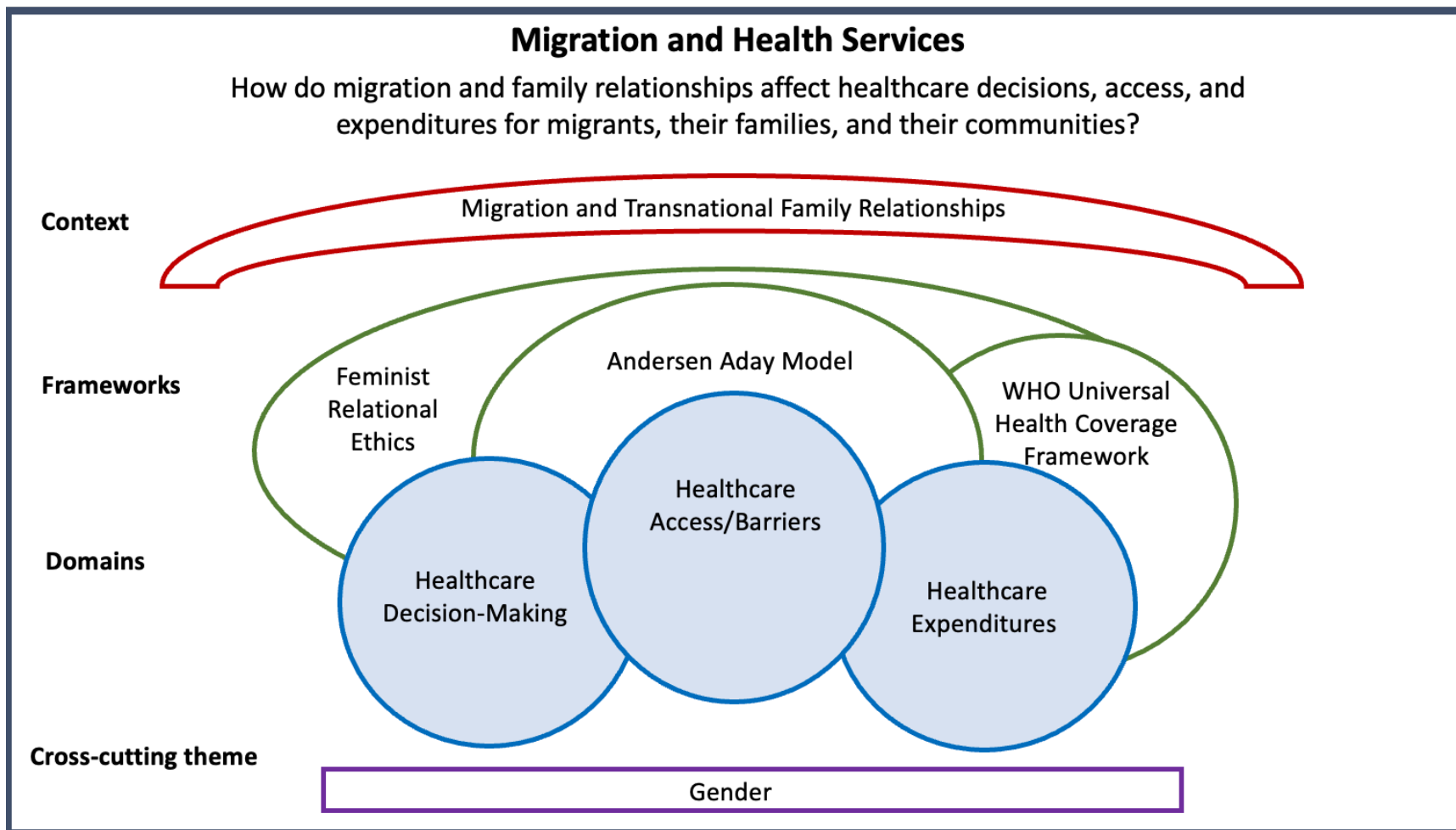
Figure 1.2: Example of mapping migrant sending and receiving factors onto the Andersen model

Healthcare Access and Utilization for Migrant Families

Macro-Social/Pol/Econ Context	Pre-disposing	Enabling	Need	Realized Access, Barriers, Expenditures
General				
• **Healthcare System** • Delivery of care • Financing • Environment • Political Situation • Social Structures • Econ Conditions	• Social Position • Demographics • Genetics • Socioeconomic characteristics • Health Beliefs/ culture • Geographic location	• Financial resources • Distance/transport to facility • Health knowledge • Relationship with health providers • Insurance • Efficacy & Perception	• Current health status • Perception of health	• Delay or deferral of care • Barriers to accessing care • Utilization for self & family • Type of care (inpatient, outpatient, public/private,) • Expenditures • Catastrophic expenditures
Left-Behind				
• **Migration Policy** • Sending Country • Receiving Country • Labor market • Transnational financial and communication systems	• Type of migration • Duration of migration • Who migrates	• Remittances received • Costs of migration • Size / composition of family • Permission to go	• Family view of health status & need • Migrant view of need/urgency	

*Adaptation of Yang and Hwang's version of the Andersen Model for Immigrant Health Service Utilization (Andersen 1995; Yang & Hwang 2016)

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Chapter 2 : Healthcare access for families left behind: A cross-country analysis of the effects of spousal migration

Abstract

Understanding patterns of healthcare utilization and barriers to care in out-migration communities helps us better understand the effects of migration, and how health systems can respond. This study evaluated the impact of male spousal migration on women and children's healthcare access and utilization in high out-migration contexts in South and Southeast Asia.

This was a quantitative cross–sectional study using data from Bangladesh, Indonesia, Nepal and the Philippines. All four countries have negative net migration rates and are among the highest migrant sending countries in the world. Beyond looking at how barriers and use of postpartum and children's healthcare were associated with having a migrant spouse, we evaluated differences across contexts through cross-country comparisons, an approach rarely employed in studies of the left-behind. The primary outcome measures were women's barriers to accessing healthcare and realized access to healthcare for women and young children. This work used the nationally representative Demographic and Health Surveys (DHS). The pooled sample includes 71,045 currently married women aged 15-49. The percentage of women with migrant spouses ranged from 7% in the Philippines and Indonesia to 16% and 33% in Bangladesh and Nepal.

There was significant variation by spousal migration status for the barriers to care that women experienced. In pooled estimates, having a migrant spouse was good for accessing care and was associated with a significant reduction in the probability of experiencing any barriers to care (AOR:0.83, p<0.001), permission (AOR:0.864, p<0.01), financial (AOR:0.839, p<0.0001) and traveling alone barriers (AOR:0.899, p<0.001). Results were similar in country-level

estimates; however, we saw important cross-country differences in which barriers were more sensitive to spousal migration, with the greatest reductions in the overall odds of experiencing barriers in Indonesia. Despite improvements in access to care associated with spousal migration, weighted bivariate and multivariable pooled and country-level estimates showed that spousal migration was not a significant predictor postpartum healthcare. Spousal migration was also not associated with the probability of care-seeking for children experiencing a fever or diarrhea.

Spousal migration can have a positive impact on healthcare access through reducing common barriers to care for women. However, reductions in these barriers are not necessarily associated with increased utilization of postpartum or children's healthcare. Efforts aimed at increasing access to care for women and children should consider the migration context and how best to leverage the benefits of migration for improving the health of sending communities.

Introduction and Background

Understanding barriers to care and patterns of healthcare utilization in out-migration communities will help us better understand the effects of migration, and how health systems can respond. Given the scope of the current literature, and the dearth of research on varying out-migration contexts in South and Southeast Asia, this study evaluated the impact of male spousal migration on women and children's healthcare access and utilization in four countries with substantial out-migration: Bangladesh, Indonesia, Nepal, and the Philippines. Beyond looking at how barriers and use of postnatal and children's healthcare were associated with having a migrant spouse, we evaluated differences across contexts through cross-country comparisons, an approach rarely employed in studies of the left-behind.

Migration in Asia

Driven largely by increases in migrants from Asia, migration has outpaced global population growth with over 281 million people participating in international migration international migration (United Nations 2020). In 2017, 106 million migrants, approximately 40% of the world's total, originated from Asia (Kobler and Lattes 2017). Bangladesh (#6), the Philippines (#9), and Indonesia (#11) are consistently in the top 20 migrant sending countries in the world (McAuliffe and Khadria 2019). While Nepal has a relatively small population (28.9 million) compared to other Asian countries such as Indonesia and Bangladesh, migration has a major effect on the population, with almost 50% of households having a member who was either working overseas or had returned, and 7.3% of the total population abroad at any given time (International Organization for Migration 2019). The world's most populous region also now hosts the most migrants in absolute numbers, with the number of resident migrants in Asia

increasing by over 50% between 2000 and 2015.

On an economic scale, migrant remittances account for a significant portion of Gross Domestic Product (GDP) in many countries. In Nepal, remittances make up almost 25% of the GDP, ranking it as the 5th highest remittance recipient (as a share of GDP) in the world, and the highest in The South Asian Association for Regional Cooperation (SAARC[1]). According to the Asian Development Bank, remittances are the "bedrock" of Nepal's economy and indispensable for its development (International Organization for Migration 2019). The Philippines is consistently among the largest remittance recipient countries in the world, fourth behind India, China and Mexico (World Bank 2019b) with remittances over 30 billion USD making up over 9% of GDP in 2020. Given the size and scale of migration in Asia, and its use by governments as a development strategy, it is important to understand how it impacts the families who are participating in labor migration.

Left-behind families

Migration is a multidimensional and ongoing process that requires a comprehensive approach to understand its complex impact on individuals, families, and communities. There is growing recognition and attention to migration on a global scale including in the 2030 Sustainable Development Goals and the Global Compact on Safe, Orderly and Regular Migration, the first ever comprehensive framework for global migration governance (Solomon and Sheldon 2018; United Nations 2015). However, despite increased international attention, the International Organization for Migration states that "...*the current evidence base on the health impacts of labour migration, both for migrants and their families, remains weak. The health impact on families left*

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[1] Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri-Lanka

behind is especially salient for the majority of labour sending nations, which are mostly low- and middle-income countries that lack adequate resources to respond to broad public health outcomes linked to increased migration and its cascading reverse impact" (Wickramage et al. 2018).

Migration has a profound effect on families, but evidence documenting the impact of migration on healthcare access for families left behind is still lacking. When a family member migrates out of the country, relationships become transnational and the family structure is altered. These transnational relationships are often characterized by economic transfers (remittances), social contact through mobile phones, and shifts in family roles and responsibilities at home. Although studies have explored how remittances improve economic outcomes for the left-behind (Green et al. 2019), how migration can result in possible negative psychosocial outcomes for children (Lu et al. 2019), and the positive effects children's migration can have on elders' health (Kuhn et al. 2011), the mixed results and unclear mechanisms through which these outcomes occur warrant further study. While we know that migration can have significant implications for community development and gender relations, there is little to no consensus on whether the impacts for women left behind are positive or negative (Chant 1998; Choithani 2019; Fernández-Sánchez et al. 2020; Ferrandiz-Mont and Chiao 2020; Gartaula et al. 2012; Hadi 2001; Rashid 2013). Understanding shifts in patterns of healthcare utilization, and barriers to accessing healthcare in out-migration communities will help us better understand the physical and psychosocial effects of migration, and support the growing literature on the left-behind. In expanding study populations beyond immigrants in their destination, research has begun to consider how the impacts of migration extend to migrants' sending communities (Fellmeth et al. 2018), but specific attention to women and how transnational relationships impact health services remains understudied (Fernández-Sánchez et al. 2020; Wickramage et al. 2018).

Gender and Migration

To fully understand the impacts of migration on development and health, we must develop empirical evidence on how migration intersects with social factors such as gender. Gender and migration are intimately intertwined to reflect the social, cultural, and political experiences of men and women as they embed themselves into new societies for work (Desai and Banerji 2008; Herrera 2013). Almost three-quarters of all international migrants are working age, and in Africa and Asia migration is dominated by men (McAuliffe and Ruhs 2017). Between 1985 - 2017 there were 19 specific laws passed regulating women's movement outside of Nepal, most of which included prohibitions on certain types of migration or particular groups of women (International Organization for Migration 2019). Bangladeshi migration, motivated by international work policies and mechanisms, specifically banned women from migrating for work until 2007. Today women make up about 12% of labor migrants from Bangladesh (Bureau of Manpower 2018), however the multifaceted gendered impacts of large groups of men leaving the country are still being measured and contextualized to better understand the effects on families left behind. Scholars have found, by centering their analysis on women, larger interactions between the political, economic, social, and health domains emerge (Chatterjee and Desai 2020; Kabeer 2019).

Mechanisms- migration and health of the left-behind

Migration could have a positive impact on left-behind wives through increased autonomy (Agadjanian and Hayford 2017) and remittances can improve financial well-being. However, the inherently gendered restructuring of the household when fathers and male family members leave home can moderate these positive impacts (Chant 1998; Mazzucato 2015; Shattuck et al. 2019). For example, earlier work shows that women with migrant spouses in rural Bangladesh see

improved access to healthcare: women with an international migrant spouse were half as likely to be prevented from accessing healthcare compared to women with coresident spouses, and faced fewer financial barriers to care (West et al. 2021c). When testing for factors that could moderate the relationship between migration and healthcare utilization, it was found that migration-related improvements in women's economic empowerment and mobility were completely reversed for women who lived in multigenerational households with their parents or in-laws, resulting in significant reductions in empowerment in both domains (West et al. 2022). Although some of the benefits of migration include ability to pay for healthcare, these may be diluted by family structures that perpetuate unequal gender dynamics. These studies were conducted in a single area of rural Bangladesh, and it is important to conduct similar analyses in a variety of contexts and using larger datasets, so we can have a clearer picture of how the relationship between migration and health plays out in sending communities.

Healthcare Context

The healthcare systems within which women and children are seeking care are distinct, but facing problems in accessing care is unfortunately, common in all four countries. The main barriers to care represent both resource constraints such as access to money to pay for care and transportation to facilities, and gender-related barriers such as needing to obtain permission and not being able to or wanting to seek care alone (Ministry of Health Nepal 2017; National Population Family Planning Board - (BKKBN) et al. 2018; NIPORT; and ICF 2020; Philippine Statistics Authority - PSA and ICF 2018).

The Bangladeshi health system is characterized by widely available yet variable quality healthcare (Ahmed et al. 2013), a highly pluralistic system. Eight-six percent of the 2017-18 Demographic and Health Survey (DHS) sample clusters have a health facility within their village or mohalla (locality); 44% have a government health facility, 9% each have an NGO facility and a private facility, and 77% have a satellite clinic, with slightly higher availability in urban clusters (90%) compared to rural clusters (84%). More women in rural areas (71%) than urban areas (58%) have problems in accessing healthcare and the poorest women are also more likely to face barriers to care (80%) compared to the richest women (50%) (NIPORT; and ICF 2020).

In Indonesia, the fourth largest country in the world with over 17,000 islands, the health system is fragmented with a mixture of public and private providers and financing. Wealthier individuals have private coverage, whereas the poorer use the public system. Among women aged 15-49, 58% have health insurance; 31% have subsidized health insurance, and 22% have nonsubsidized health insurance. Despite advances toward universal health coverage, access to care remains an issue for women, with over thirty percent reporting experiencing at least one of the specified problems in accessing healthcare when they are sick (National Population Family Planning Board - (BKKBN) et al. 2018).

Access to quality care remains a problem in Nepal, despite the codification of basic healthcare as a human right in the 2015 constitution. The system is characterized by disease focused programs as the country transitions to a federalist approach (Sharma et al. 2018). Women in Nepal face more problems in accessing care than in the other three countries with almost 8 in ten women facing at least one of the four barriers to care (Ministry of Health Nepal 2017).

The Philippines, like Indonesia is further along in the process of decentralization and health system development; having invested heavily in infrastructure and human resources, and

strengthened policies to improve service delivery for women and children. Sixty-eight percent of

the population has some form of health insurance coverage. In terms of care-seeking overall, 8%

of household members visited a health facility for advice or treatment recently. Most people (59%)

seek care at a public medical facility, 40% consulted a private facility. Despite advancements in

healthcare coverage, over 50% of women still experience problems in accessing care (Philippine

Statistics Authority - PSA and ICF 2018).

To understand potential barriers and facilitators to healthcare access and utilization, we

analyzed the effects of migration on problems in accessing care and on healthcare utilization for

women and children left behind by migrant spouses and fathers in four countries with substantial

out-migration in Asia, Bangladesh, Indonesia, Nepal and the Philippines (Table 2.1).

Research Question and Specific Aims

Is spousal migration associated with barriers to healthcare access and healthcare utilization for

women and children in high out-migration contexts in South and Southeast Asia?

Aim 1: Evaluate the overall impact of male spousal migration on women and children's healthcare

access and utilization in high-out migration contexts in South and Southeast Asia.

Aim 2: Compare the effects of male spousal migration on healthcare utilization and barriers to

access across different outmigration contexts – Bangladesh, Indonesia, Nepal and the Philippines.

Conceptual Model

The conceptual model (Figure 2.1) shows the pathways through which the migration of a spouse acts on specific enabling and pre-disposing characteristics for women left behind. The categorization of the factors is drawn from the Yang and Hwang version of the Andersen model (Yang and Hwang 2016). Yang and Hwang adapted the Andersen model to the case of immigrants in the United States. This model's factors however are not sufficient to explain for example, why women or children left behind by migration experience realized access to care and/or barriers to care differently than families without migrants. We therefore build on their adaptation by including the familial and relational aspects of migration. The specific enabling, pre-disposing and utilization measures listed are drawn from the data set (Demographic and Health Surveys), and standard measures of access in low- and middle-income countries.

Methods

Research Design

This is a quantitative cross–sectional study using data from four countries in South and Southeast Asia.

Ethical Review

This study has been determined exempt from human subjects' research requirements by the UCLA Institutional Review Board (IRB#20-001931).

Table 2.1: Summary Migration Descriptions and Data Characteristics by Country

	Bangladesh	Indonesia	Nepal	Philippines
Total Population 2017 (Female headed households)	159.45 (12.5%)	262.79 (14.85%)	28.98 (31.3%)	104.9 (20.6%)
Net Migration Rate 2017*	-3.1	-1.1	-2.2	-2
Annual Labor Migrants (% men)	1 million (88%)	261,800 (30%)	236,211 (91.3%)	1.8 million (50%)
Main Destination Countries	Saudi Arabia, UAE, Oman, Malaysia	Malaysia, Saudi Arabia, China, Singapore	Qatar, UAE, Saudi Arabia, Kuwait	Saudi Arabia, Singapore, China, Qatar
DHS Data Year	2017-2018	2017	2016	2017
DHS Sample Size Women (currently married 15-49**)	17,323	33,080	9,307	11,335

Data from DHS StatCompiler, CIA World Fact Book and IOM Migration Data Portal

*Net migration rate= migrants per 1,000 population. Immigrants minus Emigrants, divided by the person-years lived by the population of the receiving country for 2017

**DHS sample is women age 15-49, this study only includes a subset of that sample – married / or cohabitating women

Figure 2.1: Conceptual model- Pathways through which migration impacts enabling and predisposing factors for healthcare use

Migration and Enabling Health Service Utilization for Women Left-Behind

Exposure

Migrant Spouse

Remittances[u]

In village with family[u]

Husband not present to give permission

Fewer people in HH

Husband not present for joint-decision making

Enabling

Financial resources

Distance/transport to facility

Permission to go to facility

Someone to accompany

Pre-disposing

Health related decision-making

Utilization

- Postnatal care (self)
- Diarrhea care (child)
- Fever care (child)

Key
+ = increases ability to address this barrier to care   [U] = unmeasured mechanisms
− = decreases ability to address this barrier to care

Data and Sample

This study used data from the Demographic and Health Surveys (DHS) from Bangladesh, Nepal, Indonesia and the Philippines (Table 2.1). These are nationally representative household surveys that include health and economic data. The DHS Program, established in 1984, is run by the United States Agency for International Development (USAID) and its main objective is "*to improve the collection, analysis, and dissemination of population, health, and nutrition data and to facilitate use of these data for planning, policy-making and program management*" (Croft 2018). One of the key aims of the DHS is to collect data that are comparable across countries and accordingly, they implemented standardized questionnaires.

The primary population for the DHS surveys is women aged 15-49. The samples for the four countries are two-stage probability samples drawn from an existing sample frame, generally the most recent census frame (Bangladesh, Indonesia, Nepal) (Ministry of Health - MOH/Nepal et al. 2017; National Population Family Planning Board - (BKKBN) et al. 2018; NIPORT; and ICF 2020). For the Philippines, the sampling frame was the Master Sample Frame from the Philippine Statistics Authority (Philippine Statistics Authority - PSA and ICF 2018). DHS samples are stratified by geographic region and by urban/rural areas within each region.

Measures

The primary dependent and independent variables were measured at the level of the individual woman respondent. The measures for barriers to care capture the respondent's perception of the barriers and how big of a problem they present in accessing care. Receipt of a postpartum check within two days of giving birth was selected as the main healthcare utilization

variable because it is the global standard of care for all postpartum women regardless of delivery location. It was consistently measured, has a large sample size, and because it is not connected to an illness, injury or perceived need for care, selection bias was reduced. The other utilization measures were for children's acute healthcare utilization for fever and diarrhea in children five years and under. The combination of realized access to care and perceived barriers to accessing care provided a more complete picture of challenges faced by women with and without migrant spouses and whether those challenges reduced recommended healthcare utilization.

The spousal migration variable captured whether the spouse was currently a migrant. The effects of migration can change based on the phase of migration (pre-departure, out of the household, returned) (Zimmerman et al. 2011) and for the purposes of this study, we wanted to capture how spousal absence impacted women's healthcare, so use of a measure that captured the current status was most appropriate.

Measures and Operationalization

    a. *Outcome 1:* Barriers to Care

        i. *Variable:* Experience of one or more barriers/problems in seeking healthcare.

        ii. *Question(s): "Many different factors can prevent women from getting medical advice or treatment for themselves. When you are sick and want to get medical advice or treatment, is each of the following a big problem or not a big problem*

            1. *Getting permission to go to the doctor?*

            2. *Getting money needed for advice or treatment?*

            3. *The distance to the health facilities?*

            4. *Not wanting to go alone?"*

i. *Operationalization:* 5 separate outcome barriers. Four binary indicators of whether or not each specific barrier was a big problem (1) or not a big problem (0) One composite measure of whether or not a woman experienced one or more of these 4 problems. This is also a binary indicator variable (1) experienced one or more of the four barriers (0) experienced none of the four barriers.

b. *Outcome 2*: Realized access to healthcare for self (woman)

i. *Variable*: For women who had a live birth in the last 2 years: received postpartum check for herself within 2 days after delivery from a medically trained provider

ii. *Question(s)*: For facility births: *"I would like to talk to you about checks on your health after delivery, for example, someone asking you questions about your health or examining you. Did anyone check on your health while you were still in the facility?" "Now I want to talk to you about what happened after you left the facility. Did anyone check on your health after you left the facility?"* For home or other non-facility births: *"I would like to talk to you about checks on your health after delivery, for example, someone asking you questions about your health or examining you. Did anyone check on your health after you gave birth to (NAME)?"*

1. For each of the above questions the following was asked: *"How long after delivery did that check take place?" "Who checked on your health at that time?"*

i. *Operationalization*: Binary variable indicating whether (1) or not (0), for the last live birth that occurred within the prior 2 years, the woman received a postpartum check (at any location) within 2 days of delivery by a health provider.

ii. *Notes*: Operationalization included checks on multiple variables and followed the recommended calculation by the DHS program. Who counted as a trained health provider for the postpartum check varied slightly by country because of different training and licensing for providers. Included providers for each country were as follows:

    a. *Bangladesh*: qualified doctor, nurse, midwife, paramedic, family welfare visitor, community skilled birth attendant, sub-assistant community medical officer (SACMO)

    b. *Indonesia*: obstetrician, general practitioner, midwife, nurse

    c. *Nepal*: doctor, nurse/midwife, health assistant (AHW), maternal and child healthcare worker (MCH Worker), village health worker (VHW)

    2. *Philippines*: doctor, nurse, midwife

c. *Outcome 3:* Realized access to healthcare for family (children 5 and under)

i. *Variable:* Healthcare utilization for child with acute illness (diarrhea or fever).

ii. *Question(s): "Did you seek advice or treatment for the [diarrhea, fever] from any source?"*

i. *Operationalization:* Two different binary variables indicating whether (1) or not (0) care was sought for fever or diarrhea. A composite measure that includes care-seeking for either diarrhea or fever.

  ii. *Notes:* Only applies to subsample of women who had a child 5 and under who reported that the child experienced diarrhea or a fever in the last two weeks.

 d. *Primary predictor:* Spousal Migration Status

  i. *Variable:* Spouse living elsewhere (domestic or international migrant)

  ii. *Question: "Is your husband living with you now or is he staying elsewhere?"*

  iii. *Operationalization:* Binary variable indicating whether (1) or not (1) the current spouse does not reside in the household with the respondent.

  iv. *Notes:* Only among women currently married

 e. *Covariates:* Variables were selected using a combination of a review of the literature, model fit statistics, and formal tests on individual predictors: Age (5 year age groups), education (none, primary, secondary, higher, children 5 years and younger in household (3 different specifications: yes/no indicator for any children =<5, count of number of children =<5, yes/no indicator for multiple children =<5), urban/rural location, household headship (relationship to head: self or husband, in-law, bio/natal family member), wealth quintile (index is a composite measure of household's living standard and includes ownership of assets such as televisions or bicycles, materials used for constructing the home, and access to improved water and sanitation).

Analyses

  Statistical analyses were performed using Stata Statistical Software: Release 15, College Station, TX: StataCorp LLC. For testing overall differences across categories within variables, chi-square tests and t-tests were used. Statistical estimates of barriers to access and healthcare utilization were based on weighted logistic regression models, controlling for individual characteristics (age, education), geographic location (rural/urban), household structure

(relationship to household head), minor children, and household wealth (WASH, electricity and assets). Survey weights were used to account for the complex survey design and selection of households, and individuals within households. For pooled analyses, weights were adjusted to account for sampling at the country level and to give each survey equal weight regardless of sample or population size.

Treatment Selection and Sensitivity analyses

Migration is not randomly assigned and families with migrants may be different from families without migrants in ways that also relate to the outcomes of interest. Accordingly, it was important to control for selection into a migrant family so we could better understand the actual impact of having a migrant spouse separate of factors such as wealth or education that may make migrant families inherently different from non-migrant families. Following the framework developed by Rosenbaum and Rubin and its recent application in migration-related studies, we tested multiple selection control models (Atake 2018; Brookhart et al. 2006; Kuhn et al. 2020; Kuhn et al. 2011; Rosenbaum and Rubin 1983; Rosenbaum and Rubin 1984). Our propensity score analysis focused on predisposing variables well-known to impinge on the migration decision, including household socioeconomic status, wealth, and education. For each outcome, we tested models that did not include propensity score adjustments, models that restricted the sample to the area of common support (ACS), models that used the restricted sample and a linear propensity score term as a control, and models that used a restricted sample and controls for propensity block. The second analytic approach that we employed was the calculation of the average treatment effect based on propensity score matching.

Results

Descriptive

Table 2.2 provides background on the characteristics of the women in the sample and shows how the women differ across the different country contexts. Seventeen percent of women overall had a migrant husband with significant variation by country. In Nepal 33% of women had a current migrant spouse while that number was only 16% in Bangladesh and 7% in both Indonesia and the Philippines. Across all four countries, most women (84%) had at least primary education, but this differed widely across context with only 59% of women in Nepal and 99% in the Philippines having at least primary education. Most women lived in rural settings and 44% lived in urban areas. This varied across countries (29% urban in Bangladesh, 61% urban in Nepal). The average age for all women was 34 years with slightly younger groups in Bangladesh (32 years) and Nepal (32 years) and older in Indonesia (35 years) and the Philippines (37 years).

Women with and without migrant spouses differed on a range of sociodemographic characteristics. Women with migrant husbands were younger overall (average 30 years) compared to women without migrant husbands (34 years). This trend of younger women being more likely to have a migrant spouse held true across all countries except in the Philippines where there was no difference in average age for women with and without migrant spouses. More women with migrant spouses had children 5 years or younger at home compared to women without migrant spouses. Women with migrant spouses were significantly less likely to be in the poorest or poorer wealth quintiles with the starkest differences in the Philippines where only 8% of women with migrant spouses were in the poorest quintile and over 40% were in the richest. Most women (78%) lived in households where they or their husbands are heads with the highest percentage in the Philippines (86%) and lowest in Nepal (69%). Household headship shifted when men migrate

leading to significant increases in women who live with their natal families (17% vs. 6%) or in-laws (27% vs. 11%). Changes in household headship occurred across all countries with most of the shift to natal families in Indonesia and the Philippines and toward in-laws in Bangladesh and Nepal.

Table 2.2: Characteristics of women by country

	Bangladesh n=17,323		Indonesia n=33,080		Nepal n=9,307		Philippines n=11,335		Pooled n=71,045	
	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI
Migrant Spouse*** (ref: co-resident)	0.16	[0.15-0.17]	0.07	[0.07-0.08]	0.33	[0.31-0.35]	0.07	[0.06-0.08]	0.17	[0.16-0.18]
Age ***										
15-19	0.09	[0.09-0.10]	0.02	[0.02-0.02]	0.06	[0.06-0.07]	0.01	[0.00-0.01]	0.05	[0.05-0.06]
20-24	0.17	[0.16-0.17]	0.09	[0.08-0.09]	0.16	[0.15-0.17]	0.06	[0.05-0.06]	0.13	[0.12-0.13]
25-29	0.18	[0.17-0.19]	0.15	[0.15-0.16]	0.2	[0.19-0.21]	0.15	[0.14-0.16]	0.17	[0.17-0.18]
30-34	0.18	[0.17-0.19]	0.18	[0.18-0.19]	0.18	[0.17-0.19]	0.18	[0.17-0.20]	0.18	[0.18-0.19]
35-39	0.15	[0.15-0.16]	0.21	[0.20-0.21]	0.16	[0.15-0.17]	0.21	[0.20-0.22]	0.18	[0.17-0.18]
40-44	0.12	[0.11-0.12]	0.18	[0.18-0.19]	0.14	[0.12-0.15]	0.2	[0.19-0.21]	0.15	[0.15-0.16]
45-49	0.11	[0.11-0.12]	0.17	[0.16-0.17]	0.11	[0.10-0.12]	0.2	[0.19-0.21]	0.14	[0.13-0.14]
Highest Education Level***										
No Education	0.16	[0.15-0.17]	0.02	[0.02-0.02]	0.41	[0.39-0.44]	0.01	[0.01-0.02]	0.17	[0.16-0.18]
Primary	0.32	[0.31-0.33]	0.34	[0.33-0.35]	0.19	[0.18-0.20]	0.18	[0.17-0.20]	0.27	[0.26-0.28]
Secondary	0.4	[0.39-0.41]	0.52	[0.51-0.53]	0.29	[0.27-0.30]	0.45	[0.43-0.46]	0.41	[0.40-0.41]
Higher	0.12	[0.11-0.13]	0.12	[0.11-0.13]	0.11	[0.10-0.13]	0.36	[0.34-0.38]	0.16	[0.15-0.16]
Wealth Index										
Poorest	0.18	[0.17-0.20]	0.17	[0.16-0.18]	0.17	[0.15-0.20]	0.2	[0.18-0.22]	0.18	[0.17-0.19]
Poorer	0.2	[0.18-0.21]	0.2	[0.19-0.21]	0.2	[0.18-0.22]	0.2	[0.18-0.21]	0.2	[0.19-0.21]
Middle	0.2	[0.19-0.21]	0.21	[0.20-0.22]	0.21	[0.19-0.23]	0.19	[0.17-0.20]	0.2	[0.20-0.21]
Richer	0.21	[0.20-0.22]	0.21	[0.21-0.22]	0.21	[0.19-0.23]	0.2	[0.19-0.22]	0.21	[0.20-0.22]
Richest	0.21	[0.19-0.23]	0.2	[0.19-0.22]	0.21	[0.18-0.24]	0.21	[0.19-0.24]	0.21	[0.20-0.22]
Rural Place of Residence*** (ref: urban)	0.71	[0.68-0.74]	0.51	[0.50-0.53]	0.39	[0.34-0.44]	0.58	[0.54-0.62]	0.56	[0.54-0.57]
Has child <=5										
none	0.5	[0.49-0.51]	0.49	[0.48-0.50]	0.49	[0.48-0.51]	0.48	[0.46-0.50]	0.49	[0.49-0.50]
1 or more	0.5	[0.49-0.51]	0.51	[0.50-0.52]	0.51	[0.49-0.52]	0.52	[0.50-0.54]	0.51	[0.50-0.51]
More than 1 child <=5***										
1 or none	0.88	[0.88-0.89]	0.9	[0.90-0.91]	0.81	[0.80-0.83]	0.82	[0.81-0.83]	0.86	[0.85-0.87]
2 or more	0.12	[0.11-0.12]	0.1	[0.09-0.10]	0.19	[0.17-0.20]	0.18	[0.17-0.19]	0.14	[0.13-0.15]
Relationship to HH Head***										
Head/wife of head	0.81	[0.80-0.81]	0.79	[0.79-0.80]	0.69	[0.68-0.70]	0.86	[0.85-0.87]	0.78	[0.77-0.79]
Natal Family	0.06	[0.05-0.06]	0.14	[0.14-0.15]	0.04	[0.03-0.04]	0.09	[0.08-0.10]	0.08	[0.08-0.08]
In-law	0.14	[0.13-0.14]	0.07	[0.06-0.07]	0.27	[0.26-0.28]	0.05	[0.04-0.05]	0.14	[0.13-0.15]

Source: DHS 2016-2017.   Currently married women ages 15-49, Data are given as mean [95%CI], *** p<0.001, ** p<0.01, * p<0.05, p values indicate significance of Chi-square test statistics on difference between women across countries. Weighted estimations. Pooled estimates are calculated separately as they require different weighting. Each country given equal weight in pooled estimates so reduce effect of country population/sample size

It was extremely common for women to have reported experiencing problems in accessing healthcare. Fifty-nine percent of women faced at least one problem in accessing care with the most frequent problems being not wanting to go alone (41%) and getting money to pay for care (39%) (Figure 2.2). More women faced barriers to care in Nepal (78%) and Bangladesh (67%) compared to the Philippines (52%) and Indonesia (33%). The proportion of women reporting specific problems varied widely across countries, but not wanting to go alone was the biggest problem in Bangladesh (45%), Indonesia (23%) and Nepal (68%). In the Philippines, money was the biggest issue with 44% of women saying they faced this problem (See Appendix 2.7.A for additional details).

In weighted unadjusted models, having a migrant spouse was associated with a significant reduction (-19%) in the odds of experiencing any problem in accessing healthcare (Table 2.3). Having a migrant spouse had a positive impact on financial and accompaniment barriers as well, with significant reductions in the odds of experiencing these specific barriers to care of 22% and 8% respectively. Across all four countries, having a migrant spouse was associated with lower odds of experiencing any problem in accessing care. We saw the greatest differences in reported barriers between women with and without migrant spouses in Indonesia and the Philippines, the two countries that had the lowest proportions of women experiencing barriers to start with (Table 2.3 and Appendix 2.8.A).

Spousal migration remained a significant predictor of women's access to healthcare in multivariable models controlling for age, education, rural/urban location, children under five, family structure (headship), and wealth. In pooled results having a migrant spouse reduced the

odds that a woman would face barriers to care (AOR: 0.832, p<0.001) (Table 2.3 Pooled). Having a migrant spouse was associated with lower odds of facing any problems in accessing care in all four countries although the results for the aggregate measure of barriers were only statistically significant in Indonesia and Nepal (AORs: 0.648 and 0.775, p<0.001) (Table 2.3 Indonesia and Nepal).

In comparing across the four countries, we saw reductions in barriers associated with spousal migration to the greatest extent in Indonesia and Nepal where there were statistically significant reductions in barriers related to permission, distance/travel and not wanting to go alone. Financial barriers were also positively impacted by spousal migration in Nepal. In Bangladesh spousal migration was associated with fewer problems getting the money to pay for healthcare. In the Philippines, we did not find statistically significant relationships between migration and specific barriers to healthcare in multivariable models (Table 2.3).

Figure 2.2: Problems Accessing Care Vary by Country

Barriers to Healthcare by Country and Barrier Type
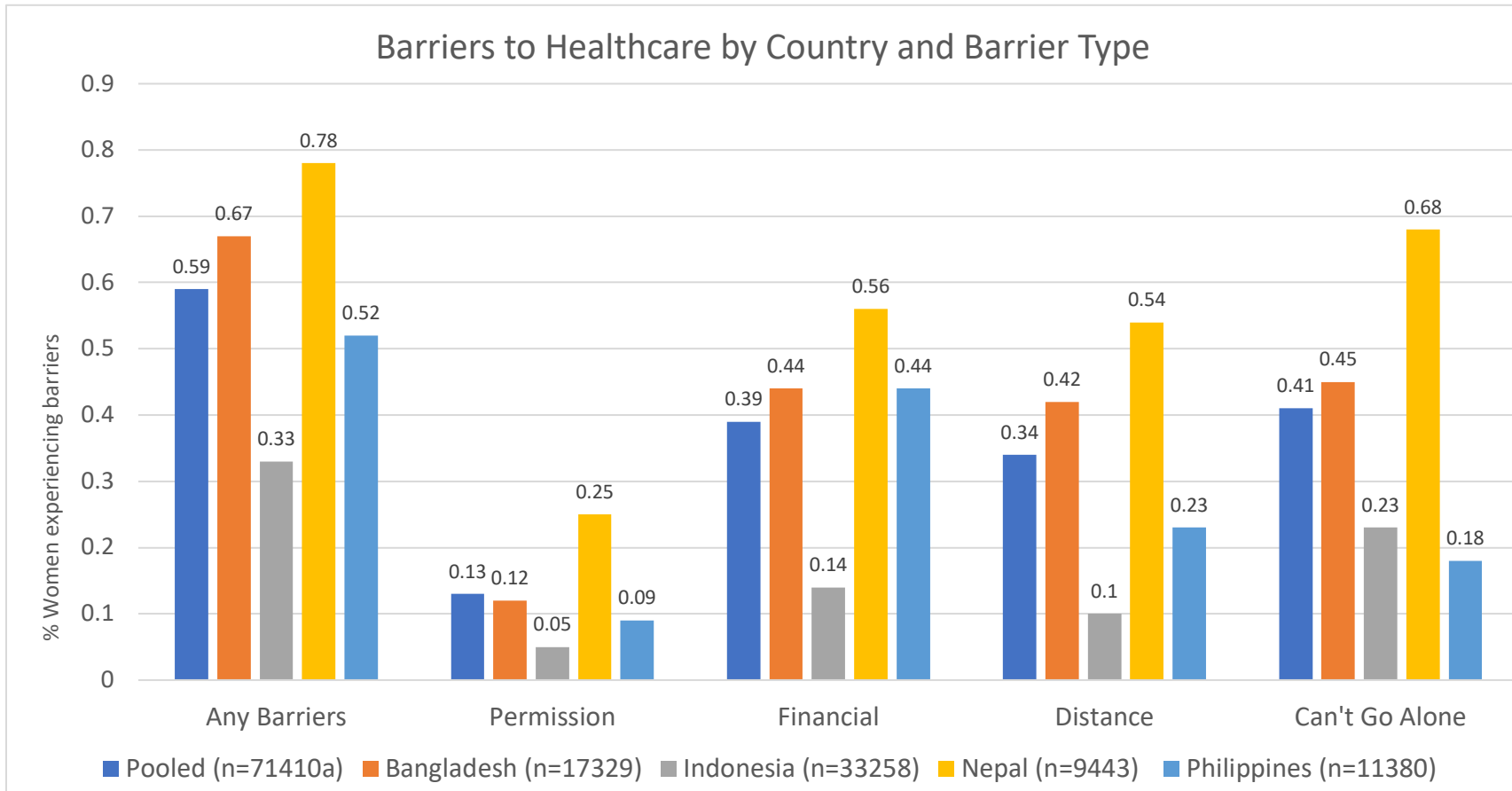
Weighted estimations. Currently married women ages 15-49, Source: DHS 2016-2017.

Table 2.3: Multivariate analysis of spousal migration on barriers to women's healthcare utilization

	1	2	3	4	5	6	7	8	9	10
	Any Barriers to Care		Permission Barrier to Care		Financial Barrier to Care		Distance Barrier to Care		Go Alone Barrier to Care	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Pooled n=71,045	0.811*** (0.757 - 0.870)	0.832*** (0.775 - 0.892)	0.925 (0.832 - 1.027)	0.864** (0.777 - 0.960)	0.778*** (0.724 - 0.836)	0.839*** (0.780 - 0.901)	0.968 (0.898 - 1.043)	0.979 (0.905 - 1.059)	0.923* (0.860 - 0.989)	0.899** (0.835 - 0.967)
Bangladesh n=17,323	0.768*** (0.686 - 0.860)	0.885 (0.779 - 1.004)	1.067 (0.875 - 1.301)	1.070 (0.877 - 1.307)	0.631*** (0.563 - 0.707)	0.814** (0.720 - 0.921)	0.964 (0.864 - 1.075)	1.064 (0.942 - 1.201)	0.956 (0.858 - 1.066)	0.974 (0.868 - 1.092)
Indonesia n=33,080	0.687*** (0.606 - 0.779)	0.648*** (0.568 - 0.741)	0.566*** (0.408 - 0.785)	0.583** (0.417 - 0.815)	0.866 (0.738 - 1.016)	0.865 (0.730 - 1.024)	0.809* (0.670 - 0.976)	0.806* (0.662 - 0.981)	0.645*** (0.555 - 0.749)	0.592*** (0.507 - 0.690)
Nepal n=9307	0.963 (0.858 - 1.082)	0.775*** (0.678 - 0.885)	0.932 (0.817 - 1.064)	0.771*** (0.673 - 0.884)	0.918 (0.823 - 1.024)	0.827*** (0.741 - 0.924)	1.022 (0.912 - 1.147)	0.862* (0.764 - 0.971)	0.984 (0.881 - 1.100)	0.829** (0.733 - 0.938)
Philippines n=11,335	0.619*** (0.495 - 0.775)	0.899 (0.701 - 1.152)	0.474** (0.302 - 0.745)	0.700 (0.449 - 1.092)	0.622*** (0.502 - 0.772)	0.926 (0.721 - 1.188)	0.713* (0.520 - 0.977)	1.107 (0.749 - 1.635)	0.766 (0.541 - 1.086)	1.043 (0.720 - 1.510)

Source: DHS 2016-2017. Currently married women ages 15-49. Logistic Regression Odd Ratios (ORs), 95% CI in parentheses for having a migrant spouse. *** p<0.001, ** p<0.01, * p<0.05 Weighted logistic regression estimations. Adjusted models control for ag, education, urban/rural location, children under 5 years, household headship, and wealth. For pooled estimates each country given equal weight to reduce effect of country population/sample size.

Figure 2.3 shows the marginal effects of having a migrant spouse on experiencing barriers to care. Having a migrant spouse reduced the probability of experiencing any barriers by almost 4% (from 59% to 55%). The largest single barrier effects were for financial barriers (-3%) and barriers related to accompaniment or not wanting to go alone (-2%). In Indonesia, the overall probability of experiencing barriers was lower compared to the other countries and the marginal effects of spousal migration were greater; reduction of 9% in the probability of experiencing any barriers (33% to 24%). Needing permission and distance to the facility saw small but significant marginal effects, but most of the effect in Indonesia was driven by an 8% reduction in the probability of experiencing barriers related to accompaniment for women with migrant spouses compared to women with co-resident spouses. Nepal, where women experienced the highest number of problems, saw a marginal effect of spousal migration of -4%, reducing the probability of experiencing problems for women with migrant spouses from 79% to 74%. In Nepal the probability of experiencing each of the four barriers was significantly reduced for women with migrant spouses (-3% for distance up to -4% for permission, money, and accompaniment barriers).

Other factors that were associated with problems in accessing care included age, education, urban location, and wealth (Tables 2.6a-e). Older women were less likely to experience barriers to accessing care compared to younger women in all locations except in the Philippines where age was not a significant predictor of barriers. Women with more education were less likely to experience barriers to care compared to less educated women. Women who lived in an urban area were less likely to experience barriers compared to women who lived in a rural area (0.825, p<0.001). Living in an urban area was associated with lower odds of problems accessing healthcare in all countries, although the results were not statistically significant in Indonesia. The effect of

living in an urban area was quite strong and held across all bivariate and multivariable tests of all barriers. Having greater household wealth was also a significant predictor for enhanced ability to access healthcare. Compared to women in the poorest wealth quintile, women in the richest quintile were between 82% (Nepal) and 49% (Indonesia) less likely to experience problems accessing care.

Figure 2.3: Spousal Migration Associated with Fewer Barriers to Healthcare
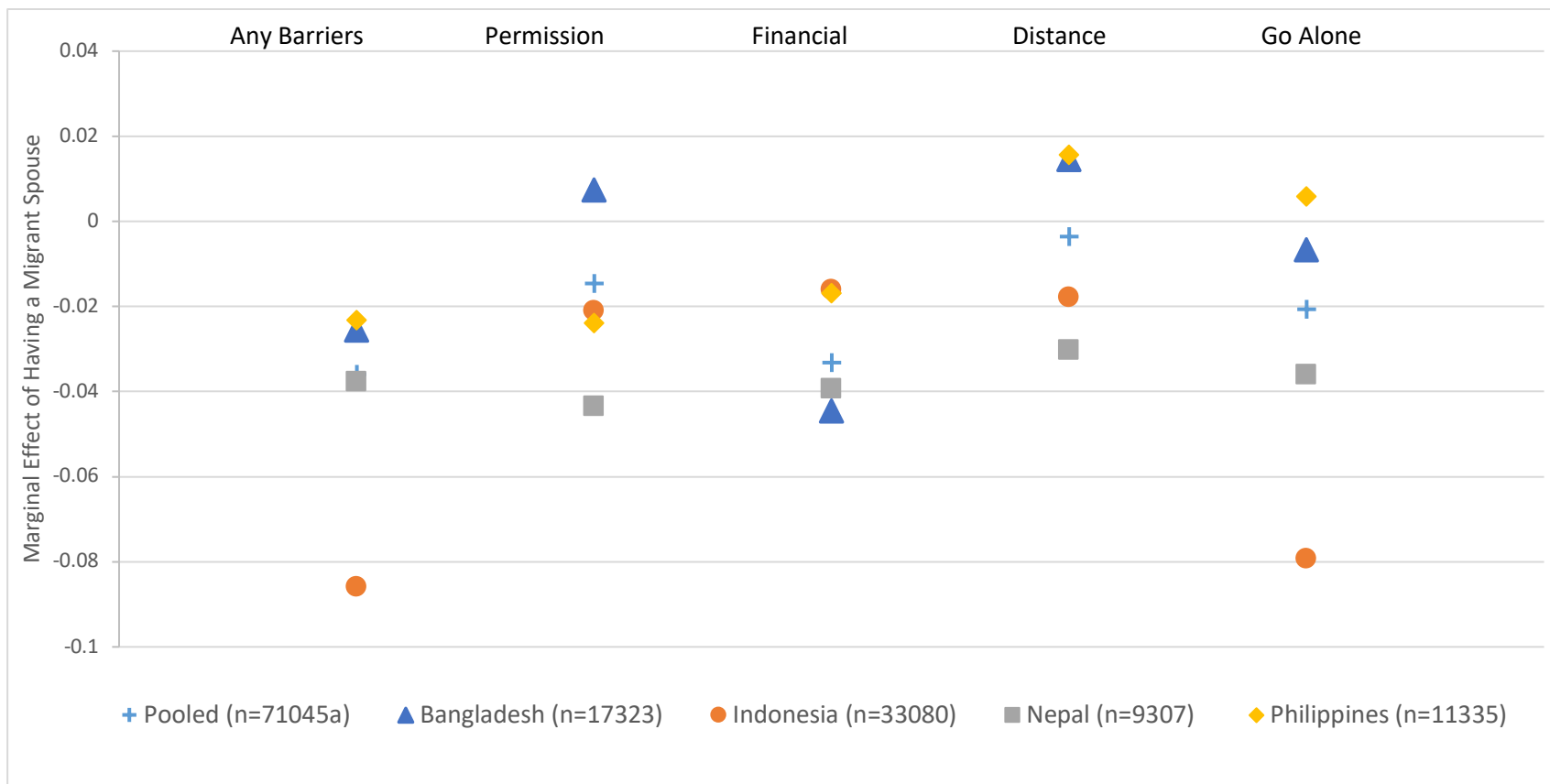
Marginal effects of spousal migration on experiencing barriers to accessing care for currently married women 15-49 years. Source: DHS 2016-2017. Weighted Logistic Regression controlling for age, education, urban/rural, wealth index, children under 5 years, and household headship

Healthcare Utilization Postpartum

Most women (66%) received a postpartum checkup by a health professional within two days of giving birth. The lowest rates of recommended postpartum care for women were in Bangladesh (49%) and Nepal (56%) (Figure 2.4). In Indonesia and the Philippines 86% and 84% of women received the recommended postpartum check within 2 days (Figure 2.4 and Appendix 2.7.A). In unadjusted logistic regression models, having a migrant spouse was not significantly associated with receipt of recommended postpartum care for women (Table 2.4).

Similar to the unadjusted models, we found no relationship between spousal migration and receipt of postpartum care for women in pooled or country specific results (Table 2.4 and Figure 2.5). This outcome was not sensitive to spousal migration. Adjusted models showed that receipt of a postpartum checkup within 2 days by a health professional was positively associated with education and wealth and negatively associated with having more than one child five years or younger. In Indonesia older women were more likely to have received the recommended postpartum check and in Bangladesh this was true for women in urban settings.

Healthcare Utilization Child Fever or Diarrhea

We measured whether women sought care for their children (5 years old and younger) who had an acute illness in the two weeks prior to the survey. Around 50% of women sought care for their child who had diarrhea (49%) or fever (52%) (Figure 2.4). The rates varied significantly by country and more women sought care for fever compared to diarrhea except in Bangladesh where 46% of women sought care for children diarrhea and 30% for fever. Thirty-five percent of women sought care for children with diarrhea in Nepal, 39% in the Philippines and 61% in Indonesia (Figure 2.4 and Appendix 2.7.A and 2.8.A). Having a migrant spouse was not significantly

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associated with care-seeking for children except in the Philippines where spousal migration was associated with higher odds of care-seeking for diarrhea and fever.

Adjusted models for care seeking for child diarrhea and fever controlled for the woman's age, education, urban location, having multiple children five years old or younger, household headship, and wealth. In these models, we found no relationship between migration and care-seeking for child fever or composite measure of care seeking for child fever or diarrhea across pooled results and three of the four countries (Table 2.5, Figure 2.6). We do see significant associations for multivariable models for the Philippines. However, these results should not be interpreted as a strong relationship because this model was overfitted. There is not enough variation in the outcome and the number of women with migrant spouses who experienced either the fever or composite outcome is too few to appropriately interpret the results from the multivariable logistic regression model.

Figure 2.4: Healthcare Use Varies by Country with the Best Rates in Indonesia

Healthcare Utilization for Postpartum and Acute Child Illness by Country
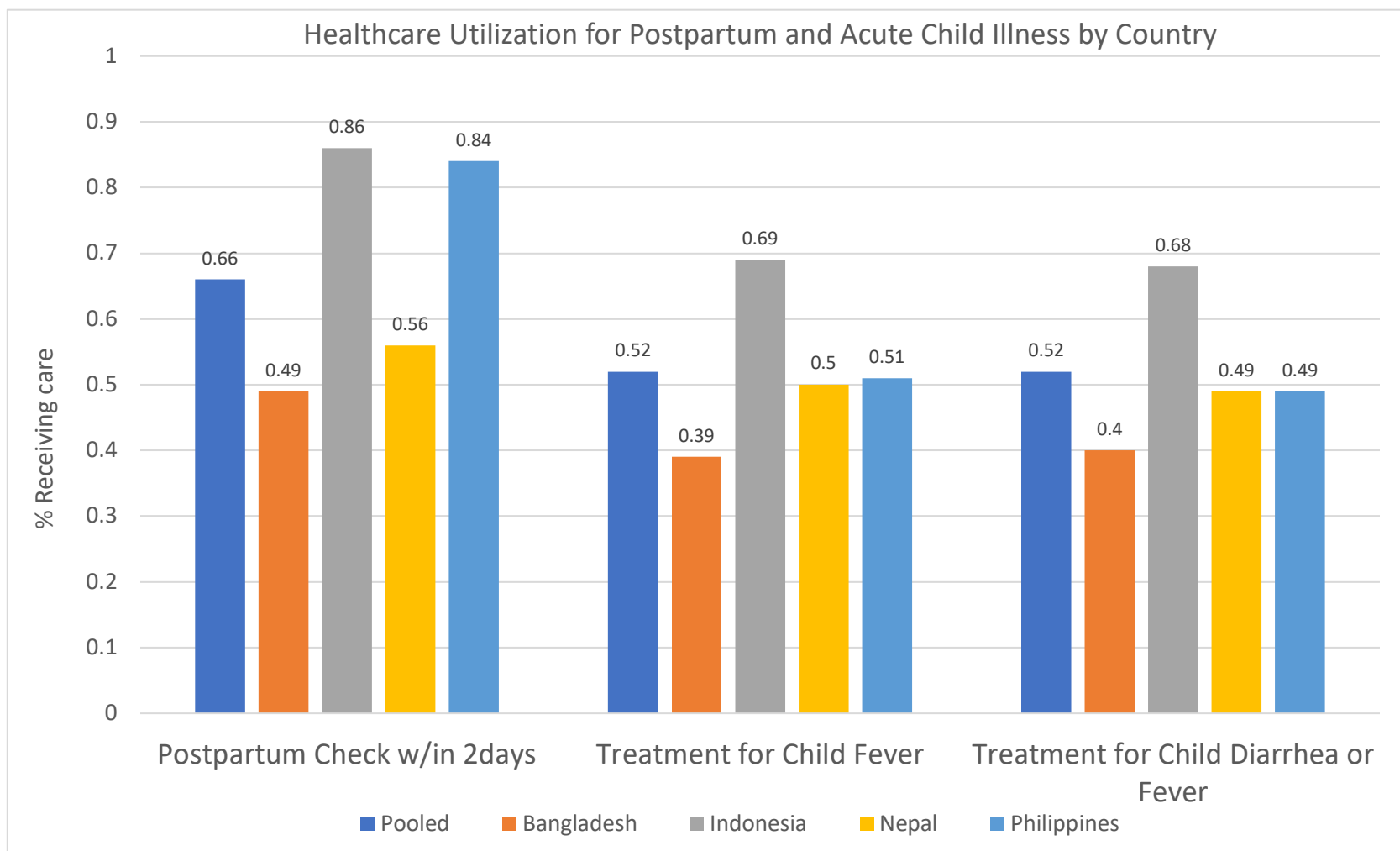
Weighted estimations. Source: DHS 2016-2017.   Sample for Postpartum Check: Currently married women ages 15-49 with a birth in the last 2 years in any delivery location , most recent birth if more than 1 – Pooled: 13, 236 Bangladesh: 2,943 Indonesia: 6,317 Nepal: 1,747 Philippines: 2,229   Sample for Child illness: Woman with child 5 years or younger who had fever or diarrhea in 2 weeks preceding survey, only one instance per woman – fever first, if no fever then diarrhea: Pooled: 10,818 (fever only 9,484) Bangladesh: 2,610 (fever only 2,470) Indonesia: 6,036 (fever only 5,129) Nepal: 1,042 (fever only 926) Philippines: 1,130 (fever only 959)

Table 2.4: Multivariate analysis of spousal migration on receipt of postpartum checkup for woman

	1	2	3	4	5	6	7	8	9	10
	Pooled		Bangladesh		Indonesia		Nepal		Philippines	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Migrant Spouse (vs. non-migrant spouse)	1.123	1.065	1.210	1.066	0.905	0.823	1.065	1.092	2.113	1.752
	(0.968 - 1.302)	(0.912 - 1.243)	(0.964 - 1.518)	(0.817 - 1.391)	(0.658 - 1.245)	(0.581 - 1.165)	(0.851 - 1.334)	(0.867 - 1.376)	(0.943 - 4.736)	(0.660 - 4.654)
Observations	13,236		2,943		6,317		1,747		2,229	

Source: DHS 2016-2017. Married women ages 15-49 with a birth in the last 2 years in any delivery location, most recent birth if more than 1 Logistic Regression Odd Ratios (ORs), 95% CI in parentheses for having a migrant spouse. *** p<0.001, ** p<0.01, * p<0.05. Weighted Logistic Regression controlling for age, education, urban/rural, wealth index, number of children under 5 years, household headship. For pooled estimates each country given equal weight to reduce effect of country population/sample size.

Table 2.5: Multivariate analysis of spousal migration on care-seeking for child acute illness (fever or diarrhea)

	1	2	3	4	5	6	7	8	9	10
	Pooled		Bangladesh		Indonesia		Nepal		Philippines+	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Migrant Spouse (vs. non-migrant spouse)	1.026	1.021	1.013	0.941	1.111	1.103	0.864	0.910	3.933***	4.671***
	(0.879 - 1.197)	(0.871 - 1.198)	(0.804 - 1.277)	(0.739 - 1.200)	(0.876 - 1.409)	(0.858 - 1.417)	(0.641 - 1.164)	(0.666 - 1.244)	(2.115 - 7.314)	(2.295 - 9.508)
Observations	10,818		2,610		6,036		1,042		1,130	

Source: DHS 2016-2017. Currently married women 15-49 years with child under 5 who had a fever or diarrhea in the 2 weeks preceding the survey Weighted Logistic Regression controlling for age, education, urban/rural, wealth index, number of children under 5 years, and household headship. +Philippines results should be interpreted with caution as the sample has very little variation in care-seeking

Figure 2.5: Spousal migration does not have a significant impact on postpartum care for women

Predicted Probabilities for receiving Postpartum Check by trained provider within 2 days
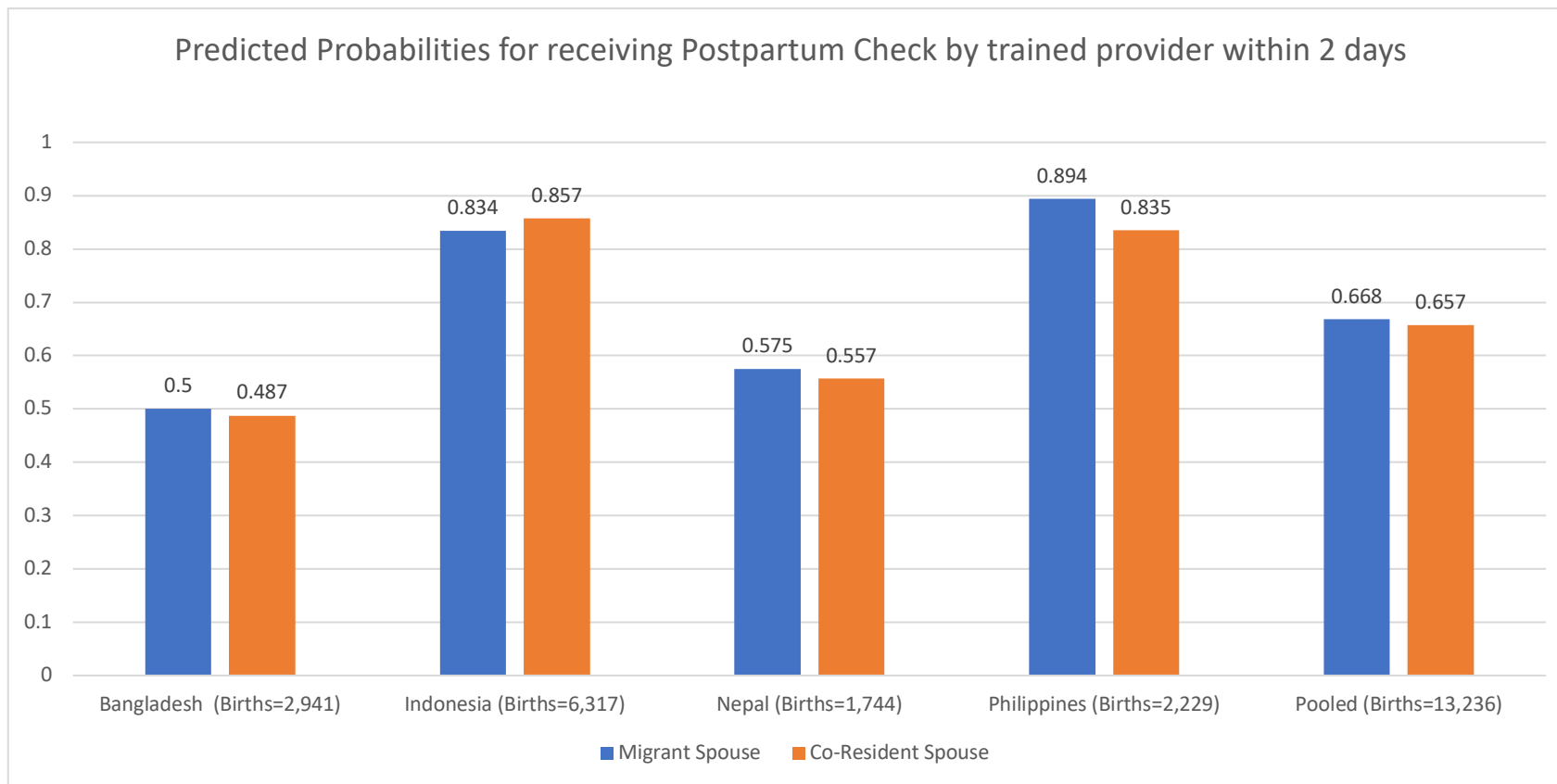
Predicted probabilities for receipt of postpartum check for self within 2 days of delivery by trained health provider
Weighted Logistic Regression controlling for age, education, urban/rural, wealth index, number of children under 5 years, and household headship
Currently married women 15-49 years old who gave birth within prior 2 years

Figure 2.6: Spousal Migration Not Associated with Acute Healthcare Utilization for Child Fever or Diarrhea Except in the Philippines
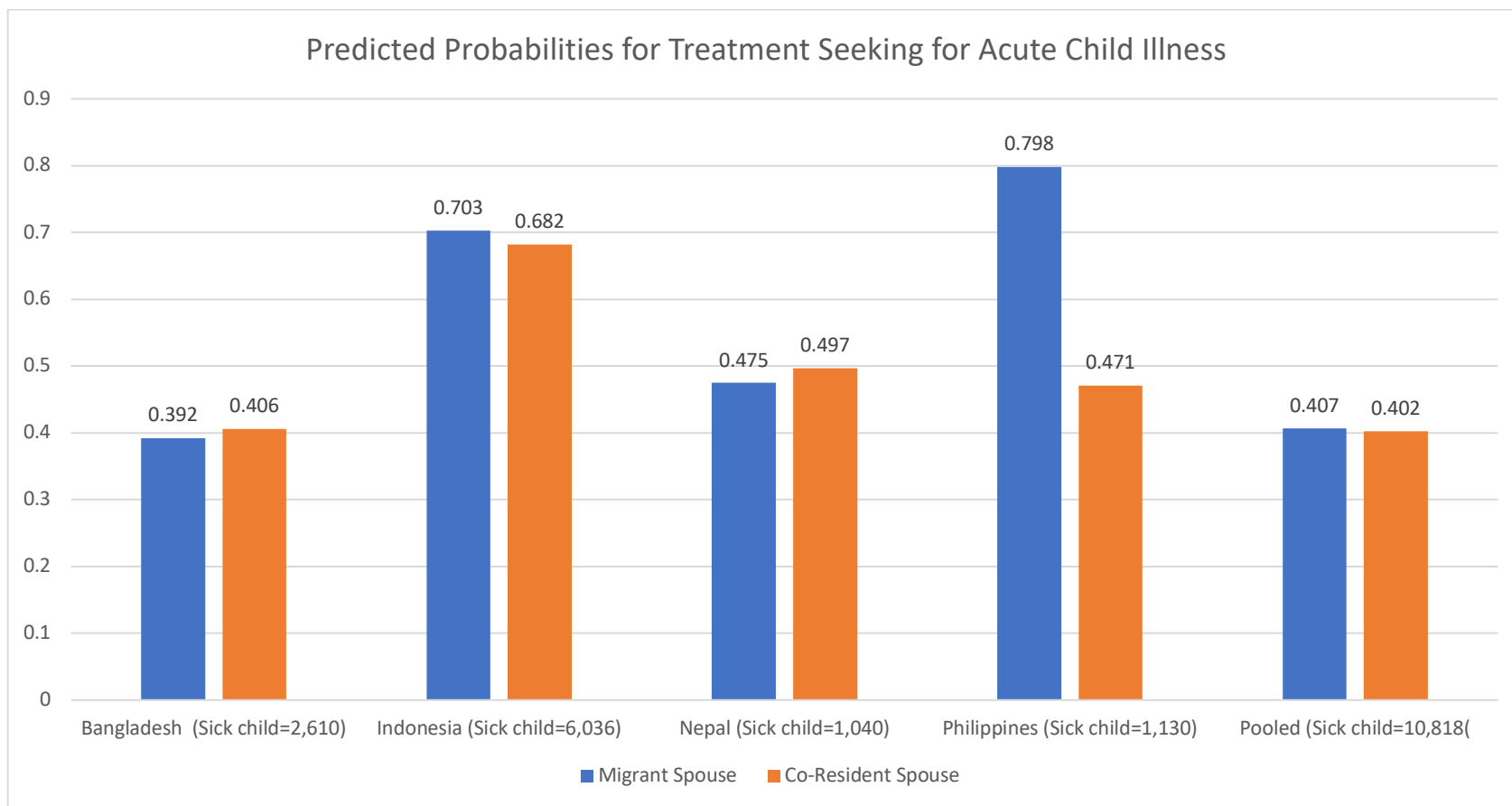
Predicted probabilities for care seeking for child <5 with fever
Weighted Logistic Regression controlling for age, education, urban/rural, wealth index, number of children under 5 years, and household headship
Currently married women 15-49 years with child under 5 who had a fever or diarrhea in the 2 weeks preceding the survey
+Philippines results should be interpreted with caution as the sample has very little variation in care seeking

Migration Selection and Treatment Effects

The 2-stage propensity score approach did not alter the results. Tables 2.6a-e provide estimates for main effects and covariates for the restricted propensity block specification of the propensity models which were nearly identical to the specifications without propensity score adjustments as well as the other propensity models. The area of common support (ACS) for pooled analyses included propensities between 0.029 and 0.526, accounting for all but 91(0.001%) of the observations from the full sample and creating 12 propensity blocks. Using propensity scores to control for selection into the treatment of having a migrant spouse, we found the effect of migration on women's healthcare access and utilization was robust to a variety of propensity adjustments: 1) restricting analysis to the area of common support, 2) controlling for propensity score, 3) controlling for propensity block, and 4) estimating the average treatment effect.

The average treatment effect (ATE) of having a migrant spouse was -0.066, p<0.0001, meaning that spousal migration reduced the average probability of experiencing problems in accessing healthcare by about 10%. The average treatment effect for those who had migrant spouses (ATET) was slightly lower (-0.041, p<0.0001) which is not surprising given that this subsample had higher representation of wealthier and more educated women. The ATE and ATET were greatest in Indonesia (-0.091, p<0.001, -0.08, p<0.001) and results were not significant in the Philippines. In Bangladesh and Nepal we saw ATEs of around -0.03, p<0.01.

Table 2.6a-e: Multivariate Propensity Score analysis of spousal migration on barriers to healthcare -   Pooled

	1	2	3	4	5
	Any Barriers	**Permission**	**Financial**	**Distance**	**Go Alone**
Migrant Spouse	0.833***	0.866**	0.842***	0.983	0.899**
	(0.776 - 0.895)	(0.779 - 0.962)	(0.784 - 0.906)	(0.909 - 1.064)	(0.835 - 0.967)
Age (ref 15-19)					
20-24	0.735***	0.637***	0.896	0.853**	0.688***
	(0.647 - 0.835)	(0.551 - 0.737)	(0.792 - 1.013)	(0.755 - 0.962)	(0.610 - 0.776)
25-29	0.657***	0.546***	0.794**	0.766***	0.603***
	(0.565 - 0.763)	(0.453 - 0.657)	(0.684 - 0.922)	(0.663 - 0.884)	(0.526 - 0.693)
30-34	0.609***	0.465***	0.718***	0.727***	0.551***
	(0.514 - 0.722)	(0.368 - 0.587)	(0.603 - 0.853)	(0.611 - 0.866)	(0.469 - 0.647)
35-39	0.513***	0.388***	0.595***	0.610***	0.487***
	(0.419 - 0.629)	(0.290 - 0.519)	(0.478 - 0.740)	(0.493 - 0.756)	(0.400 - 0.593)
40-44	0.475***	0.303***	0.506***	0.559***	0.474***
	(0.379 - 0.597)	(0.215 - 0.427)	(0.396 - 0.647)	(0.438 - 0.713)	(0.379 - 0.592)
45-49	0.462***	0.304***	0.430***	0.499***	0.472***
	(0.356 - 0.599)	(0.205 - 0.450)	(0.326 - 0.567)	(0.375 - 0.664)	(0.362 - 0.614)
Education (ref none)					
Primary	0.541***	0.579***	0.409***	0.593***	0.706***
	(0.466 - 0.627)	(0.461 - 0.727)	(0.352 - 0.476)	(0.510 - 0.690)	(0.608 - 0.820)
Secondary	0.407***	0.410***	0.279***	0.465***	0.530***
	(0.349 - 0.475)	(0.320 - 0.525)	(0.239 - 0.326)	(0.397 - 0.546)	(0.455 - 0.618)
Higher	0.254***	0.222***	0.164***	0.341***	0.346***
	(0.215 - 0.299)	(0.168 - 0.294)	(0.138 - 0.195)	(0.284 - 0.408)	(0.292 - 0.410)
Urban residence	0.825***	0.807**	0.956	0.645***	0.756***
	(0.756 - 0.899)	(0.690 - 0.944)	(0.866 - 1.056)	(0.582 - 0.716)	(0.690 - 0.828)
Child(ren) <=5	1.063*	1.059	1.082**	1.107***	1.040
	(1.014 - 1.114)	(0.981 - 1.142)	(1.027 - 1.139)	(1.048 - 1.170)	(0.991 - 1.091)
HH Head(ref: self/sp)					
Bio/Natal Family	0.941	1.131	0.971	0.893*	0.970
	(0.866 - 1.022)	(0.981 - 1.304)	(0.876 - 1.076)	(0.799 - 0.998)	(0.889 - 1.057)
In-laws	1.067	1.374***	1.027	1.040	1.110*
	(0.973 - 1.169)	(1.247 - 1.514)	(0.947 - 1.115)	(0.955 - 1.133)	(1.020 - 1.209)
Wealth (ref poorest)					
Poorer	0.802***	0.854*	0.831***	0.667***	0.849***
	(0.738 - 0.873)	(0.751 - 0.972)	(0.760 - 0.909)	(0.607 - 0.733)	(0.783 - 0.921)
Middle	0.663***	0.861	0.707***	0.546***	0.775***
	(0.600 - 0.733)	(0.730 - 1.014)	(0.635 - 0.788)	(0.488 - 0.611)	(0.701 - 0.857)
Richer	0.568***	0.779*	0.539***	0.454***	0.740***
	(0.504 - 0.640)	(0.643 - 0.944)	(0.477 - 0.610)	(0.391 - 0.526)	(0.653 - 0.838)
Richest	0.353***	0.617***	0.322***	0.300***	0.553***
	(0.310 - 0.403)	(0.501 - 0.761)	(0.277 - 0.376)	(0.255 - 0.351)	(0.483 - 0.632)
Country (ref: Bang.)					
Indonesia	0.249***	0.485***	0.212***	0.175***	0.415***
	(0.228 - 0.271)	(0.416 - 0.566)	(0.193 - 0.233)	(0.158 - 0.195)	(0.382 - 0.450)
Nepal	1.718***	2.407***	1.582***	1.836***	2.681***
	(1.500 - 1.966)	(2.020 - 2.869)	(1.403 - 1.784)	(1.619 - 2.083)	(2.367 - 3.037)
Philippines	0.690***	1.051	1.377***	0.501***	0.361***
	(0.615 - 0.774)	(0.881 - 1.255)	(1.225 - 1.547)	(0.441 - 0.568)	(0.320 - 0.406)
Observations	70,954	70,954	70,954	70,954	70,954

Source: DHS 2016-2017.   Currently married women ages 15-49. Logistic Regression Odd Ratios (ORs), 95% CI in parentheses for having a migrant spouse. *** p<0.001, ** p<0.01, * p<0.05. Weighted estimations. Controls for propensity blocks.

Table 2.6b: Multivariate Propensity Score analysis of spousal migration on barriers to healthcare utilization - Bangladesh

	1	2	3	4	5
	Any Barriers	**Permission**	**Financial**	**Distance**	**Go Alone**
Migrant Spouse	0.892	1.068	0.824**	1.070	0.977
	(0.785 - 1.013)	(0.873 - 1.308)	(0.729 - 0.932)	(0.947 - 1.208)	(0.871 - 1.096)
Age (ref 15-19)					
20-24	0.811**	0.684***	1.123	1.036	0.763***
	(0.696 - 0.947)	(0.549 - 0.851)	(0.963 - 1.309)	(0.896 - 1.198)	(0.660 - 0.881)
25-29	0.782**	0.757*	1.131	0.976	0.678***
	(0.666 - 0.919)	(0.593 - 0.966)	(0.967 - 1.322)	(0.845 - 1.127)	(0.586 - 0.785)
30-34	0.707***	0.656**	1.117	0.995	0.635***
	(0.589 - 0.848)	(0.509 - 0.846)	(0.941 - 1.326)	(0.844 - 1.172)	(0.541 - 0.745)
35-39	0.632***	0.691*	1.010	0.919	0.613***
	(0.515 - 0.776)	(0.503 - 0.948)	(0.823 - 1.240)	(0.757 - 1.115)	(0.509 - 0.738)
40-44	0.560***	0.578**	0.852	0.832	0.646***
	(0.438 - 0.716)	(0.404 - 0.827)	(0.668 - 1.086)	(0.669 - 1.035)	(0.520 - 0.802)
45-49	0.547***	0.750	0.780	0.836	0.713*
	(0.410 - 0.732)	(0.488 - 1.153)	(0.594 - 1.023)	(0.635 - 1.099)	(0.548 - 0.926)
Education (ref none)					
Primary	0.932	0.911	0.899	0.890	0.924
	(0.811 - 1.071)	(0.749 - 1.108)	(0.784 - 1.031)	(0.788 - 1.006)	(0.821 - 1.041)
Secondary	0.785**	0.815	0.704***	0.818*	0.808**
	(0.663 - 0.929)	(0.636 - 1.044)	(0.598 - 0.829)	(0.700 - 0.955)	(0.697 - 0.936)
Higher	0.505***	0.481***	0.418***	0.651***	0.553***
	(0.411 - 0.620)	(0.344 - 0.674)	(0.336 - 0.522)	(0.531 - 0.797)	(0.459 - 0.666)
Urban residence	0.606***	0.779	0.878	0.611***	0.735***
	(0.489 - 0.749)	(0.546 - 1.112)	(0.711 - 1.085)	(0.499 - 0.748)	(0.615 - 0.879)
Child(ren) <=5	0.998	1.090	1.010	1.021	1.035
	(0.917 - 1.086)	(0.955 - 1.245)	(0.928 - 1.100)	(0.944 - 1.104)	(0.960 - 1.116)
HH Head (ref: self/sp)					
Bio/Natal Family	0.780**	0.858	0.833*	0.789**	0.830*
	(0.666 - 0.915)	(0.646 - 1.140)	(0.698 - 0.995)	(0.671 - 0.928)	(0.711 - 0.969)
In-laws	0.998	1.247*	0.921	0.970	1.138*
	(0.872 - 1.142)	(1.044 - 1.490)	(0.811 - 1.045)	(0.857 - 1.098)	(1.004 - 1.289)
Wealth (ref poorest)					
Poorer	0.874	0.867	0.726***	0.799***	0.903
	(0.755 - 1.013)	(0.712 - 1.055)	(0.635 - 0.830)	(0.703 - 0.909)	(0.799 - 1.021)
Middle	0.735**	0.965	0.560***	0.715***	0.871
	(0.606 - 0.892)	(0.725 - 1.284)	(0.465 - 0.673)	(0.602 - 0.850)	(0.742 - 1.022)
Richer	0.702**	0.932	0.445***	0.655***	0.895
	(0.563 - 0.876)	(0.680 - 1.277)	(0.361 - 0.547)	(0.533 - 0.805)	(0.746 - 1.074)
Richest	0.484***	0.721	0.288***	0.502***	0.697***
	(0.383 - 0.612)	(0.491 - 1.059)	(0.225 - 0.370)	(0.403 - 0.625)	(0.576 - 0.843)
Observations	17,322	17,322	17,322	17,322	17,322

Source: DHS 2016-2017.   Currently married women ages 15-49. Logistic Regression Odd Ratios (ORs), 95% CI in parentheses for having a migrant spouse. *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Weighted estimations. Controls for propensity blocks.

Table 2.6c: Multivariate Propensity Score analysis of spousal migration on barriers to healthcare utilization - Indonesia

	1 Any Barriers	2 Permission	3 Financial	4 Distance	5 Go Alone
Migrant Spouse	0.651***	0.583**	0.870	0.807*	0.591***
	(0.570 - 0.744)	(0.416 - 0.816)	(0.734 - 1.031)	(0.663 - 0.983)	(0.506 - 0.690)
Age (ref 15-19)					
20-24	0.761*	0.789	0.764	0.692*	0.745*
	(0.600 - 0.965)	(0.524 - 1.188)	(0.568 - 1.029)	(0.512 - 0.936)	(0.583 - 0.953)
25-29	0.680**	0.725	0.683*	0.658*	0.695**
	(0.522 - 0.886)	(0.440 - 1.195)	(0.485 - 0.962)	(0.461 - 0.940)	(0.529 - 0.914)
30-34	0.703*	0.811	0.723	0.714	0.672*
	(0.518 - 0.955)	(0.442 - 1.488)	(0.471 - 1.110)	(0.457 - 1.116)	(0.486 - 0.930)
35-39	0.688*	0.778	0.779	0.696	0.632*
	(0.484 - 0.977)	(0.380 - 1.595)	(0.483 - 1.257)	(0.419 - 1.156)	(0.438 - 0.912)
40-44	0.680*	0.770	0.749	0.636	0.632*
	(0.473 - 0.978)	(0.368 - 1.607)	(0.454 - 1.237)	(0.375 - 1.078)	(0.432 - 0.923)
45-49	0.722	0.749	0.782	0.667	0.693
	(0.494 - 1.054)	(0.348 - 1.612)	(0.468 - 1.306)	(0.385 - 1.154)	(0.466 - 1.029)
Education (ref none)					
Primary	0.778*	0.634	0.676**	0.623**	0.784*
	(0.618 - 0.979)	(0.401 - 1.002)	(0.506 - 0.903)	(0.451 - 0.859)	(0.634 - 0.969)
Secondary	0.573***	0.444***	0.546***	0.486***	0.559***
	(0.451 - 0.728)	(0.276 - 0.713)	(0.399 - 0.748)	(0.340 - 0.695)	(0.447 - 0.700)
Higher	0.424***	0.337***	0.344***	0.406***	0.410***
	(0.327 - 0.550)	(0.203 - 0.559)	(0.244 - 0.485)	(0.276 - 0.599)	(0.319 - 0.528)
Urban residence	1.035	1.183	1.325***	1.002	0.924
	(0.933 - 1.148)	(0.943 - 1.482)	(1.157 - 1.517)	(0.843 - 1.191)	(0.823 - 1.038)
Child(ren) <=5	1.007	1.020	1.187***	1.123*	0.960
	(0.943 - 1.076)	(0.886 - 1.175)	(1.088 - 1.295)	(1.018 - 1.239)	(0.891 - 1.033)
HH Head (ref self/sp)					
Bio/Natal Family	1.020	0.785*	0.966	0.942	1.113*
	(0.927 - 1.123)	(0.637 - 0.967)	(0.846 - 1.104)	(0.803 - 1.105)	(1.002 - 1.236)
In-laws	1.159*	0.918	0.877	1.024	1.257***
	(1.030 - 1.304)	(0.706 - 1.195)	(0.740 - 1.039)	(0.851 - 1.232)	(1.100 - 1.436)
Wealth (ref poorest)					
Poorer	0.785***	0.803	0.623***	0.516***	0.953
	(0.703 - 0.876)	(0.642 - 1.004)	(0.543 - 0.713)	(0.439 - 0.605)	(0.846 - 1.074)
Middle	0.628***	0.629***	0.433***	0.414***	0.868*
	(0.562 - 0.701)	(0.497 - 0.796)	(0.375 - 0.500)	(0.350 - 0.490)	(0.764 - 0.986)
Richer	0.563***	0.695**	0.301***	0.323***	0.881
	(0.499 - 0.635)	(0.542 - 0.891)	(0.256 - 0.353)	(0.267 - 0.391)	(0.763 - 1.018)
Richest	0.507***	0.884	0.194***	0.278***	0.891
	(0.441 - 0.583)	(0.653 - 1.197)	(0.159 - 0.237)	(0.225 - 0.344)	(0.756 - 1.049)
Observations	32,803	32,803	32,803	32,803	32,803

Source: DHS 2016-2017. Currently married women ages 15-49. Logistic Regression Odd Ratios (ORs), 95% CI in parentheses for having a migrant spouse. *** p<0.001, ** p<0.01, * p<0.05. Weighted estimations. Controls for propensity blocks.

Table 2.6d: Multivariate Propensity Score analysis of spousal migration on barriers to healthcare utilization – Nepal

	1	2	3	4	5
	Any Barriers	**Permission**	**Financial**	**Distance**	**Go Alone**
Migrant Spouse	0.782***	0.772***	0.836**	0.866*	0.833**
	(0.685 - 0.893)	(0.673 - 0.885)	(0.749 - 0.934)	(0.769 - 0.975)	(0.737 - 0.941)
Age (ref 15-19)					
20-24	0.715	0.696**	0.949	0.945	0.692*
	(0.496 - 1.031)	(0.531 - 0.913)	(0.726 - 1.241)	(0.734 - 1.215)	(0.514 - 0.931)
25-29	0.568**	0.559***	0.841	0.855	0.573***
	(0.399 - 0.808)	(0.423 - 0.738)	(0.628 - 1.125)	(0.659 - 1.109)	(0.428 - 0.767)
30-34	0.580**	0.527***	0.644**	0.743*	0.497***
	(0.406 - 0.830)	(0.396 - 0.702)	(0.496 - 0.837)	(0.570 - 0.968)	(0.365 - 0.676)
35-39	0.590	0.418**	0.484**	0.585*	0.374***
	(0.296 - 1.177)	(0.241 - 0.724)	(0.315 - 0.745)	(0.378 - 0.906)	(0.217 - 0.647)
40-44	0.496	0.229***	0.291***	0.433**	0.263***
	(0.179 - 1.372)	(0.0997 - 0.525)	(0.150 - 0.566)	(0.230 - 0.814)	(0.121 - 0.575)
45-49	0.404	0.270*	0.215***	0.269**	0.222**
	(0.122 - 1.337)	(0.0975 - 0.749)	(0.0952 - 0.486)	(0.102 - 0.710)	(0.0851 - 0.579)
Education (ref none)					
Primary	0.701**	0.769*	0.613***	0.758**	0.816
	(0.546 - 0.899)	(0.621 - 0.953)	(0.517 - 0.727)	(0.628 - 0.915)	(0.656 - 1.014)
Secondary	0.425***	0.456***	0.331***	0.535***	0.507***
	(0.336 - 0.537)	(0.368 - 0.563)	(0.280 - 0.393)	(0.447 - 0.639)	(0.413 - 0.623)
Higher	0.193***	0.192***	0.153***	0.312***	0.262***
	(0.147 - 0.254)	(0.139 - 0.265)	(0.119 - 0.197)	(0.242 - 0.402)	(0.205 - 0.335)
Urban residence	0.714*	0.844	0.769*	0.578***	0.675**
	(0.521 - 0.977)	(0.624 - 1.141)	(0.612 - 0.966)	(0.459 - 0.729)	(0.513 - 0.889)
Child(ren) <=5	1.208**	1.039	1.160**	1.128	1.091
	(1.054 - 1.385)	(0.908 - 1.188)	(1.037 - 1.298)	(0.994 - 1.281)	(0.966 - 1.231)
HH Head (ref: self/sp)					
Bio/Natal Family	1.127	1.794***	1.168	1.110	1.055
	(0.797 - 1.594)	(1.321 - 2.437)	(0.835 - 1.633)	(0.764 - 1.613)	(0.772 - 1.441)
In-laws	1.070	1.488***	1.107	1.119	1.073
	(0.893 - 1.284)	(1.300 - 1.705)	(0.972 - 1.262)	(0.970 - 1.290)	(0.925 - 1.244)
Wealth (ref poorest)					
Poorer	0.571***	0.778*	0.948	0.549***	0.723**
	(0.420 - 0.778)	(0.614 - 0.986)	(0.758 - 1.185)	(0.450 - 0.669)	(0.583 - 0.896)
Middle	0.507***	0.791	0.989	0.441***	0.625***
	(0.353 - 0.728)	(0.582 - 1.076)	(0.761 - 1.285)	(0.346 - 0.561)	(0.481 - 0.812)
Richer	0.342***	0.620**	0.502***	0.279***	0.480***
	(0.235 - 0.496)	(0.441 - 0.873)	(0.393 - 0.641)	(0.210 - 0.372)	(0.351 - 0.655)
Richest	0.175***	0.433***	0.310***	0.135***	0.275***
	(0.119 - 0.257)	(0.299 - 0.627)	(0.225 - 0.427)	(0.100 - 0.183)	(0.202 - 0.375)
Observations	9,279	9,279	9,279	9,279	9,279

Source: DHS 2016-2017. Currently married women ages 15-49. Logistic Regression Odd Ratios (ORs), 95% CI in parentheses for having a migrant spouse. *** p<0.001, ** p<0.01, * p<0.05. Weighted estimations. Controls for propensity blocks.

Table 2.6e: Multivariate Propensity Score analysis of spousal migration on barriers to healthcare utilization - Philippines

	1	2	3	4	5
	Any Barriers	**Permission**	**Financial**	**Distance**	**Go Alone**
Migrant Spouse	0.894	0.749	0.937	1.123	1.083
	(0.690 - 1.160)	(0.479 - 1.169)	(0.723 - 1.214)	(0.751 - 1.679)	(0.745 - 1.576)
Age (ref 15-19)					
20-24	0.685	0.676	0.764	0.707	0.722
	(0.374 - 1.253)	(0.371 - 1.231)	(0.442 - 1.323)	(0.381 - 1.312)	(0.386 - 1.351)
25-29	0.587	0.449**	0.733	0.596	0.572
	(0.328 - 1.049)	(0.251 - 0.805)	(0.442 - 1.213)	(0.328 - 1.081)	(0.314 - 1.045)
30-34	0.674	0.493*	0.843	0.529*	0.428**
	(0.378 - 1.202)	(0.271 - 0.898)	(0.497 - 1.430)	(0.295 - 0.950)	(0.234 - 0.785)
35-39	0.682	0.443**	0.883	0.646	0.502*
	(0.384 - 1.211)	(0.239 - 0.819)	(0.521 - 1.496)	(0.357 - 1.170)	(0.273 - 0.920)
40-44	0.717	0.478*	1.006	0.624	0.558
	(0.399 - 1.292)	(0.261 - 0.876)	(0.600 - 1.687)	(0.350 - 1.113)	(0.303 - 1.029)
45-49	0.880	0.476*	1.133	0.527*	0.482*
	(0.484 - 1.598)	(0.259 - 0.878)	(0.660 - 1.945)	(0.286 - 0.971)	(0.260 - 0.894)
Education (ref none)					
Primary	0.854	0.418***	0.682	0.588**	0.437***
	(0.536 - 1.361)	(0.268 - 0.653)	(0.441 - 1.053)	(0.395 - 0.874)	(0.286 - 0.669)
Secondary	0.639	0.341***	0.530**	0.506**	0.331***
	(0.389 - 1.052)	(0.203 - 0.572)	(0.332 - 0.847)	(0.329 - 0.777)	(0.211 - 0.519)
Higher	0.480**	0.292***	0.354***	0.484**	0.313***
	(0.287 - 0.802)	(0.164 - 0.518)	(0.218 - 0.576)	(0.304 - 0.769)	(0.195 - 0.501)
Urban residence	0.829	0.630***	0.872	0.476***	0.665**
	(0.686 - 1.001)	(0.483 - 0.822)	(0.733 - 1.038)	(0.377 - 0.602)	(0.508 - 0.870)
Child(ren) <=5	1.056	0.964	1.030	1.194*	0.976
	(0.929 - 1.200)	(0.792 - 1.173)	(0.911 - 1.166)	(1.031 - 1.382)	(0.844 - 1.129)
HH Head (ref self/sp)					
Bio/Natal Fam	0.902	1.183	0.906	0.752*	0.899
	(0.715 - 1.138)	(0.802 - 1.745)	(0.713 - 1.151)	(0.567 - 0.997)	(0.676 - 1.196)
In-laws	1.080	1.095	1.221	0.863	0.882
	(0.783 - 1.489)	(0.687 - 1.746)	(0.876 - 1.701)	(0.595 - 1.250)	(0.610 - 1.276)
Wealth (ref poorest)					
Poorer	0.660***	0.753*	0.734**	0.641***	0.686***
	(0.546 - 0.799)	(0.593 - 0.956)	(0.608 - 0.886)	(0.532 - 0.773)	(0.568 - 0.829)
Middle	0.629***	0.640**	0.717**	0.497***	0.626***
	(0.510 - 0.776)	(0.481 - 0.852)	(0.585 - 0.877)	(0.400 - 0.616)	(0.488 - 0.802)
Richer	0.406***	0.554*	0.548***	0.285***	0.441***
	(0.298 - 0.553)	(0.335 - 0.916)	(0.403 - 0.745)	(0.190 - 0.426)	(0.284 - 0.685)
Richest	0.207***	0.442*	0.257***	0.241***	0.465**
	(0.149 - 0.288)	(0.230 - 0.849)	(0.185 - 0.357)	(0.155 - 0.375)	(0.283 - 0.765)
Observations	11,201	11,201	11,201	11,201	11,201

Source: DHS 2016-2017. Currently married women ages 15-49. Logistic Regression Odd Ratios (ORs), 95% CI in parentheses for having a migrant spouse.
*** p<0.001, ** p<0.01, * p<0.05. Weighted estimations. Controls for propensity blocks.

Discussion

Spousal migration can have a positive impact on healthcare access through reducing common barriers to care for women in South and Southeast Asia. Women with migrant spouses reported fewer problems in accessing care overall and these reductions were largely driven by fewer gender-related problems. Because we were able to control for selection into migration using propensity score approaches, we are more confident that migration effects can be attributed to the migration and not to other factors such as wealth and education. Propensity adjustments did little to alter our findings. This is unsurprising in light of an earlier studies in Bangladesh and Indonesia and the existing history and networks of migration in the study population (Kuhn et al. 2020; Kuhn et al. 2011). The evidence of spousal migrations' positive impact on the healthcare access for wives in Bangladesh, Nepal, Indonesia, and to a lesser extent, the Philippines contributes to the healthcare access literature by directing us to look beyond individual factors and toward broader family and community characteristics when seeking to understand the role of enabling, predisposing, and need factors in different contexts (Andersen 1995; Yang and Hwang 2016). The relationship between migration and health extends beyond the migrants themselves, and the improvements in access for wives of migrants highlights the importance of relational factors in these relationships (Connell 2012; Rajendra 2015). Future research should address additional barriers to access in these settings and link specific barriers to utilization.

We see some variation in the barriers most frequently reported and those associated with spousal migration across the four countries. This is partially explained by different gendered contexts of migration, gender norms around women's movement and travel outside of the home. For example, in Bangladesh and Nepal, migration is much more male dominated compared to Indonesia and the Philippines where fewer women had migrant spouses (Table 2.2). The migration

flows in each of these four countries are relatively mature, but there are big differences in the proportions of male and female labor migrants (Table 2.1). For example, in Indonesia and the Philippines families are just as likely or even more likely to have a woman labor migrant in the household whereas in Bangladesh and Nepal women migrating for work is extremely rare. In Indonesia, spousal migration did not have a significant effect on financial barriers to care, but we saw effects of the largest magnitude for overall barriers (AOR Propensity Score: 0.651, p<0.001) and all three other specific barriers – permission, distance, and not wanting to go alone (AOR Propensity Score Model 2- Permission: 0.583, p<0.01; Distance: 0.807, p<0.05; Alone: 0.591, p<0.001). Indonesia has made massive strides toward achieving Universal Health Coverage (UCH), and ensuring access to free and low-cost services, however, this largely political process has not addressed gender specific barriers to care (Fossati 2016; Pisani et al. 2016). Further evidence that is able to link social and relational factors such as religious and cultural influences to healthcare use and women's autonomy across diverse locations could help to unpack some of the disparities in access. Despite differences in magnitude and which specific barriers where sensitive to spousal migration across the four counties, we find a consistent pattern across different high out-migration contexts: that of spousal migration being associated with a reduction in barriers to accessing healthcare for women, but not associated with increases in care utilization, specifically postpartum and acute care for children under five years old.

Different aspects of migration are acting on the different problems women face in accessing care. The mechanism through which financial barriers to care were affected in this study was most likely remittances, especially as these effects held in the propensity models. Income received by women through remittances from a migrant husband may provide substantial economic support and additional resources. Financial barriers were the most sensitive to spousal migration in

Bangladesh and Nepal where we saw reductions in the odds of experiencing money related barriers of 17-20% for women with migrant spouses compared to women with co-resident spouses in all specifications of the second stage propensity models (p<0.01). This finding is in line with studies on common barriers to care in a range of settings where healthcare costs lead to forgoing and/or delay of care (Ahmed et al. 2006; Israel 2016; Kim et al. 2017). This result may be predictable given the substantial financial returns to overseas migration in a population with well-established migration routes and deep stocks of social capital. Additionally, in Bangladesh where the gender-related barriers to care were not positively impacted by migration, prior studies have shown that migration may be a mechanism for changes in beliefs or attitudes around gender norms, but not changes in practice (Mobarak et al. 2018). Another study in Bangladesh found similar results with spousal migration significantly improving women's access to care through a reduction in financial barriers, but that it was simultaneously associated with a worsening in gender and family related barriers to care (West et al. 2021c).

There can also be interactions between different migration related mechanisms such as the financial and gender-based impacts of male migration. We see this in the case of India where women's increased freedom of movement to healthcare centers was positively associated with spousal migration, but only when she received regular patterned remittances and otherwise there was no migration effect (Green et al. 2019) and when migration had positive effects on women's health autonomy but not when she lived with her in-laws (Chatterjee and Desai 2020).

The results of this study showed that migration may reduce barriers to care and improve access, but we did not find significant migration related impacts on healthcare utilization. Since the barriers to healthcare access in this study were measured more generally and not directly linked to a specific health incident or illness, it is possible that they are capturing improvements in

perception, beliefs, and attitudes rather changes in experiences or behaviors (Mobarak et al. 2018).

Also, the measures of healthcare utilization analyzed in this study may not be as sensitive to

changes in the household, such as migration, because of the nature of the type of care. For

example, there is no debate about the importance of timely postpartum checks for women and they

are universally recommended. While this reduces bias in determining a healthcare need, it may

also reduce the impact of outside factors on this type of healthcare use. Similarly, care for child

diarrhea and fever may not be as sensitive to factors outside the health system in contexts with

high rates of child mortality, and considering that it is the second leading cause of death for

children under 5 years old. The limited literature on left-behind populations healthcare use shows

that the type of care matters. For example, in Ecuador, Migrant predictors were strongly associated

with use of antiparasitic medicines, and to a lesser extent, with curative visits, but no relationships

between migration and use of preventative services was found (Lopez-Cevallos and Chi 2012).

Who is migrating and the healthcare context also play a role. In Thailand, data showed that

children's migration increased the health services utilization of parents left behind for their most

recent illness (Adhikari et al. 2011). Similarly a study in Togo found that migration did have a

positive effect on maternal health services uses including facility delivery, antenatal care, and

postnatal care (Atake 2018). These mixed results point to the need for further study on the

relationship between migration and healthcare use for left-behind populations. Future research

should include multiple types of healthcare use and if possible link experiences of access barriers

to specific utilization needs.

Strengths and Limitations

Immigration focused studies frequently compare immigrants by country of origin (Hyman

et al. 2006; Sudhinaraset et al. 2019; Van Hook and Glick 2020), but this cross-country comparison approach is rarely employed in studies of the left-behind. While methodologically challenging to compare estimates of migration effects across diverse countries, the data We employed for this process were distinctly suited to such an approach and the similarities in primary destinations and types of migration help mitigate some confounding influences.

However, the cross-sectional study design has inherently limited internal validity. We were unable to determine any cause-and-effect relationships or the chronological directionality of the associations. The use of one year of cross-sectional data prevented the measurement of changes over time or the ability to examine changes in trends for groups. However, the study is strong in terms of generalizability in the region, strengthening external validity, because it used representative data with consistent measures over time and location. Data were recoded and extensive documentation provided to allow for pooling and cross-national comparisons. The methodological approach followed best practices outlined by DHS statistical experts.

The main surveys did not include questions that allowed me to delineate between domestic and international migration. While this is a limitation, it likely biased any results toward the null because domestic and international spousal migration were combined into one measure. Past studies that were able to distinguish between migrants destinations found healthcare use effects were largely driven by international migration, not domestic (West et al. 2021c) . Additionally, we did not account for the duration of the spousal migration or the timing of migration in relation to healthcare use or access problems.

The data on healthcare utilization for acute child illness (fever and diarrhea) were limited by small sample sizes. The small sample sizes were partly due to the use of a two week recall period. This short recall period reduces other issues of recall bias and memory, but simultaneously

presents issues with the sample size. We utilized a composite measure to help address this, but given that some locations such as the Philippines had very little variation in care-seeking, results should still be interpreted with caution.

Conclusions

Notwithstanding these limitations, this study established a strong foundation for future studies looking at how changes in healthcare access and utilization attributable to migration link to other important domains such as health, well-being, and development. The migration of a spouse should not be viewed strictly as the absence of a spouse, but rather as an opportunity for men and women to renegotiate women's opportunities, barriers, and perceived equitability in the context of globalization. This paper demonstrated that migration can simultaneously play a role in some of the individual and structural barriers to care, and also direct us to look at the relational aspects of gender inequities. There is a need for further research on migration, gender and the health of those left-behind. Due to the dynamic and evolving nature of migration, a comprehensive approach is essential to understand the impacts on women and their families and inform policies in both sending and receiving countries.

This study showed there is a need for further research on the gendered dynamics of migration and the health of those left behind. This analysis of healthcare utilization for women left behind in four countries provides rare evidence on a population that is both understudied and at risk. The comparison of women with and without migrant spouses across countries, allows us to approach an answer to the question of whether spousal migration is good for left-behind families' healthcare access, and in what ways. Wives of migrants showed significantly better access to healthcare even when accounting for selection into a migrant family. Yet, despite these advantages, wives of migrants still may face many challenges in regard to accessing care.

Contribution

This was the first work looking at the intersection of spousal migration and healthcare utilization using the DHS, and makes a novel contribution to regional work in South and Southeast Asia, one of the world's largest migration corridors. This study was innovative in terms of the disciplinary and multi-country approach, the use of the data, and the populations studied. We took a public health and health systems approach to analyzing migration impacts and transnational connections, an area of research more typically addressed through sociological, geographic, or economic approaches.

Chapter 2 Appendix

Table 2.7.A: Distribution of Outcomes by Country

	Bangladesh		Indonesia		Nepal		Philippines		Pooled	
	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI
Experienced Any Barriers to Care	0.67	[0.66-0.69]	0.33	[0.32-0.34]	0.78	[0.75-0.80]	0.52	[0.50-0.54]	0.59	[0.58-0.60]
Permission Barrier to Care	0.12	[0.11-0.13]	0.05	[0.05-0.06]	0.25	[0.22-0.27]	0.09	[0.08-0.10]	0.13	[0.12-0.14]
Financial Barrier to Care	0.44	[0.42-0.45]	0.14	[0.13-0.15]	0.56	[0.54-0.59]	0.44	[0.43-0.46]	0.4	[0.38-0.41]
Distance Barrier to Care	0.42	[0.40-0.43]	0.1	[0.10-0.11]	0.54	[0.51-0.57]	0.23	[0.21-0.25]	0.34	[0.33-0.35]
Go Alone Barrier to Care	0.45	[0.44-0.47]	0.23	[0.22-0.23]	0.68	[0.65-0.70]	0.18	[0.17-0.20]	0.41	[0.40-0.43]
Postpartum Check w/in 2days	0.49	[0.46-0.52]	0.86	[0.84-0.87]	0.56	[0.53-0.60]	0.84	[0.81-0.86]	0.66	[0.64-0.68]
Treatment for Child Fever	0.39	[0.37-0.42]	0.69	[0.67-0.70]	0.5	[0.46-0.55]	0.51	[0.45-0.56]	0.52	[0.50-0.53]
Treatment for Child Diarrhea or Fever	0.4	[0.38-0.43]	0.68	[0.67-0.70]	0.49	[0.44-0.53]	0.49	[0.45-0.54]	0.52	[0.51-0.54]

Weighted estimations. Currently married women ages 15-49, Source: DHS 2016-2017.

Table 2.8.A: Distribution of Outcomes by Spousal Migration Status

	Any Barriers to Care		Postpartum Check w/in 2 Days		Treatment for Child Fever		Treatment for Child Diarrhea or Fever	
	Co-Resident Spouse	Migrant Spouse	Co-Resident Spouse	Migrant Spouse	Co-Resident Spouse	Migrant Spouse	Co-Resident Spouse	Migrant Spouse
Pooled	0.67*** [0.66-0.69]	0.6 [0.57-0.64]	0.58*** [0.57-0.59]	0.64 [0.63-0.66]	0.53* [0.51-0.54]	0.49 [0.45-0.52]	0.53 [0.51-0.54]	0.49 [0.46-0.53]
Bangladesh	0.68*** [0.67-0.70]	0.62 [0.60-0.65]	0.48 [0.45-0.51]	0.53 [0.47-0.58]	0.39 [0.37-0.42]	0.39 [0.34-0.44]	0.40 [0.38-0.43]	0.41 [0.36-0.46]
Indonesia	0.33 *** [0.32-0.34]	0.25 [0.23-0.28]	0.86 [0.84-0.87]	0.84 [0.80-0.88]	0.69 [0.67-0.70]	0.71 [0.65-0.76]	0.68 [0.67-0.70]	0.7 [0.65-0.75]
Nepal	0.78 [0.75-0.80]	0.77 [0.74-0.80]	0.56 [0.52-0.60]	0.57 [0.52-0.62]	0.52 [0.47-0.58]	0.47 [0.41-0.53]	0.5 [0.45-0.56]	0.47 [0.41-0.52]
Philippines	0.53*** [0.51-0.55]	0.41 [0.36-0.46]	0.83* [0.80-0.86]	0.92 [0.84-0.96]	0.49*** [0.43-0.54]	0.78 [0.65-0.87]	0.47*** [0.42-0.52]	0.78 [0.66-0.86]

Weighted estimations. Mean [95% CI]. *** p<0.001, ** p<0.01, * p<0.05. p-values indicated significant differences in the proportion of women with co-resident and migrant spouses based on chi-square tests. Currently married women ages 15-49, Source: DHS 2016-2017.

Chapter 3 : Migration as financial protection: Remittances & healthcare spending in the Philippines

Abstract

This study investigated the relationship between migration and health expenditures in the Philippines. The Philippines is a top migrant-sending country: the annual flow of labor migrants is over 1.8 million people. The Philippines consistently ranks one of the highest recipients of remittances in the world. Annual remittances into the country were over $34 billion, making up over 9% of 2020 GDP. This quantitative cross–sectional study examined two key outcomes: out-of-pocket health expenditures and catastrophic expenditures (CHE) (health expenditures 10% or more of total household consumption) to better understand the economic and health effects of migration and inform financial protection policies for healthcare. The independent variables were remittances received by the household.

Using nationally representative data from the Philippines Family Income and Expenditure Survey (FIES 2018), we found that remittance receiving households spent significantly more on healthcare compared to households that did not receive remittances. Thirty percent of FIES households received remittances from abroad averaging 101,027 PHP (1,797 USD) (median: 48,500) over a six-month period (~30% of total household income for the same period). Receipt of any remittances from abroad was significantly associated with greater overall spending on health by 5,331 PHP ($98). The positive association between remittances and health spending remained significant when controlling for family size, region, urban location, and household income although the magnitude dropped slightly. Approximately 5% of households experienced CHE. Families that received remittances of any amount were almost twice as likely to experience

CHE compared to families who did not receive remittances (predicted probability of CHE: 0.058 vs. 0.039, AOR: 1.54, 95% CI: 1.43 – 1.65 p<0.001).

Migration can provide additional financial resources for basic household consumption needs such as healthcare, but remittances do not necessarily provide protection against CHE. Migrant families are more likely to use private inpatient facilities and seek outpatient care, a possible driver of higher costs. Efforts aimed at increasing financial protection for healthcare and achieving universal health coverage should consider the migration context and how best to leverage the benefits of migration for improving health and economic well-being.

Introduction and Background

Labor migration is a key driver of economic growth. There is increasing attention to and prioritization of migration in the global development agenda, including a focus on how remittances change economic circumstances in sending communities (Abella and Ducanes 2009; Adams Jr and Page 2005; Eggoh et al. 2019; Feeny et al. 2014; World Bank 2019a; World Bank 2019b). However, current evidence on the health impacts of migration, especially the impacts for families left behind, remains weak (Wickramage et al. 2018). This study helps to fill that gap by quantitatively measuring the relationship between migration and healthcare spending for families left behind.

One way in which migration may affect health is through remittances, which increase household income and can reduce resource barriers to care-seeking among the left-behind. Studies show that remittances are often used for basic consumption needs and to improve human capital through spending on food, health, and education (Ajefu and Ogebe 2020; Lu 2013; Mishra et al. 2022). The literature on remittances and how they affect healthcare decision-making, mobility, and access to facilities for the left-behind is inconclusive, showing increased utilization of some services and not others (Atake 2018; Lopez-Cevallos and Chi 2012; Roosen and Siegel 2018). For example, in Mexico, remittances were directly linked to increased household healthcare spending (Amuedo-Dorantes and Pozo 2011), and a study in Cambodia did not find any links between remittances and increased utilization of qualified providers for children in Cambodia (Treleaven 2019). Other aspects of healthcare use that may be sensitive to remittances, as they have been shown to be linked to income or wealth, include seeking care at private versus public healthcare facilities, travel to facilities, and spending on medicines and other medical products (Bredenkamp and Buisman 2016; Macinko et al. 2022; Treleaven 2019).

Remittances may also change labor force participation in different ways for men and women, leading to shifts in responsibility and time constraints that impact women's ability to seek and afford healthcare services as well as their insurance eligibility and participation (Amuedo-Dorantes and Pozo 2006; Ducanes 2015; Khan and Valatheeswaran 2016; Lokshin and Glinskaya 2009). Prior work on left-behind populations showed that women in rural Bangladesh with an international migrant spouse were half as likely to face barriers in accessing healthcare compared to women with coresident spouses, and faced fewer financial impediments to care (West et al. 2021c). In some cases, migration induced improvements in health-related decision-making and autonomy were more dependent on the specific timing and patterns of remittances rather than the amount received (Green et al. 2019).

The Philippines is one of the top migrant-sending countries globally: the annual flow of labor migrants is over 1.8 million people (McAuliffe and Khadria 2019). Annual remittances into the country are over $34 billion USD, making up over 9% of the Philippines' GDP in 2020. The Philippines consistently ranks as one of the highest recipients of remittance inflows in the world, alongside India, China and Mexico (World Bank 2019b). How do these demographic shifts and cash inflows from abroad impact the health spending and healthcare use of families who remain?

Healthcare expenditures are an important indicator of health system success. Health systems are not only about delivering healthcare, but also about financial protection; meaning that people can obtain the health services they need without experiencing financial hardship (The World Bank 2020). Financial protection is embedded in the Sustainable Development Goals as part of universal health coverage (UHC) (Goal 3, Target 3.8, Indicator 3.8.1), which were universally adopted by all member states of the United Nations in 2015 (United Nations 2015). In addition to being a basic measure of health system functioning, health expenditures can also serve

as indicator of equity as certain groups may be more likely to experience financial burden from illness or injury and incur catastrophic health expenditures (CHE) (Liu et al. 2021; Loganathan et al. 2019; van Doorslaer et al. 2007). Research has shown that financial protection can be measured by inclusion of expenditures in household surveys, and that progress toward UHC is possible with commitments at all levels of governance (Boerma et al. 2014; Wagstaff et al. 2018; Xu et al. 2007) The World Bank and the World Health Organization track financial protection and have found troubling trends since the year 2000 of increasing expenditures, increasing catastrophic expenditures, and increasing impoverishment from health expenditures. In 2015, health spending pushed over 371 million people into poverty, 90 million of whom were pushed into extreme poverty (below $1.90 per person per day). In both absolute and population proportion measures, most of those people who impoverished by healthcare expenditures were in Asia (The World Bank 2020).

Despite a number of policies to promote health insurance and reduce the burden of healthcare expenditures, out-of-pocket spending in the Philippines has increased leading to 7.7% of people incurring catastrophic expenditures and an additional 1.5 million people pushed into poverty by healthcare costs (Bredenkamp and Buisman 2016). The National Health Insurance Program (NHIP), administered by PhilHealth, has a goal of 100% coverage and the government has recently increased provision of free health services in the public sector and covered services in the NHIP. The National Demographic and Health Survey (2017) (NDHS) showed that 68% of the population had some form of health insurance coverage, with PhilHealth the most common form of health insurance (Philippine Statistics Authority - PSA and ICF 2018). There was significant regional variation in health insurance coverage with the lowest rates in the Autonomous Region in Muslim Mindanao (ARMM) at 50% and the highest coverage in the National Capital

Region (NCR) (75%). Coverage increased with household wealth from 60% in the lowest quintile to 83% in the highest quintile (Philippine Statistics Authority - PSA and ICF 2018).

This study builds on prior work by examining a high out-migration context (the Philippines), using a larger dataset, and focusing on the mechanism of financial burden (financial inflows through remittances, and health expenditures), to unpack a potential relationship between migration and health. This can help us better understand the economic effects of migration and inform policies to ensure financial protection for healthcare.

Research Question and Specific Aims

This study addressed the research question: does international migration influence household healthcare expenditures for the left-behind, and are migrant remittances associated with reduced incidence of catastrophic health expenditures?

The specific aims were:

Aim 1: Assess the relationship between remittances and healthcare expenditures in the Philippines to provide evidence of the interplay between the migration and health systems.

Aim 2: Determine if remittances provide protection against catastrophic health expenditures for households in the Philippines.

Conceptual Model

The model below (Figure 3.1) shows the hypothesized pathways through which migration is related to health spending in countries of origin. The columns from left to right represent the pathways; the two rows show different levels of the relationships: system (e.g. health system, migration system) and household. The measures and hypothesized relationships between them were selected based on the World Health Organization (WHO) University Health Coverage

Framework (UHC) and the global UHC monitoring indicators and targets (see measures section

below) (Boerma et al. 2014; Fox and Reich 2015; Saksena et al. 2014) .

Figure 3.1: Conceptual Model

Migrant Remittances and Healthcare Spending

Migration	Income/Wealth/ Consumption		Utilization	Health Spending

Household

- Remittances (amount)

- Household income
- Household consumption
- Family size

Need for healthcare

- Outpatient Care
- Inpatient Care
  - Public v. Private
- Medical Products

- Healthcare spending (overall)*
- Catastrophic health expenditure*

System

- Migration Policy
- Labor market
- Transnational financial & communication systems

- Cost of care relative to local median income
- Cost of care relative to remittance income

- Level of awareness of health programs
- Community/cultural perceptions of need

- Demand for health services
- Systematic barriers to accessing care

- Insurance*
- Cost of care by facility type & illness
- Cost of transport to care

▢ = Measure in FIES   *Indicators from WHO UHC Framework (Boerma et al. 2014)

Methods

Research Design

This is a quantitative cross–sectional study to examine the relationship between migration and household healthcare expenditures in the Philippines.

Data and Sample

This work uses a nationally representative survey that includes health and economic spending data: the Family Income and Expenditure Survey. The 2018 Family Income and Expenditure Survey (FIES) is a nationwide survey of households by the Philippine Statistics Authority. Started in 1957, the 2018 FIES includes interviews with a sample of around 150,000 non-institutionalized households and provides reliable estimates of income and expenditures at the national, regional, provincial, and highly urbanized cities (HUC) levels. The goal of the FIES is to provide information to support government policy-making, and specifically to gather data on family income, sources of income, family expenditures and related information; determine the income distribution, levels of living and spending patterns, and the degree of inequality among Filipino families; and provide information for the Consumer Price Index (CPI) and estimation of the country's poverty threshold and incidence. We included the full 2018 sample of 147,717 households in all the descriptive and primary multivariable analyses.

Measures

Selection and operationalization of the healthcare expenditure and related covariate measures were guided by the WHO UHC framework and were directly aligned with the indicators used to evaluate progress toward the WHO UHC goals (e.g. catastrophic out-of-pocket health

payments as an indicator of coverage of the population with financial protection) (Boerma et al. 2014). The FIES had detailed spending information by category, but not by time, household member, or incident of healthcare use. Expenditures were aggregated over a 6-month measurement period. FIES also did not indicate how costs were covered by each household (e.g. by Philhealth vs. wages or savings etc.).

Outcomes

The unit of analysis was the household. The primary outcome was healthcare expenditures for the household. These expenditures were 6-month aggregate totals for the period July – December 2018. In addition to the aggregate total of all healthcare expenditures for the household, we looked at the separate totals for outpatient, inpatient, and medical products (pharmaceuticals, medical supplies, etc.). We also examined subcategories of the total and three expenditure categories. For inpatient expenditures, in addition to the total, we measured expenditures for private and public care separately. While we did not have a measure of what was covered by PhilHealth, we did have a measure of cash expenditures, so we constructed separate variables for the total expenditures and the cash expenditures for each category and subcategory. For total expenditures and each category and subcategory, we constructed different variables: a yes/no binary measure for whether households had any expenditures, a measure of the total expenditures, and a log transformed measure of the total expenditures for those with non-zero costs.

FIES had detailed consumption data which allowed for the constructions of measures of catastrophic health expenditures. Following Van Doorslaer, Wagstaff, and Bredenkamp et al. (Bredenkamp and Buisman 2016; van Doorslaer et al. 2007; Wagstaff et al. 2007) we defined two measures of catastrophic expenditures as those in excess of two common thresholds; 10% of total consumption and 40% of total non-food consumption. These same measures are also used by the

WHO for measuring financial protection in the UHC frameworks and in the United Nations Sustainable Development Goals indicator framework (The World Bank 2020). We tested binary measures of whether or not a household incurred catastrophic health expenditures using both thresholds.

Predictors

The predictor variables measured international migrant remittances. We compared households who received remittances to those who did not in addition to looking at the amount of remittances received as absolute numbers and as a percentage of household income. In 2018, 88.7% of overseas migrants sent remittances back home (Philippine Statistics Authority - PSA 2019). The FIES survey asked if the household has received any cash from family members overseas and then reported the total cash receipts over a 6 month-period (July – December 2018). *"During the period JULY to DECEMBER 2018, did you or any member of your family receive in cash any receipt, gift or other forms of assistance from abroad? (yes/no)."* If there was a "yes" response, amounts of each category were ascertained and a total amount from abroad was reported. The five categories were:

1. *Cash received from family members who are Overseas Contract Workers (OCW)*

2. *Cash received from family members who are working abroad other than OCW*

3. *Pensions, retirement, workmen's compensation and other benefits*

4. *Cash gifts, support, relief, etc. from abroad*

5. *Dividends from investment abroad*

We created multiple variable specifications including a binary indicator of whether or not remittances were received, a log transformed total of remittances, and remittances as a proportion

of total income. Following work in Bangladesh, another high remittance receiving country, the primary specification was the binary indicator of receipt of any remittances (West et al. 2021c) but we also include results for remittance amount and a log transformation of the remittance amount. The log transformation of the remittance amount was selected to address the non-normal distribution of the remittance amount variable. This specification does not include households that did not receive remittances (no zeros) in order to estimate the effects of remittance amount instead of remittance receipt (as measured by the binary specification). In addition to summary statistics and visual inspection of the distribution, we used the "gladder" tool in Stata to compare different transformations. The log transformation was most appropriate for normalizing these remittance data.

Covariates

These data contain rich information about income, consumption, and remittances, so regression analyses included other important factors that influence health spending, and selection into migration. We included the following covariates: household size, children in household, household type (single or extended family), urban/rural location, per capita income, and region.

Analyses

The literature review and conceptual model informed variable selection and operationalization. Univariate and descriptive analyses, including visual inspections of distributions, guided the cleaning, coding, and transformations of variables as appropriate. Given that expenditure data, our outcome, was not normally distributed, we tested multiple transformations and compared distributions to determine that the log transformation was the most appropriate.

Statistical analyses were performed using Stata Statistical Software: Release 15, College Station, TX: StataCorp LLC. For testing overall differences across categories within variables, chi-square tests, and t-tests and were used to calculate p-values. Statistical estimates of how different factors impacted health expenditures were based on weighted least squares regression models, logistic regression models for binary outcomes, and generalized linear models. Variables that were included in the final models were selected using a combination of a review of the literature, the model fit statistics, and formal tests on individual predictors. Survey weights were used to account for the complex survey design and selection of households.

Sensitivity analysis of different constructions of the outcomes and predictors were conducted to ensure that our results were not a result of measurement error. Additionally, we tested our models on a different expenditure outcome to evaluate whether the relationship between migration and health expenditures was similar or different for other expenditures. For example, we were testing whether increased income from remittances increased consumption across other expenditure categories and whether those increases were comparable. For these models, our outcome was total food expenditures during the same 6-month period (July-December 2018).

Given that not all households had health expenditures during the measurement period or that many households only had one type of expenditure, we needed to account for varying rates of zeros in the different outcome variables. Zero values for an expenditure category indicated that the household did not use that type of healthcare (or any for the total measure) so had no health expenditures. To deal with zero values and how they impacted outcomes and model fit, we took multiple approaches such as reporting means with and without the inclusion of zero values, running models restricted to non-zero expenditures, and performing manual two-part models. For the two-part models, we first ran a logistic regression to understand what factors may predict whether or

not a household has any expenditures in particular category, then ran a separate least squares

regression model with a log transformed outcome to see what predictors impact the amount of

expenditures given that a household has any health expenditures in that particular category. Log

transformed outcomes only included non-zero values so all log models are second stage. For log

transformed outcomes, we reported relevant results as percentage differences in the outcome for

different categories of predictors to avoid some of the pitfalls of back-transforming an outcome

variable. Models that included a log transformed expenditure outcome and a log transformed

remittance predictor (log-log data) were used to calculate elasticities (Dambolena et al. 2009). We

also ran generalized linear models (GLMs) with a gamma family and a log link and reported

predicted probabilities and marginal effects from these models using the Stata postestimation

command "margins." These models did not require transformation or back-transformation,

avoiding some of the issues with log transformed models and improving interpretation of the

marginal effects.

Results

Description of the groups

All results reported below are weighted estimates. Thirty percent of households received

remittances from abroad from a family member who was an overseas migrant. Average

remittances received, conditional on receiving any remittances, were 101,027 PHP (1,797 USD)

(median: 48,500) over a six-month period which accounted for ~30% of total household income

on average for the same period. As shown in Table 3.1, households were split almost evenly

between urban (52%) and rural (48%) locations and 12% were categorized as meeting the national

poverty threshold. Eighty-four percent of families had 3 or more people (9% had 8 or more, 5%

were single people living alone). Most people had a household that consisted of their nuclear

family only (72%), while 28% lived with extended family. Most families (72%) had children

under 18, with 32% of households having at least one child under 5 years old.

Table 3.1: Sample Characteristics by Household Remittance Status

	No Remittances		Yes Remittances		Total		
	mean	95% CI	mean	95% CI	mean	95% CI	n = 147717
Urban	0.51	[0.51-0.51]	0.55	[0.54-0.56]	0.52	[0.52-0.53]	66,137
In Poverty	0.15	[0.15-0.15]	0.06	[0.05-0.06]	0.12	[0.12-0.12]	21,563
Regional Per Capita Income							
First decile	0.12	[0.12-0.12]	0.05	[0.05-0.05]	0.1	[0.10-0.10]	14,867
Second decile	0.12	[0.11-0.12]	0.06	[0.06-0.07]	0.1	[0.10-0.10]	14,798
Third decile	0.11	[0.11-0.11]	0.08	[0.07-0.08]	0.1	[0.10-0.10]	14,738
Fourth decile	0.11	[0.10-0.11]	0.08	[0.08-0.09]	0.1	[0.10-0.10]	14,658
Fifth decile	0.1	[0.10-0.11]	0.09	[0.09-0.09]	0.1	[0.10-0.10]	14,762
Sixth decile	0.1	[0.10-0.10]	0.1	[0.10-0.11]	0.1	[0.10-0.10]	14,696
Seventh decile	0.09	[0.09-0.10]	0.11	[0.11-0.12]	0.1	[0.10-0.10]	14,699
Eighth decile	0.09	[0.09-0.09]	0.12	[0.12-0.13]	0.1	[0.10-0.10]	14,887
Ninth decile	0.08	[0.08-0.09]	0.14	[0.14-0.14]	0.1	[0.10-0.10]	14,783
Tenth decile	0.08	[0.07-0.08]	0.15	[0.15-0.16]	0.1	[0.10-0.10]	14,829
Family Size							
1	0.05	[0.05-0.05]	0.04	[0.04-0.05]	0.05	[0.05-0.05]	7,506
2	0.1	[0.10-0.10]	0.11	[0.11-0.11]	0.1	[0.10-0.10]	15,058
3	0.16	[0.16-0.17]	0.18	[0.17-0.18]	0.17	[0.16-0.17]	23,945
4	0.21	[0.21-0.22]	0.21	[0.21-0.22]	0.21	[0.21-0.22]	30,937
5	0.18	[0.18-0.19]	0.18	[0.17-0.18]	0.18	[0.18-0.18]	26,763
6	0.12	[0.12-0.13]	0.12	[0.11-0.12]	0.12	[0.12-0.12]	18,504
7	0.07	[0.07-0.08]	0.07	[0.07-0.08]	0.07	[0.07-0.08]	11,179
8+	0.09	[0.09-0.09]	0.08	[0.08-0.09]	0.09	[0.09-0.09]	13,825
Extended Family (ref: Nuclear)	0.25	[0.25-0.25]	0.36	[0.35-0.36]	0.28	[0.28-0.28]	40,485
Children Under 5 years*							142,277
None	0.67	[0.66-0.67]	0.7	[0.70-0.71]	0.68	[0.67-0.68]	96,663
1	0.25	[0.24-0.25]	0.23	[0.22-0.23]	0.24	[0.24-0.24]	33,610
2+	0.09	[0.08-0.09]	0.07	[0.07-0.07]	0.08	[0.08-0.08]	12,004
# of children 5-17yrs*							144,769
None	0.36	[0.35-0.36]	0.34	[0.34-0.35]	0.35	[0.35-0.36]	50,829
1	0.27	[0.27-0.27]	0.28	[0.27-0.29]	0.27	[0.27-0.28]	38,523
2	0.2	[0.20-0.20]	0.21	[0.21-0.22]	0.2	[0.20-0.21]	29,384
3	0.11	[0.10-0.11]	0.11	[0.10-0.11]	0.11	[0.10-0.11]	15,546
4+	0.07	[0.07-0.07]	0.06	[0.06-0.06]	0.07	[0.07-0.07]	10,487
Region							
Region I - Ilocos Region	0.04	[0.03-0.04]	0.08	[0.08-0.09]	0.05	[0.05-0.05]	5,892
Region II - Cagayan Valley	0.03	[0.03-0.03]	0.05	[0.05-0.05]	0.03	[0.03-0.04]	6,278
Region III - Central Luzon	0.1	[0.10-0.10]	0.15	[0.14-0.15]	0.11	[0.11-0.11]	11,807
Region IVA - Calabarzon	0.15	[0.14-0.15]	0.17	[0.16-0.17]	0.15	[0.15-0.16]	7,353
Region V - Bicol Region	0.06	[0.06-0.06]	0.03	[0.03-0.03]	0.05	[0.05-0.05]	8,199
Region VI - Western Visayas	0.07	[0.07-0.07]	0.08	[0.07-0.08]	0.07	[0.07-0.08]	10,680
Region VII - Central Visayas	0.08	[0.07-0.08]	0.07	[0.07-0.07]	0.07	[0.07-0.08]	8,056
Region VIII - Eastern Visayas	0.05	[0.05-0.05]	0.03	[0.02-0.03]	0.04	[0.04-0.04]	9,509
Region IX - Zamboanga Pen.	0.04	[0.04-0.04]	0.02	[0.02-0.03]	0.03	[0.03-0.03]	5,823
Region X – Nor. Mindanao	0.05	[0.05-0.05]	0.03	[0.03-0.03]	0.05	[0.04-0.05]	9,096
Region XI - Davao Region	0.06	[0.05-0.06]	0.04	[0.04-0.04]	0.05	[0.05-0.05]	8,270
Region XII - Soccsksargen	0.04	[0.04-0.04]	0.05	[0.05-0.05]	0.05	[0.04-0.05]	7,448
NCR	0.14	[0.13-0.14]	0.13	[0.13-0.14]	0.13	[0.13-0.14]	17,977
CAR	0.02	[0.02-0.02]	0.02	[0.02-0.02]	0.02	[0.02-0.02]	8,538
ARMM	0.03	[0.03-0.03]	0.02	[0.02-0.02]	0.03	[0.03-0.03]	7,255
Region XIII - Caraga	0.03	[0.03-0.03]	0.02	[0.01-0.02]	0.03	[0.02-0.03]	7,587
Mimaropa	0.03	[0.03-0.03]	0.02	[0.02-0.02]	0.03	[0.03-0.03]	7,949

Source: FIES 2018. *Number of children was only ascertained at the 2nd visit and is missing for a small number of households

Remittance receiving households (international migrant households) and non-remittance receiving households differed on some key characteristics. Remittance receiving households were more likely to be located in an urban area compared to non-remittance receiving households (55% versus 51%), and much less likely to be in poverty (6% versus 15%). Only 5% of households that received remittances were in the lowest regional per capita income decile while 15% were in the highest.

International migrant families were more likely to live in households with extended family rather than in a nuclear / single family household although there were similar numbers of children across both groups. Geographically, migrant and non-migrant households were fairly equally distributed across the 17 regions. The regions where the proportion of remittance receiving households were the greatest were Region I - Ilocos Region, which had twice the proportion of migrants (8%) compared to non-migrants (4%) and Region III - Central Luzon with 15% of the migrant population and 10% of the non-migrant population. Region V - Bicol Region had fewer migrant households with half the proportion of migrant families (3%), compared to non-migrant families (6%).

Overall spending and use

For the sixth-month period July – December 2018, almost all households, 96%, had healthcare expenditures of some kind, and 95% of households spent cash on health expenditures (instead of paying through credit, in-kind, or loan) (Table 3.2). Thirty-four percent of households had outpatient expenditures, almost all of them spending some cash on those expenditures, and 5% had inpatient expenditures. For those who sought inpatient care, about 50% had expenditures from a public facility, and about 52% had them for private facilities. Of all expenditures, the most common by far were expenditures for medical products like pharmaceuticals (medicines), and 96%

of all households had these kinds of expenditures. Ninety-four percent of all households paid some cash for their medical product expenditures. Since cash and total expenditures were not appreciably different, reported results focus on total expenditures instead of reporting each separately.

Catastrophic health expenditures (CHE), measured as expenditures greater than 10% of total consumption, impacted 4.5% of households. While the numbers were only slightly higher when restricting to households with any expenditures (4.7%), 35% of households who had inpatient expenditures experienced CHE and 44% of those who had private inpatient expenditures. Twenty-six percent of households with public inpatient expenditures and 9% of those with outpatient expenditures incurred CHE. Using an alternative measure of CHE, 40% of non-food expenditure, the proportion of households experiencing CHE is much lower at 1%.

Table 3.4 shows the mean household health expenditures for each expenditure category and by remittance receipt. Overall, total mean health expenditures for the six-month period July – December 2018 were 6,560 PHP ($117 USD) (95% CI: 6,341 - 6,779 PHP). Inpatient expenditures were the highest, particularly at private facilities (inpatient: 26,178 PHP, $471; private inpatient: 38,640. PHP, $696). Medical product expenditures exceeded average outpatient expenditures, even when restricting only to those who had outpatient expenditures (medical products: 4,113 PHP, $74; outpatient: 3,284 PHP, $59).

Factors that predicted differences in expenditures were urban location, wealth/income, family structure, region, and receipt of remittances. Urban households spent more overall by 2,809 PHP ($50 USD) (95% CI: 2,373 – 3,245 PHP) on average compared to rural households, although this was reduced to about 1,000 PHP in multivariable models. Families in poverty spent significantly less on healthcare compared to families who were not below the poverty threshold. The differences

were stark between the poorest and the richest with those in the 10th regional per capita income decile spending 21,988 PHP ($391 USD) (95% CI: 20,146 - 23,829 PHP) and those in the first decile spending only 1,612 PHP ($29 USD) (95% CI: 1,516 - 1,709 PHP). The magnitude of the difference remained in multivariable models.   Given that the measure is total expenditures per household, the largest households spent more on healthcare than the smallest households. Those in the middle ranges fluctuated, and this depended on the number of children.   Households with extended families spent more on healthcare on average compared to single family households. There was significant regional variation with the Calabarzon region having the highest mean expenditures 9,159 PHP ($163 USD) (95% CI: 8,126 - 10,193 PHP) and ARMM the lowest, 1,351 PHP ($24 USD) (95% CI: 1,200 - 1,503 PHP). When looking at cash expenditures the same relationships emerged in regard to urban location, wealth, family structure and region.

Table 3.2: Households that received remittances were more likely to have healthcare expenditures across all categories except for public inpatient care

| | Received Remittances | | | | | | |
| | No | | Yes | | Total | | n[a] |
	mean	95% CI	mean	95% CI	mean	95% CI	147,717
Any health expenditure***	0.96	[0.96-0.96]	0.97	[0.97-0.97]	0.96	[0.96-0.96]	141,569
Any cash health expenditure***	0.95	[0.94-0.95]	0.97	[0.96-0.97]	0.95	[0.95-0.95]	139,821
Any outpatient expenditure***	0.31	[0.31-0.31]	0.41	[0.40-0.42]	0.34	[0.34-0.34]	46,882
Any cash outpatient expenditure***	0.29	[0.29-0.29]	0.39	[0.38-0.40]	0.32	[0.32-0.32]	43,733
Any inpatient expenditure***	0.05	[0.05-0.05]	0.06	[0.06-0.06]	0.05	[0.05-0.05]	7,945
Any cash inpatient expenditure***	0.04	[0.04-0.04]	0.05	[0.05-0.06]	0.05	[0.04-0.05]	7,026
Any private inpatient expenditure***	0.02	[0.02-0.02]	0.04	[0.03-0.04]	0.03	[0.03-0.03]	3,687
Any cash private inpatient expenditure***	0.02	[0.02-0.02]	0.03	[0.03-0.03]	0.02	[0.02-0.02]	3,356
Any public inpatient expenditure	0.03	[0.02-0.03]	0.03	[0.02-0.03]	0.03	[0.02-0.03]	4,388
Any cash public inpatient expenditure	0.02	[0.02-0.02]	0.02	[0.02-0.02]	0.02	[0.02-0.02]	3,773
Any medical product expenditure***	0.95	[0.95-0.95]	0.97	[0.96-0.97]	0.96	[0.95-0.96]	140,550
Any cash medical product expenditure***	0.94	[0.94-0.94]	0.96	[0.95-0.96]	0.94	[0.94-0.95]	138,580
CHE (>10% of consumption)***	0.04	[0.03-0.04]	0.07	[0.06-0.07]	0.05	[0.04-0.05]	6,368
CHE (>40% of non-food consumption)***	0.01	[0.01-0.01]	0.01	[0.01-0.01]	0.01	[0.01-0.01]	1,209

Catastrophic Health Expenditure (CHE), *** $p<0.001$, ** $p<0.01$, * $p<0.05$
Source: FIES 2018
[a] n = the total households who had any of the expenditure type in that row out of the total sample of 147,717

Table 3.3: Households with higher mean remittances received are more likely to have healthcare expenditures

N=147,717	Remittance Amount PHP		Remittance Amount PHP (if any received)	
	mean	95% CI	mean	95% CI
Total	29,991	[29,212.69-30,768.95]	101,027	[98,705.21-103,348.63]
Any health expenditure				
no	15,256	[13,340.60-17,171.31]	70,668	[63,365.66-77,970.54]
yes	30,567	[29,762.71-31,372.02]	101,882	[99,504.72-104,258.58]
Any cash health expenditure				
no	14,812	[13,114.72-16,509.87]	68,302	[61,734.44-74,868.89]
yes	30,754	[29,941.91-31,566.29]	102,213	[99,820.94-104,605.16]
Any outpatient expenditure				
no	22,678	[21,987.72-23,367.66]	85,556	[83,293.23-87,818.89]
yes	44,170	[42,333.66-46,006.56]	123,204	[118,643.29-127,765.40]
Any cash outpatient expenditure				
no	22,702	[22,023.61-23,380.36]	85,222	[83,007.51-87,435.76]
yes	45,501	[43,562.55-47,439.12]	125,797	[121,027.75-130,565.44]
Any inpatient expenditure				
no	29,330	[28,542.65-30,117.09]	99,810	[97,438.98-102,180.82]
yes	42,346	[38,088.26-46,604.35]	119,966	[109,196.83-130,736.15]
Any cash inpatient expenditure				
no	29,332	[28,546.63-30,117.10]	99,696	[97,333.41-102,059.11]
yes	43,849	[39,269.57-48,428.19]	124,382	[112,844.21-135,918.92]
Any private inpatient expenditure				
no	29,173	[28,402.07-29,942.93]	99,265	[96,945.37-101,584.68]
yes	60,453	[52,683.28-68,223.06]	148,317	[131,321.02-165,313.62]
Any public inpatient expenditure				
no	30,167	[29,371.97-30,962.53]	101,613	[99,240.22-103,986.48]
yes	23,195	[20,546.69-25,843.53]	78,370	[70,879.40-85,859.92]
Any medical product expenditure				
no	17,990	[15,901.65-20,077.78]	79,209	[71,703.08-86,715.09]
yes	30,540	[29,731.94-31,347.45]	101,782	[99,394.91-104,169.54]
CHE (>10% of consumption)				
no	28,934	[28,141.88-29,726.59]	99,758	[97,332.37-102,183.61]
yes	52,276	[48,306.50-56,245.24]	118,645	[110,908.10-126,381.91]
CHE (>40% of non-food consumption)				
no	29,791	[29,010.87-30,572.01]	100,764	[98,424.66-103,102.77]
yes	53,283	[43,895.25-62,671.62]	121,810	[103,031.13-140,589.48]

Catastrophic Health Expenditure (CHE), Source: FIES 2018

Table 3.4: Remittance receiving households spent more on healthcare across all categories

	No Remittances			Received Remittances			Total		
	Mean PHP	SE	CI	Mean PHP	SE	CI	Mean PHP	SE	CI
Total Health Expenditures	4977.52	91.12	[4,798.92-5,156.11]	10308.84	305.34	[9,710.38-10,907.30]	6560.17	111.47	[6,341.70-6,778.64]
Total Cash Expenditures	4473.58	72.77	[4,330.96-4,616.21]	9181.28	264.65	[8,662.57-9,700.00]	5871.11	94.18	[5,686.52-6,055.69]
Total if any	5195.69	94.97	[5,009.56-5,381.82]	10599.08	313.66	[9,984.31-11,213.85]	6816.86	115.69	[6,590.10-7,043.62]
Total Cash if any	4725.58	76.67	[4,575.31-4,875.86]	9514.06	273.92	[8,977.18-10,050.95]	6166.35	98.75	[5,972.80-6,359.90]
Outpatient	811.78	32.63	[747.82-875.73]	1841.40	77.11	[1,690.26-1,992.53]	1117.43	32.46	[1,053.80-1,181.06]
Cash Outpatient	730.69	30.87	[670.18-791.20]	1681.35	74.07	[1,536.18-1,826.52]	1012.90	30.95	[952.25-1,073.56]
Outpatient if any	2614.99	103.66	[2,411.82-2,818.17]	4481.03	183.71	[4,120.96-4,841.10]	3283.99	93.79	[3,100.16-3,467.82]
Cash Outpatient if any	2517.71	104.88	[2,312.15-2,723.27]	4316.32	186.12	[3,951.53-4,681.10]	3168.27	95.14	[2,981.80-3,354.74]
Inpatient	949.80	41.78	[867.91-1,031.68]	2228.22	234.89	[1,767.84-2,688.59]	1329.31	75.71	[1,180.91-1,477.71]
Cash Inpatient	803.41	38.9	[727.17-879.66]	1792.52	191.96	[1,416.27-2,168.76]	1097.04	63.25	[973.08-1,221.00]
Inpatient if any	20327.37	795.9	[18,767.43-21,887.31]	36904.17	3,692.79	[29,666.37-44,141.97]	26178.72	1,414.41	[23,406.52-28,950.93]
Cash Inpatient if any	19221.54	831.41	[17,591.99-20,851.10]	33253.31	3,368.19	[26,651.72-39,854.89]	24168.23	1,314.49	[21,591.86-26,744.61]
Inpatient Private if any	29894.58	1,472.85	[27,007.83-32,781.33]	51351.31	5,957.31	[39,675.10-63,027.51]	38640.20	2,608.17	[33,528.23-43,752.17]
Cash Inpatient Priv. if any	28313.83	1,492.32	[25,388.91-31,238.74]	45705.56	5,314.94	[35,288.38-56,122.73]	35339.63	2,346.04	[30,741.43-39,937.83]
Inpatient Public if any	11481.19	617.59	[10,270.73-12,691.64]	15209.85	1,227.68	[12,803.63-17,616.07]	12584.76	567.79	[11,471.91-13,697.62]
Cash Inpatient Pub. if any	10481.20	677.8	[9,152.73-11,809.67]	14122.37	1,349.18	[11,478.01-16,766.74]	11561.20	623.27	[10,339.61-12,782.79]
Medical Products (pharma)	3215.94	67.21	[3,084.21-3,347.67]	6239.23	114.45	[6,014.91-6,463.56]	4113.43	58.46	[3,998.85-4,228.02]
Cash Medical Products (pharma)	2939.48	44.5	[2,852.26-3,026.70]	5707.42	103.92	[5,503.74-5,911.10]	3761.17	44.23	[3,674.49-3,847.85]

Source: FIES 2018

Healthcare Expenditures for Remittance Receiving Households

Across all categories, except for expenditures for public inpatient care, remittance receiving households were significantly more likely to incur health expenditures. Households that received remittances were slightly more likely to have any health expenditures and any cash expenditures, but not by much (1- 2% higher proportion of households) (Table 3.2). The biggest differences between remittance receiving and non-remittance households were in outpatient and private expenditures. Forty-one percent of households with international migrants had outpatient patient expenditures compared to only 31% of non-remittance households. Thirty-nine percent of remittance households had cash outpatient expenditures compared to 29% of non-remittance households. While a small proportion of households overall sought private inpatient care, twice as many international migrant households (4%) as non-migrant households (2%) had expenditures for private hospitals. In bivariate analyses, expenditures were significantly higher for families who received remittances from abroad compared to families who did not (Table 3.4). Migrant households spent 10,309 PHP ($183 USD) (95% CI: 9,710 - 10,907 PHP) while non-migrant households spent 4,978 PHP ($89 USD) (95% CI: 4,799 - 5,156 PHP) on average.

Table 3.3 looks at the average remittance amount for households by expenditure category, showing that households that receive more financial support from abroad are more likely to have health expenditures. For example, households that had any health expenditures received on average 30,567 PHP in remittances while households who did not have any health expenditures received about half that amount on average, 15,256. In almost all expenditure categories, except for public expenditures, households with healthcare expenditures had about twice the amount of average remittance receipt.

The positive correlation between remittances and health spending remained significant across all adjusted models and for all categories, except public inpatient. Adjusted models controlled for family size, region, urban location, family structure, and household income. Models included logistic (for any expenditure), OLS, OLS restricted to households with expenditures, Log transformed OLS, and GLMs. We also tested three different specifications of the remittances predictor variable (binary: received any yes/no, amount received, and log of the amount received if any) and results remained consistent.

In fully adjusted models we see that the marginal effect of receiving remittances is an increase in total health expenditures of about 2,300-2,600 PHP ($41– 47 USD) per sixth month period (Table 3.11). In fully adjusted log transformed models, receipt of international remittances is associated with an approximately 42% increase in health expenditures (Table 3.5, model 6, AOR: 0.35, p<0.001). We see similar associations and effect size when examining the effect of remittances on total cash expenditures.

Table 3.5: Multivariable - Remittance receiving households spent more on healthcare overall

	(1)	(2)	(3)	(4)	(5)	(6)
		OLS		GLM	Logistic	Log OLS
	OLS	(no zeros)	GLM	(no zeros)	Regression	(no zeros)
Received Remittances	2,562.84***	2,591.82***	0.34***	0.33***	0.24***	0.35***
	(286.06)	(294.79)	(0.02)	(0.02)	(0.05)	(0.01)
Rural (ref: urban)	-940.53***	-997.04***	-0.26***	-0.26***	0.09*	-0.35***
	(235.90)	(245.18)	(0.02)	(0.02)	(0.04)	(0.01)
Income: regional per capita (ref: 1st decile)						
2	692.11***	698.23***	0.34***	0.32***	0.48***	0.33***
	(86.84)	(90.94)	(0.04)	(0.04)	(0.07)	(0.02)
3	1,394.14***	1,408.68***	0.56***	0.53***	0.60***	0.55***
	(107.45)	(111.95)	(0.04)	(0.04)	(0.08)	(0.02)
4	2,177.50***	2,207.84***	0.75***	0.72***	0.63***	0.72***
	(141.51)	(147.29)	(0.04)	(0.04)	(0.08)	(0.02)
5	3,068.14***	3,099.56***	0.98***	0.94***	0.98***	0.87***
	(180.72)	(187.20)	(0.04)	(0.04)	(0.08)	(0.03)
6	3,806.98***	3,856.80***	1.15***	1.11***	0.94***	1.02***
	(185.40)	(192.63)	(0.04)	(0.04)	(0.08)	(0.03)
7	5,199.22***	5,265.59***	1.36***	1.32***	1.10***	1.22***
	(244.83)	(254.19)	(0.04)	(0.04)	(0.09)	(0.03)
8	7,334.40***	7,478.68***	1.68***	1.64***	1.10***	1.51***
	(314.73)	(326.31)	(0.04)	(0.04)	(0.08)	(0.03)
9	10,855.29***	11,075.27***	2.05***	2.01***	1.30***	1.86***
	(432.03)	(446.30)	(0.04)	(0.04)	(0.09)	(0.03)
10	21,987.85***	22,471.08***	2.84***	2.78***	1.59***	2.58***
	(1,012.48)	(1,041.92)	(0.05)	(0.05)	(0.09)	(0.03)
*Family Size (ref: 1)						
2	5,180.58***	5,313.96***	0.65***	0.59***	0.78***	0.71***
	(577.69)	(621.23)	(0.05)	(0.05)	(0.07)	(0.04)
3	5,516.50***	5,526.92***	0.71***	0.62***	1.31***	0.92***
	(375.79)	(406.97)	(0.05)	(0.05)	(0.07)	(0.04)
4	6,961.29***	6,975.78***	0.88***	0.79***	1.59***	1.09***
	(467.70)	(500.08)	(0.05)	(0.05)	(0.07)	(0.04)
5	7,753.76***	7,773.01***	1.02***	0.92***	1.82***	1.23***
	(620.95)	(657.61)	(0.05)	(0.05)	(0.08)	(0.04)
6	8,529.10***	8,567.34***	1.11***	1.01***	1.95***	1.35***
	(498.13)	(531.26)	(0.05)	(0.05)	(0.09)	(0.04)
7	8,613.96***	8,648.31***	1.20***	1.10***	1.99***	1.42***
	(514.77)	(547.53)	(0.06)	(0.06)	(0.10)	(0.04)
8	9,484.89***	9,537.81***	1.36***	1.25***	2.20***	1.59***
	(524.47)	(558.45)	(0.06)	(0.06)	(0.10)	(0.04)
Single Family (ref: extended family)	-1,857.57***	-1,857.42***	-0.31***	-0.31***	-0.20***	-0.34***
	(250.06)	(257.60)	(0.02)	(0.02)	(0.05)	(0.01)
Constant	-4,939.30***	-4,891.45***	6.57***	6.73***	1.02***	5.47***
	(661.96)	(702.85)	(0.06)	(0.06)	(0.10)	(0.04)
Observations	147,717	141,569	147,717	141,569	147,717	141,569
R-squared	0.06	0.06				0.21
Ftest	59.92	59.92	59.92	59.92	59.92	59.92
df	19	19	19	19	19	19

Standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05, Source: FIES 2018, * Includes members inside and outside of household (including overseas), GLM models were run with gamma family and log link

Table 3.6: Multivariable analysis of remittance amounts on total healthcare expenditures and probability of catastrophic healthcare expenditures

	1	2	2	3	4	5	6
			Total Expenditures	CHE		CHE	
	Total Expenditures		(Log)	(>10% total consumption)		(>40% non-food consumption)	
Remittances Amount in PHP	0.014***			[a]0.000***		0.000**	
	(0.003)			(0.000)		(0.000)	
Log of Remittances in PHP (if any)		750.661*	0.094***		0.043*		-0.006
		(296.685)	(0.009)		(0.021)		(0.044)
Constant	-4,246.00***	-14,921.93***	5.20***	-3.27***	-3.56***	-5.15***	-6.03***
	(660.856)	(2,342.416)	(0.113)	(0.137)	(0.371)	(0.308)	(0.715)
Observations	147,717	41,805	40,465	147,717	41,805	147,717	41,805
R-squared	0.062	0.054	0.190				
Ftest	268.8	268.8	268.8	268.8	268.8	268.8	268.8
df	19	19	19	19	19	19	19

Catastrophic Health Expenditure (CHE), *** p<0.001, ** p<0.01, * p<0.05. Source: FIES 2018. OLS models controlling for rural/urban location, family size, income, and household type. Source: FIES 2018. [a] coefficients and standard errors of zero are a result of very low magnitude effects, requires six or more decimals to show effect greater than zero. Models with log transformed variables are restricted to observations greater than zero (Log remittances only includes households who received remittances, Log of the outcome only includes households who had an expenditure in that category).

Figure 3.2: Predicted Healthcare Expenditures by Type and Receipt of Remittances

Households that Receive Remittances have Signficantly Higher Health Expenditures
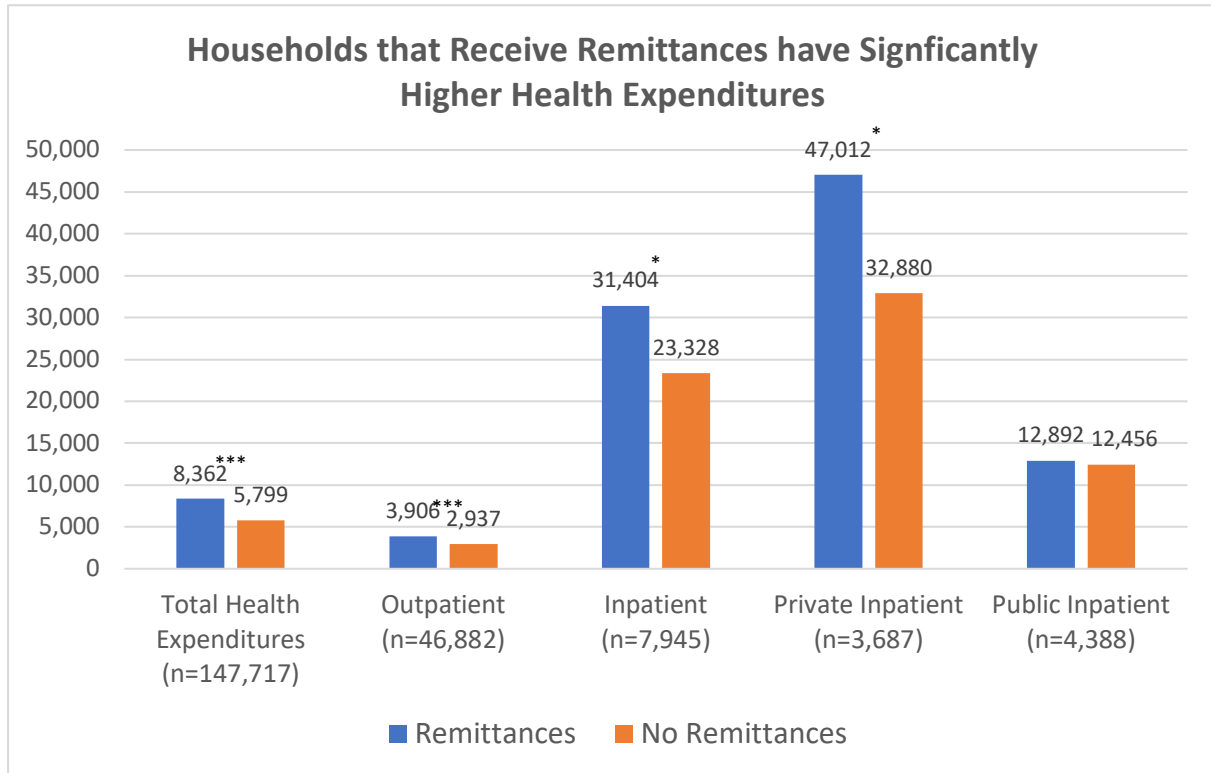
Source FIES 2018, Predicted margins on OLS controlling for urban location, regional per capita income decile, family size, and family type. Total expenditures include all households, outpatient and inpatient expenditures restricted to household that had any expenditures in that category (n= number of households that had expenditures in that category)

*** $p<0.001$, ** $p<0.01$, * $p<0.05$. Significance indicates significant marginal effect of remittances.

Average inpatient expenditures for the six-month period July- December 2018 were 1,329 PHP ($24 USD) (95% CI: 1,181 - 1,478 PHP) (Table 3.4). However, this amount is deceptively low because only 5% of households had any inpatient expenditures. When limiting to households that had any inpatient expenditures the mean was 26,179 PHP ($466 USD) (95% CI: 23,406 – 28,952 PHP). This accounts for 8% of total average income and 11% of total average consumption.

There were no differences between rural and urban households in terms of inpatient expenditures, and family structure, size, and number of children also did not impact inpatient expenditures. Families who were not experiencing poverty and those in the upper income deciles spent more on inpatient care. Regionally, households paid the least on average in ARMM (mean for households who had any inpatient expenditures 10,751 PHP, 95% CI: 8,072 – 13,430 PHP), and the most in Soccksargen (mean for households who had any inpatient expenditures 27,905 PHP 95% CI : 22,282 – 33,528 PHP). There were no differences in cost of private care between urban and rural households. On average private facilities charge the same in rural and urban areas. Wealthier families and those not in poverty spent much more on private inpatient care. With those in poverty and the lower regional per capita income deciles having almost no inpatient private expenditures.

We saw significant differences of 16,576 PHP ($295 USD) between inpatient expenditures for households that received remittances (36,904 PHP, 95% CI: 29,665 - 44,143 PHP) compared to those that did not (20,327 PHP, 95% CI: 18,767 – 21,888 PHP) (Table 3.4). Differences in inpatient expenditures can be partially explained by use of private inpatient facilities as there were significant differences in expenditures between public and private facilities and migrant households were more likely to use private facilities. Average public inpatient care costs were

12,585 PHP ($224 USD) (95% CI: 11,471 - 13,698 PHP), but the average for households that received remittances was 15,210 PHP ($271 USD) (95% CI: 12,803 – 17,617 PHP). In contrast the average 6-month household expenditures for private care were 38,640 PHP ($687 USD) (95% CI: 33,526 – 43,754 PHP), and the average for migrant households was 51,351 PHP ($913 USD) (95% CI: 39,670 – 63,033 PHP), an average difference between migrant and non-migrant households of 21,457 PHP ($382 USD) for the same category of care.

In fully adjusted models (Table 3.7), remittance-receiving households had significantly higher odds of having any inpatient expenditures and any cash inpatient expenditures by approximately 14% and 13% respectively. The amounts were also about 13% higher for these households. Remittance-receiving households were 22% more likely to have expenditures for private inpatient care and those expenditures were higher by about 15%. They were also 21% more likely to have cash expenditures and for those cash expenditures to be 12% higher than households that did not have an international migrant sending remittances. The marginal effect of being in a household that received remittances was an increase in 8,077 PHP ($144 USD) in OLS models and 4,714 PHP ($85 USD) in GLM models (Table 3.11). The effect was much higher for private inpatient care, 14,132 PHP ($254 USD) in OLS models and 9,675 PHP ($174 USD) in GLM models. There were no significant marginal effects of receipt of remittances for public inpatient expenditures (Table 3.11 and Figure 3.2).

We further tested the effect of remittances by looking at them as a proportion of total household income. Figure 3.3 shows that the effect of remittances were not simply about having additional income to spend on health because both the proportion of income from remittances and the proportion of consumption that goes to health were positively correlated. As the proportion of income from remittances increased, the proportion of spending going toward health also increased.

This trend held for total expenditures, total inpatient expenditures, and private inpatient expenditures. For public inpatient care, increased income from remittances did not change the proportion of spending that went toward public expenditures.

Figure 3.3: Remittances and Health Expenditures as Proportions of Income and Consumption

**Proportion of Spending on Healthcare Increases
As Remittances make up Greater Proportion of Income**

CHE Threshold

Expenditures % of total consumption

Proportion of income from remittances

- · · · · · · · · All Expenditures
- – – – – Inpatient
- – · – · – Private Inpatient
- – · · – · · – Public Inpatient

Fitted Values. Source: FIES 2018
Inpatient estimates restricted to households with expenditures in those categories.
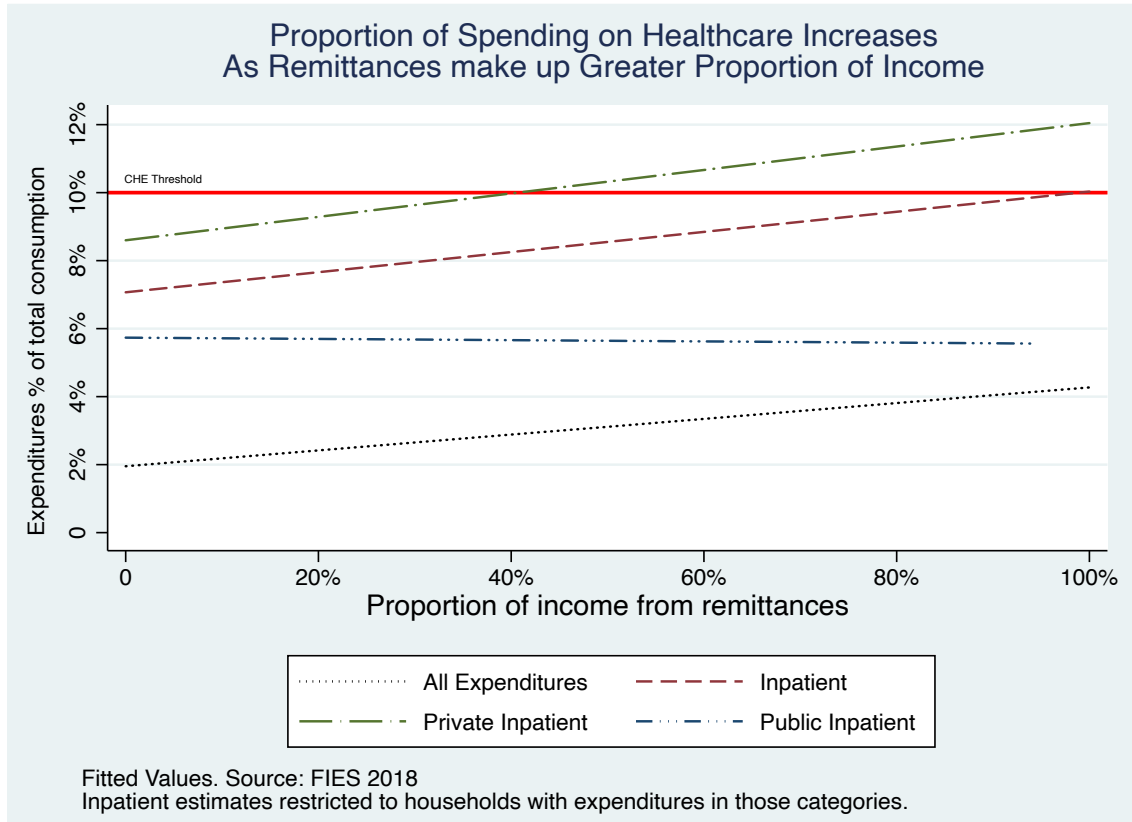
Table 3.7: Multivariable - Remittance receipt was associated with greater inpatient healthcare spending except in public inpatient facilities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Inpatient				Private Inpatient				Public Inpatient			
	OLS	GLM	Logistic	Log OLS	OLS	GLM	Logistic	Log OLS	OLS	GLM	Logistic	Log OLS
Received Remittances	8,076.51*	0.18**	0.13***	0.12*	14,131.91*	0.25**	0.20***	0.14*	436.32	0.03	0.03	0.05
	(3,193.31)	(0.06)	(0.03)	(0.05)	(5,587.07)	(0.08)	(0.05)	(0.06)	(1,291.10)	(0.07)	(0.05)	(0.06)
Rural (ref: urban)	-912.20	-0.04	0.20***	-0.03	-294.94	0.00	0.05	-0.01	179.32	-0.01	0.35***	0.06
	(2,997.65)	(0.06)	(0.03)	(0.04)	(5,585.70)	(0.08)	(0.05)	(0.06)	(1,098.59)	(0.06)	(0.04)	(0.06)
Income: Regional per capita (ref: 1st decile)												
2	1,090.79	0.20	0.12	0.17	5,581.25*	0.60**	0.66***	0.45*	-485.07	-0.03	-0.04	0.01
	(1,081.30)	(0.12)	(0.08)	(0.10)	(2,817.95)	(0.20)	(0.16)	(0.19)	(905.77)	(0.11)	(0.09)	(0.11)
3	2,500.88*	0.32**	0.25**	0.37***	6,029.90*	0.64***	0.78***	0.71***	1,502.87	0.18	0.09	0.21
	(1,165.83)	(0.10)	(0.08)	(0.10)	(2,625.47)	(0.13)	(0.16)	(0.18)	(1,086.64)	(0.12)	(0.09)	(0.11)
4	4,084.34**	0.49***	0.36***	0.41***	6,793.62*	0.74***	1.09***	0.61***	3,497.43*	0.39**	0.09	0.27*
	(1,498.51)	(0.11)	(0.08)	(0.10)	(3,447.34)	(0.15)	(0.15)	(0.18)	(1,373.50)	(0.13)	(0.09)	(0.13)
5	7,919.70***	0.75***	0.38***	0.69***	14,254.50**	1.12***	1.32***	0.94***	3,544.40**	0.41**	-0.04	0.44***
	(2,053.43)	(0.12)	(0.08)	(0.10)	(4,462.27)	(0.17)	(0.15)	(0.19)	(1,244.10)	(0.12)	(0.09)	(0.12)
6	9,679.81***	0.88***	0.49***	0.80***	12,086.11***	1.05***	1.42***	0.92***	7,839.19***	0.74***	0.06	0.63***
	(2,010.74)	(0.12)	(0.08)	(0.10)	(3,468.67)	(0.13)	(0.15)	(0.19)	(2,298.78)	(0.17)	(0.09)	(0.12)
7	13,741.54***	1.08***	0.62***	0.99***	21,982.07***	1.45***	1.71***	1.30***	4,142.64**	0.47***	0.05	0.52***
	(2,456.89)	(0.11)	(0.08)	(0.10)	(4,149.97)	(0.14)	(0.15)	(0.18)	(1,310.74)	(0.12)	(0.09)	(0.13)
8	21,892.00***	1.42***	0.72***	1.25***	28,326.40***	1.66***	1.92***	1.50***	12,321.97**	1.01***	0.01	0.74***
	(3,342.36)	(0.12)	(0.08)	(0.11)	(4,859.49)	(0.14)	(0.14)	(0.18)	(4,397.97)	(0.20)	(0.10)	(0.13)
9	28,389.11***	1.61***	0.85***	1.54***	34,121.32***	1.79***	2.26***	1.66***	11,049.00***	0.95***	-0.31**	0.93***
	(3,874.04)	(0.11)	(0.08)	(0.10)	(5,837.32)	(0.14)	(0.14)	(0.17)	(2,072.66)	(0.13)	(0.10)	(0.13)
10	61,937.57***	2.31***	1.13***	1.97***	70,871.52***	2.45***	2.60***	2.03***	25,171.80***	1.56***	-0.26*	1.34***
	(8,677.56)	(0.14)	(0.08)	(0.10)	(11,418.96)	(0.16)	(0.14)	(0.18)	(4,485.09)	(0.17)	(0.11)	(0.14)
*Family Size (ref 1)												
2	25,592.83*	0.57**	0.72***	0.43**	33,357.89*	0.56*	0.93***	0.25	13,133.56*	0.56*	0.30	0.52*
	(11,242.31)	(0.19)	(0.12)	(0.16)	(16,856.46)	(0.22)	(0.16)	(0.20)	(5,800.97)	(0.26)	(0.16)	(0.23)
3	16,019.25**	0.40**	0.84***	0.36*	21,926.71**	0.43**	0.94***	0.21	5,911.13*	0.25	0.58***	0.37
	(4,914.34)	(0.14)	(0.11)	(0.16)	(8,054.36)	(0.17)	(0.15)	(0.19)	(2,409.78)	(0.22)	(0.15)	(0.21)
4	22,430.83***	0.64***	1.17***	0.49**	29,570.03***	0.64***	1.33***	0.35	8,661.29**	0.47*	0.81***	0.45*
	(5,210.50)	(0.14)	(0.11)	(0.15)	(8,409.57)	(0.16)	(0.15)	(0.19)	(2,733.67)	(0.23)	(0.15)	(0.21)
5	25,755.45**	0.68***	1.32***	0.55***	36,134.11*	0.72***	1.48***	0.39*	8,356.44**	0.44*	0.97***	0.53*

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	(8,841.08)	(0.17)	(0.11)	(0.16)	(15,765.86)	(0.20)	(0.15)	(0.20)	(2,611.21)	(0.22)	(0.15)	(0.21)
6	25,941.42***	0.76***	1.41***	0.65***	36,028.11***	0.78***	1.62***	0.50*	10,186.08***	0.58*	0.99***	0.61**
	(6,068.68)	(0.16)	(0.11)	(0.16)	(10,331.78)	(0.18)	(0.16)	(0.20)	(2,755.45)	(0.23)	(0.15)	(0.21)
7	24,208.10***	0.75***	1.57***	0.67***	31,296.12**	0.71***	1.63***	0.42*	11,363.14**	0.65*	1.28***	0.77***
	(6,519.76)	(0.17)	(0.12)	(0.16)	(10,701.93)	(0.21)	(0.17)	(0.21)	(4,399.20)	(0.26)	(0.16)	(0.22)
8	23,041.40***	0.71***	1.85***	0.60***	30,346.56**	0.66***	2.06***	0.45*	9,017.05**	0.54*	1.43***	0.59**
	(6,379.99)	(0.16)	(0.12)	(0.16)	(10,723.08)	(0.18)	(0.16)	(0.21)	(2,892.42)	(0.23)	(0.15)	(0.22)
Single Family (ref: extended)	899.93	-0.11	-0.11**	-0.17***	4,211.26	-0.04	-0.12*	-0.13	-1,555.51	-0.16*	-0.12*	-0.16*
	(2,825.22)	(0.06)	(0.04)	(0.05)	(5,508.52)	(0.08)	(0.05)	(0.07)	(1,248.78)	(0.07)	(0.05)	(0.06)
Constant	-17,808.71	8.27***	-4.72***	7.74***	-31,056.16	8.12***	-6.55***	7.95***	-995.97	8.48***	-4.63***	7.67***
	(9,165.67)	(0.19)	(0.13)	(0.18)	(16,793.26)	(0.23)	(0.20)	(0.26)	(3,411.83)	(0.26)	(0.17)	(0.24)
Observations	7,945	7,945	147,717	7,945	3,687	3,687	147,717	3,687	4,388	4,388	147,717	4,388
R-squared	0.09			0.17	0.08			0.15	0.06			0.07
Ftest	59.92	59.92	59.92	59.92	59.92	59.92	59.92	59.92	59.92	59.92	59.92	59.92
df	19	19	19	19	19	19	19	19	19	19	19	19

Standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05, Source: FIES 2018, * Includes members inside and outside of household (including overseas), GLM models were run with gamma family and log link

Table 3.8: Multivariable analysis of remittance amounts on inpatient healthcare expenditures

	1	2	3	4	5	6	7	8	9
	Inpatient		Inpatient (Log)	Private Inpatient		Private Inpatient (Log)	Public Inpatient		Public Inpatient (Log)
Remittances Amount in PHP	0.005			0.005+			[a] -0.000+		
	(0.003)			(0.003)			(0.000)		
Log of Remittances in PHP (if any)		182.196	0.045		179.589	0.036		2.607	0.043
		(248.072)	(0.034)		(247.527)	(0.043)		(16.469)	(0.046)
Constant	-2,210.54***	-6,441.45***	7.40***	-2,038.01***	-6,157.53***	7.10***	-172.53*	-283.92	7.38***
	(487.897)	(1,893.112)	(0.461)	(476.623)	(1,859.582)	(0.813)	(86.790)	(264.262)	(0.624)
Observations	147,717	41,805	2,765	147,717	41,805	1,483	147,717	41,805	1,333
R-squared	0.009	0.009	0.159	0.009	0.009	0.137	0.001	0.002	0.081
Ftest	268.8	268.8	268.8	268.8	268.8	3.816	268.8	268.8	3.816
df	19	19	19	19	19	19	19	19	19

*** $p<0.001$, ** $p<0.01$, * $p<0.05$. Source: FIES 2018. OLS models controlling for rural/urban location, family size, income, and household type. [a] coefficients and standard errors of zero are a result of very low magnitude effects, requiring 6+ decimals to show effect greater than zero. Models with log transformed variables are restricted to observations greater than zero (Log remittances only includes households who received remittances, Log of the outcome only includes households who had an expenditure in that category).

Average outpatient expenditures were 1,117 PHP ($20 USD) (95% CI: 1,054 - 1,181 PHP) per household per 6-month period. Limiting to only households who had outpatient expenditures, the mean total was 3,284 PHP ($58 USD) (95% CI: 3,100 – 3,468 PHP) (Table 3.4). All the same patterns across categories held true for outpatient expenses as they did for total expenses – higher expenditures in urban areas, and wealthier families.

Across all outpatient expenditure types (total, cash, log transformed), households that received remittances had higher outpatient health expenditures compared to households that did not receive remittances (Table 3.4). The average outpatient expenditures for all international migrant households was 1,841 PHP ($33 USD) (95% CI: 1,690 - 1,993 PHP), and when excluding international migrant households who did not have any outpatient expenditures the average was 4,481 PHP ($80 USD) (95% CI: 4,121 – 4,841 PHP). This compares to averages of 812 PHP ($14 USD) (95% CI: 748 – 876 PHP) and 2,615 PHP ($47 USD) (95% CI: 2,412 – 2,818 PHP) for households that did not receive remittances. Conversely, households that had any outpatient expenditures received on average 44,170 PHP in remittances whereas households who did not spend any money on outpatient care only received 22,678 in remittances on average (Table 3.3).

Migrant households were 28% more likely to have any outpatient expenditures, and living in a migrant household was predictive of an approximate 21% increase in outpatient health expenditures when controlling for household size, household type, urban location, and regional per capita income decile (Table 3.9). Results were similar for cash outpatient expenditures and held across all models and variable specifications. The marginal effect of being in a household that

received remittances was an increase in outpatient health expenditures of between 809 PHP ($15 USD) (GLM) and 969 PHP ($17 USD) OLS (Table 3.11, Figure 3.2).

Medicines

Over the six-month period July-December 2018, families spent 4,113 PHP ($73 USD) (95% CI: 3,999 - 4,228 PHP) on medical products (primarily pharmaceuticals or medicines) (Table 3.4). Because 96% of households had medical product expenditures, the mean of only households that had expenditures (4,302 PHP or $77 USD) is not much different from the overall mean. Urban households also spent significantly more on medical products by an average of 2,231 PHP ($40 USD) (95% CI: 1998 - 2,464 PHP).

Remittance receiving households were 22% more likely to have medical product expenditures compared to non-remittance receiving households, and 16% more likely to have cash expenditures for medical products. When they did have medical product expenditures, the overall and cash expenditures were higher by 39-72% compared to non-migrant households (Table 3.3c). The marginal effect of receiving remittances was an increase of medical product expenditures of between 1,388 PHP ($25 USD) (OLS) and 1,476 PHP ($26 USD) (GLM) (Table 3.4). Regression results were not sensitive to a variety of controls and variable specifications.

Elasticities and Expenditure Comparison

Healthcare is a normal good with high income elasticity on demand. As income increases, the proportion spent on healthcare also increases. The regression coefficient from our log-log model for total healthcare expenditures (Table 3.6), is 0.094. This is the point estimate of the elasticity of healthcare with respect to remittances. For a one percent increase in remittances, we would expect to see a 0.09 percent increase in total healthcare expenditures. For the average

remittance receiving household (101,027 PHP), a 1% increase in remittances (1,010 PHP over six months) would increase total health spending by 9.28 PHP in that same period. We see similar increases for outpatient and medical product expenditures (Table 3.10).

Results showed that increases in household income from remittances received from abroad increased expenditures on health consistently and across multiple healthcare expenditure categories. To understand whether the relationship between remittances and expenditures was unique to healthcare or holds across other good, we ran models to assess the association between remittances and household food expenditures. We saw similar patterns – receipt of remittances associated with significant increases in spending on food. However, the magnitude of the effect was much lower for spending on food than for healthcare. Food spending was also a much larger part of household spending on average compared to healthcare. In multivariable models controlling for income, rural location, family size, family type and region, receipt of remittances was associated with increase of 2,831 PHP in food spending, a 2.8% increase of mean food expenditures. In comparison, for health (total expenditures) we saw a 2,563 PHP increase which was 39% percent of mean health expenditures. This was a much greater magnitude and proportional increase. When looking at private health expenditures, the differences were even greater. For inpatient private healthcare expenditures, receipt of remittances was associated with an increase of 14,132* PHP increase, which was 1,398% percent of mean private healthcare expenditures. When restricting to only those who had inpatient private expenditures, households who would already have spending in this category, receiving remittances was associated with an 36.6% increase in spending.

Table 3.9: Receipt of remittances associated with greater outpatient and medical product expenditures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Outpatient				**Medical Products (Pharma)**			
	OLS	GLM	Logistic	Log OLS	OLS	GLM	Logistic	Log OLS
Received Remit	968.99***	0.24***	0.25***	0.19***	1,388.37***	0.33***	0.20***	0.33***
	(216.63)	(0.05)	(0.02)	(0.02)	(146.75)	(0.02)	(0.04)	(0.01)
Rural	-331.84	-0.11**	-0.18***	-0.11***	-1,132.54***	-0.38***	0.08*	-0.38***
	(180.67)	(0.04)	(0.02)	(0.02)	(102.19)	(0.02)	(0.04)	(0.01)
Income: Regional per capita (ref: 1st decile)								
2	263.33**	0.22**	0.18***	0.26***	421.08***	0.29***	0.44***	0.32***
	(96.86)	(0.08)	(0.04)	(0.04)	(54.35)	(0.04)	(0.07)	(0.02)
3	472.09***	0.34***	0.33***	0.25***	835.30***	0.51***	0.56***	0.52***
	(141.77)	(0.09)	(0.04)	(0.04)	(62.95)	(0.04)	(0.07)	(0.02)
4	671.93***	0.44***	0.40***	0.45***	1,333.57***	0.69***	0.59***	0.67***
	(162.10)	(0.08)	(0.04)	(0.04)	(82.14)	(0.04)	(0.07)	(0.02)
5	1,158.95***	0.66***	0.47***	0.53***	1,833.72***	0.88***	0.92***	0.82***
	(227.08)	(0.10)	(0.04)	(0.04)	(97.88)	(0.04)	(0.08)	(0.02)
6	1,189.00***	0.71***	0.61***	0.62***	2,318.46***	1.03***	0.86***	0.95***
	(159.21)	(0.08)	(0.04)	(0.04)	(108.67)	(0.04)	(0.08)	(0.03)
7	1,820.36***	0.92***	0.69***	0.74***	3,068.12***	1.22***	1.01***	1.12***
	(255.96)	(0.09)	(0.04)	(0.04)	(128.57)	(0.04)	(0.08)	(0.02)
8	2,338.10***	1.11***	0.86***	0.93***	4,349.85***	1.51***	1.03***	1.39***
	(249.94)	(0.09)	(0.04)	(0.04)	(171.04)	(0.04)	(0.08)	(0.03)
9	3,926.25***	1.52***	1.04***	1.19***	6,529.01***	1.85***	1.19***	1.72***
	(452.94)	(0.11)	(0.04)	(0.04)	(230.05)	(0.04)	(0.08)	(0.03)
10	7,169.44***	2.09***	1.43***	1.69***	12,917.68***	2.56***	1.33***	2.40***
	(451.13)	(0.09)	(0.04)	(0.04)	(554.64)	(0.05)	(0.09)	(0.03)
*Family Size (ref: 1)								
2	1,558.61***	0.31***	0.47***	0.19***	2,681.66***	0.49***	0.73***	0.65***
	(332.44)	(0.08)	(0.05)	(0.05)	(263.33)	(0.05)	(0.07)	(0.04)
3	2,276.17***	0.44***	0.69***	0.21***	2,779.69***	0.48***	1.24***	0.83***
	(434.71)	(0.09)	(0.05)	(0.05)	(252.95)	(0.05)	(0.07)	(0.03)
4	2,690.66***	0.58***	0.80***	0.29***	3,296.73***	0.54***	1.49***	0.95***
	(396.16)	(0.09)	(0.04)	(0.05)	(355.71)	(0.05)	(0.07)	(0.03)
5	2,710.93***	0.66***	0.90***	0.34***	3,646.39***	0.64***	1.71***	1.07***
	(361.41)	(0.09)	(0.05)	(0.05)	(277.43)	(0.05)	(0.07)	(0.03)
6	3,144.38***	0.75***	0.95***	0.39***	4,161.10***	0.72***	1.82***	1.17***
	(413.14)	(0.10)	(0.05)	(0.05)	(328.00)	(0.05)	(0.08)	(0.04)
7	2,864.05***	0.73***	1.00***	0.40***	4,270.18***	0.80***	1.89***	1.24***
	(386.82)	(0.11)	(0.05)	(0.05)	(307.52)	(0.06)	(0.10)	(0.04)
8	3,412.92***	0.86***	1.13***	0.48***	4,663.04***	0.92***	2.06***	1.38***
	(461.31)	(0.11)	(0.05)	(0.05)	(313.07)	(0.06)	(0.10)	(0.04)
1 Family (ref: extended)	-385.62	-0.15**	-0.18***	-0.13***	-1,434.28***	-0.35***	-0.19***	-0.34***
	(232.44)	(0.06)	(0.02)	(0.02)	(130.51)	(0.02)	(0.05)	(0.01)
Constant	-1,576.38***	6.41***	-1.94***	5.84***	-1,291.76***	6.70***	1.02***	5.41***
	(419.80)	(0.12)	(0.06)	(0.06)	(301.52)	(0.06)	(0.10)	(0.04)
Observations	46,882	46,882	147,717	46,882	140,550	140,550	147,717	140,550
R-squared	0.02			0.13	0.08			0.21
Ftest	59.92	59.92	59.92	59.92	59.92	59.92	59.92	59.92

Standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05, Source: FIES 2018, * Includes members inside and outside of household (including overseas), GLM models were run with gamma family and log link

Table 3.10: Multivariable analysis of remittance amounts on outpatient and medical products healthcare expenditures

	1	2	3	4	5	6
	Outpatient		Outpatient (Log)	Medical Products		Medical Products (Log)
Remittances Amount in PHP	0.003***			0.006***		
	(0.001)			(0.001)		
Log of Remittances in PHP (if any)		187.630***	0.097***		380.836***	0.088***
		(45.192)	(0.011)		(108.167)	(0.008)
Constant	-886.34***	-3,742.59***	5.15***	-1,149.12**	-4,737.89***	5.25***
	(128.754)	(559.151)	(0.149)	(293.001)	(1,035.860)	(0.110)
Observations	147,717	41,805	16,183	147,717	41,805	40,160
R-squared	0.017	0.019	0.118	0.074	0.082	0.184
Ftest	268.8	268.8	268.8	268.8	268.8	268.8
df	19	19	19	19	19	19

*** p<0.001, ** p<0.01, * p<0.05. Source: FIES 2018. OLS models controlling for rural/urban location, family size, income, and household type. Models with log transformed variables are restricted to observations greater than zero (Log remittances only includes households who received remittances, Log of the outcome only includes households who had an expenditure in that category).

Table 3.11: Predicted Probabilities and Marginal Effects of Receiving Remittances on Household Healthcare Expenditures

	OLS		GLM	
	Probabilities	Marginal Effects	Probabilities	Marginal Effects
Total Expenditures				
Did Not Receive Remittances	5,799		5,746	
	(107.2)		(103.5)	
Received Remittances	8,362	2,563***	8,043	2,297***
	(268.2)	(286.1)	(175.3)	(157.1)
Observations	147,717	147,717	147,717	147,717
Inpatient				
Did Not Receive Remittances	23,328		24,187	
	(913.3)		(1,141)	
Received Remittances	31,404	8,077*	28,901	4,714**
	(3,267)	(3,193)	(1,981)	(1,655)
Observations	7,945	7,945	7,945	7,945
Private Inpatient				
Did Not Receive Remittances	32,880		34,102	
	(1,607)		(1,878)	
Received Remittances	47,012	14,132*	43,778	9,675**
	(5,583)	(5,587)	(3,747)	(3,300)
Observations	3,687	3,687	3,687	3,687
Public Inpatient				
Did Not Receive Remittances	12,456		12,451	
	(689.2)		(651.8)	
Received Remittances	12,892	436.3	12,843	636.2
	(1,064)	(1,291)	(774.0)	(658.3)
Observations	4,388	4,388	4,388	4,388
Outpatient				
Did Not Receive Remittances	2,937		2,950	
	(119.3)		(112.7)	
Received Remittances	3,906	969.0***	3,759	808.8***
	(170.6)	(216.6)	(135.6)	(157.0)
Observations	46,882	46,882	46,882	46,882
Medical Products				
Did Not Receive Remittances	3,885		3,788	
	(82.90)		(66.98)	
Received Remittances	5,273	1,388***	5,263	1,476***
	(106.7)	(146.7)	(87.66)	(85.24)
Observations	140,550	140,550	140,550	140,550

Standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05, Except for Total Expenditures, all models restricted to households who had expenditures in that category. All models control for rural/urban location, family size, income, and household type. Source: FIES 2018

Catastrophic Health Expenditures

Approximately 5% of households experienced CHE. Families that received remittances of any amount were almost twice as likely to experience CHE (7% CHE) compared to families who did not receive remittances (4% CHE) (Table 3.2). For households that received remittances, those where remittances accounted for between 25-50% of total income had the highest risk of catastrophic expenditures compared to those households where remittances were a lesser or greater proportion of income.

Across all models, adjusted and unadjusted, and each specification of remittances and of catastrophic expenditures, remittance receiving households were significantly more likely to experience CHE compared to non-remittance households (Table 3.12). For example, households that received international remittances had 54% higher odds of experiencing CHE than households that had not received any international remittances when controlling for household size, household type, urban location, and regional per capita income decile. The predicted probability of having catastrophic health expenditures for migrant households was 5.8% compared to 3.9% for non-migrant households (AOR: 1.54, 95% CI: 1.43 - 1.65, p<0.001) (Figure 3.4). Increased income from remittances was not offering financial protection from catastrophic expenditures.

These models also confirm what we saw in bivariate results regarding wealthier families being much more likely to experience catastrophic expenditures. Having greater income and not meeting the poverty threshold were also associated with having catastrophic health expenditures. Only 1% of households in poverty had catastrophic expenditures while 5% of those above the poverty line did. Only 1% of households in the lowest regional per capita income decile experienced catastrophic health expenditures while 10% of households in the 10th income decile did. The proportion of households experiencing catastrophic expenditures rose with each income

decile. Single and two person households had higher proportions of catastrophic expenditures (9%) compared to larger households (between 3-5%). Similarly, families without children had a higher proportion of catastrophic expenditures compared to those with one or more children under 18 years. Geographically, 7% of Families in the CAR region had catastrophic expenditures while only 1% in the ARMM. Inpatient expenditures and particularly private inpatient expenditures were associated with catastrophic expenditures – 35% of households that had any inpatient expenditure experienced catastrophic expenditures and 44% of those who had private inpatient expenditures. In comparison, 26% of households those who had public inpatient care experienced CHE. Outpatient healthcare was associated with lower rates of CHE with only 9% of households and medical product expenditures led to 5% CHE.
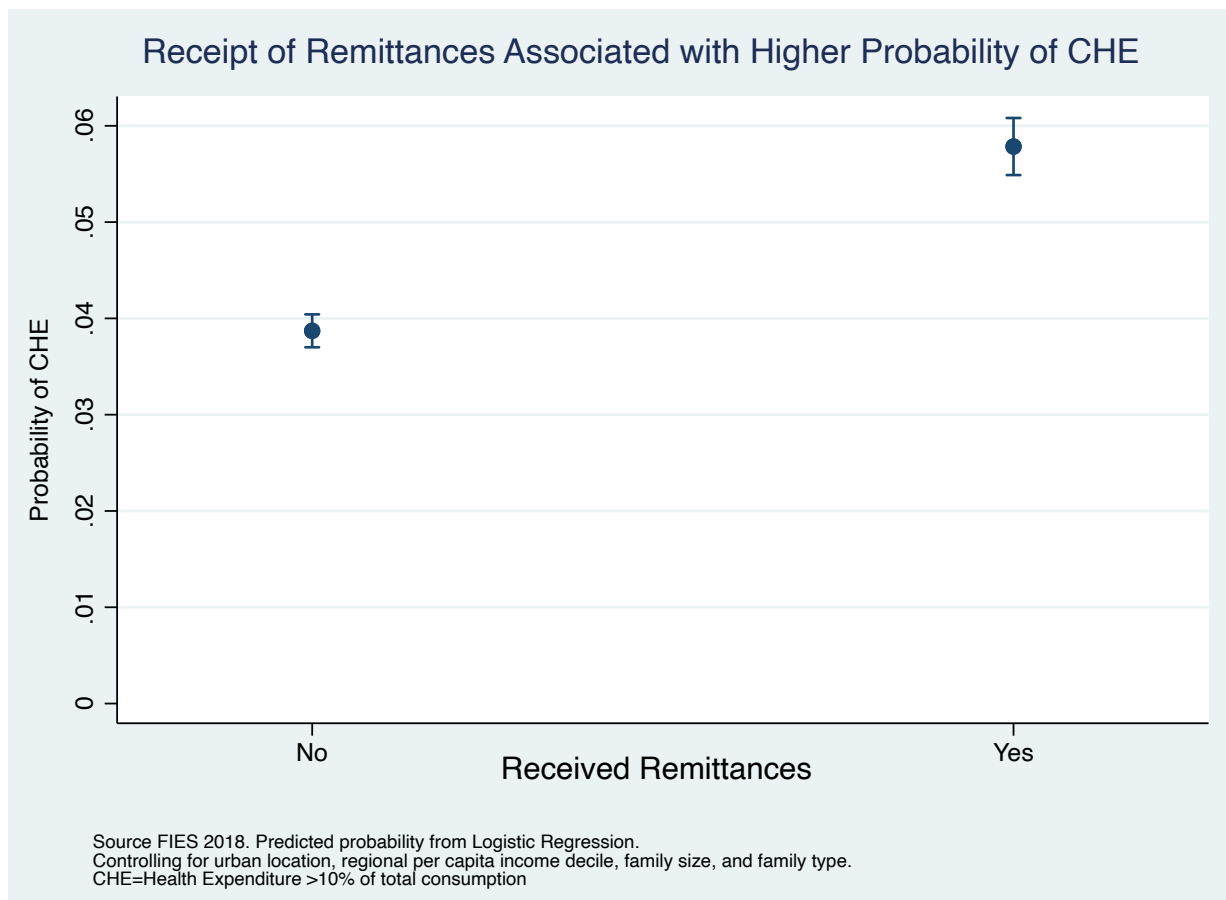
Figure 3.4:Catastrophic Health Expenditures

Receipt of Remittances Associated with Higher Probability of CHE

Source FIES 2018. Predicted probability from Logistic Regression.
Controlling for urban location, regional per capita income decile, family size, and family type.
CHE=Health Expenditure >10% of total consumption

Table 3.12: Remittance receiving households at greater risk for catastrophic healthcare expenditures (CHE)

	CHE=>10% of Total Consumption				CHE=>40% of Non-Food Consumption			
	Bivariate	HH Controls	HH Controls + Region	HH Controls + Reg Income	Bivariate	HH Controls	HH Controls + Region	HH Controls + Reg Income
Received Remittances	0.66***	0.58***	0.56***	0.43***	0.62***	0.55***	0.56***	0.40***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.08)	(0.08)	(0.08)	(0.08)
Rural (ref: urban)		0.04	-0.05	0.12***		0.38***	0.22*	0.44***
		(0.04)	(0.04)	(0.04)		(0.08)	(0.09)	(0.08)
		-0.73***	-0.71***			-0.56***	-0.61***	
		(0.09)	(0.09)			(0.17)	(0.17)	
*Family Size (ref: 1)								
2		-0.11	-0.10	-0.02		-0.04	-0.02	0.02
		(0.07)	(0.07)	(0.07)		(0.15)	(0.15)	(0.15)
3		-0.61***	-0.60***	-0.48***		-0.59***	-0.57***	-0.44**
		(0.07)	(0.07)	(0.07)		(0.16)	(0.16)	(0.15)
4		-0.95***	-0.93***	-0.69***		-0.88***	-0.86***	-0.68***
		(0.08)	(0.08)	(0.08)		(0.16)	(0.16)	(0.16)
5		-1.06***	-1.05***	-0.76***		-0.99***	-0.97***	-0.69***
		(0.08)	(0.08)	(0.08)		(0.17)	(0.17)	(0.18)
6		-1.20***	-1.18***	-0.83***		-1.20***	-1.18***	-0.87***
		(0.09)	(0.09)	(0.09)		(0.19)	(0.19)	(0.20)
7		-1.24***	-1.22***	-0.87***		-1.21***	-1.19***	-0.89***
		(0.11)	(0.11)	(0.11)		(0.25)	(0.25)	(0.26)
8		-1.31***	-1.29***	-0.94***		-0.94***	-0.92***	-0.70**
		(0.11)	(0.11)	(0.11)		(0.21)	(0.21)	(0.23)
Single Family (ref: extended family)		-0.39***	-0.37***	-0.33***		-0.30**	-0.29**	-0.25*
		(0.04)	(0.04)	(0.04)		(0.10)	(0.10)	(0.10)
Children <5 in Household (ref: no children <5)		-0.28***	-0.28***			-0.46***	-0.46***	
		(0.05)	(0.05)			(0.11)	(0.11)	
Region (ref: Ilocos Region)								
Cagayan Valley			-0.20				0.06	
			(0.13)				(0.29)	
Central Luzon			0.32***				0.33	
			(0.09)				(0.21)	
CALABARZON			0.25*				0.20	
			(0.10)				(0.23)	
Bicol Region			0.36***				0.65**	
			(0.10)				(0.21)	
Western Visayas			0.29**				0.61**	
			(0.09)				(0.20)	
Central Visayas			0.10				0.41+	
			(0.10)				(0.23)	
Eastern Visayas			0.11				0.30	
			(0.10)				(0.24)	
Zamboanga Peninsula			0.06				0.49*	

			(0.11)				(0.23)	
Northern Mindanao			0.04				0.38+	
			(0.10)				(0.22)	
Davao Region			-0.16				0.29	
			(0.10)				(0.23)	
SOCCSKSARGEN			0.45***				0.96***	
			(0.10)				(0.20)	
NCR			-0.33**				-0.46+	
			(0.10)				(0.25)	
CAR			0.52***				0.45*	
			(0.09)				(0.21)	
ARMM			-0.77***				-0.57+	
			(0.15)				(0.33)	
Caraga			0.18+				0.34	
			(0.10)				(0.22)	
MIMAROPA			0.03				0.18	
			(0.10)				(0.23)	
Income: Regional per capita (ref: first decile)								
2				0.14				-0.19
				(0.13)				(0.28)
3				0.30*				0.27
				(0.13)				(0.26)
4				0.60***				0.31
				(0.12)				(0.26)
5				0.69***				0.68**
				(0.12)				(0.26)
6				0.76***				0.77**
				(0.12)				(0.24)
7				0.98***				0.91***
				(0.11)				(0.24)
8				1.17***				1.08***
				(0.11)				(0.24)
9				1.32***				1.20***
				(0.11)				(0.24)
10				1.50***				1.36***
				(0.11)				(0.24)
Constant	-3.29***	-2.10***	-2.20***	-3.35***	-4.99***	-4.10***	-4.34***	-5.22***
	(0.02)	(0.08)	(0.11)	(0.14)	(0.05)	(0.17)	(0.24)	(0.31)
Observations	147,717	142,277	142,277	147,717	147,717	142,277	142,277	147,717
Ftest	0	1.362	1.557	0.804	0	0.463	0.360	0.692
p-value Ftest	1	0.199	0.122	0.612	1	0.900	0.954	0.717

Standard errors in parentheses, *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$. * Includes members inside and outside of household (including overseas). Source: FIES 2018

Discussion

This study found that migrant remittances were used for healthcare costs and receipt of remittances increased household spending on healthcare. Households that received remittances had higher spending on health. This finding held for all categories of six-month aggregate expenditures: total expenditures, outpatient, inpatient, medical products and cash expenditures for totals and each category. Increases in income led to increases in spending for health. The increases were not linear as increases in income from remittances, led to increases in the proportion of spending on health, not just absolute increases. This does not necessarily mean that migrants were using more healthcare as they could have been substituting for more expensive care. However, higher levels of spending overall, and results for specific inpatient, outpatient, and medical product expenditures indicate the members of migrant households may be using different types of care, and certain individuals in the household may use more care even if their household is not any more likely to have any expenditures. Our comparison of healthcare and food expenditures demonstrates that remittance receiving households increase their expenditures across multiple goods and services with the additional income remittances provide. However, healthcare spending increases both absolute and proportionally were greater than those on food despite food being a larger household expense. There is something unique about the relationship between healthcare spending and international remittances that goes beyond an additional source of income.

These results confirm findings on remittance spending from studies in Sub-Saharan Africa, Indonesia, Mexico and Nepal that remittances are often used for basic consumption needs and lead to increased health spending (Ajefu and Ogebe 2020; Amuedo-Dorantes and Pozo 2011; Lu 2013; Mishra et al. 2022) and a 2015 study on remittance use in the Philippines found similar increased spending on healthcare for remittance receiving households (Ducanes 2015). While we do not

measure utilization directly, our results complement studies of other high-out migration contexts that found increased utilization for families left-behind by migrants (Adhikari et al. 2011; Kuhn et al. 2011; West et al. 2021c).   Following work by Treleaven that found that receipt of remittances in Cambodia was not sufficient to increase the quality of care for children (Treleaven 2019), further research should investigate quality of care and examine whether increased spending by migrant households is associated with access to better quality care and, ultimately, better health outcomes. We also should seek to understand unmet care needs. In other words, are families getting the care that they need when they need it or are there disparities in who is delaying or forgoing needed healthcare, and what role can migration play in addressing these access issues?

In issues of quality and choice, we find that the types of care and types of facilities where families seek care matter in terms of explaining expenditure patterns. The biggest differences between remittance receiving and non-remittance households were in outpatient and private expenditures. Not only were international migrant households more likely to have expenditures for outpatient and private healthcare services, but their expenditures for those types of healthcare services, were much higher. Both outpatient care and private facility care could be viewed as more sensitive to choice and resources, as hospitalizations are typically for more serious health issues and households have greater financial access to public facilities.

Furthermore, individuals with more means (higher incomes from remittances), may be less likely to seek out more affordable care or forgo care for more minor health issues that can be treated in an outpatient context. Lopez-Cevallos and Chi found similar results in Ecuador where receipt of remittances was associated with increased use of antiparasitic medicines and other curative services primarily for the low-income groups who may otherwise not access these services (Lopez-Cevallos and Chi 2012). To examine whether the increased spending in private facilities

is associated with receipt of better quality care or improved health outcomes, further research could leverage data on chronic conditions and facility profiles available in data such as the Demographic and Health Surveys similar to the approach taken by Macinko et al. in Brazil (Macinko et al. 2022).

CHE measured as expenditures greater than 10% of total consumption, impacted 4.5% of all sample households. While the numbers were only slightly higher when restricting to households with any expenditures (4.7%), 35% of households who had inpatient expenditures experienced CHE and 44% of those who had private inpatient expenditures. Twenty-six percent of households with public inpatient expenditures and 9% of those with outpatient expenditures incurred CHE. While rates of inpatient healthcare use were relatively low in our analyses (~5% of households had any inpatient expenditures), overall healthcare costs, particularly for inpatient care were very high compared to mean household income and consumption. Mean inpatient expenditures on average were equal to 11% of total household consumption. This is beyond the threshold of catastrophic expenditures (10% of total consumption). While many households did not have any inpatient expenditures or spent below the mean, it is problematic that on average, households will incur CHE if someone requires hospitalization. This points toward implementation challenges in financial protection and the need to focus on inpatient care. To get a more complete picture of CHE and financial protection, data on healthcare utilization, how specific healthcare costs are covered, and expenditures should be interpreted together (Bredenkamp and Buisman 2016). This will provide greater insight into how migrant and non-migrant households navigate financial protection when seeking inpatient care, and also point to key areas for intervention to reduce CHE.

In this study, remittances did not provide financial protection against catastrophic health expenditures (CHE). Increases in income from remittances led to a greater proportion of income being spent on healthcare, and accordingly, a higher proportion of international migrant

households experienced catastrophic healthcare expenditures. Almost twice the proportion of remittance receiving households had CHE compared to households that did not receive remittances. Receipt of remittances was a risk factor for CHE rather than providing additional financial protection. This validates other findings from the Philippines and around the world that wealthier households or households with greater income are more likely to spend more on health and that catastrophic spending is concentrated in the higher income households (Bredenkamp and Buisman 2016; The World Bank 2020; van Doorslaer et al. 2007). The precarity of remittances as a source of income could be one contributing factor in the increased risk for CHE for remittance receiving households. A study in India found that receipt of remittances was only associated with positive healthcare related outcomes when they were regular and consistently patterned regardless of amount (Green et al. 2019). If households are reliant on remittances for covering healthcare costs, disruptions in the international labor market or travel as induced by shocks such as the 2008/2009 recession or the COVID-19 pandemic can have devastating consequences for migrant families' health.

Van Doorslaer et al. find that in most low and middle-income countries, those with more resources are more likely to spend a large fraction of those resources on healthcare. The poor on the other hand, may be unable to divert resources to healthcare, delay or forgo care at higher rates, and also be more likely to access financial protection offered by public programs (van Doorslaer et al. 2007). To better understand the burden of CHE, next steps should consider measures of impoverishing healthcare expenditures, those that push a household into poverty, as done by Bredenkamp et al. (Bredenkamp and Buisman 2016). Clearer measures of insurance and how expenditures are covered would allow for more precise measures of out-of pocket spending. Studies that can link expenditures to specific household members and utilizations would help in

understanding concentrations of expenditures and how financial protection can be better applied to reduce CHE.

Limitations

The cross-sectional study design has inherently limited internal validity. We were unable to determine any cause-and-effect relationships or the chronological directionality of the associations. The use of one year of cross-sectional data prevented the measurement of changes over time or the ability to examine changes in trends for groups. However, the study is strong in terms of generalizability in the region, strengthening external validity, because it used representative data with consistent measures over time and location.

We were not able to capture details about the migration such as who was abroad, how many household members were migrants, and when/how were the remittances received (e.g. weekly, monthly, lump sum etc.). Additionally, we did not account for the duration of migration or the timing of migration in relation to healthcare spending. Finally, we did not have more specific healthcare use and insurance information. Our analysis was limited by the fact that we only had 6-month aggregate totals and we did not know who utilized healthcare, the reason for use, and how many times they utilized specific services.

Despite these limitations, this study makes important contributions to the literature on the health of families left behind by migration. The strength of this paper lies in the distinct use of the data to look at the interaction between major drivers of income and household expenditures. This study tells an important story of how overseas migration influences health spending for those left behind and points to how migration may be related to risks of catastrophic expenditures. Additionally, we provided valuable information about progress toward UHC through estimates of exposures to migration, risks for catastrophic health expenditures, and demand for health services.

This is critical at a time when the Philippines health system is shifting toward more provincial level governance.

This project contributed to the literature on migration and health and specifically, the literature that examines how migration impacts sending communities. It complements prior work on spousal migration and healthcare access and utilization in South and Southeast Asia by taking a deeper dive into one key country, and focusing on the specific mechanism of remittances in the relationship between the migration and health systems. Our findings point to the need for future studies looking at how migration impacts healthcare use patterns, including barriers to care and decisions about if and when to seek care.

Conclusions

Migration can provide additional financial resources through remittances, for basic household consumption needs such as healthcare, but remittances do not necessarily provide protection against CHE. Efforts aimed at increasing financial protection for healthcare and achieving universal health coverage should consider the migration context and how best to leverage the benefits of migration for improving health and economic well-being.

Migrant remittances total more than three times all development aid and foreign direct investment combined (World Bank 2019b). This study advances understanding of how remittances are used for healthcare expenditures in the context of high out-migration and rapid development informing a growing number of policy interventions that seek to promote financial protection against catastrophic health expenditures. For sending countries such as the Philippines, who are looking to reduce out-of-pocket spending on healthcare, this evidence can be useful for understanding how successful UHC efforts have been and whether or not local wages are not enough to support healthcare costs (Andaleeb et al. 2007).

Chapter 4 : The role of immigration & family relationships in health services decision-making

Abstract

Immigrants in the United States face disparities in healthcare access and utilization. Although accurately understanding the cause of such disparities is essential to improving health equity, current evidence is limited by its focus on individual characteristics. This study leverages valid and reliable data on migration-related demographics and health services utilization to examine health services decision-making through the lens of family relationships, thereby informing innovative health system interventions that see the immigrant patient in the context of their family, community and society.

Findings indicate that immigrants faced socioeconomic and health services disparities related to education, income, insurance, and having a usual source of care. However, when it came to healthcare decision-making, immigrants were significantly less likely to delay or forgo healthcare when they needed it compared to non-immigrants. Relational factors impacted immigrant families' healthcare decision-making differently than non-immigrant families. For example, immigrants who were undocumented or on temporary visas had significantly lower probabilities of forgoing needed healthcare if they were single parents while US born citizens had much higher probability if they were single (with or without children). Through a quantitative evaluation of how immigration and family characteristics impact care-seeking decisions, we identified important limitations in the dominant individual-focused frameworks and propose advanced interdisciplinary approaches to better understand how migration contributes to both advantages and disparities in health services.

Introduction and Background

Immigrants in the US face numerous disparities in access to and use of health services (Bustamante et al. 2019; Chang 2019; Kaiser Family Foundation 2020; Ortega et al. 2018; Rhodes et al. 2015). Immigrants are less likely to have health insurance, get recommended cancer screenings, have a usual source of care, obtain all recommended childhood immunizations, and more recently, get testing and treatment for COVID-19 (Bustamante et al. 2019; Chang 2019; Duncan and Horton 2020; Kaiser Family Foundation 2020; Ortega et al. 2007; Ortega et al. 2018; Rhodes et al. 2015; Ross et al. 2020). When it comes to insurance, a key component in decisions around care, immigrants account for 30% of the non-elderly uninsured despite making up only 15% of the total US population (Kaiser Family Foundation 2020).

Evidence has documented the complex relationship between migration and healthcare for immigrants, and the vast disparities between immigrant and non-immigrant populations, but in examining these important equity issues, our focus has tended to be on the individual immigrant or on broad systemic explanations such as exclusionary policies (Bustamante et al. 2019; Leung et al. 2018; Okie 2007; Ortega et al. 2007; Potochnick et al. 2017; Sudhinaraset et al. 2020a; Sudhinaraset et al. 2020b; Wallace et al. 2019; Young et al. 2019). Migration and health researchers have largely sought to understand these disparities through individual or policy-centric lenses, but in doing so have often ignored how social environments and relations may influence decisions about when and where to seek care. Individual and system factors are important, but they can fail to capture the full spectrum of influence in health services decision-making and neglect possible venues for improving equity.

Immigrants exist within families and communities which often extend beyond country borders. Prior work has found that migration has a profound impact on healthcare access and

utilization for families left behind in sending communities (Adhikari et al. 2011; Atake 2018; Lopez-Cevallos and Chi 2012; Treleaven 2019; West et al. 2020; West et al. 2021c). In an ongoing study that follows migrants from Bangladesh, findings demonstrate that strong transnational relationships impact economic security, mental health, and health behaviors such as COVID-19 vaccine uptake (West et al. 2021a). The relationships between immigrants and their families, expressed and reinforced through family structures and caregiving responsibilities, form an important nexus that has implications for decisions about seeking care and what barriers women may face in their care seeking (West et al. 2021c). For example, in making decisions around health services, individuals may consider how seeking care interferes with time needed for caring for children or older parents, or how their role as household head or breadwinner for a transnational household denotes a responsibility to not divert financial resources to individual healthcare needs. On the other hand, parents who are separated across borders may feel an obligation to ensure their own health and well-being if they are the only caretaker for their children while other family remains abroad. Prior work has pointed to the importance of family relationships but has yet to directly study their impact on immigrants' healthcare use (West 2020; West et al. 2021a; West et al. 2021c).

Accordingly, this study explores an innovative domain in health services decision-making: the relational factors of family structure and caregiving. Relational factors exist beyond the bounds of the individual who needs healthcare, and encompass family members, migrant networks, and transnational relationships. Relational factors are important because they help us see patients in the context of their family, community, and society, and can explain essential aspects of health services decision-making. Furthermore, relational factors may play a unique role for immigrants given that their families often extend beyond the borders of the country to which they migrated.

Transnational relationships are an underexamined factor in health services, yet they are critical part of immigrant life in the US and represent a distinctive family structure. Despite the official position that family-based immigration is the cornerstone of US immigration policy, most immigrants have family remaining abroad, and wait times for those eligible to reunite with relatives range from 2 years for some countries, to over 20 years for children and siblings waiting in Mexico, having a profound effect on families and increasing the numbers of transnational relationships (Gubernskaya and Dreby 2017; Van Hook and Glick 2020). Research has begun to consider how the impacts of migration extend beyond the migrants themselves to their sending communities, but specific attention to how family relationships impact use of health services remains understudied.

Taking a relational approach opens new opportunities to understand how a more diverse set of factors may affect health services decisions. The relational approach is grounded in feminist care ethics and political theory, and views the individual self as delineated and defined through relationships, rather than through contract of agreement like an individual rights-based approach (Robinson 1990; Robinson 2011). Additionally, this approach is closely aligned with migration theory that focuses on families and networks in immigrant communities (Massey 1990; Stark and Bloom 1985). This unique lens will allow us to identify and analyze atypical factors that inform healthcare choices and understand how the health system is or is not meeting the needs of the immigrant community. Furthermore, studies of immigrant healthcare decision-making tend to focus on specific treatments or services or look at the impact of policies on utilization patterns (Agbemenu et al. 2018; Espinoza et al. 2014; Garcés et al. 2006; Kim et al. 2015; Légaré et al. 2011). Instead, this study employed a broader definition of health services decision-making which

increases the applicability of results beyond service specific analyses to decision-making about any healthcare use.

California, home to over a quarter of the foreign-born population nationwide, has more immigrants by number and proportion than any other state (Johnson 2021). While the experiences of California immigrants may not be generalizable to the entire US population, the makeup of the immigrant population in California is similar to that of other major immigrant destinations such as Texas, Florida and New York. The size of the population and diversity of the immigrant experience throughout the state's 58 counties make California an ideal setting for studying immigrants' experiences with the health system. Additionally, California data allow for specific analysis by legal status that are not possible with most national level data. Using quantitative data from the California Health Interview Survey (CHIS) this analysis leverages existing and complementary data on migration-related demographics and health services decisions to contribute new evidence for reducing disparities in immigrant healthcare access. Using quantitative methods, we characterized predictors of health services decisions about if and when to seek care for immigrant and non-immigrant families and explored the role of family relationships in the decision-making processes.

Research Question and Specific Aims

The purpose of this study was to address the research question: How do immigration factors and family structure affect health services decision-making for immigrants and non-immigrants in the US?

o **Aim 1:** Evaluate the prevalence of decisions to delay or forgo needed healthcare by immigration

    factors (status, years in the US, language spoken at home, English language proficiency) and

    compare immigrants and non-immigrants.

    o Analysis by immigration factors helps us understand differences between immigrants and

        non-immigrants and across subgroups of immigrants. The different immigration related

        factors point to different barriers or facilitators of healthcare use such as access to insurance

        programs and knowledge and experience with the US health care system.

o **Aim 2:** Assess how relational factors such as family structure, size, and presence of children

    influence health services decisions and if the effect of family structure differs by immigration

    related factors.

    o Characterizing predictors of health services decisions by immigration status *and* relational

        factors illuminates interaction effects, and demonstrates if transnational relationships are

        the possible mechanism for differences across immigrant subgroups.

Conceptual Model

The model below (Figure 4.1) shows different factors that can inform the health services decision-

making process; some of these factors are captured by relational models whereas others are

primarily individual-focused approach. The individual constructs draw primarily from the Yang

and Hwang adaptation of the Andersen model to immigrants in the United States (Aday and

Andersen 1974); (Andersen 1995; Andersen et al. 2002; Yang and Hwang 2016) and the relational

constructs are inspired by feminist relational ethics that center relationships as the domain within

which decisions are made (Connell 2012; Held 2006; Robinson 1990; Robinson 2011). As shown

in the model, focusing exclusively on the individual domain omits many important factors that influence decisions such as the family makeup, status and location of family members, and household resources. When deciding if, when, and where to seek care individuals consider a broad array of factors, many of which are not exclusively individual. Current evidence is limited by its focus on individual characteristics and gaps in measurement of migration and relational characteristics. Through a quantitative evaluation of how immigration and family characteristics impact care-seeking decisions, we identify limitations in the dominant individual-focused frameworks and propose advanced interdisciplinary approaches to better understand how migration contributes to both advantages and disparities in health services.

Multiple types of theory informed this analysis and conceptually driven approach. Migration and gender relations theory undergirded the conceptual approach, and theories of health access and relational ethics guided the variable selection, coding, and analyses processes. First, gender relations and migration systems theory (Connell 2012; Nawyn 2010; Rajendra 2015) helped situate the migrants in the context of their communities through highlighting the very high degree of dependence between migrants and families left behind, as well as the macro-structural power relationships in the migration context. Similarly, relational ethics, originating from political theory and psychology, centers relationships as the domain within which decisions are made (Connell 2012; Held 2006; Robinson 1990; Robinson 2011). The relational approach is one that views the individual through relationships and connections, and as outlined in the "relational" red oval in Figure 4.1, examines individuals in context, not as separate units. This provides new information for consideration when trying to explain why a person makes a particular decision for their own health. This approach helps broaden our understanding beyond individual cost/benefit

calculations to more comprehensive frames that consider immigrants within the context of a web of relationships (Babitsch et al. 2012; Rajendra 2015).

The conceptual framework (Figure 4.2) demonstrates some of the potential mechanisms through which relational factors may present barriers in the enabling domain of healthcare access. It also outlines examples of potential healthcare related interventions that could improve the enabling domain of healthcare access and reduce the likelihood that someone will delay or forgo needed healthcare. Social role theory was used to guide selection of relational factors and immigration into measurable typologies in order to capture the overlapping nature of relational factors (Barnett and Baruch 1985; Jackson and Erving 2020). Being an immigrant has a hypothesized negative impact on care seeking decisions through the financial (sending remittances abroad), time (lack of paid time off), and language access domains. We hypothesized that being a caregiver/parent has a negative effect on enabling healthcare access through a reduction in time and a responsibility to provide financial resources, but that having a spouse in the same household would reduce that negative impact. This is one reason why the implications of immigration characteristics may vary by family structure – an immigrant's spouse may be overseas meaning that they are in a transnational family. We also hypothesized that some of the negative effects of these relational factors could be mediated by relational healthcare interventions.
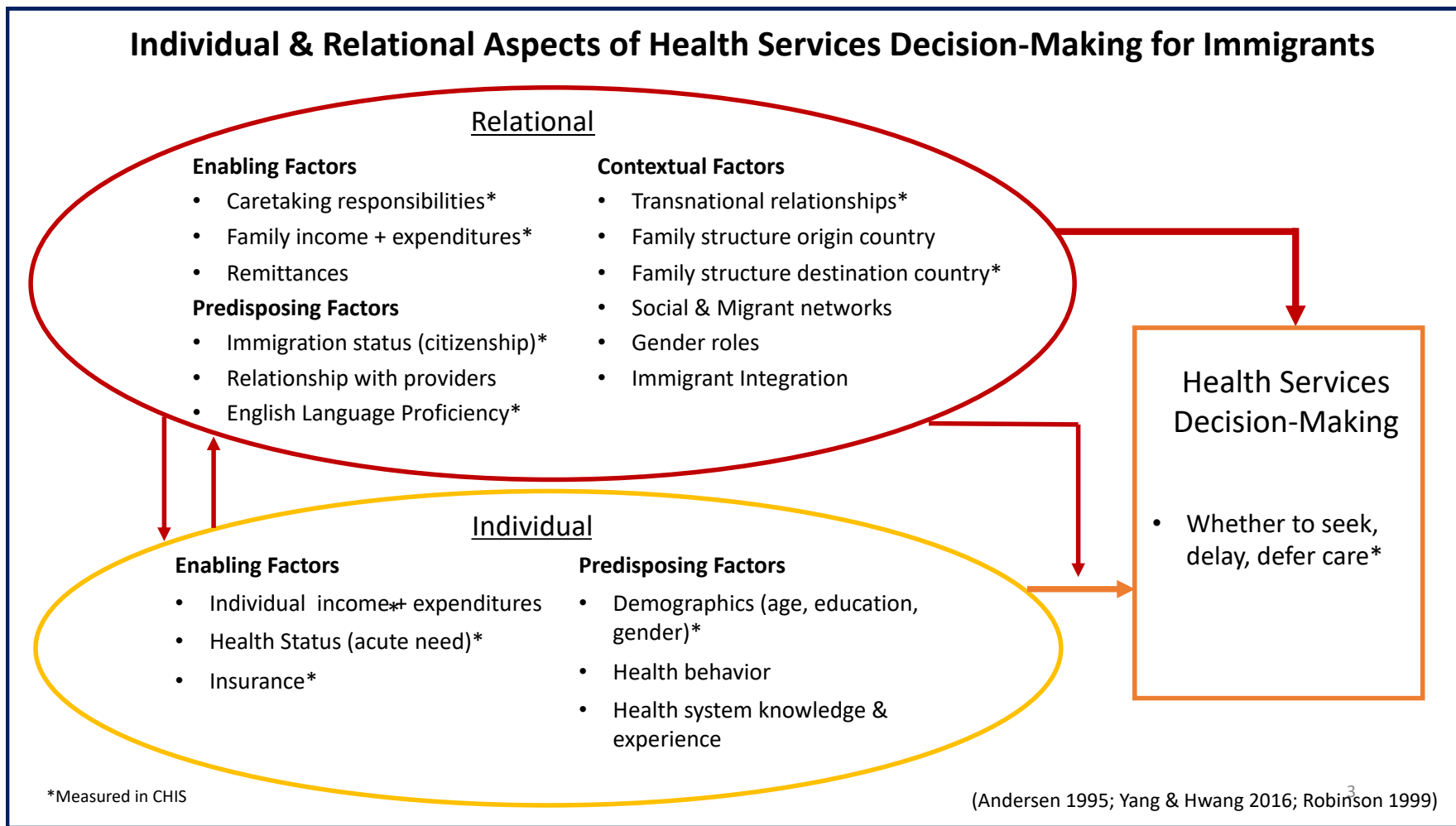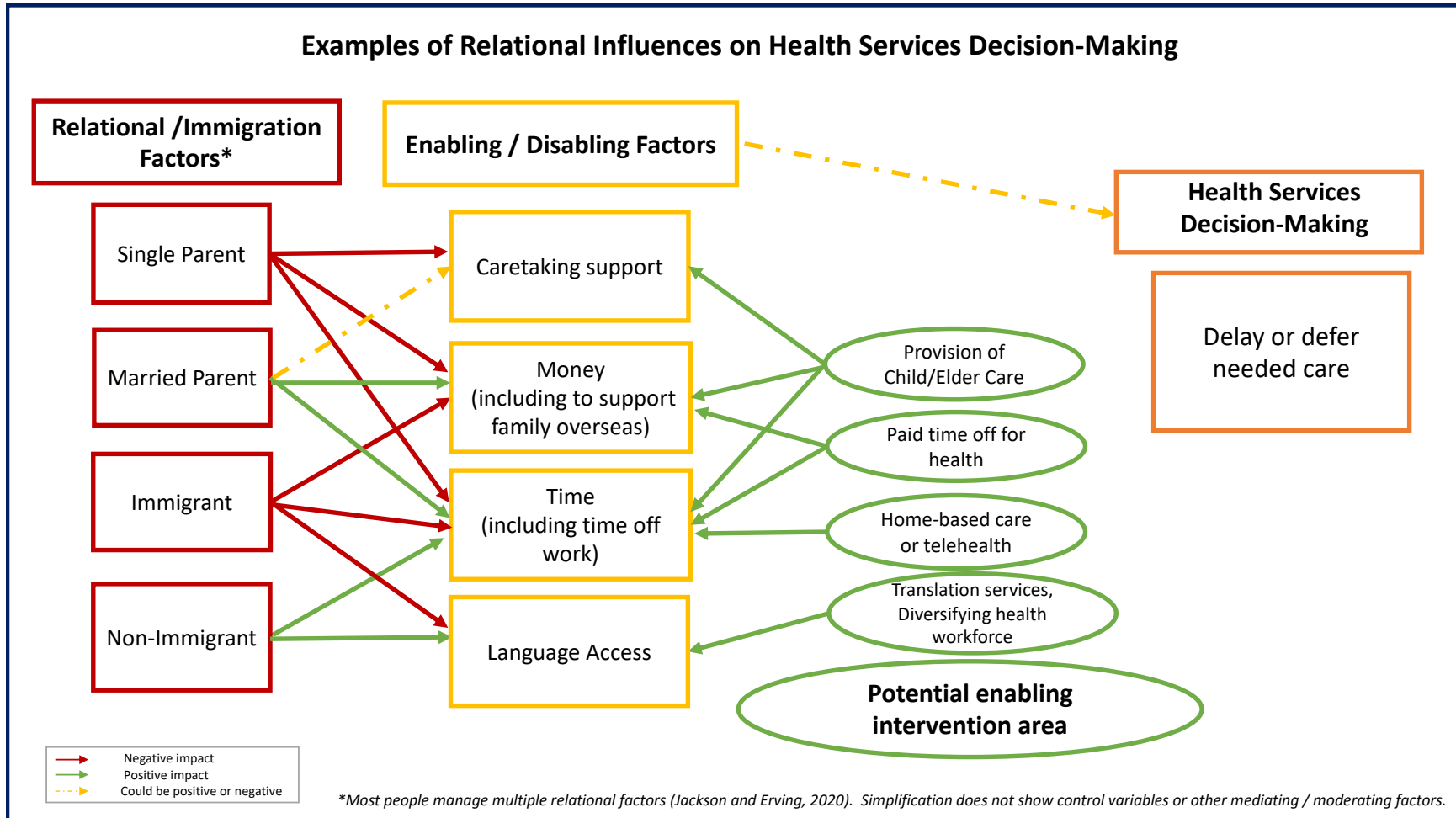
Figure 4.1: Analytical Framework

Individual & Relational Aspects of Health Services Decision-Making for Immigrants

Relational

Enabling Factors
- Caretaking responsibilities*
- Family income + expenditures*
- Remittances

Predisposing Factors
- Immigration status (citizenship)*
- Relationship with providers
- English Language Proficiency*

Contextual Factors
- Transnational relationships*
- Family structure origin country
- Family structure destination country*
- Social & Migrant networks
- Gender roles
- Immigrant Integration

Individual

Enabling Factors
- Individual income + expenditures
- Health Status (acute need)*
- Insurance*

Predisposing Factors
- Demographics (age, education, gender)*
- Health behavior
- Health system knowledge & experience

Health Services Decision-Making

- Whether to seek, delay, defer care*

*Measured in CHIS

(Andersen 1995; Yang & Hwang 2016; Robinson 1999)

Figure 4.2: Conceptual Framework

Examples of Relational Influences on Health Services Decision-Making

Relational /Immigration Factors*

Enabling / Disabling Factors

Health Services Decision-Making

Single Parent

Married Parent

Immigrant

Non-Immigrant

Caretaking support

Money (including to support family overseas)

Time (including time off work)

Language Access

Provision of Child/Elder Care

Paid time off for health

Home-based care or telehealth

Translation services, Diversifying health workforce

Potential enabling intervention area

Delay or defer needed care

Negative impact
Positive impact
Could be positive or negative

*Most people manage multiple relational factors (Jackson and Erving, 2020). Simplification does not show control variables or other mediating / moderating factors.

Methods

Study Design

This was a cross-sectional quantitative study to assess the relationships between immigration factors, family relationships, and health services. The analysis built understanding of the prevalence of the problem and who is most impacted through answering questions about who is delaying or forgoing care and what factors make someone more likely to make a particular health services decision. The analysis focused on relational (family structure) and immigration factors as the primary predictors, with interactions between these factors illuminating the complex connections between immigration and health. The information helped paint a more complete picture of immigrant health services decision-making.

Ethical Review

This study has been reviewed and approved by the UCLA Institutional Review Board (IRB#21-001256).

Data and Sample

Data were from the 2017 and 2018 California Health Interview Survey (CHIS) collected between June 2017 and January 2019. This timing allows for analysis of immigration and healthcare during some of the most recent peak anti-immigrant social and policy context and prior to the disrputions of the COVID-19 pandemic. CHIS is the country's largest state health survey and is recognized as a national model for data collection on race/ethnicity and immigrant health. CHIS is a population-based telephone survey of California's residential, noninstitutionalized population conducted every other year since 2001 and continually beginning in 2011. CHIS 2017/2018 employs a multi-stage sample design with the random-digit-dial sampling including telephone

numbers assigned to both landline and cellular service. It has representative data on all 58 counties in California and provides a detailed picture of the health and health care needs of California's large and diverse population. More than 20,000 people complete interviews each year. CHIS conducts oversampling of some demographic groups and smaller geographic areas.

The average adult interview in 2017/18 took 42 minutes to complete, with interviews in non-English languages taking slightly longer (~50 minutes). More than eight percent of the adult interviews were completed in a language other than English (UCLA Center for Health Policy Research 2019). Analyses for this study used the restricted CHIS dataset which was accessed through the Data Access Center at the UCLA Center for Health Policy Research (CHPR) (Project approval reference number: DAC211036).

Measures

The primary outcome was a binary measure of delaying or forgoing needed healthcare derived from the question: *"During the past 12 months, did you delay or not get any medical care you felt you needed—such as seeing a doctor, a specialist, or other health professional?"*. We also analyzed the responses to follow-up questions including *"Did you get the care eventually?"* to understand the prevalence of delays versus forgone care; and *"What was the one main reason why you delayed getting the care you felt you needed?"*.

Predictors fell into two main categories: immigration and relational. These were tested independently, together, and as moderators. Immigration related predictors fell into three categories: status, length of time in the US, and language. The analysis included these different characteristics to test which aspects of the immigrant experience were associated with healthcare decisions. The status measure included three different specifications of four different status categories: natural born US Citizen, naturalized citizen, lawful permanent resident/green card

holder (LPR), temporary visa or undocumented. The first immigration status measure included all 4 categories separately, the second compared US born residents to naturalized citizens and non-citizens (combines LPRs and visa/undocumented categories) and the third was a binary measure of all immigrants compared US born citizens. A measure capturing years in the US had three categories: US born citizens, immigrants who had been in the US between 0-14 years, and immigrants who had been here 15 or more years. The language measures captured English language proficiency and whether English was the primary language spoken at home. For English language proficiency, we tested two specifications – a three-category version of 1. Native English speaker, 2. Speaks English very well or well, and 3. Does not speak English well or not at all, and a two-category version 1. Native speaker or speaks English very well/well, 2. Does not speak English well or at all. The language spoken at home variable was specified as 1. English only, 2. English and something else, and 3. Not English.

The main relational independent variable was a categorical measure that captured both marital status and whether the family had children (single no children, married no children, married with children, and single with children). We also tested other relational variables before selecting the combination variable that combined marital status and children. The other relational variables included: marital status, household size (number of people in same residential household supported by household income), family size (number of people in the family – included immediate family members who lived outside of the household including overseas), and number of children separately. Marital status was a three-category variable: Single never married, widowed/separated/divorced, and married or cohabitating. The final specifications of the household size, family size, and number of children variables were ordinal categorical variables

with household and family size including categories of 1, 2, 3, 4 and 5 or more, and the number of children in the household including four categories 0, 1, 2, and 3 or more.

Covariates included basic demographic characteristics and those known to impact healthcare decisions including age, sex, race/ethnicity, education, income, rural/urban location, health status, insurance, and whether the individual had a usual source of care other than the emergency department at a hospital. Because healthcare infrastructure varies throughout the state and counties determine access to many indigent care programs, we also incorporated a county variable and an indicator for whether the county has an indigent care program for undocumented immigrants. Age was measured in 5-year age groups. Sex was a binary measure of male or female. Education was a four-category measure of the highest level of education (less than high school, high school, some college, and college degree or above). Income was measured in relation to the federal poverty level (FPL), consistent with income measures for state and federal health programs. Categories included less than 100% of the FPL, 100-199% FPL, 200-299% FPL, and 300%+ FPL. Rather than a subjective measure of health status such as self-reported health, we used a measure of whether the respondent had been told by a doctor that they had one or more of the following chronic conditions: diabetes, heart disease, asthma, and/or high blood pressure (Joynt 2021; Pourat et al. 2014; Ro et al. 2022). The measure of insurance was a categorical variable indicating whether the respondent had no insurance, public insurance, or private insurance.

Analyses

Analysis was conducted with the support of the California Center for Health Policy Research Data Access Center (DAC). As per the requirements of the approved confidential CHIS data application (DAC211036).

We conducted data exploration, univariate analysis of distributions, and assessed missingness. Descriptive analyses included correlations, unadjusted logistic regression, and bivariate tests of differences in means and proportions such as chi-square tests for binary and categorical variables and t-tests for continuous variables. We tested for collinearity and used both statistical and theoretical approaches to determine final variable selection and multivariable model development. It was important to control extensively for factors that determine need for healthcare. To address issues of collinearity and model fit and reduce the number of variables while still maintaining information from those variables, we used principal components analysis (PCA). PCA can reduce dimensionality by transforming a larger set of variables into a smaller set of components that maintains most of the information from the original set of variables. We included 6 variables in the PCA which was reduced to three components compiled into an index that was normalized to a 0-1 index. We also created a low, medium, high need ordinal version of the index to include in interaction models testing for moderation by healthcare need. The variables included were: number of chronic conditions (0-4), overall health status (self-reported, 5 categories), current smoking status (yes/no), obesity indicator, experienced psychological distress in last year (yes/no), and number of doctor visits in last year (0, 1, 2, 3, 4, 5, 6, 7-8, 9-12, 13-24, 25+).

Multivariable logistic regression was used to determine associations between immigration and relational characteristics and delayed or forgone healthcare. We ran logistic regression models with interaction terms to hold control variables constant while maximizing the ability to see contrasts between specific relational and immigration characteristics. We also included sex in the interaction models to see if the effect of family relationships differed by sex. Utilizing the

"margins" command in Stata, we reported the results of the interactions as predicted probabilities and average marginal effects to ease in the interpretation of these complex models.

For sensitivity analyses, multiple specifications of the outcome, predictor, and control variables described above were tested. Survey weights were employed so that the results represent California's residential population during the two-year period and also to account for bias due to sampling, nonresponse, and coverage. Use of weights is important for ensuring accuracy of standard error estimates. We used the Taylor Series Linearization method. All analyses are conducted using Stata software, v15.

Results

Characteristics of the Sample

The study sample included 42,330 households. See Table 4.1 for details regarding the sample characteristics. The average number of people in the household was 3.5 and the average family size, which includes all family supported by the household income even if they do not live in the household (e.g. living abroad), was 2.2 people. Most households did not include children under 18 (61%, mean number of children 0.8), 15% had 1 child, 13% had 2 and 10% had 3 or more children. Fifty-seven percent were married or cohabitating with a partner while 28% were single never married. Single parents made up 5% of the sample. Average age was 46.7 years, and 90% lived in an urban location.

Thirty-two percent of the sample were immigrants, 64% of whom were naturalized citizens, 22% were legal permanent residents (LPPs/green card holders), and 15% were temporary visa holders or undocumented immigrants. Among immigrants, 80% had been in the US for 15 or more years and 20% had been in the US for 0-14 years. Fifty-six percent of the sample spoke only

English (native speakers) while 15% did not speak English well or at all. Another measure of language showed similar distributions with 56% of respondents speaking only English at home while 17% spoke only another language at home, and 26% spoke English and another language at home.

Most people were insured (over 90%) with 50% of respondents having private insurance and 42% public. Eighty-five percent of respondents had a usual source of care other than the hospital emergency department and 83% had visited the doctor at least once in the last 12 months. While 78% of the sample said they were in excellent, very good, good health, 41% had at least one chronic condition (asthma, diabetes, high blood pressure/heart disease, kidney disease) and 60% were obese.

There were some significant demographic and healthcare related differences between immigrant and non-immigrant households. Immigrants of all groups were overrepresented in the "less than high school" education category and had significantly lower proportions in the "high school diploma," "some college," and "college degree or more" categories. For example, only 7% of US Born citizens had less than high school education while 25%, 47%, and 59% of naturalized citizens, LPRs, and temporary visa holders/undocumented individuals had less than high school education respectively. Forty-two percent of temporary visa holders/undocumented immigrants made less than 100% of the Federal Poverty Level, while only 12% of the US Born group was considered in poverty by the federal cutoff. Immigrants had lower incomes despite significantly lower levels of unemployment, particularly temporary visa holders and undocumented immigrants. Immigrants were more likely to be married, more likely to have children, and greater numbers of children (8% of US born parents had 3 or more children, 28% of parents who were on temporary visas or undocumented (p<0.001)). Immigrants were also more likely to have larger households,

and especially to live in households with 5 or more people (19% for US Born, 44% for those on temporary visas or undocumented). We saw similar differences for family size, which is a measure of family members that includes people out of household who are supported by the household income. Noting that immigrant families were more likely to have children, we see a greater proportion of families who are married with children and single with children in households where the respondent is on a temporary visa or undocumented compared to the US born. For US born families 5% were single with children and 18% were married with children compared to temporary/undocumented immigrant families were 12% were single with children and 40% were married with children.

For healthcare related measures, immigrants were less likely to have insurance or have a usual source of care other than the ER (Table 4.2). When looking at specific immigrant status categories, we find that 6% of US born citizens were uninsured compared to 36% of temporary visa holders/undocumented immigrants. While more naturalized citizens had a usual source of care compared to their US born counterparts (89% vs. 87%), LPRs and temporary visa holders/undocumented immigrants were much less likely to have a usual source of care, 75% and 61% respectively. A lower proportion of immigrants, particularly LPRs and those on temporary visas or undocumented, had visited a doctor in the last 12 months (66% of temporary immigrants compared to 85% of US born citizens). Fewer doctor visits was in spite of the fact that a significantly higher proportion of immigrants in all categories reported being in fair or poor health compared to the US born population (Table 4.2). While non-citizens were more likely to report being in fair or poor health, they also experienced lower rates of chronic disease and psychological distress compared to both US born and naturalized citizens.

4.1: Description of the Sample

	mean	95% CI	n= 42,330
Age Group (10yr)			
18-29yrs	0.22	[0.22-0.23]	5,618
30-39yrs	0.18	[0.17-0.18]	4,179
40-49yrs	0.17	[0.16-0.18]	4,661
50-59yrs	0.16	[0.15-0.17]	7,021
60-69yrs	0.14	[0.13-0.14]	9,204
70+yrs	0.13	[0.13-0.14]	11,647
Sex			
Male	0.49	[0.48-0.50]	19,071
Female	0.51	[0.50-0.52]	23,259
Race/Ethnicity			
Latino[a]	0.22	[0.22-0.23]	5,648
Asian	0.15	[0.14-0.15]	3,147
African American	0.06	[0.05-0.06]	2,322
White	0.43	[0.42-0.44]	26,314
Other Single/multiple race	0.14	[0.14-0.15]	4,899
Self-reported educ level of resp (adults)			
< High school education	0.16	[0.16-0.17]	3,468
High school education	0.22	[0.21-0.22]	8,764
Some college	0.23	[0.22-0.23]	11,868
College degree or above	0.39	[0.38-0.40]	18,230
Employment status			
Employed	0.64	[0.63-0.65]	21,524
Unemployed	0.36	[0.35-0.37]	20,806
% Below Federal poverty level			
0-99% FPL	0.16	[0.15-0.16]	5,687
100-199% FPL	0.18	[0.17-0.18]	7,185
200-299% FPL	0.13	[0.13-0.14]	5,752
300% FPL +	0.54	[0.53-0.54]	23,706
Urban (ref: rural)	0.9	[0.89-0.90]	34,228
Type of current insurance			
Uninsured	0.09	[0.08-0.09]	2,509
Public	0.42	[0.41-0.42]	23,261
Private	0.5	[0.49-0.50]	16,560
County has indigent care for undocumented immigrants	0.7	[0.70-0.71]	30,459
Has usual source of care other than ER	0.85	[0.84-0.85]	37,769
Had at least one doctor visit in last 12 months	0.83	[0.82-0.83]	36,702
Has one or more Chronic Condition(s)	0.41	[0.40-0.42]	21,438
General Health Condition			
Excellent	0.17	[0.17-0.18]	7,182
Very Good	0.3	[0.30-0.31]	13,150
Good	0.31	[0.30-0.32]	12,979
Fair	0.17	[0.16-0.17]	6,615
Poor	0.05	[0.04-0.05]	2,404
Smoker	0.11	[0.10-0.11]	4,673
Obese	0.6	[0.59-0.61]	25,641
Psychological distress in last year	0.1	[0.10-0.11]	3,781
Marital status			
Never married	0.28	[0.27-0.28]	9,036

Widowed/separated/divorced	0.15	[0.15-0.16]	12,192
Married or cohabitating	0.57	[0.56-0.58]	21,102
Number of Children in household			
0	0.61	[0.60-0.62]	32,010
1	0.15	[0.15-0.16]	4,329
2	0.13	[0.13-0.14]	3,569
3 or more	0.1	[0.10-0.11]	2,421
Number of people in the household			
1	0.1	[0.10-0.11]	12,262
2	0.27	[0.27-0.28]	13,763
3	0.2	[0.19-0.21]	6,074
4	0.19	[0.18-0.20]	5,051
5 or more	0.23	[0.22-0.24]	5,180
Family Size: incl out of household			
1	0.4	[0.39-0.41]	20,813
2	0.32	[0.31-0.33]	14,241
3	0.11	[0.10-0.11]	2,915
4	0.1	[0.10-0.11]	2,654
5 or more	0.07	[0.07-0.08]	1,707
Family type			
Single, No Children	0.44	[0.43-0.45]	21,906
Married, No Children	0.29	[0.28-0.30]	13,322
Married, Children	0.22	[0.21-0.22]	5,336
Single, Children	0.05	[0.05-0.06]	1,766
Immigrant documentation status			
US born citizen	0.68	[0.68-0.69]	33,903
Naturalized citizen	0.18	[0.17-0.18]	5,353
LPR	0.08	[0.07-0.08]	1,845
Temp. Visa/Undocumented	0.06	[0.06-0.07]	1,229
English use and proficiency			
Speak only English	0.56	[0.56-0.57]	30,305
Very well/well	0.29	[0.28-0.30]	8,760
Not well/not at all	0.15	[0.14-0.15]	3,265
What languages spoken at home			
Not English	0.17	[0.17-0.18]	4,341
English and something else	0.26	[0.26-0.27]	7,684
English only	0.56	[0.56-0.57]	30,305
Years in the US			
0-14 years	0.08	[0.07-0.08]	1,657
15 or more years	0.24	[0.23-0.25]	6,770
US born	0.68	[0.68-0.69]	33,903

Weighted estimates. Source: CHIS 2017, 2018 pooled. [a] All other categories do not include people who identify as Latino/Hispanic ethnicity regardless of race

Table 4.2: Distribution of the Outcome and Health-Related Measures by Immigration Status

	US born citizen		Naturalized citizen		LPR		Temp. Visa/Undocumented		Total		n
	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	n= 42330
Delay or Forgo needed care***											
No	0.86	[0.85-0.86]	0.9	[0.89-0.92]	0.9	[0.88-0.92]	0.89	[0.87-0.92]	0.87	[0.86-0.88]	36,875
Delay	0.05	[0.05-0.06]	0.04	[0.03-0.04]	0.04	[0.03-0.05]	0.04	[0.02-0.05]	0.05	[0.04-0.05]	2,032
Forgo	0.09	[0.09-0.10]	0.06	[0.05-0.07]	0.06	[0.04-0.08]	0.07	[0.05-0.09]	0.08	[0.08-0.09]	3,423
Reasons forgone necessary care***											
Inapplicable	0.86	[0.85-0.86]	0.9	[0.89-0.92]	0.9	[0.88-0.92]	0.89	[0.87-0.92]	0.87	[0.86-0.88]	36,875
Cost	0.06	[0.06-0.07]	0.04	[0.03-0.05]	0.05	[0.04-0.06]	0.07	[0.05-0.09]	0.06	[0.05-0.06]	2,269
Couldn't get appointment	0.01	[0.01-0.01]	0.01	[0.01-0.01]	0	[0.00-0.01]	0.01	[0.00-0.02]	0.01	[0.01-0.01]	485
Didn't have time	0.03	[0.02-0.03]	0.02	[0.01-0.02]	0.02	[0.01-0.03]	0.02	[0.01-0.03]	0.02	[0.02-0.02]	862
Others	0.05	[0.04-0.05]	0.03	[0.02-0.04]	0.03	[0.02-0.04]	0.01	[0.01-0.02]	0.04	[0.04-0.04]	1,839
Type of current insurance***											
Uninsured	0.06	[0.06-0.07]	0.07	[0.06-0.08]	0.14	[0.12-0.17]	0.36	[0.33-0.40]	0.09	[0.08-0.09]	2,509
Public	0.41	[0.40-0.42]	0.44	[0.42-0.46]	0.46	[0.43-0.49]	0.4	[0.36-0.44]	0.42	[0.41-0.42]	23,261
Private	0.53	[0.52-0.54]	0.49	[0.47-0.51]	0.4	[0.36-0.43]	0.24	[0.21-0.27]	0.5	[0.49-0.50]	16,560
Has usual source of care not ER***	0.87	[0.86-0.88]	0.89	[0.87-0.90]	0.75	[0.72-0.78]	0.61	[0.57-0.65]	0.85	[0.84-0.85]	37,769
Had at least one doctor visit in last 12 months***	0.85	[0.84-0.86]	0.83	[0.82-0.85]	0.71	[0.69-0.75]	0.66	[0.62-0.69]	0.83	[0.82-0.83]	36,702
General health condition***											
Excellent	0.18	[0.17-0.19]	0.17	[0.15-0.18]	0.13	[0.11-0.16]	0.12	[0.10-0.15]	0.17	[0.17-0.18]	7,182
Very good	0.34	[0.33-0.35]	0.25	[0.23-0.27]	0.21	[0.18-0.24]	0.15	[0.12-0.18]	0.3	[0.30-0.31]	13,150
Good	0.3	[0.29-0.31]	0.32	[0.30-0.34]	0.35	[0.32-0.38]	0.39	[0.35-0.43]	0.31	[0.30-0.32]	12,979
Fair	0.14	[0.13-0.14]	0.2	[0.18-0.22]	0.23	[0.20-0.26]	0.3	[0.26-0.34]	0.17	[0.16-0.17]	6,615
Poor	0.04	[0.04-0.05]	0.06	[0.05-0.07]	0.08	[0.06-0.10]	0.04	[0.03-0.06]	0.05	[0.04-0.05]	2,404
Has Chronic Condition(s)***	0.42	[0.41-0.43]	0.44	[0.42-0.46]	0.36	[0.33-0.40]	0.28	[0.25-0.32]	0.41	[0.40-0.42]	21,438
Obese***	0.6	[0.59-0.61]	0.57	[0.55-0.59]	0.63	[0.59-0.66]	0.68	[0.64-0.71]	0.6	[0.59-0.61]	25,641
Psychological distress in last yr	0.12	[0.12-0.13]	0.06	[0.06-0.08]	0.06	[0.05-0.08]	0.07	[0.05-0.09]	0.1	[0.10-0.11]	3,781

Weighted estimates. Source: CHIS 2017, 2018 pooled

Distribution of the outcome

Overall, 13% of the sample delayed or forewent healthcare when they needed it (Table 4.2 and Appendix Table 4.6.A). Five percent of the total sample (37% of those who delayed or forewent) delayed getting care and got it eventually, and 8% (63% of those who delayed or forewent) forewent care entirely and did not get the care they needed. The main reason for delaying or forgoing needed care was cost, which accounted for 42% of the total. Other reasons captured by the CHIS survey were a lack of time (16%) and inability to get an appointment (9%).

Immigration Characteristics and Forgoing Needed Care

There were significant differences in the proportion of people who delayed or forewent needed healthcare by immigration related characteristics and these factors remained significant predictors of healthcare decision-making in multivariable models when controlling for demographic, household, and healthcare utilization measures (Table 4.3). In each of the different measures across the three categories of immigration status, language, and years in the US, being an immigrant, and a more newly arrived or less integrated immigrant, was associated with a reduced likelihood of deciding to forgo needed healthcare. For example, in fully adjusted models compared to US born citizens immigrants who were on temporary visas or undocumented had 35% lower odds of delaying or forgoing needed healthcare (AOR: 0.65, 95% CI: 0.481-0.879).

After running fully adjusted logistic regression models controlling for family type, age, sex, race/ethnicity, education, income, healthcare need index, insurance status, county indigent care programs for undocumented immigrants, and usual source of care, we calculated predicted probabilities and average marginal effects (Table 4.5). The probability of deciding to forgo necessary care for US born citizens was 13.6% and it was smaller for each subsequent immigration status category: 12.7% for naturalized citizens, 10.7% for LPRs, and 9.5% for temporary visa

holders and undocumented immigrants. The significant marginal effect for being an immigrant in any category was a reduction in probability of about 3% compared to people who were born in the US. When looking by immigration category, we see that the significant immigration effect is driven by non-citizens (LPRs, temporary visa holders and undocumented immigrants). The marginal effect for being an LPR compared to a US born citizen was -0.03 (p<0.05) and for temporary visa holders it was -0.04 (p<0.01), an almost 30% reduction in the probability of delaying or forgoing needed care. The probabilities and marginal effects were similar for the other immigration related characteristics of English language proficiency, language spoken at home and years in the US. Those who were native speakers of English, spoke only English at home and had been in the US for their entire lives had a predicted probability of delaying or forgoing needed healthcare of 13.7%, 13.5%, and 13.6% respectively. Being a non-native English speaker, speaking a language other than English at home, and being in the US for less than 15 years reduced the probability of delaying or forgoing care between 3.5-4.7%. Being an immigrant and a newly arrived immigrant had positive effects on healthcare decision-making and was associated with fewer delays and forgone healthcare.

Table 4.3: Bivariate and Multivariable Analysis of the effect of Immigration Characteristics on Delaying or Forgoing Needed Healthcare

	1. Status	2. English	3. Lang. Home	4. Yrs in US	5. Demo	6. Full Model
Immigration Status (Ref: US Born)						
Naturalized citizen	0.632***				0.838*	0.915
	(0.540 - 0.741)				(0.704 - 0.999)	(0.769 - 1.089)
LPR	0.627***				0.677**	0.750*
	(0.498 - 0.789)				(0.525 - 0.873)	(0.582 - 0.967)
Temp. Visa/Undocumented	0.698**				0.601***	0.650**
	(0.536 - 0.909)				(0.448 - 0.806)	(0.481 - 0.879)
English proficiency (Ref: Native)						
Very Well or Well		0.923				
		(0.826 - 1.032)				
Not Well or Not at All		0.566***				
		(0.466 - 0.686)				
Language home (Ref: not English)						
English +something else			1.410***			
			(1.171 - 1.698)			
English only			1.554***			
			(1.315 - 1.836)			
Yrs in the US (Ref: 0-14)						
15 or more years				1.081		
				(0.838 - 1.396)		
US born				1.648***		
				(1.315 - 2.067)		
Age (Ref 18-29 years)						
30-39yrs					0.998	0.911
					(0.847 - 1.176)	(0.772 - 1.075)
40-49yrs					0.863	0.780**
					(0.730 - 1.019)	(0.657 - 0.926)
50-59yrs					0.814*	0.727***
					(0.695 - 0.954)	(0.617 - 0.856)
60-69yrs					0.612***	0.561***
					(0.522 - 0.717)	(0.474 - 0.663)
70+yrs					0.268***	0.270***
					(0.219 - 0.327)	(0.216 - 0.339)
Sex: Female (Ref: male)					1.380***	1.546***
					(1.248 - 1.527)	(1.391 - 1.718)
Race/Ethnicity (Ref: Latino)[a]						

Asian	0.627***	0.641***
	(0.495 - 0.793)	(0.506 - 0.813)
African American	1.106	1.062
	(0.868 - 1.408)	(0.829 - 1.360)
White	1.402***	1.401***
	(1.199 - 1.639)	(1.197 - 1.640)
Other	1.080	1.039
	(0.904 - 1.291)	(0.867 - 1.244)
Education (Ref: < high school)		
High school education	0.873	0.993
	(0.704 - 1.081)	(0.800 - 1.232)
Some college	1.135	1.290*
	(0.918 - 1.404)	(1.041 - 1.599)
College degree or above	1.161	1.583***
	(0.939 - 1.436)	(1.276 - 1.963)
Poverty (Ref: <100% FPL)		
100-199% FPL	0.745***	0.791**
	(0.631 - 0.880)	(0.666 - 0.939)
200-299% FPL	0.755**	0.837
	(0.630 - 0.904)	(0.691 - 1.012)
300% FPL +	0.517***	0.639***
	(0.445 - 0.601)	(0.539 - 0.757)
Rural (Ref: Urban)	1.070	1.058
	(0.934 - 1.225)	(0.921 - 1.216)
Healthcare Need Index[b]		12.80***
		(9.549 - 17.15)
Insurance (Ref: No Insurance)		
Public Insurance		0.796*
		(0.648 - 0.977)
Private Insurance		0.834
		(0.682 - 1.018)
County indigent care for undoc.		1.020
		(0.915 - 1.138)
No usual source of care		1.283**
		(1.099 - 1.498)

Weighted Logistic Regression, ORs, 95% CI, *** p<0.001, ** p<0.01, * p<0.05, Source: CHIS 2017/2018 pooled. N=42,330 for all models. [a] All other categories do not include Latino ethnicity regardless of race. [b] Healthcare need index from principal components analysis including variables: number of chronic conditions (0-4), overall health status, smoking status, obesity indicator, experienced psychological distress in last yr, # of doctor visits in last yr. LPR= lawful permanent resident. FPL=federal poverty level

We tested a variety of relational factors to understand how family relationships impact decisions around healthcare use. Distribution of the outcome by family type is presented in Appendix Table 4.6.A In unadjusted regression models, being married or cohabitating as well as being formerly married (divorced/separated/widowed) was associated with lower odd of deciding to forgo needed healthcare compared to being single (AOR married: $0.741, 95\%, $CI: 0.662-0.829) (AOR widowed/separated/divorced: 0.863^*, 95% CI: 0.753 - 0.989). Having children in the household was associated with greater incidence of delaying or forgoing needed healthcare. Having 1 child increased the odds of deciding to forgo care by 21% and 3 or more children by 32.7%. Living alone or being single, regardless of your household size, were associated with greater odds of deciding not to seek needed care.

Given the existing overlap in some of these measures and following social role theory that situates people in multiple roles simultaneously, our main relational measure was a combination of marital status and number of children in the household, "family type". Using this four-category measure, we found that being married with no children was associated with 17.2% lower odds of deciding to forgo care compared to being single with no children (fully adjusted model 7 Appendix Table 4.7.A). The marginal effect of being married and not having children was a reduction in the probability of forgoing care of almost 3% compared to not being married and having no children.

Table 4.4: Multivariable Analysis of the effect of Immigration and Relational Characteristics on Delaying or Forgoing Needed Healthcare

	1 Status	2 English	3 Lang. Home	4 Yrs in US	5 Interaction Fam	6 Interaction Need
Immigration Status (Ref: US Born)						
Naturalized citizen	0.920				1.084	
	(0.773 - 1.096)				(0.841 - 1.397)	
LPR	0.754*				0.740	
	(0.585 - 0.972)				(0.524 - 1.045)	
Temp. Visa/Undoc	0.650**				0.635*	
	(0.480 - 0.879)				(0.412 - 0.979)	
Immigrant Y/N						0.798*
						(0.669 - 0.952)
English proficiency (Ref: Native)						
Very Well or Well		0.982				
		(0.857 - 1.126)				
Not Well or Not at All		0.608***				
		(0.469 - 0.789)				
Language home (Ref: not English)						
English +other			1.273*			
			(1.036 - 1.563)			
English only			1.306*			
			(1.054 - 1.619)			
Yrs in the US (Ref: 0-14)						
15+ yrs				1.320*		
				(1.009 - 1.727)		
US born				1.491**		
				(1.160 - 1.916)		
Family type (Ref: Single, No Children)						
Married, No Children	0.828**	0.833**	0.824**	0.829**	0.839*	0.826**
	(0.724 - 0.947)	(0.729 - 0.952)	(0.721 - 0.942)	(0.726 - 0.948)	(0.726 - 0.971)	(0.723 - 0.944)
Married, Children	1.029	1.032	1.012	1.027	1.057	1.009
	(0.880 - 1.204)	(0.883 - 1.208)	(0.865 - 1.183)	(0.877 - 1.201)	(0.889 - 1.258)	(0.862 - 1.180)
Single, Children	0.821	0.807	0.809	0.819	0.946	0.836
	(0.651 - 1.036)	(0.641 - 1.016)	(0.642 - 1.020)	(0.649 - 1.033)	(0.723 - 1.239)	(0.663 - 1.052)
Healthcare Need (High/Med/Low) [a]						

	(1)	(2)	(3)	(4)	(5)	(6)
Medium						2.117***
						(1.867 - 2.400)
High						3.980***
						(3.019 - 5.247)
Interactions						
Immigration Status # Family Type						
Nat Cit # Married no children					0.807	
					(0.555 - 1.173)	
Nat Cit # Married children					0.698	
					(0.446 - 1.091)	
Nat Cit # Single children					0.835	
					(0.447 - 1.561)	
LPR # Married no children					1.035	
					(0.598 - 1.789)	
LPR # Married children					1.138	
					(0.645 - 2.006)	
LPR # Single children					0.447	
					(0.174 - 1.144)	
Temp Visa # Married no children					1.569	
					(0.694 - 3.549)	
Temp Visa # Married children					1.117	
					(0.609 - 2.049)	
Temp Visa # Single children					0.373*	
					(0.167 - 0.836)	
Healthcare Need Categories # Immigrant Y/N						
Med Need # Immigrant						1.040
						(0.788 - 1.374)
High Need # Immigrant						0.920
						(0.428 - 1.979)
Constant	0.0933***	0.100***	0.0673***	0.0580***	0.0928***	0.139***
	(0.0664 - 0.131)	(0.0696 - 0.145)	(0.0480 - 0.0945)	(0.0403 - 0.0834)	(0.0661 - 0.130)	(0.101 - 0.193)
Observations	42,330	42,330	42,330	42,330	42,330	42,330

CI Eform in parentheses, *** p<0.001, ** p<0.01, * p<0.05. Source: CHIS 2017, 2018 pooled. Weighted Logistic Regression controlling for age, education, race/ethnicity, sex, rural location, healthcare need index, insurance, usual source of care, county indigent care programs for undocumented immigrants.
[a] Healthcare need index developed using principal components analysis and includes the following variables: number of chronic conditions (0-4), overall health status (self reported), smoking status, obesity indicator, experienced psychological distress in last 12 months, number of doctor visits in last 12 months. LPR= lawful permanent resident. FPL = federal poverty level

Table 4.5: Immigrants and families with children have lower predicted probabilities of delaying or forgoing needed healthcare

	1	2
Immigration Status		
US Born		0.136
		(0.00374)
Naturalized citizen		0.127
		(0.00837)
LPR*		0.107
		(0.0109)
Temp. Visa/Undocumented**		0.0945
		(0.0117)
Family type		
Single, No Children	0.135	
	(0.00419)	
Married, No Children**	0.115	
	(0.00552)	
Married, Children	0.138	
	(0.00733)	
Single, Children	0.115	
	(0.0106)	
Observations	42,330	42,330

Source: CHIS 2017, 2018 pooled. *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Significance level indicates significant average marginal effect of being a non-citizen compared to a US born citizen and being married with no children compared to being single with no children. Predicted probabilities from weighted Logistic Regression controlling for age, education, race/ethnicity, sex, rural location, healthcare need index, insurance, usual source of care, county indigent care programs for undocumented immigrants. [a] Healthcare need index developed using principal components analysis and includes the following variables: number of chronic conditions (0-4), overall health status (self reported), smoking status, obesity indicator, experienced psychological distress in last 12 months, number of doctor visits in last 12 months. LPR= lawful permanent resident.

Table 4.4 shows that both immigration and relational characteristics are significantly associated with healthcare seeking decisions. When models controlled for both immigration related characteristics and family type, results indicate that non-citizens and people who are married without children are more likely to seek healthcare when needed compared to US citizens and single people without children. To better understand if immigration status has different effects on the healthcare seeking decisions of various family types, we used interaction terms in the fully adjusted regression models to test immigration and relational typologies (Table 4.4, Model 5). The interactions include the family type variable which is a combination of two relational factors – marital status and caretaking (having children), and different immigration factors (status, language, years in the US).

Figures 4.3 and 4.4 demonstrate the important finding that family structure affected the healthcare decisions of people differently based on their immigration status, years in the US, and language. All panels of Figure 4.3 and Figure 4.4 show that US born and native English speakers had the highest probability of deciding to forgo needed healthcare in all family types and household sizes. What these figures show in addition to the differences in probabilities, is that the patterns were different for different groups. For example, the top left panel of Figure 4.3, shows that the predicted probability of deciding to forgo needed healthcare was highest for single people with and without children for citizens (US born and naturalized), but it was the opposite for LPRs and those on temporary visas or undocumented, with much lower probabilities of forgoing care for single parents and roughly the same for single people with no children and married people with or without children. The top right panel of Figure 4.3 shows similar results except with those who were in the US longer (15+ years) tracking similar to US born citizens except if they were single

parents. The bottom two panels of Figure 4.3 show predicted probabilities of deciding to forgo needed healthcare by language factors and they confirm what we saw in the top two panels, that factors associated with being an immigrant, particularly a more newly arrived or less integrated immigrant were associated with lower probabilities of deciding to forgo needed healthcare, but that this varies by family type, with the lowest probabilities for non-English speaking single parent families.

Figure 4.4 displays different relational measures, household and family size. Family size is an important measure as it captures immediate family members who are not in the same household but are supported by the same family income. For immigrants, this can often be family members who remain overseas. Again, we saw that a relational factor, family size, impacted people differently based on their immigration status. Citizens had similar patterns. LPRs and temporary visa holders/undocumented people tracked slightly differently with the lowest probability for LPRs with the biggest families of 5 or more and the highest for families of 3. For undocumented immigrants and those on temporary visas the lowest probabilities of deciding to forgo needed healthcare was for families of 3 and the highest was for families of 2 and 5.

Figure 4.5 shows that relational factors affected men and women differently with single fathers having higher probability of deciding to forgo needed care while for single mothers, this family type represented the lowest probability of delayed or forgone healthcare. The effect of immigration factors did not vary with sex but the differences between men and women were largest for LPRs with men having a lower probability of not seeking needed healthcare across all immigration categories.

Figure 4.3: Predicted Probabilities of delaying or forgoing care by immigration factors and family type
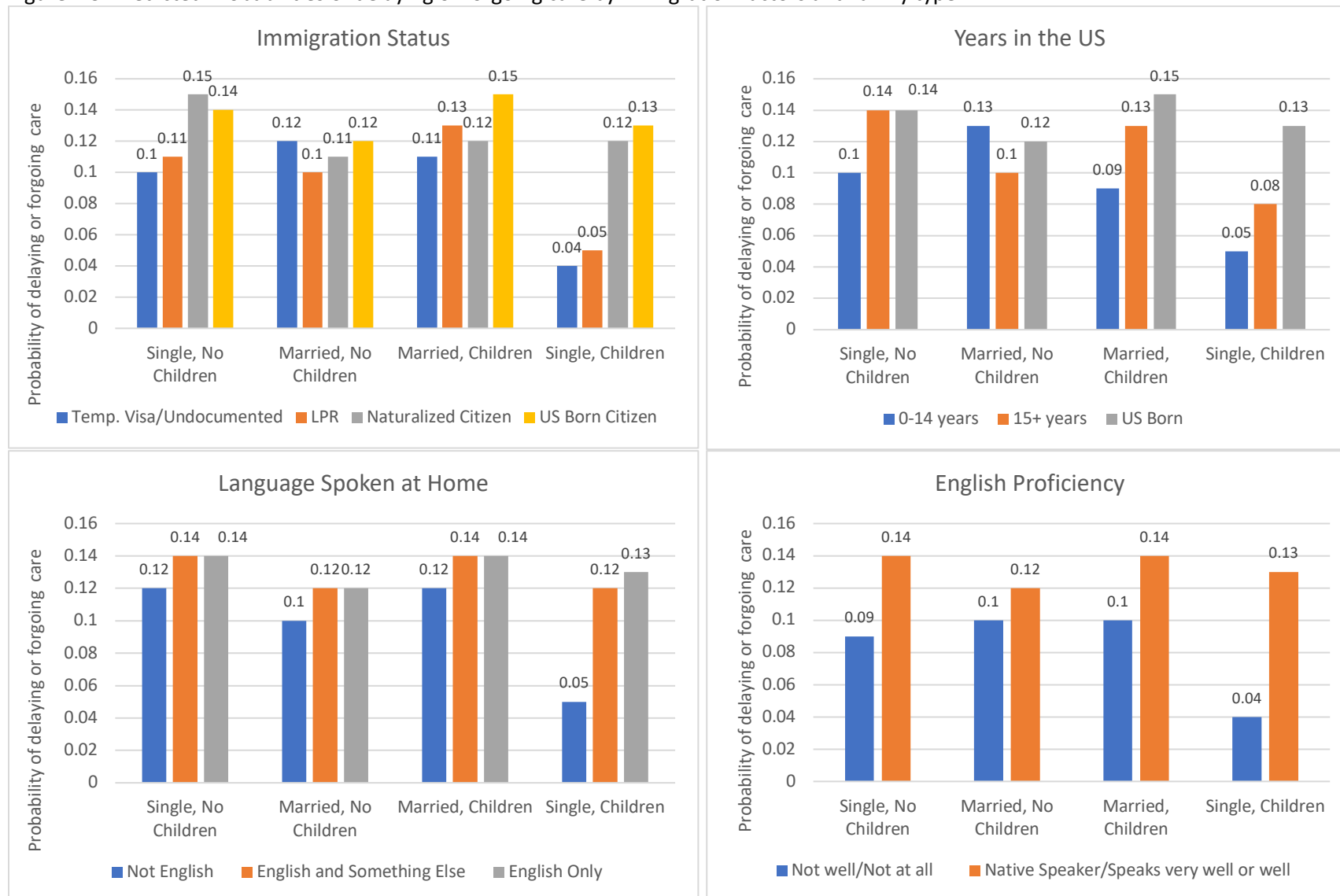
Figure 4.4: Predicted Probabilities of delaying or forgoing care by immigration status, family size and household size
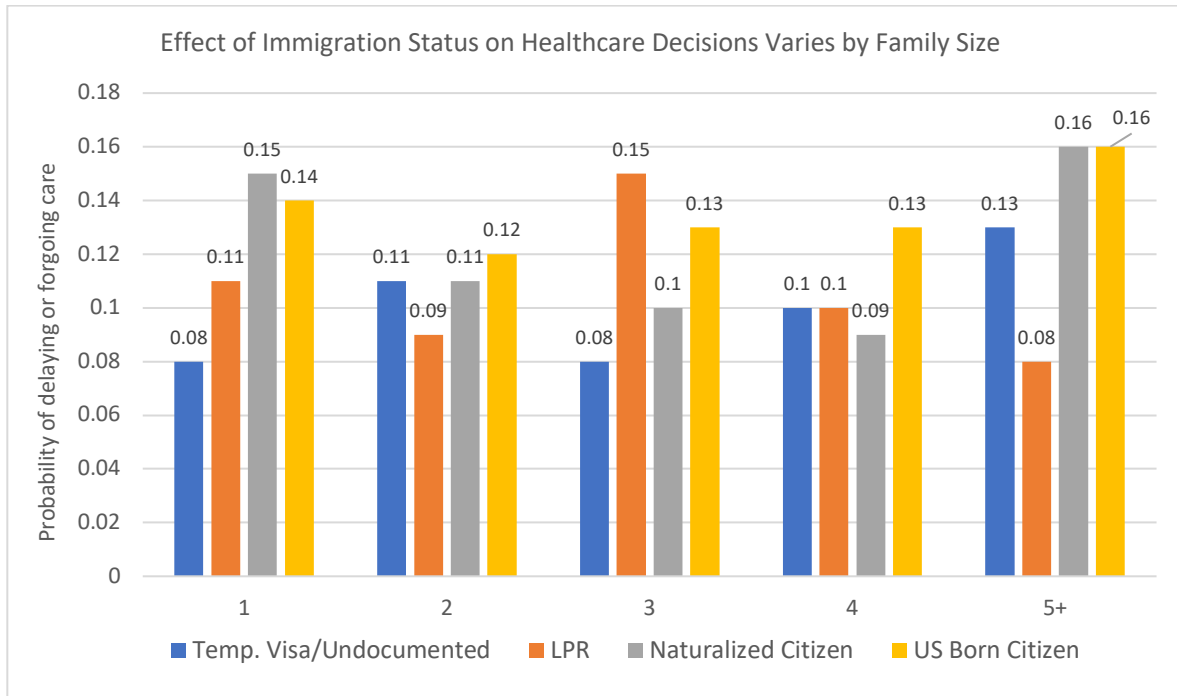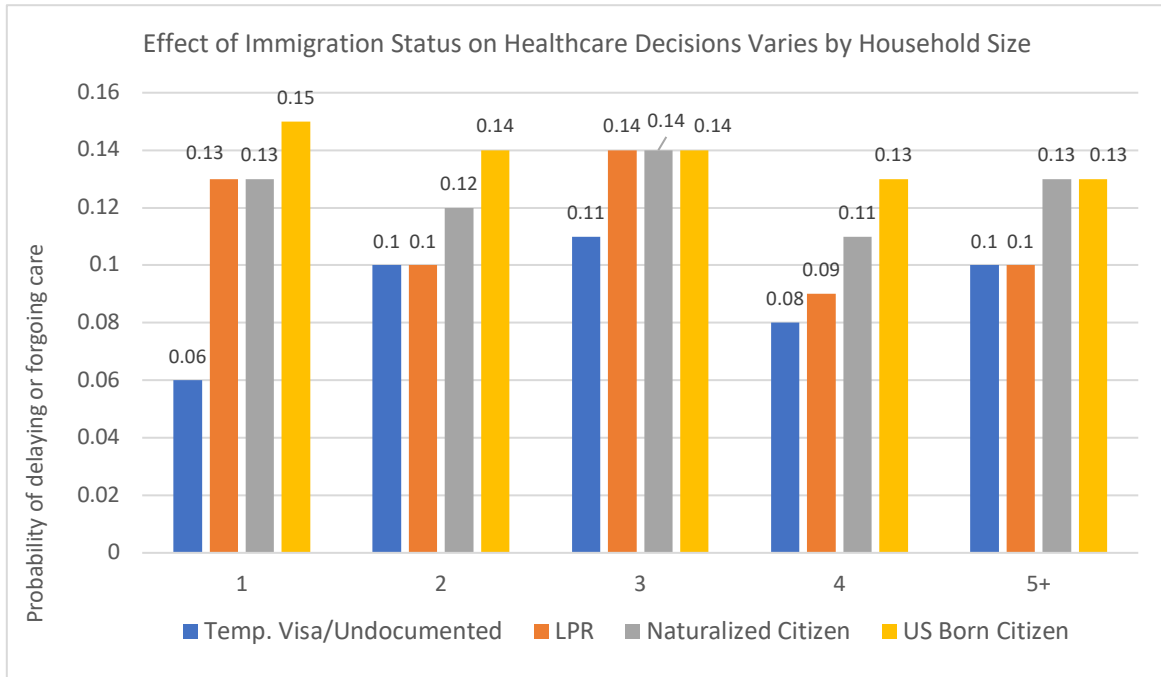
Effect of Immigration Status on Healthcare Decisions Varies by Household Size

Effect of Immigration Status on Healthcare Decisions Varies by Family Size

Source: CHIS 2017, 2018 pooled. Predicted probability from weighted Logistic Regression controlling for age, sex, race/ethnicity, education, poverty, urban/rural, insurance, usual source of care, healthcare need index, county has indigent care for undocumented residents. LPR= Lawful Permanent Resident

Figure 4.5: Predicted Probabilities of delaying or forgoing care by immigration status, family type, and sex
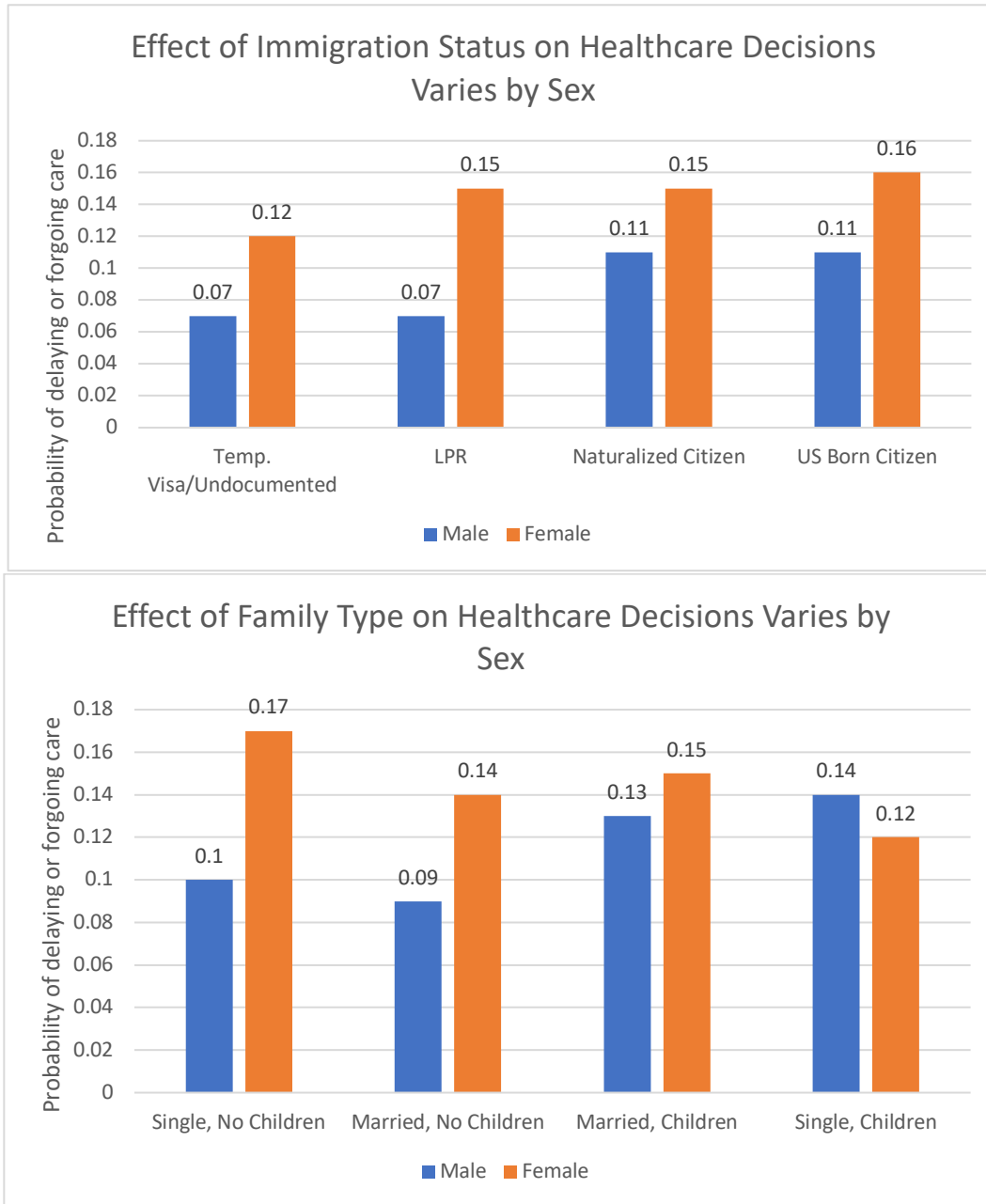
Effect of Immigration Status on Healthcare Decisions Varies by Sex

Effect of Family Type on Healthcare Decisions Varies by Sex

Source: CHIS 2017, 2018 pooled. Predicted probability from weighted Logistic Regression controlling for age, race/ethnicity, immigration status, education, poverty, urban/rural, insurance, usual source of care, healthcare need index, county has indigent care for undocumented residents. LPR= Lawful Permanent Resident

Other Factors Associated with Forgoing Needed Care

In fully adjusted weighted logistic regression models controlling for immigration status, family type, age, sex, race/ethnicity, education, income, healthcare need, insurance status, county indigent care programs for undocumented immigrants, and usual source of care, several socioeconomic and healthcare factors were associated with decisions to delay or forgo needed care (Table 4.3). People in older age groups (40+years) were less likely to forgo care compared to people in the youngest age group (18-29 years) and the magnitude of the effect increased with each subsequent age group. Women had 55% greater odds of forgoing healthcare compared to men. Being a woman was associated with an increase of more than 5% in the probability of deciding to forgo care, from about 10.6% probability of forgoing to care for men to 15.3% for women. Compared to people identifying as Latinos, White people were significantly more likely (AOR: 1.401, 95% CI:1.197-1.604) and Asian people were significantly less likely to delay or forgo needed care (AOR: 0.641, 95% CI: 0.506-0.813). Compared to those in the lowest income group (less than 100% FPL), people in each of the other income groups were significantly less likely to forgo needed care by 21- 36%. Having one or more chronic conditions was associated with increases in delay and forgoing of needed care by almost 30% (95% CI: 1.159-1.445, model not shown) as was not having a usual source of care other than the ER (AOR: 1.283, 95% CI: 1.099-1.498). Having public insurance was significantly associated with a reduction of decisions to forgo care compared to not having any insurance (AOR: 0.796, 95% CI:0.648-0.977), but private insurance was not (AOR: 0.834, 95% CI:0.682-1.018).

Discussion

Our results show that immigrants have a lower probability of forgoing needed care compared to non-immigrants. While this held true across multiple different immigration measures, the starkest contrasts were between US born citizens and immigrants who were on temporary visas or undocumented. This is a positive finding in terms of disparities for immigrant groups and was also surprising given the challenges faced by immigrant families as hypothesized in the conceptual model.

Our empirical analysis confirmed what others have found in terms of immigrant health services disparities in that the immigrants in our study were less likely to have insurance and a usual source of care (Bustamante et al. 2019; Kaiser Family Foundation 2020; Ortega et al. 2018). We also found that immigrants' social determinants of health such as education and income were more predictive of reduced healthcare access, confirming other studies of immigrant health (Chang 2019; Ortega et al. 2007; Ortega et al. 2018). These socioeconomic and healthcare differences would typically predict reduced healthcare access and increased likelihood of delay or forgoing of care. Despite these challenges, immigrants in our study consistently made the decision to seek healthcare when they needed it at higher rates than their US born counterparts, instead of delaying or forgoing needed care. While this result may be surprising given the health services and socioeconomic disadvantages faced by the immigrant population in our sample, our results did not conflict with studies that find immigrants were using less healthcare than non-immigrants (Derose et al. 2007; McBride et al. 2020; Pitkin Derose et al. 2009), given that we measured decisions about seeking needed care, not overall healthcare use. We did not determine if immigrants were using more care, just that they were less likely to forgo care when they need it. One reason for this might be that non-citizens in our study had chronic conditions at significantly lower rates than

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US born and naturalized citizens, so healthcare need or perceived need could be lower for these groups overall.

The outcome measures captured one of the most important health services decisions that a person can make – whether or not to seek care when it is needed. This decision directly impacts health outcomes such as disease management, and is often linked to preceding factors that fall within the enabling, predisposing and need categories of the conceptual model (e.g. insurance, health status). Further research on immigrant healthcare decision-making is needed to understand which factors might be influencing the health promoting decisions to seek care when needed. There are gaps in our understanding of what type of care was needed which could help unpack differences in perception of need, a potential mechanism for decisions about care seeking.

While this study focused on relational factors and was not seeking to understand policy differences that impact immigrants, we controlled for the local policy environment by including an indicator of whether or not the county had an indigent care program for undocumented immigrants. We did not find any significant differences in healthcare decision-making across these different counties. It is likely that policy differences at the state level are more relevant for healthcare utilization rather than the local policy context. Another important area for related research on the connections between relational and immigrant factors includes work on state level policies and mixed-status families (Kemmick Pintor and Call 2019; Rodriguez 2016; Rodríguez et al. 2015; Wallace et al. 2019; Young et al. 2020)

Family matters in the healthcare decisions of immigrants and non-immigrants. The structure of one's family, the size of one's family and household, and whether or not there were children present all were associated with decisions to delay or forgo needed healthcare in our study. Even though our outcome was measured at the individual level, the decision that the individual

made about their own healthcare use in times of illness, injury, or preventive care need, was influenced by the others in their lives. How the family life was structured played an important role in care seeking decisions. Confirming other studies, being married was generally good for health and healthcare use (Babitsch et al. 2012; Iwashyna and Christakis 2003; Robards et al. 2012). Our study is in line with findings that family was helpful (children, spouses) in making good decisions around healthcare (Gallant et al. 2007). Family structure was shown to influence child health in a cross-country comparison of 42 countries (Heaton et al. 2005) and while this was measuring a different outcome, we can argue that it was consistent with our findings about family mattering for health and healthcare. Parental absence (single parents) can be bad for child health, but on the other hand, female headed households (because of male absence/single mothers) was good for child health (Heaton et al. 2005). Similarly, Bennett confirms that being a single mother is not uniformly bad for child health despite generally accepted hypotheses about single parenthood. Similar to our findings, Bennett found that unmarried status had the greatest negative impact for white women over age 20 (Bennett 1992). Qualitative research can help us understand how different family structures and family members influence health decisions and how we can best incorporate relational factors into policies or programs to improve healthcare access. This study helped to fill some gaps in our understanding of how family structure can have positive or negative impacts on health by combining the analysis of relational factors with immigration factors. The effect of relational factors is not uniform across different groups and our analysis of immigration factors confirms this.

Relational factors such as family structure matter, and they matter differently for immigrant families. One mechanism through which family structure can impact immigrants' healthcare use is through social support in decision making. A study looking at a small subpopulation of

immigrants, those who were dual eligible for Medicare and Medicaid, underscores importance of social support in decision-making and how this looks different for immigrant families compared to non-immigrant families (McBride et al. 2020). Social support for immigrants often came from community-based organizations, instead of directly from family or friends (McBride et al. 2020), which could explain why immigrants who were single parents and therefore had less family support, were still able to get healthcare when they needed it. Future research should address how individuals and families are making care-seeking decisions to understand some of the complex mechanisms at play. Qualitative studies are particularly well positioned to examine these nuanced processes and the many factors that influence healthcare decision-making.

Studies show that household structure matters when looking at immigration related effects in high out-migration contexts such as those in South Asia (Chatterjee and Desai 2020; Desai and Banerji 2008; Yabiku et al. 2010). Our findings that being in an immigrant family can be good for healthcare decision-making is in line with prior findings for immigrants and left-behind populations (the other half of the immigrant marriage) (Kuhn et al. 2011; Lopez-Cevallos and Chi 2012; West 2020; West et al. 2021a). Left-behind women saw enhanced health related autonomy and were also less likely to delay or forgo needed healthcare through reductions in barriers to accessing care (Green et al. 2019; West et al. 2021c). Studying the effects of migration on left-behind populations is one way to study transnational relationships. This study points us toward the importance of looking at the effect of transnational relationships on immigrants themselves, not just those who have been left behind. For example, we see the lowest rates of delaying and forgoing needed healthcare for immigrant single parents, and this was also the category where US born and temporary immigrants diverged the most. This could be an effect of transnational relationships. While our main models tested the effect of family type, we also saw family size (but

not household size) affect immigrant families differently (Figure 4.4). This effect also only showed up when looking at more nuanced status variable with multiple categories. This is the variable that includes counts of family members who are not in the household. This may have different effects because of transnational relationships. While we do not have a direct measure, this could be picking up the effect of those relationships as non-citizens are more likely to have immediately family members still abroad. These results point to the need for more precise measures of transnational relationships so that we can directly assess their impact on the health and wellbeing of immigrants and their families.

Limitations

The cross-sectional nature of the quantitative design inhibits causal inference. The experiences of California immigrants are not representative of all immigrants, which limits the external validity of the study. However, for a study on immigration, California is an ideal location because it is home to the largest immigrant population in the US and main countries of origin for California immigrants represents the largest immigrant groups in the US. The dataset is also an important consideration when studying immigration. CHIS is one of the richest datasets for subsamples of mixed status immigrant families, and several major Asian ethnic groups. Participants are chosen at random, and the sample is extensive enough to minimize coverage bias of California's diverse population.

One challenge in analyzing the impact of relationships is that survey data are collected and reported at the individual level. This study addressed this challenge through the explicit and intentional inclusion and prioritization of relational factors expressed by the individual (e.g. caregiving responsibilities, household structure). We analyzed an individual in the context of their relationships, not in isolation of them.

Another limitation is related to the subjective perception of need for healthcare. The respondent had to feel that they needed health care in order to say whether they did get it. So there may be differences in experienced or perceived need. Given the potential effects of healthcare need on our outcome measures, we controlled extensively for need through testing models with various need controls and access controls and using principal components analysis to better adjust for multiple interrelated factors that can impact healthcare need and perceived need. We also tested whether there was an interaction between immigration related variables and the need index. Results of one of those interaction models is shown in Table 4.4 Model 6. There were no significant interaction effects between migration related characteristics (status, language, length of time in the US) and the healthcare need measure generated by PCA. This increased confidence in our results and points to the fact there are unique immigration and family related effects that are not fully explained by differences in need or perceived need for healthcare. Further research should explore decisions about healthcare use for multiple members of the same family to better understand how family structure and immigration characteristics may impact different family members. New CHIS data will also allow for comparisons before, during, and after the peak of the COVID-19 pandemic and the shifts in healthcare delivery that coincided.

Conclusion

This study explored a new domain in health services decision-making, that of relational factors combined with immigration characteristics. Understanding how healthcare decisions are made can inform effective policy development and implementation. By providing evidence on the healthcare decision-making of immigrants in California, home to over a quarter of the foreign-born population nationwide, and through incorporating the novel element of transnational

relationships, this study provides important nuance for health system interventions operating in the context of immigration.

The data for this study (2017/2018) come from a time of volatile immigration policy with sweeping changes to public charge rules, detention for asylum seekers and immigration enforcement. The findings are particularly relevant for public charge rule changes given how public charge assessments include family members in determining eligibility for individuals. The rule changes proposed by the Trump administration would penalize immigrant families for accessing health and social programs that they or their children qualified for such as Medicaid, supplemental nutrition assistance and housing assistance. While these changes were never fully enacted, the issue is still relevant in the 2023 policy context as Congress recently passed a joint resolution disapproving of public charge and the chilling effects of the proposed rule changes still reverberate through immigrant communities.

The experiences, preferences and priorities of immigrants and their families can provide useful insight into how policies and programs can better adapt to meet the needs and leverage the strengths of immigrant communities. By building on existing health services models such as the Andersen and Aday model of healthcare access, the study helps move the field toward a more inclusive and comprehensive understanding of health services decision-making. Using an innovative lens to address an understood phenomenon such as disparities in access to care opens up new avenues for addressing the problem.

Chapter 4 Appendix

Table 4.6.A: Distribution of the Outcome by Family Type

	Single, No Children		Married, No Children		Married, Children		Single, Children		Total		n
	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	n=42330
Delay or Forgo needed care***											
No	0.85	[0.84-0.86]	0.91	[0.90-0.92]	0.86	[0.85-0.87]	0.85	[0.82-0.87]	0.87	[0.86-0.88]	36,875
Delay	0.05	[0.05-0.06]	0.04	[0.03-0.04]	0.04	[0.03-0.05]	0.06	[0.05-0.08]	0.05	[0.04-0.05]	2,032
Forgo	0.09	[0.09-0.10]	0.06	[0.05-0.06]	0.1	[0.09-0.11]	0.09	[0.07-0.11]	0.08	[0.08-0.09]	3,423
Reasons forgone necessary care***											
Inapplicable	0.85	[0.84-0.86]	0.91	[0.90-0.92]	0.86	[0.85-0.87]	0.85	[0.82-0.87]	0.87	[0.86-0.88]	36,875
Cost	0.06	[0.06-0.07]	0.04	[0.03-0.04]	0.07	[0.06-0.08]	0.07	[0.06-0.10]	0.06	[0.05-0.06]	2,269
Couldn't get appointment	0.01	[0.01-0.01]	0.01	[0.01-0.01]	0.01	[0.01-0.01]	0.01	[0.01-0.02]	0.01	[0.01-0.01]	485
Didn't have time	0.02	[0.02-0.03]	0.02	[0.01-0.02]	0.02	[0.02-0.03]	0.02	[0.01-0.03]	0.02	[0.02-0.02]	862
Others	0.05	[0.04-0.05]	0.03	[0.02-0.03]	0.04	[0.03-0.05]	0.05	[0.03-0.06]	0.04	[0.04-0.04]	1,839

Weighted estimates. Source: CHIS 2017, 2018 pooled

Table 4.7.A: Bivariate and Multivariable Analysis of the effect of Immigration Characteristics on Delaying or Forgoing Needed Healthcare

	1 Fam Type	2 Marital	3 Children	4 HH Size	5 Fam Size	6 Fam Type Demo	7 Fam Type Full
Immigration Status (Ref: US Born)							
Naturalized citizen							0.920
							(0.773 - 1.096)
LPR							0.754*
							(0.585 - 0.972)
Temp. Visa/Undocumented							0.650**
							(0.480 - 0.879)
Family type (Ref: Single, No Children)							
Married, No Children	0.580***					0.728***	0.828**
	(0.517 - 0.651)					(0.639 - 0.830)	(0.724 - 0.947)
Married, Children	0.929					0.840*	1.029
	(0.812 - 1.062)					(0.721 - 0.979)	(0.880 - 1.204)
Single, Children	1.027					0.775*	0.821
	(0.828 - 1.274)					(0.614 - 0.978)	(0.651 - 1.036)
Marital status (Ref: Single)							
Widowed/separated/divorced		0.863*					
		(0.753 - 0.989)					
Married or cohabitating		0.741***					
		(0.662 - 0.829)					
# of children in HH (Ref: 0)							
1			1.210**				
			(1.051 - 1.394)				
2			1.007				
			(0.863 - 1.175)				
3 or more			1.327**				
			(1.114 - 1.581)				
# of people in the HH (Ref: 1)							
2				0.848*			
				(0.746 - 0.965)			
3				1.016			
				(0.874 - 1.181)			

4				0.926			
				(0.795 - 1.079)			
5 or more				1.055			
				(0.908 - 1.227)			
Family Size: incl out of HH (Ref: 1)							
2					0.609***		
					(0.544 - 0.683)		
3					0.829*		
					(0.694 - 0.990)		
4					0.812*		
					(0.680 - 0.970)		
5 or more					1.064		
					(0.865 - 1.309)		
Constant	0.173***	0.179***	0.140***	0.155***	0.178***	0.179***	0.0933***
	(0.162 - 0.185)	(0.164 - 0.196)	(0.132 - 0.148)	(0.140 - 0.171)	(0.166 - 0.190)	(0.143 - 0.225)	(0.0664 - 0.131)
Observations	42,330	42,330	42,329	42,330	42,330	42,330	42,330

CI Eform in parentheses, *** p<0.001, ** p<0.01, * p<0.05. Source: CHIS 2017, 2018 pooled. Weighted Logistic Regression. Models 6 and 7 control for age, education, race/ethnicity, sex, rural location. Model 7 also controls for healthcare need index, insurance, usual source of care, county indigent care programs for undocumented immigrants. LPR= lawful permanent resident.

Chapter 5 : Discussion

This dissertation examined how migration is associated with health services in contexts that send a high number of migrants and a major migrant destination. Regularizing migration, reducing disparities for migrant families, and more fully understanding the risks and benefits of migration are key parts of the global development agenda as explicitly outlined in the Global Compact for Migration and the Sustainable Development Goals (SDGs) (Solomon and Sheldon 2018; United Nations 2015). Despite significant growth in migration and the economic contributions of migrant remittances to the global economy, as well as the global attention to migration in the last decade, (United Nations 2019; World Bank 2019a; World Bank 2019b) substantial gaps remain in our understanding of the impacts of migration for the health of migrants, their families, and communities (Wickramage et al. 2018). Measurement of migration in major health surveys remains limited leaving researchers and policy-makers to rely on imperfect measures and incomplete evidence.

Accordingly, this dissertation worked to fill gaps in our understanding of how the effects of migration extend through families and impact healthcare decisions, access, and expenditures in different contexts. This program of research did this through answering three research questions:

1. Is spousal migration associated with barriers to access and healthcare utilization for women and children in high out-migration contexts in South and Southeast Asia?

2. Does international migration influence household healthcare expenditures for the left-behind, and are migrant remittances associated with reduced incidence of catastrophic health expenditures?

3. How do immigration factors and family structure affect health services decision-making for immigrants and non-immigrants in the US?

Summary of Findings

The first study of the dissertation (Chapter 2) evaluated the impact of male spousal migration on the healthcare use and access for left-behind women and children using a quantitative cross-country comparison of four countries in South and Southeast Asia. There is limited research on the impact of out-migration on sending communities and particularly the use of health services in those communities, and this study offers some of the first multi-country evidence on this aspect of the migration and health relationship. Results showed that male spousal migration was positively associated with barriers to healthcare use across Bangladesh, Indonesia, Nepal, and the Philippines through a reduction in both economic and social (gender-related) barriers to care - adding new evidence to the literature showing that migration can contribute to the health and wellbeing of those left-behind (Atake 2018; Hadi 2001; Lopez-Cevallos and Chi 2012; Lu 2013). However, migration was not associated with increased utilization of postpartum care in any context, or child healthcare except in the Philippines. In evaluating how spousal migration impacted women's and children's healthcare access and use across a variety of contexts, results demonstrated that the same general patterns persisted across countries with migration having positive associations with healthcare access. We saw the largest magnitude, as well as the broadest range of effects in Indonesia, the country that had some of the best access to begin with. This

demonstrates that the effects of migration are not uniform and can perhaps have the greatest impact on improving access in locations where the health system has already made greater progress toward Universal Health Coverage (UHC) (Pisani et al. 2016).

The second study of the dissertation (Chapter 3) contributed to more direct measurement of UHC progress by examining healthcare expenditures in the context of high out-migration (Sparkes et al. 2019). This study measured receipt of international migrant remittances and healthcare expenditures to show how this important source of income for families and for the economy of the Philippines related to spending on healthcare. We also tested whether remittances were associated with catastrophic health expenditures. We found that remittance receiving households spent significantly more on healthcare than non-remittance receiving households. This association did not just represent an absolute increase in spending. As the proportion of household income from remittances increased, the proportion of spending that went toward healthcare also increased. Confirming the literature on remittance use that shows that migrant households use remittances for basic consumption and investment in human capital (health and education), we find that families were using remittances to purchase healthcare and health related products such as medicines (Koc and Onan 2004; Mishra et al. 2022; Page and Plaza 2006; Taghizadeh-Hesary et al. 2020; World Bank 2019b). Remittances did not provide financial protection against catastrophic health expenditures (CHE) and a significantly higher proportion of migrant households experienced CHE compared to non-migrant households.

Chapter 4 of the dissertation (Study 3) examined the role of family structures and immigration factors in health services decision-making. This study found that immigrants had a higher probability of seeking healthcare when they needed it compared to their US born counterparts who delayed or forewent needed care at higher rates. Married individuals, and

particularly those who were married but did not have children, had the lowest probability of forgoing necessary care. In evaluating the interaction between these two components: family structure and immigration, the effect of various family structures differed by immigration status. For example, for temporary and undocumented immigrants being a single parent was associated with a lower probability of deciding to forgo necessary healthcare while being a single parent was associated with higher probabilities of forgoing healthcare for citizens (natural born and naturalized). This suggests that transnational relationships may be having a positive influence in healthcare utilization for immigrants in their destination country. Providing new insight into the factors that influence healthcare use, this study highlights the importance of considering diverse family structures when working to improve equity in access to care across different immigrant and non-immigrant groups.

Cross-cutting Findings from Dissertation

The three papers of this dissertation expand our understanding of the relationship between migration and health services. Healthcare access is complex, incorporating both supply and demand side components (Aday and Andersen 1974; Andersen 1995). In this dissertation, access to health services was examined along multiple intersecting components: family and social support, language, affordability, geographic proximity, and resources available to pay for care (Derose et al. 2011; Pitkin Derose et al. 2009; Yang and Hwang 2016). We also evaluated the effects of migration through the interaction of individual and relational determinants to equity in health services – gender-based barriers to care, wealth, immigration status, and family structure. The findings presented here highlight three main themes:

1. Migration can be good for healthcare access in both sending and receiving contexts. Accordingly, health systems need to better account for migration and leverage some of these benefits to improve health equity and achieve UHC.

2. Migration is a family process. Individualized models and measurement make it difficult to capture the full scope of migration's impact on health.

3. The migration and health services relationships are not universal. The context and performance of the health system are key components in how migration impacts health and healthcare.

Leveraging the benefits of migration for health

Women left behind by migrant spouses have reduced financial and social barriers to care (Study 1). Migrant families who receive remittances have more resources to spend on health and have significantly higher health expenditures relative to non-migrant families (Study 2). Immigrants in the US prioritize their own health and are less likely to forgo healthcare when they need it compared to their US born counterparts (Study 3). While results were not uniform across different contexts and family structures, this dissertation provides evidence that in many cases, migration can be good for healthcare access and utilization, both for those who migrate and the families they leave behind. As health systems try to move toward UHC and ensuring that everyone has access to and can afford quality healthcare, it is important for policies and programs to fully consider the context within which the health systems operate and the dynamics of the patient population they seek to serve. Considering how migration impacts the health system in a particular

area can inform policies and programs designed to achieve UHC. For example, a health system may face migration related changes in their patient population if a large proportion of the working-age population is traveling overseas and leaving families behind. These families may have access to incoming remittances that boost local income and can be used for health spending, but may also be facing challenges related to accompaniment or travel to appointments. In migrant destinations, there may be increased incentives to access healthcare for immigrants who need to remain healthy to work and maintain visa status or support families at home and abroad, but these patients may also face challenges related to language access, insurance eligibility, and time off for accessing care.   Health systems can respond to the benefits and challenges of migration, through understanding the migration related characteristics of their patient population and helping migrants to leverage the financial benefits of migration into better health for themselves and their families.

Migration is relational

Theories of migration decision-making have incorporated the family as a foundational unit in the migration process (Massey 1990; Stark and Bloom 1985), but in examining migration's impact on health, research has tended to use individual models to explain issues of healthcare access and utilization (Loganathan et al. 2019; Ortega et al. 2007). More recently, migration is becoming part of social and structural determinants of health analyses, but again, this work tends to focus in on the individual migrants and how their migration impacts their health and healthcare access (Castañeda et al. 2015; Davidson et al. 2004; Sudhinaraset et al. 2020a; Wallace et al. 2019; Yang and Hwang 2016). The studies in this dissertation used a feminist relational lens instead, which opened up the analysis to the broader family unit and considered the individual's health and healthcare in the context of their family.   Additionally, each study explicitly incorporated

measurement of relational characteristics into the analysis. In Study 3 (Chapter 4), one of the main independent variables was a measure of family structure and results indicated that important interactions between immigration characteristics and family structure exist. Studies 1 and 2 (Chapters 2 and 3), examined how transnational relationships impact healthcare use and spending through testing the impacts of male spousal migration and receipt of international remittances.

The results from these relational analyses highlight the complexity and nuance of migration's health impacts. While patterns as a whole showed that migration can have a positive impact on health services access for immigrants and their families, the effects vary by family structure in both sending and receiving contexts, and remittance induced increased spending on health put migrant households at higher risk for CHE. This confirms finding from two studies that formed the foundation of this dissertation (West et al. 2022; West et al. 2021a; West et al. 2021c), and shows that analyzing the migration and health relationship without the inclusion of the family risks misattribution of migration effects and mechanisms.

The importance of family and family structure in determining health services related outcomes should be a key consideration in health and social policy. For example, policies like Public Charge that link family members' use of social programs to immigration eligibility for other family members can have generationally cascading negative impacts on health and well-being. On the other hand, the importance of family can be leveraged to improve access and utilization. Immigrant families with children were less likely to forgo needed healthcare pointing to potential increased health system literacy and commitments to preventive health for parents. Children's health insurance and educational programs can be entry points for health and health system learning.

While there are some broad cross-cutting findings from the three diverse studies of this dissertation, it is important to consider the local context as the migration and health services relationships are not universal. The context and performance of the health system are key components in how migration impacts health and healthcare. For the health systems to leverage the benefits of migration to improve the health of their patient population, they must consider these important context specific recommendations that arise from each of the three studies:

- Study 1 compared four different out-migration contexts in Asia and found that migration can have a greater impact in settings where the health system is already further advanced in terms of providing universal health coverage, such as Indonesia. In places with the most access challenges, such as Nepal, we see some of the smallest migration related improvements even with some of the highest proportion of migrants in the region. The positive impacts of migration on sending communities may be able to help achieve some of the "last mile" effects when working toward UHC. The benefits of migration in terms of increased financial resources for health and potential increases in women's status or autonomy make the greatest difference for health where the health system is already working to reduce economic and social barriers to care. Health systems can potentially accelerate their efforts toward UHC in high out migration contexts if they leverage migration benefits through a focus on reduction on gender and economic barriers to care.

- Study 2 found that migrant remittances significantly increased spending on health in absolute and proportional measures in the Philippines. Remittance receiving households were also significantly more likely to experience catastrophic health expenditures (CHE)

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compared to non-remittance receiving households. As the Philippines continues to invest in UHC and decentralization of the health system, financial protection should continue to be a top priority. Costs for inpatient care and medicines should be prioritized because of the high rates of CHE associated with inpatient care expenditures and because almost all households had some expenditures associated with medical products. The Philippines health system also has incentives to help lead efforts to regulate international financial transfers to help ensure that migrant families are receiving a greater proportion of remittances instead of paying exorbitant amounts in fees and exchange rates.

- Study 3 in the major migrant destination of the state of California in the US points to the importance of looking at healthcare access and utilization across a broad range of factors. For example, disparities in some components such as rates of insurance or having a usual source of care did not negatively impact certain forms of healthcare decision making. With immigrant populations, we do not always see traditional pathways of socioeconomic and healthcare access predictors and healthcare decisions and use. Additionally, this study highlighted how social and relational factors such as family size and type can impact various immigrant groups and non-immigrants differently. Traditional social determinants of health analyses would miss these important distinctions. In looking to connect social policy and health policy to improve access, the unique family structures of immigrants should be considered, and immigrant groups should not be treated as a monolith.

Future Research

These studies highlight several areas for future research. First, there is a need for additional research on healthcare utilization patterns, as much is still unknown about the trade-offs

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individuals make when deciding whether to seek care, and how these tradeoffs may differ by the type, need, and cost of care. For example, do relational and migration characteristics have different effects on seeking care for injuries and illnesses compared to preventative or routine care? How does perception of need vary, and does it impact utilization – overall use, facility type, timing of care, amount paid for care? Future studies should also consider how specific healthcare costs are covered (insurance, loans, cash etc.), and expenditures should be interpreted together (Bredenkamp and Buisman 2016). Clearer measures of insurance and how expenditures are covered would allow for more precise measures of out-of-pocket spending. Studies that can link expenditures to specific household members and utilizations would help in understanding concentrations of expenditures and how financial protection can be better applied to reduce CHE. This will provide greater insight into how migrant and non-migrant households navigate financial protection when seeking care and also point to key areas for intervention to reduce CHE.

Second, research is needed to better understand access to quality care. Expanding on research about utilization patterns, studies should incorporate measures of care quality to understand the degree to which migration induced increased access, increased utilization, and/or increased spending are associated with increased quality of care. To examine whether the increased spending and use of private facilities is associated with receipt of better quality care or improved health outcomes, further research could exploit data on chronic conditions and facility profiles available in data such as the Demographic and Health Surveys similar to the approach taken by Macinko et al. in Brazil (Macinko et al. 2022). Another way to examine quality would be to look at the degree to which the care provided is patient-centered (Hasnain-Wynia and Baker 2006; Hunt and de Voogd 2005; Mohammed et al. 2016). For migrants specifically, this could incorporate measures of language access and culturally competent care. For families left-behind by migration, this could

look at issues of accompaniment and joint decision-making. In both cases, telehealth and related technologies could play a role in allowing family/spousal participation from different locations.

This dissertation also raised important issues of measurement as well as theoretical and methodological approaches that should be considered in future migration and health research. Regardless of migration's documented impact on health and the evidence supporting its incorporation as a social determinant of health (Castañeda et al. 2015; Wallace et al. 2019; West et al. 2021b; Zimmerman et al. 2011), most health surveys have imperfect, if any measure of migration. Researchers should include direct and specific measurement of migration in each family and household in health surveys. Interdisciplinary research that brings in sociological and political theories such as relational ethics and social role theory can help guide studies to improve incorporation of social and relational determinants of health such as migration and family. Given that health surveys typically include family or household rosters and many questions regarding a variety of social determinants, the addition of a few questions about the location of family members when collecting the household roster, would be an appropriate addition. Roster inclusion of family members who are currently out of the household due to migration would allow for direct measurement of transnational relationships. Qualitative work is also well positioned to capture complex processes like health decision making and to understand the nuance of how migrants incorporate transnational relationships into their daily decisions about health and wellbeing.

Finally, there is a need for further research that directly addresses the role of gender in the relationship between migration and health. This is a gap in studies of both contexts – sending and receiving. Research has established that migration is a gendered process (Curran et al. 2006; Llácer et al. 2007; Nawyn 2010), but most studies fail to directly address the role of gender. In addition to the measurement and methodological benefits of an interdisciplinary approach to migration

mentioned above, this kind of approach also opens up space for considering the role of broad sociopolitical influences such as gender. The third study of this dissertation pointed to sex differences in healthcare decision-making; differences that also interacted with family structure. The first study focused on women and highlighted important gender-based barriers to healthcare access and how migration can potentially play a role in reducing or exacerbating some of these barriers. Due to the dynamic and evolving nature of migration, a more comprehensive approach to addressing the role of gendered family relations and migration processes is essential. This study shows there is a need for further research on the gendered dynamics of migration and health.

Conclusion

Findings from this dissertation provide new empirical evidence on the intersection between the migration and health systems. We tested the effects of these systems in the everyday lives of migrants and their families in both sending and receiving contexts and in five different countries. We used an interdisciplinary approach, which is underutilized in health services research. This approach made the work uniquely positioned to capture complex multi-step processes such as healthcare decision-making, or use of remittances by bringing in theories, methods and expertise from health services, sociology, political theory, and psychology. Results show significant links between the two systems and that relational frameworks can help capture some of the nuance of the complicated migration and health relationship.

In addition to contributing to scientific literature the studies in this dissertation are also relevant to global development and governance institutions. For example, this work answers call in the SDGs to explicitly incorporate evidence disaggregated by migration status to disparities across social determinants and links to the Global Compact on Migration and the WHO UCH

Framework (Solomon and Sheldon 2018; The World Bank 2020). Substantial improvements in healthcare access and financial protection are possible if global, national, and local systems leverage some of migration's benefits for health while simultaneously advancing policies and programs to improve equity and reduce disparities.

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