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**EVALUATING THE ABILITY OF CONDITIONAL CASH TRANSFER TO PROMOTE
HUMAN CAPITAL THROUGH THE PROTECTION OF HEALTH**

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A Dissertation Submitted to the Faculty of
The Harvard T.H. Chan School of Public Health
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Science
in the Department of Social and Behavioral Sciences

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Evaluating the ability of conditional cash transfers to promote human capital through the protection of health

ABSTRACT

Conditional cash transfer programs have diffused rapidly across the world since the mid-1990s and have been adopted as a poverty-reduction tool in the majority of Latin American countries. This dissertation focuses specially on the Colombian conditional cash transfer program, *Familias en Acción*, and examines the relationship between social welfare policy and health in the Colombian context. The work is divided into three separate papers.

Paper 1 assesses the impact of *Familias en Acción* on adult health outcomes that capture disruptions in daily life due to health conditions. The analysis utilizes data collected by the Colombian National Department of Planning for program evaluation purposes and employs a differences-in-differences approach specifying mixed effects logistic models to examine the impact of the program on impairment, bedridden status, and hospitalization among individuals 18 years of age and older.

Paper 2 explores the impact of *Familias en Acción* on mortality assessing the possibility of differential impacts by age group and cause of death. The work pools program evaluation data with vital statistics and census data to create a dataset of municipal population, municipal death, and municipal exposure to the anti-poverty program. The analysis uses a differences-in-differences approach specifying mixed effects negative binomial regression models.

Paper 3 is a qualitative political economy project and draws from both primary as well as secondary data. *Familias en Acción* was modeled after the Mexican conditional cash transfer program, and the two programs are nearly identical in terms of programmatic components with

one major exception which is in the area of health programming. The Mexican program is more comprehensive in the area of health, targeting all ages and offering a more comprehensive package of health services. The work examines the political and economic reasons that led to the adaptation of the Mexican conditional cash transfer program in the Colombian context.

TABLE OF CONTENTS

ABSTRACT	ii
LIST OF FIGURES	vi
LIST OF TABLES	vii
ACKNOWLEDGEMENTS	ix
PAPER 1	
Impact of the Colombian conditional cash transfer program <i>Familias en Acción</i> on the health of adult men and women	1
Abstract.....	2
Introduction.....	3
Methods.....	5
Results.....	11
Discussion.....	18
Supplemental Material.....	25
Endnotes.....	31
References.....	36
PAPER 2	
Spillover effects of the Colombian conditional cash transfer program <i>Familias en Acción</i> on municipal mortality	38
Abstract.....	39
Introduction.....	41
Methods.....	44
Results.....	49
Discussion.....	54
Supplemental Material.....	60
References.....	62

PAPER 3

The political economy of health protection in conditional cash transfer programs64

Abstract.....65

Background.....66

Conceptual Framework.....76

Methods.....79

Results.....80

Discussion.....96

Conclusion.....99

Supplemental Material.....100

References.....106

LIST OF FIGURES

- FIGURE 1.1** **Participant flow diagram**
- FIGURE 2.1** **Age and sex adjusted mortality rates before and after the CCT program implementation by treatment assignment and year.**
- SUPPLEMENTAL** **Decision tree for Weyland’s four theoretical explanations for policy**
FIGURE 3.1 **diffusion.**

LIST OF TABLES

TABLE 1.1	Baseline demographic characteristics by treatment assignment.
TABLE 1.2	Difference-in-differences estimates for logistic models: Change in self-reported health among municipalities exposed to <i>Familias en Acción</i> compared to their control counterparts.
TABLE 1.3	Difference-in-differences estimates for logistic models: Change in self-reported health by age and sex.
SUPPLEMENTAL TABLE 1.1	Change in average household subsidy and income by treatment group, 2002-2006.
SUPPLEMENTAL TABLE 1.2	Descriptive statistics by sex group, for treatment subjects (TSP) who completed the baseline survey prior to receipt of the cash transfers ($n=83$ municipalities).
SUPPLEMENTAL TABLE 1.3	Interaction of difference-in-differences estimates with sex variable, for treatment subjects (TSP) who completed the baseline survey prior to receipt of the cash transfers ($n=83$ municipalities).
SUPPLEMENTAL TABLE 1.4	Descriptive statistics by age group, including all (TSP & TCP) treatment subjects ($n=109$ municipalities).
SUPPLEMENTAL TABLE 1.5	Descriptive statistics by age group, comparing municipalities receiving treatment after (TSP) and before (TCP) the baseline survey ($n= 57$ municipalities).
SUPPLEMENTAL TABLE 1.6	Difference-in-differences estimates for logistic models including all treatment subjects: Change in self-reported health among treatment and control municipalities ($n=109$ municipalities).
SUPPLEMENTAL TABLE 1.7	Difference-in-differences estimates for logistic models including all treatment subjects: Change in self-reported health by age and sex ($n=109$ municipalities).
SUPPLEMENTAL TABLE 1.8	Location of birth among women reporting having birthed a child in the 12 months prior to the survey by treatment group and time.
SUPPLEMENTAL TABLE 1.9	Proportion of women reporting hospitalization among women reporting having birthed a child in the past 12 months at a hospital, clinic, or health center by treatment group and time.

SUPPLEMENTAL TABLE 1.10	Average number of hours worked over time among those who reported working at least one hour weekly on average, by treatment group and sex ($n=6,603$).
TABLE 2.1	Baseline municipal characteristics.
TABLE 2.2	Difference-in-differences estimates for multilevel negative binomial models: Change in mortality among municipalities exposed to <i>Familias en Acción</i> compared to their control counterparts, stratified by age group.
SUPPLEMENTAL TABLE 2.1	Difference-in-differences estimates for multilevel Poisson and negative binomial models, and likelihood-ratio test comparison of the Poisson model nested in the negative binomial model.
SUPPLEMENTAL TABLE 2.2	Difference-in-differences estimates for multilevel negative binomial models: Change in mortality for specific causes of death among municipalities exposed to <i>Familias en Acción</i> compared to their control counterparts, stratified by age group.
TABLE 3.1	Health conditionalities by age group within Latin American CCT programs.
TABLE 3.2	Cross-country comparison of economic, social, and health indicators.
TABLE 3.3	Health conditionalities of CCT programs by age and country.
TABLE 3.4	Colombian health insurance coverage and barriers to health care services by socioeconomic status (1997 and 2010).
SUPPLEMENTAL TABLE 3.1	Mexican conditional cash transfer associated packet of basic health services
SUPPLEMENTAL TABLE 3.2	Colombia's mandatory health care compliance program: Prevention and promotion activities.

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Esther Velásquez
Boston, MA
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PAPER 1

**Impact of the Colombian conditional cash transfer program *Familias en Acción*
on the health of adult men and women**

ABSTRACT

OBJECTIVES: The Colombian conditional cash transfer program (CCT) was implemented in 2002. We sought to determine if the CCT program had benefits for adult health in the treated municipalities after 4 years of follow-up.

METHODS: Eligibility for the CCT program was assigned at the municipal level in a quasi-experimental study. Our sample comprised of 10,823 adults from 5,464 households, and 83 municipalities. Using prospective data from the Colombian Department of National Planning, we estimated the likelihood of impairment due to a health condition, bedridden status, and hospitalization using a differences-in-differences approach and specifying random-intercept multilevel logistic models.

RESULTS: Compared to those not eligible for the CCT program, adults in eligible households reported a statistically significant greater reduction in impairment (odds ratio [OR]=0.82; 95% confidence interval [CI], 0.71-0.95; $p=0.006$), bedridden status (OR=0.81; 95% CI, 0.68-0.97; $p=0.023$) and hospitalization (OR=0.69; 95% CI, 0.56-0.86; $p<0.001$). Sex differences were present for hospitalization; while eligible women experienced no statistically significant change, eligible men reported reductions in hospitalization as compared to their control counterparts (OR=0.69; 95% CI, 0.56-0.85; $p<0.001$).

CONCLUSIONS: Despite the lack of health conditionalities and program services directly targeting adults in the Colombian CCT program, eligibility was associated with reductions in self-reported health outcomes reflecting disruptions in the ability to perform daily activities.

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INTRODUCTION

Since the introduction of conditional cash transfer (CCT) programs in Mexico in the late 1990s, more than half of Latin American nations have adopted this new model of poverty reduction.¹ Colombia launched *Familias en Acción* in 2002; during the first six years of operation, the CCT program targeted rural and displaced populations serving 848 municipalities and 700,000 families.² Subsequently, Colombia has expanded *Familias en Acción* to cover more rural municipalities, indigenous communities, and urban areas. At its 10-year review, the CCT program covered 25% of the country, 55% of the nation's poor, and 70% of eligible families.²

Despite the national scale up of the Colombian CCT program and changes in eligibility criteria to include households with higher incomes, little is known about the impact of *Familias en Acción* on the health outcomes of adults residing in households receiving program benefits. Impact evaluations examining health have largely focused on pediatric health outcomes and to a lesser extent maternal health outcomes.^{2,3} To our knowledge, there is a single study exploring the impact of *Familias en Acción* on adult health. Forde *et al.* (2012) identified a deleterious impact of *Familias en Acción* on the health of adult women; their findings showed that program participation was associated with an increased BMI and an increased odds of obesity among women 18 years of age and older as compared to their control counterparts.⁴

Outside the Colombian context, numerous studies have explored the relationship between CCT programs and adult health, particularly in Mexico. The Mexican CCT program has been associated with lower average BMI, a lower prevalence of obesity, a lower prevalence of uncontrolled hypertension, and greater ability to walk without tiring among adults <65 years.^{5,6} Further, studies evaluating the impact of the Mexican CCT program on adult health have demonstrated differences by sex as well as age. Behrman and Parker (2013) found that women

aged 50 years and older enrolled in the Mexican CCT program had a lower likelihood to report sick days, impairment, or hypertension and had a greater likelihood to report ability to engage in vigorous physical activity and to be working for an income as compared to a control group not receiving the CCT.⁷ The Mexican CCT program had beneficial impacts on men aged 50 years and older as well but there were fewer statistically significant associations: men were more likely to have attended a health clinic in the past year, more likely to work for an income, and less likely to report diabetes.⁷ Additional, benefits of CCT program exposure for older adults in the Mexican context include a reduction in all-cause mortality as well as a 7.0% increase in influenza, pneumococcal, and tetanus vaccinations.^{8,9}

Existing literature for the impact of the Colombian CCT program on adult health is minimal and suggests a detrimental association on BMI among women. While investigations exploring the health effects of a CCT program in Mexico largely suggest a beneficial impact for adults, country differences, including program differences in particular, could produce differential findings in the Colombian context. For example, the Mexican program includes health conditionalities that target adults directly as well as a program orientation that seeks to promote health service use and self-care among all family members; these programmatic components are not mirrored in the Colombian CCT program.^{2,10-12} The present study prospectively investigated whether exposure to the Colombian CCT program, *Familias en Acción*, predicted a reduction in illness and ailments among women and men aged 18 years and older.

METHODS

Program Design

Familias en Acción is designed to promote human capital investment through education, and to bolster this investment through the protection of health via the provision of health services and nutritional support. The program offers two cash transfers linked to conditionalities. Families complete the specified behaviors in order to receive program benefits, which include a nutritional supplement of 40,000^a Colombian pesos (~US\$13.14) per month for families with children younger than 7 years of age. This benefit linked to three conditions: children < 7 years must attend growth and development check-ups, children < 7 years must receive immunizations, and mothers must attend bimonthly health educational workshops.^b Families with children 7-17 years of age receive 14,000 pesos (~US\$4.60) for each child enrolled in elementary school [2nd grade to 5th grade] and 28,000 pesos (~US\$9.20) for each child in secondary school, so long as the child does not exceed 8 unexcused absences in a two-month period.^{2,11} In 2002 and using the sample described below, subsidies constituted 14.8% of the household incomes for households receiving *Familias en Acción* cash transfers, rising to 18.4% by 2006 (Supplemental Table 1.1). At the start of *Familias en Acción*, households receiving the cash benefit reported an average household income excluding subsidies that was 87,232 pesos (~US\$29.84) lower than that of control households. By 2006, households receiving cash transfers continued to report lower average household incomes; however, when subsidies were included, households receiving the cash benefit reported an average household income that was 616 pesos (~US\$0.21) higher than that of control households.

^a The subsidy amounts reflect 2002 values in Colombian pesos. The USD conversion reflects August 2016 exchange rates. Subsidy amounts have increased over time with inflation.

^b The growth and development schedule is determined by the Colombian Ministry of Health and Social Protection through Resolution 412 of 2000. The frequency and content of visits is age dependent.

Sample

Study participants were part of the *Familias en Acción* program evaluation conducted by the Colombian National Department of Planning and Institute for Fiscal Studies which assessed economic, educational, and health outcomes for children and adults residing in program-eligible households. Baseline data were collected between June 20 and October 31, 2002. First follow-up data were collected between July 28 and November 20, 2003, and second follow-up data were collected between November 16, 2005 and April 15, 2006. In the present analysis, we included individuals aged 18 years or older who reported health outcome data in the baseline survey.

Sampling Procedure and Study Design

Familias en Acción was implemented at the municipal level. Inclusion criteria for treatment municipalities included a population of less than 100,000 inhabitants, an adequate health and education infrastructure, presence of a local bank, and cooperation from the municipal authorities (as indicated by municipal registration and the necessary documentation, including a list of SISBEN I^c residents). Municipalities that were the capital of the department were excluded. Thus, treatment municipalities were not randomly assigned. Household eligibility for participation in *Familias en Acción* included the following criteria: (1) residence in an eligible municipality; (2) registration as SISBEN I prior to December 31, 1999; and (3) presence of children younger than 18 years in the household.^d

Familias en Acción was initially implemented in 832 municipalities nationwide.^e

Compared with the nation as a whole, this target population had greater levels of poverty (69.2%

^c The Selection and Identification System for Social Program Beneficiaries (SISBEN) generates an indicator of economic well-being for households corresponding to one of six levels and is calculated using a proxy means test which is based on multiple socioeconomic variables.¹³

^d Note that household eligibility to receive *Familias en Acción* benefits has changed since the creation of the program, and eligibility requirements listed here reflect program guidelines during the study period.

^e Of the 1,024 municipalities in Colombia, these met initial criteria for participation in the program.

with unmet basic needs at the start of the program vs. 22.9% nationwide)^f and larger household sizes (6.9 vs. 5.2 persons).¹⁴ Primary sampling units (PSUs) were defined as municipalities with at least 226 eligible households; municipalities with fewer eligible households were joined with adjacent municipalities. The 639 PSUs (464 treatment and 175 control) were then categorized into one of 25 strata based on the following characteristics: geographical region, proportion of residents in urban areas, quality of life index,^g population size, and health and educational service infrastructure. Two treatment municipalities were randomly selected from each stratum with a probability of selection proportional to the population of the municipality. Then, a control municipality was matched to the selected treatment municipality based on population and the quality of life index.¹¹ Thus, there were 50 treatment PSUs and 50 control PSUs included in the survey sample. The selected sample included 15,718 households eligible to participate in *Familias en Acción*; of these households, 11,623 (73.9%) were surveyed. At baseline, 2,786 out of 3,215 (86.7%) eligible households in eligible municipalities were enrolled in *Familias en Acción*.

Twenty-six of the treatment municipalities began receiving program benefits prior to administration of the baseline survey. Program eligible families residing in municipalities where the program had been implemented prior to the baseline survey were excluded from the primary analysis; program impact for this group was assessed in sensitivity analyses. In addition, households in 13 control municipalities began receiving cash transfers during follow-up; because

^f *Familias en Acción* originally targeted rural municipalities, and thus rural municipalities are over-represented in the program evaluation sample. There are large inequalities in poverty between urban and rural areas in Colombia; unmet basic needs was 53.4% in rural areas and 19.6% in urban areas using 2003 and 2008 Quality of Life Survey data.

^g The quality of life index considers access to services, housing, actual and potential human capital, educational level of the head of household, educational level of individuals aged 12 years and older in the household, school attendance, size and household composition, overcrowding, and proportion of children less than 6 years of age.²

it is unknown if the reason for contamination is associated with the observed health outcomes, these contaminated municipalities were also excluded from the primary analysis. Here we refer to the municipalities included in the primary analysis as the *sample municipalities*.

Variable Definitions

The control group consisted of households eligible to receive *Familias en Acción* benefits but who resided in ineligible municipalities while the treatment group consisted of households eligible to receive *Familias en Acción* benefits who resided in eligible municipalities. Individual-level baseline covariates included in the statistical models were self-reported and included age (centered around the mean), sex, income earner status, and marital status. Household-level baseline covariates were reported by the individual surveyed for the household module, generally the mother of children <18 years of age in the household who received the cash transfers. These covariates included household assets including a refrigerator, a television, a bicycle, and a motorcycle; household utilities including electricity, water, sewage, and garbage; household construction materials including wall durability and roof durability; whether the home was owned by the family; and the number of individuals residing in the home. Municipal-level baseline characteristics were determined through interviews with the municipal mayor and included the following variables: geographic region, urban-rural classification, municipal population, presence of a hospital, presence of a health center, number of health posts, and number of banks.

Using self-reported health data collected during the program evaluation surveys, we assessed health outcomes through three binary variables that reflected disruptions in the ability to perform daily activities (such as attending work, caring for children, or completing chores).

Impairment is defined as inability to perform daily activities in the last 15 days due to a health

problem. *Bedridden* was defined as being confined to a bed in the last 15 days due to a health problem, and *hospitalization* was defined as having been hospitalized in the last 12 months.

Statistical Analysis

Because treatment assignment was not randomized, differences in outcomes across treatment and control municipalities at follow-up could be due to pre-baseline systematic differences between the municipalities rather than the intervention itself. Due to the non-random treatment assignment, it is possible that there were unobserved differences at baseline which we cannot adjust for in the analysis. Thus, rather than comparing follow-up values between the treatment and control groups, we utilized a difference-in-differences approach which compares the change in the outcome from baseline to the second follow-up across the two treatment groups. We performed all analyses using Stata/SE version 14.1.¹⁵

The primary assumption of the difference-in-differences approach, known as the common trends assumption, holds that the trajectory of the outcome during follow-up would have been the same for the treatment and control municipalities had *Familias en Acción* not been implemented. This counterfactual cannot be observed in practice, but the assumption can be examined by observing trends in the outcome prior to the implementation of the program. If trends in the outcome appear to be consistent across treatment groups over time and prior to the intervention, the assumption is supported. Because values for the health outcomes assessed in the *Familias en Acción* evaluation were not available at the municipal level prior to the implementation of the program, we assessed trends in municipal mortality to evaluate overall trends in health. We modeled municipal mortality from 1992 to 2001 for treatment and control municipalities with a multivariate Poisson regression model using the *meqrpoisson* command, adjusting for age and sex and specifying the logarithm of person-years as the offset. We specified

a random coefficient to allow the impact of the intervention to vary across municipalities. If the common trends analysis assumption holds, we would expect no statistically significant differences mortality trends across treatment groups in non-intervention years. We therefore examined whether trends differed when comparing groups before and after the following years: 1994, 1997, and 2001.

For the primary analysis we performed an intention-to-treat analysis comparing program-eligible households in treatment municipalities to program-eligible households in control municipalities. We generated model estimates using the *melogit* command, specifying random-intercept multilevel logistic models using the following equation:

$$\begin{aligned} \text{logit}(\pi_{ijk}) &= \log\left(\frac{\pi_{ijk}}{1 - \pi_{ijk}}\right) \\ &= \alpha_0 + \alpha_1 \text{txt}_k + \alpha_2 \text{time}_{ijk} + \alpha_3 \text{txt}_k * \text{time}_{ijk} + \alpha_4 X_{4k} + \alpha_5 X_{5jk} + \alpha_6 X_{6ijk} + \nu_{0k} + \mu_{0jk} + e_{0ijk} \end{aligned}$$

In the model displayed above, subscripts i, j , and k are identifiers at the individual, household, and municipal levels, respectively. The constant, α_0 , takes a value of 1 for each adult. The treatment effect, txt , is equal to 1 if the individual resided in a treatment municipality and 0 for residence in a control municipality.

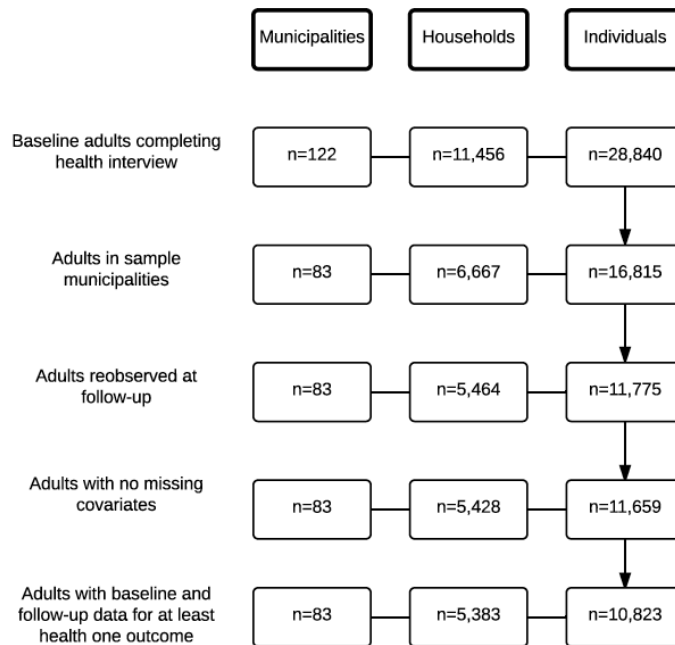
Further, we denote time equal to 1 for the second follow-up survey and 0 for the baseline survey. Vectors of covariates at the municipal, household, and individual levels are indicated by α_4 , α_5 , and α_6 while random effects at the three levels are referenced as ν_{0k} , μ_{0jk} , and e_{0ijk} . The interaction term of time and treatment (α_3) is the causal parameter of interest, and represents the difference in the change in the self-reported health outcome between treatment groups across time, which we reported as an odds ratio.

This study was reviewed by the Institutional Review Board of the Harvard T.H. Chan School of Public Health; who determined that the protocol met criteria for exemption per the Code of Federal Regulations [45 CFR 46.101(b)(2)].

RESULTS

At the 2002 baseline survey, 16,815 adults aged 18 years and older on the household rosters reported health information; of these adults captured at baseline, 11,775 (70.0%) reported health information at follow-up. In the final sample, there were 5,112 intervention-group adults from 2,574 households and 31 municipalities along with 5,711 control-group adults from 2,809 households and 52 municipalities. Figure 1.1 shows a flow diagram of participation in the study and sample inclusion.

Figure 1.1 Participant flow diagram



The individuals lost to follow-up were younger than those observed at the second follow-up (36.5 vs. 39.0 years old). The attrited group was mostly male (59%) and employed (68%),

compared to 48% male and 62% employed in the non-attrited group. Individuals observed at the second follow-up were also more likely to be married or in a free union (73%) compared to those lost to follow-up (54%). There were no differences in the distribution of individuals lost to follow-up across the treatment groups (30% of controls and 30% of those treated). One-hundred and sixteen individuals (<1% of the sample) were missing at least one covariate value and excluded from the final sample.

Table 1.1 displays the baseline sociodemographic characteristics of the participants, their households, and municipalities. Across individual-level covariates the treatment and control groups were similar. The average age was 39 years in both groups and there were slightly more males than females, 54% in the treatment group and 53% in the control group. The majority of adults were employed with slightly more control group subjects working for pay (61%) than treatment group subjects (57%). Approximately 76% of subjects in both treatment groups are married or in a free union. At the household level, the average number of people living in the home is ~6.5 in both the treatment and control groups; however, there are differences between the treatment groups regarding assets, utilities, and home construction material. The treatment group was more likely than the control group to have access to household assets such as piped water, sewage collection, and a motorcycle. On the other hand, the control group was more likely to have access to other assets such as higher durability materials for floors, walls, and roof; electricity; garbage collection; and owning a television. The control group appears to have higher economic status. At the municipal level, the treatment group is more likely to be a rural municipality, 14.1% as compared to 5.4% in the control group. Additionally, treatment municipalities have greater health infrastructure; 87.4% have at least one hospital and 62.0%

have at least one health center as compared to 63.4% and 55.3% in control municipalities respectively.

Table 1.1 Baseline demographic characteristics by treatment assignment.

Characteristic	Treated (n=5,112) Mean (SD) or %	Control (n=5,711) Mean (SD) or %	t statistic or χ^2 (p value)
<i>Individual variables</i>			
Age	38.6 (12.9)	38.9 (13.2)	1.1 (0.261)
Female	54.0	52.6	2.1 (0.148)
Employed	57.3	60.7	13.0 (<0.001)
Marital status			7.4 (0.118)
Married	31.9	33.2	
Free union	43.6	42.4	
Separated/Divorced	6.5	5.7	
Widowed	3.8	3.6	
Single	14.2	15.2	
<i>Household variables</i>			
Family-owned home	69.9	64.8	31.8 (<0.001)
Dirt floor	41.3	38.0	12.2 (<0.001)
Low durability walls	55.2	51.5	14.4 (<0.001)
Low durability roof	19.2	13.3	71.4 (<0.001)
Electricity	84.5	91.7	147.9 (<0.001)
Piped water	65.9	65.9	0.002 (0.966)
Sewage connection	28.4	24.0	26.8 (<0.001)
Garbage collection	29.6	33.7	20.8 (<0.001)
Has refrigerator	26.7	33.8	62.8 (<0.001)
Has television	59.3	66.4	57.9 (<0.001)
Has bicycle	35.3	32.9	7.1 (0.008)
Has motorcycle	5.2	2.7	44.2 (<0.001)
Household size	6.5 (2.5)	6.3 (2.5)	-3.1 (0.002)
<i>Municipal variables</i>			
Urban-rural classification			327.6 (<0.001)
Municipal center	44.2	57.8	
Populated center	41.6	36.8	
Rural, dispersed	14.1	5.4	
Region			93.3 (<0.001)
Atlantic	40.4	41.0	
Eastern	17.3	23.4	
Central	27.7	25.2	
Pacific	14.7	10.4	
Municipality size			47.4 (<0.001)
<5,000 inhabitants	34.6	38.0	
5,000-14,000 inhabitants	31.7	34.4	

Characteristic	Treated (<i>n</i> =5,112) Mean (SD) or %	Control (<i>n</i> =5,711) Mean (SD) or %	<i>t</i> statistic or χ^2 (<i>p</i> value)
>14,000 inhabitants	33.7	27.7	
Number of hospitals			1000 (<0.001)
0	12.6	38.1	
1	84.7	62.0	
2	2.7	0	
Number of health centers			673.6 (<0.001)
0	36.6	44.7	
1	37.4	43.0	
2	7.0	5.8	
3	4.2	0	
4	0	0	
5	6.0	0	
6	8.7	6.4	
Number of health posts	4.5 (4.2)	4.2 (6.0)	-3.20 (0.001)
Number of banks	1.7 (2.2)	0.8 (1.6)	-26.0 (<0.001)

Evaluation of the common trends assumption revealed no statistically significant differences in mortality across treatment groups prior to the implementation of *Familias en Acción*. The incidence rate ratio for death prior to and after the pseudo-intervention year for treatment municipalities relative to control municipalities was 1.02 (95% CI, 0.90-1.16; *p*=0.72) for the model using 1994 as a pseudo-intervention year; 1.09 (95% CI, 0.93-1.28; *p*=0.31) for the 1997 model; and 1.10 (95% CI, 0.94-1.27; *p*=0.23) for the 1999 model.

At baseline, treatment group subjects were more likely to report all health outcomes associated with inability to complete daily activities than control group subjects. Among treatment subjects, 23.0% reported impairment, 12.6% reported having been bedridden, and 9.7% reported a hospitalization as compared to 19.5%, 10.2%, and 6.7% among control group subjects, respectively. At the second follow-up, treatment group subjects remained more likely than their control counterparts to report impairment, bedridden, and hospitalization; however, the prevalence among the treatment group decreased by the second follow-up such that differences

between the treatment groups were no longer statistically significant. Treatment group impairment, bedridden status, and hospitalization prevalence at the second follow-up was 19.5%, 11.1%, and 7.4% compared to 19.0%, 10.7%, and 7.0% among the control group, respectively. Across both treatment groups, women were more likely to report impairment, bedridden status, and hospitalization than men; this pattern was observed at baseline and during follow-up (Supplemental Table 1.2).

The effects of *Familias en Acción* on adult health are displayed in Table 1.2 Adults in the treatment group reported a statistically significant greater reduction in impairment (OR=0.82; 95% CI, 0.71-0.95; $p=0.006$), bedridden status (OR=0.81; 95% CI, 0.68-0.97; $p=0.023$) and hospitalization (OR=0.69; 95% CI, 0.56-0.86; $p<0.001$) at the second follow-up, when compared to their unexposed counterparts.

Table 1.2 Difference-in-differences estimates for logistic models: Change in self-reported health among municipalities exposed to *Familias en Acción* compared to their control counterparts.*

Variable	Unadjusted		Adjusted	
	OR (95% CI)	<i>p</i> value	OR (95% CI)	<i>p</i> value
Impairment (n=10,822)				
Treatment	1.21 (1.01-1.45)	0.036	1.21 (1.02-1.43)	0.025
Time	0.96 (0.87-1.06)	0.437	0.96 (0.87-1.06)	0.433
Treatment*Time	0.82 (0.71-0.95)	0.007	0.82 (0.71-0.95)	0.006
Age (centered)			1.02 (1.02-1.03)	<0.001
Female			1.17 (1.07-1.29)	0.001
Bedridden (n=10,757)				
Treatment	1.25 (1.04-1.51)	0.018	1.28 (1.07-1.55)	0.009
Time	1.05 (0.93-1.19)	0.445	1.05 (0.93-1.19)	0.443
Treatment*Time	0.81 (0.68-0.97)	0.023	0.81 (0.68-0.97)	0.023
Age (centered)			1.02 (1.01-1.02)	
Female			1.15 (1.02-1.29)	0.019
Hospitalization (n=10,823)				
Treatment	1.48 (1.21-1.82)	<0.001	1.59 (1.32-1.91)	<0.001
Time	1.06 (0.91-1.23)	0.470	1.06 (0.91-1.23)	0.469
Treatment*Time	0.69 (0.56-0.85)	0.001	0.69 (0.56-0.85)	<0.001
Age (centered)			1.00 (1.00-1.01)	0.183
Female			1.41 (1.23-1.61)	<0.001

* The adjusted model includes the following *individual variables*: age, sex, earner status, marital status; *household variables*: home ownership, dirt floors, low durability home wall material, low durability home roof material, electricity, water, sewage, garbage, has refrigerator, has television, has bicycle, has motorcycle, number of residents; *municipal variables*: urban-rural classification, region, municipality size, number of hospitals, number of health centers, number of health posts, and number of banks.

In a secondary analysis, we assessed an interaction of the differences-in-differences estimate with sex in the main effects models to assess for potential differential effects of the CCT program. The interaction was not significant in the impairment model (OR=0.98; 95% CI, 0.82-1.16; *p*=0.791) or the bedridden model (OR=0.96; 95% CI, 0.76-1.19; *p*=0.705) but was statistically significant in the hospitalization model (OR=1.55; 95% CI, 1.18-2.02; *p*=0.001) (Supplemental Table 1.3). We then evaluated sex as a potential effect modifier of the relationship between exposure to *Familias en Acción* and health. The point estimates in the sex-stratified models were similar for impairment and bedridden status and differed only for hospitalization. Among women, there was no statistically significant association of *Familias en Acción* and self-

reported impairment, bedridden status, or hospitalization. Among men, the association between the CCT program with bedridden status was similarly insignificant; however, men exposed to the CCT program reported a statistically significant reduction in impairment (OR=0.79; 95% CI, 0.64-0.98; $p=0.032$) and in hospitalization (OR=0.47; 95% CI, 0.33-0.66; $p<0.001$), when compared to their unexposed male counterparts (Table 1.3).

Table 1.3 Difference-in-differences estimates for logistic models: Change in self-reported health by age and sex^a

Variable	Females		Males	
	OR (95% CI)	<i>p</i> value	OR (95% CI)	<i>p</i> value
Impairment ($n=5,763/5,059$)	0.85 (0.70-1.02)	0.085	0.79 (0.64-0.98)	0.032
Bedridden ($n=5,737/5,020$)	0.83 (0.65-1.04)	0.110	0.80 (0.61-1.05)	0.104
Hospitalization ($n=5,764/5,059$)	0.83 (0.64-1.09)	0.180	0.47 (0.33-0.66)	<0.001

CI = confidence interval; OR = odds ratio.

^a The model adjusts for the following *individual variables*: age, sex, earner status, marital status; *household variables*: home ownership, dirt floors, low durability home wall material, low durability home roof material, electricity, water, sewage, garbage, has refrigerator, has television, has bicycle, has motorcycle, number of residents; *municipal variables*: urban-rural classification, region, municipality size, number of hospitals, number of health centers, number of health posts, and number of banks.

A sensitivity analysis including all treatment subjects, regardless of baseline and treatment exposure timing revealed that subjects that received the intervention prior to baseline reported better health; 22.7% reported impairment, 12.6% reported bedridden, and 8.9% reported hospitalization, while those treatment subjects with a true baseline reported 23.0%, 12.6%, and 9.7%, respectively (Supplemental Tables 1.4 & 1.5). Further analysis using all treatment subjects indicated a weaker effect of the CCT program on health when including subjects exposed to the intervention prior to baseline. There was a statistically significant effect of the CCT program on impairment (OR=0.86; 95% CI, 0.76-0.97; $p=0.013$) and hospitalization (OR=0.74; 95% CI, 0.61-0.88; $p=0.001$) (Supplemental Tables 1.6 & 1.7). There was no longer a statistically significant impact of the CCT program on bedridden status when including treatment subjects without a true baseline; the treatment subjects without a true baseline reported less change in

bedridden status during follow-up (12.6% at baseline vs. 12.1% at follow-up) when compared to the treatment subjects with a true baseline (12.6% at baseline vs. 11.1% at follow-up).

DISCUSSION

The present study prospectively investigated whether exposure to the Colombian CCT program, *Familias en Acción*, predicted a change in health outcomes reflecting disruptions in the ability to perform daily activities. Despite a lack of conditionalities or programmatic components in the Colombian CCT program directly targeting adult health, we found that adults exposed to *Familias en Acción* experienced a reduced odds of self-reported impairment, bedridden status, and hospitalization when compared to their control counterparts. Additionally, there is some evidence that the program had a differential impact by sex. Men in *Familias en Acción* eligible municipalities experienced a reduction in hospitalization while there was no statistically significant impact on hospitalization for women.

Existing literature exploring the association between CCT program exposure and adult health in Colombia is minimal and limited to women. The current work builds on previous work by Forde et al. (2012) by suggesting that the Colombian CCT program improved the health of adult men and women for non-nutritional outcomes.⁴ In Mexico, an investigation of the association between adult health and the Mexican CCT program by sex indicated that CCT program exposure has beneficial impacts on health for both women and men, but that these effects are more extensive for women.⁷ Our findings contradict the sex stratified results from the Mexican program, however differences in program design between Mexico and Colombia may explain why women did not experience significant improvements in the Colombian context.

The principal differences between the Mexican and Colombian CCT programs in relation to health are the target audiences specified and the corresponding health benefits package. The Mexican CCT program's health benefit is a free basic package of health services provided to

beneficiary families by institutions participating in the program. All members of beneficiary families are required to register with their local clinic and complete the clinical visits indicated by their health care provider to fulfill the basic health services package.^{10h} The package specifies services based on the age and sex of the individual but in general emphasizes preventive interventions such as immunizations, prevention and control of arterial hypertension and diabetes mellitus, and basic sanitation.¹⁰ Failure to complete this health service conditionality results in the suspension of cash transfers as specified by the General Guidelines for *Progresa* Operations.¹² In Colombia, the health benefit also focuses on prevention, however the prevention efforts are largely focused on young children, with regular growth and development check-ups for children less than 7 years of age and bimonthly health education workshops for their mothers.^{2,11} Pediatric visits in the Colombian context could influence mothers' health indirectly by increasing exposure to a health care provider; however, the potential causal mechanisms between programmatic components of the CCT program and women's health are more explicit in the Mexican context than in the Colombian context.

In the absence of programmatic components directly targeting adult health, household consumption is a likely pathway through which the Colombian CCT program impacts health. There has been some suggestion that observed changes in household consumption among CCT exposed households can be explained by increases in women's bargaining power.¹⁶ Yet critics question whether bargaining power is determined solely by monetary contribution and whether changes in household consumption are in fact evidence of increases in female bargaining power.^{17,18} Camacho and Rodríguez demonstrated that after the Colombian CCT program was

^h Program components of the Mexican CCT program have changed since the program was initiated on August 8, 1997 under President Ernesto Zedillo. The health benefits and conditionalities described here were incorporated into program at its inception; at which time the program was entitled *PROGRESA* or Program for Education, Health, and Nutrition.¹⁰

implemented, mothers exposed to the program had a lower probability of being the sole decision-maker for extra spending and for spending decisions related to children's clothing.¹⁸

Additionally, there was a lower probability of joint (father and mother) decision-making after program implementation.¹⁸ Similarly, Lopez Arana and others observed no changes in women's decision-making role within the home; no changes in involvement in the labor market; and no changes in their knowledge regarding food consumption or care of children with diarrhea.¹⁹

Women's bargaining power falls into the broader debate of female empowerment and the impact of CCT programs on gender relationships. Critics of CCT programs as a means of female empowerment argue that they reinforce traditional gender roles by tasking mothers specifically with conditionalities such as attending health workshops focused on child health and by making financial support available to women dependent upon their role as a mother.^{20,21} *Familias en Acción* distributes the cash transfers intentionally to mothers with the rationale that mothers have preferences for spending on child health, nutrition, and education and assumes that this practice makes it such that it is "ultimately the women that decide on the formation of their children."²¹ The assumption that women are more likely to use money for their children's needs reinforces the social norm that men's spending is problematic while women's spending is altruistic.¹⁷ In reality, the relationship between CCT programs and gender relationships may not be so clear-cut; qualitative research in rural Colombia offers evidence that *Familias en Acción* reinforces both *machismo* and feminist liberalization.²² Thus, neither programmatic components nor female empowerment offer clear pathways through which female health might be impacted in the

ⁱ The excerpt referenced here reads, "Los recursos son entregados directamente a las madres, por considerar que sus preferencias en el gasto se orientan al consumo de alimentos pueden ser más efectivos cuando los recursos se supeditan a los esfuerzos familiares, y son las familias las que disponen sobre el destino de los de sus hijos." (pp. 88-89)²

Colombian context and we might expect a lack of benefit for female health in the absence of clear mechanisms.

We performed additional analyses to explore possible factors that may explain the differential impacts on hospitalization by sex (Endnotes). First, we considered two gender-related reasons for hospitalization: violence and childbirth. One possibility for a reduction in hospitalization from 2002-2006, especially among men, may be reduced violence. However, when we compared homicide rates in 2002 and 2006 across treatment groups and adjusted for 2001 homicide rates in the primary analyses, we found no statistically significant effects; homicide decreased substantially in both treatment and control municipalities during follow-up.ⁱ Data on the reason for hospitalization was not collected, but if women reported hospitalization for childbirth and there were differences in fertility across treatment groups, this could potentially obscure a reduction in hospitalization among treatment group women. Sensitivity analyses adjusting for having given birth in the previous year and excluding the women reporting child birth in the previous year yielded no changes to the reported results. There were a relatively small number of women who gave birth in the year prior to the surveys ($n=596$; 10.3% of female sample).ⁱⁱ Next, we examined sex differences in employment during follow-up as a possible explanation for differences in hospitalization. While there were gender differences in employment, the numbers were relatively stable during follow-up. Women reported 31% employment at baseline and 33% at follow-up, while for men reported 84% employment at both time points. Men worked more hours for pay than women on average, but this changed minimally over follow-up with men reporting an average 7.5 more hours per week at baseline and 8.0 more hours per week at follow-up.ⁱⁱⁱ While we were unable to explain the differential impact on hospitalization by sex, it should be noted that hospitalization may reflect declines in

health and increased morbidity or increased access to health services. Thus, it should be interpreted with caution.

A limitation of our study is the lack of random assignment. Despite adjusting for observed covariates in the statistical analysis, there may be residual confounding. Observed covariates indicated baseline differences across the treatment groups, particularly at the municipal level. Treatment communities, by design, had greater health service infrastructure which likely impacted residents' health service access and utilization. Thus, it is possible that control municipality residents would not have experienced similar gains in health due to municipal characteristics.

Another limitation is the lack of pre-intervention health information for assessing model assumptions and the constraints in health data collected at baseline and follow-up. Health data at the municipal level prior to the intervention period is scarce. We used mortality data as a proxy for municipal health status; however, additional health data, including indicators of morbidity and health service use, would provide a more precise assessment of model assumptions. Our primary outcomes reflected disruptions in daily activities, yet measures of morbidity and functionality such as hypertension, diabetes, and ability to engage in physical activity would widen the scope of health assessment. There may have been unmeasured changes in health including gains particularly for women whose exposure to health care providers likely increased from attending health education workshops and growth and development check-ups for young children.

Finally, there are limitations with the final sample used in the current study. Of the 16,815 adults with baseline health information, 30% attrited by the 2006 follow-up and adults who attrited were more likely to be younger, male, and working as compared to those who were

observed at follow-up. A likely explanation for attrition among these particular groups is that these individuals were not in the home to complete the health interview at the time the data was collected. However, attrition did not differ across treatment groups, and consequently we do not believe it significantly impacted our estimates. Aside from attrition, 26 treatment municipalities were exposed to the CCT program prior to collection of baseline data and 13 control municipalities received the treatment intervention, which reduced the sample size and power. Nevertheless, we were able to detect an impact of the CCT program despite the smaller sample size.

CCT programs offer an opportunity to reduce economic and health disparities by targeting those residents most vulnerable to poverty and poor health status. The goal of the Colombian CCT program is to promote human capital development among children and to stop the transmission of intergenerational poverty.² Illness and impairment among adults caring for children can jeopardize program goals if the caregiving adults cannot provide adequate care to ensure child wellbeing and completion of conditionalities. Through conditionalities and program benefits, CCT programs can prevent adult illness and impairment by generating demand for health services which may otherwise not be used by households that need them most due to various reasons despite free or subsidized care (e.g., clinic visits require absence from work and money for transportation to the clinic).²³ Our results demonstrate the ability of CCT programs to improve the health of adults in the absence of conditionalities and program services targeting adult health. Further research is needed, particularly in the Colombian context, to understand the extent of programmatic impact on adult health and to uncover the mechanisms influencing adult health among beneficiary households. Future work should also determine the municipal

infrastructure necessary to ensure sufficient health service supply and the replicability of health benefits in municipalities with differences in health service infrastructure.

SUPPLEMENTAL MATERIAL

Supplemental Table 1.1 Change in average household subsidy and income by treatment group, 2002-2006.

Household Type	Household Income and Subsidy Measures	2002 Colombian pesos (SE)	2006 Colombian pesos (SE)
Control	Total household income with subsidies (2005 Prices)	372,910 (28,770)	414,907 (22,255)
Treatment	Total household income with subsidies (2005 Prices)	322,463 (8,255)	414,291 (11,934)
Control	Total household income without subsidies (2005 prices)	372,910 (28,770)	410,065 (21,488)
Treatment	Total household income without subsidies (2005 prices)	285,678 (8,264)	361,391 (11,992)

Source: Table adapted using data from Attanasio O, Gómez LC. *Evaluación Del Impacto Del Programa Familias en Acción*. Bogotá D.C.; 2006:1-170.

Supplemental Table 1.2 Descriptive statistics by sex group, for treatment subjects (TSP) who completed the baseline survey prior to receipt of the cash transfers ($n=83$ municipalities).^a

Group	Baseline		Follow-Up	
	Treatment (TSP) ^b No. (%)	Control No. (%)	Treatment (TSP) ^b No. (%)	Control No. (%)
Females				
Impairment	666 (24.1)*	641 (21.4)*	572 (20.7)	616 (20.5)
Bedridden	363 (13.3)*	334 (11.1)*	320 (11.7)	344 (11.5)
Hospitalization	308 (11.3)***	241 (8.0)***	270 (9.8)*	245 (8.2)*
Males				
Impairment	508 (21.6)***	474 (17.5)***	425 (18.1)	468 (17.3)
Bedridden	273 (11.8)**	249 (9.2)**	240 (10.3)	263 (9.8)
Hospitalization	186 (7.9)***	141 (5.2)***	107 (4.6)	156 (5.8)
All				
Impairment	1,174 (23.0)***	1,115 (19.5)***	997 (19.5)	1,084 (19.0)
Bedridden	636 (12.6)***	583 (10.2)***	560 (11.1)	607 (10.7)
Hospitalization	494 (9.7)***	382 (6.7)***	377 (7.4)	401 (7.0)

^a Chi-square test: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^b Treatment (TSP) refers to those subjects within treatment municipalities who completed the baseline survey prior to receipt of the cash transfers.

Supplemental Table 1.3 Interaction of difference-in-differences estimates with sex variable, for treatment subjects (TSP) who completed the baseline survey prior to receipt of the cash transfers ($n=83$ municipalities).^a

Variable	Unadjusted		Adjusted	
	OR (95% CI)	<i>p</i> value	OR (95% CI)	<i>p</i> value
Impairment ($n=10,822$)				
Treatment	1.21 (1.01-1.45)	0.036	1.21 (1.02-1.43)	0.025
Time	0.96 (0.87-1.06)	0.437	0.96 (0.87-1.06)	0.433
Treatment*Time	0.82 (0.71-0.95)	0.007	0.83 (0.70-0.99)	0.035
Age (centered)			1.02 (1.02-1.03)	<0.001
Female			1.18 (1.07-1.31)	0.001
Female*Treatment*Time			0.98 (0.82-1.16)	0.791
Bedridden ($n=10,757$)				
Treatment	1.25 (1.04-1.51)	0.018	1.28 (1.07-1.55)	0.009
Time	1.05 (0.93-1.19)	0.445	1.05 (0.93-1.19)	0.443
Treatment*Time	0.81 (0.68-0.97)	0.023	0.83 (0.68-1.03)	0.094
Age (centered)			1.02 (1.01-1.02)	<0.001
Female			1.16 (1.02-1.32)	0.021
Female*Treatment*Time			0.96 (0.78-1.19)	0.705
Hospitalization ($n=10,823$)				
Treatment	1.48 (1.21-1.82)	<0.001	1.59 (1.32-1.91)	<0.001
Time	1.06 (0.91-1.23)	0.470	1.06 (0.91-1.23)	0.469
Treatment*Time	0.69 (0.56-0.85)	0.001	0.52 (0.39-0.68)	<0.001
Age (centered)			1.00 (1.00-1.01)	0.183
Female			1.28 (1.11-1.48)	<0.001
Female*Treatment*Time			1.55 (1.18-2.02)	0.001

^a The adjusted model includes the following *individual variables*: age, sex, earner status, marital status; *household variables*: home ownership, dirt floors, low durability home wall material, low durability home roof material, electricity, water, sewage, garbage, has refrigerator, has television, has bicycle, has motorcycle, number of residents; *municipal variables*: urban-rural classification, region, municipality size, number of hospitals, number of health centers, number of health posts, and number of banks. TSP refers to those subjects within treatment municipalities who completed the baseline survey prior to receipt of the cash transfers.

Sensitivity Analyses

Supplemental Table 1.4 Descriptive statistics by age group, including all (TSP & TCP) treatment subjects ($n=109$ municipalities).^a

Group	Baseline		Follow-Up	
	Treatment (TSP+TCP) No. (%)	Control No. (%)	Treatment (TSP+TCP) No. (%)	Control No. (%)
Females				
Impairment	1,385 (23.6) [*]	641 (21.4) [*]	1,249 (21.3)	616 (20.5)
Bedridden	761 (13.1) [*]	334 (11.1) [*]	723 (12.4)	344 (11.5)
Hospitalization	626 (10.7) ^{***}	241 (8.0) ^{***}	538 (9.2)	245 (8.2)
Males				
Impairment	1,083 (21.6) ^{***}	474 (17.5) ^{***}	912 (18.2)	468 (17.3)
Bedridden	600 (12.1) ^{***}	249 (9.2) ^{***}	534 (10.7)	263 (9.8)
Hospitalization	344 (6.9) ^{**}	141 (5.2) ^{**}	243 (4.9)	156 (5.8)
All				
Impairment	2,468 (22.7) ^{***}	1,115 (19.5) ^{***}	2,161 (19.9)	1,084 (19.0)
Bedridden	1,361 (12.6) ^{***}	583 (10.2) ^{***}	1,257 (11.6)	607 (10.7)
Hospitalization	970 (8.9) ^{***}	382 (6.7) ^{***}	781 (7.2)	401 (7.0)

^a Chi-square test: * $p<0.05$, ** $p<0.01$, *** $p<0.001$

^b TSP refers to those subjects within treatment municipalities who completed the baseline survey prior to receipt of the cash transfers. TCP refers to those subjects who were exposed to the CCT program and cash transfers prior to the administration of the baseline survey.

Supplemental Table 1.5 Descriptive statistics by age group, comparing municipalities receiving treatment after (TSP) and before (TCP) the baseline survey ($n= 57$ municipalities).^a

Group	Baseline		Follow-Up	
	Treatment (TSP) ^b No. (%)	Treatment (TCP) ^c No. (%)	Treatment (TSP) ^b No. (%)	Treatment (TCP) ^c No. (%)
Females				
Impairment	666 (24.1)	719 (23.2)	572 (20.7)	677 (21.8)
Bedridden	363 (13.3)	398 (12.9)	320 (11.7)	403 (13.1)
Hospitalization	308 (11.3)	318 (10.3)	270 (9.8)	268 (8.6)
Males				
Impairment	508 (21.6)	575 (21.6)	425 (18.1)	487 (18.3)
Bedridden	273 (11.8)	327 (12.3)	240 (10.3)	294 (11.1)
Hospitalization	186 (7.9)**	158 (5.9)**	107 (4.6)	136 (5.1)
All				
Impairment	1,174 (23.0)	1,294 (22.5)	997 (19.5)	1,164 (20.2)
Bedridden	636 (12.6)	725 (12.6)	560 (11.1)	697 (12.1)
Hospitalization	494 (9.7)*	476 (8.3)*	377 (7.4)	404 (7.0)

^a Chi-square test: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^b TSP refers to those subjects within treatment municipalities who completed the baseline survey prior to receipt of the cash transfers.

^c TCP refers to those subjects who were exposed to the CCT program and cash transfers prior to the administration of the baseline survey.

Supplemental Table 1.6 Difference-in-differences estimates for logistic models including all treatment subjects: Change in self-reported health among treatment and control municipalities ($n=109$ municipalities).^a

Variable	Unadjusted		Adjusted	
	OR (95% CI)	<i>p</i> value	OR (95% CI)	<i>p</i> value
Impairment ($n=16,587$)				
Treatment	1.19 (1.02-1.38)	0.024	1.17 (1.01-1.35)	0.036
Time	0.96 (0.87-1.06)	0.435	0.96 (0.87-1.06)	0.432
Treatment*Time	0.86 (0.76-0.97)	0.013	0.86 (0.76-0.97)	0.013
Age (centered)			1.02 (1.02-1.03)	<0.001
Female			1.18 (1.09-1.27)	<0.001
Bedridden ($n=16,496$)				
Treatment	1.27 (1.09-1.47)	0.002	1.27 (1.10-1.47)	0.001
Time	1.05 (0.93-1.19)	0.444	1.05 (0.93-1.19)	0.442
Treatment*Time	0.86 (0.74-1.00)	0.056	0.86 (0.74-1.00)	0.055
Age (centered)			1.02 (1.01-1.02)	<0.001
Female			1.11 (1.02-1.22)	0.028
Hospitalization ($n=16,588$)				
Treatment	1.37 (1.14-1.63)	0.001	1.45 (1.22-1.73)	<0.001
Time	1.06 (0.91-1.23)	0.470	1.06 (0.91-1.23)	0.469
Treatment*Time	0.74 (0.62-0.88)	0.001	0.74 (0.61-0.88)	0.001
Age (centered)			1.00 (1.00-1.01)	0.146
Female			1.41 (1.26-1.58)	<0.001

^a The adjusted model includes the following *individual variables*: age, sex, earner status, marital status; *household variables*: home ownership, dirt floors, low durability home wall material, low durability home roof material, electricity, water, sewage, garbage, has refrigerator, has television, has bicycle, has motorcycle, number of residents; *municipal variables*: urban-rural classification, region, municipality size, number of hospitals, number of health centers, number of health posts, and number of banks.

Supplemental Table 1.7 Difference-in-differences estimates for logistic models including all treatment subjects: Change in self-reported health by age and sex ($n=109$ municipalities).^a

Variable	Females	Males
	OR (95% CI)	OR (95% CI)
Impairment ($n=8,864/7,723$)	0.91 (0.77-1.07)	0.80 (0.66-0.96)
Bedridden ($n=8,820/7,672$)	0.90 (0.74-1.11)	0.81 (0.64-1.02)
Hospitalization ($n=8,866/7,722$)	0.82 (0.65-1.03)	0.60 (0.44-0.81)

CI = confidence interval; OR = odds ratio.

^a The model adjusts for the following *individual variables*: age, sex, earner status, marital status; *household variables*: home ownership, dirt floors, low durability home wall material, low durability home roof material, electricity, water, sewage, garbage, has refrigerator, has television, has bicycle, has motorcycle, number of residents; *municipal variables*: urban-rural classification, region, municipality size, number of hospitals, number of health centers, number of health posts, and number of banks. The number of health centers per municipality were excluded from the model because this variable perfectly predicted presence of the adverse health outcome.

ENDNOTES

ⁱ **Homicide Rates:** To assess whether homicide rates contributed to the hospitalization outcomes across treatment groups, we calculated average homicide rates for 2002 and 2006 using data from DANE for 81 of the 83 municipalities in our final sample which had available data. There were no statistically significant differences in average homicide rates across treatment municipalities at baseline or follow-up. In 2002, intervention municipalities had a slightly higher average rate (6.3 per 10,000 population) than control municipalities (6.0 per 10,000 population) ($t=-0.12$; $p=0.90$). By 2006, the average rates had decreased across both treatment groups by about 1.5-2 per 10,000 population. Intervention municipalities in 2006 continued to have a slightly higher average homicide rate (4.8 per 10,000 population) than their control counterparts (3.9 per 10,000 population), but again the differences were not statistically significant ($t=-0.79$; $p=0.43$). To assess the impact of homicide rates on point estimates, we adjusted for 2002 municipal homicide rates in the model examining the impact of the CCT program on hospitalization. The homicide coefficient was not statistically significant (OR=1.00; 95% CI, 0.99-1.01; $p=0.547$) and the DID estimate for the treatment effect remained relatively unchanged (OR=0.69; 95% CI, 0.56-0.85; $p=0.001$). Additionally, we adjusted for 2002 homicide rates in a model including only males and again observed no significant differences in homicide rates (OR=1.00; 95% CI, 0.98-1.01; $p=0.677$) and a relatively unchanged DID estimate for the treatment effect (OR=0.47; 95% CI, 0.33-0.68; $p<0.001$).

ⁱⁱ **Childbirth and Hospitalizations:** One possible explanation for a lack of an effect of hospitalization among women could be related to childbirth. Data on the reason for hospitalization were not collected; however, data were collected on births. In the final sample,

393 women at baseline reported having had a child in the last year compared to 203 women at follow-up. There were differences across treatment groups regarding the location of the birth as well as the relationship between birthing location and self-report of hospitalization in the past year.

A similar proportion of treatment group women reported giving birth in a hospital, clinic, or health center when compared to control group women at both baseline and follow-up (Supplemental Table 1.8). Of the women who reported having given birth in a health facility in the past year, women in the treatment group were more likely to report a hospitalization in the past 12-months when compared to women in the control group (49% vs. 36%) and this was true at the follow-up as well (75% vs. 60%) (Supplemental Table 1.9). *Nota bene* that women who reported giving birth in a health facility may have done so at a facility other than a health clinic. Additionally, women who gave birth at a hospital may not have been admitted. It is not clear if women in the treatment and control groups reported hospitalizations related to childbirth in a similar or different manner. What is more, while the number of health facility births increased from 71% at baseline to 77% at follow-up and growth was greater within the treatment group, but it is unclear if the use of a health care facility reflects positive or negative health outcomes. For example, perhaps a woman who had been receiving prenatal care was referred to a health facility for childbirth and thus the use of the facility indicates preventive health practices. In contrast, another woman may have not received prenatal care and may have gone to a health facility while in emergency labor. Thus, it is difficult to interpret these data. Consequently, we ran a sensitivity analysis excluding women who reported giving birth in the past 12 months. The DID estimate changed minimally after these women were excluded (OR=0.69; 95% CI, 0.56-0.85; $p < 0.001$) when compared to a model including them (OR=0.69; 95% CI, 0.55-0.86; p

=0.001). We also assessed whether excluding these women impacted gender as an effect modifier but found that it did not. In the model in which we included a three-way interaction for gender, treatment, and time, the DID estimate barely changed (OR=1.53; 95% CI, 1.16-2.03; $p=0.003$) and this was true for the estimates stratified model for women (OR=0.90; 95% CI, 0.66-1.22; $p=0.489$). The failure of deliveries to explain the lack of an effect of *Familias en Acción* on hospitalization is not surprising considering the relatively small number of women who gave birth in the year prior to being surveyed ($n=596$; 10.3% of female sample) as well as the lack of programmatic components focused on prenatal care or deliveries within *Familias en Acción*.

Supplemental Table 1.8 Location of birth among women reporting having birthed a child in the 12 months prior to the survey by treatment group and time.

Location	Control No. (%)	Treatment (TSP) ^a No. (%)	χ^2 statistic (p value)
Childbirth location (baseline)			0.13 (0.94)
Hospital, clinic, or health center	112 (70)	167 (72)	
Other location	48 (30)	66 (28)	
Childbirth location (follow-up)			2.1 (0.15)
Hospital, clinic, or health center	77 (82)	80 (74)	
Other location	17 (18)	29 (26)	

^a TSP refers to those subjects within treatment municipalities who completed the baseline survey prior to receipt of the cash transfers.

Supplemental Table 1.9 Proportion of women reporting hospitalization among women reporting having birthed a child in the past 12 months at a hospital, clinic, or health center by treatment group and time.

Hospitalization group	Control No. Reported/N (%)	Treatment (TSP) ^a No. Reported/N (%)	χ^2 statistic (p value)
Reported hospitalization (baseline)	40/112 (36)	82/167 (49)	4.9 (0.03)
Reported hospitalization (follow-up)	46/77 (60)	60/80 (75)	4.2 (0.04)

^a TSP refers to those subjects within treatment municipalities who completed the baseline survey prior to receipt of the cash transfers.

iii **Employment and Hospitalization by Gender:** Employment does not appear to explain the gender differences in hospitalization. The proportion of the sample reporting working one or more hour for pay on average weekly changed little over time: 57% of respondents at baseline and 58% at follow-up. Similarly within gender groups, there was little change in the proportion of the sample reporting work; for women, 31% at baseline and 33% at follow-up reported working while for men 84% reported working at both time points. Men worked more hours than women on average reporting an average of 7.5 hours more at baseline and an average of 8.0 hours more at follow-up.

When comparing treatment groups over time for women and for men separately, the findings for women help to explain a lack of an effect of the CCT program on hospitalization, but this was not true for men. At baseline, treatment women worked about 3 hours more than control group women; by follow-up, control group women were working more hours and thus there were no differences in average hours worked across treatment groups at follow-up. While treatment group women did work less over time, the absolute number was not significantly below the control group women and the group of women employed represents only a third of women in the sample. Additionally, about a third of women at baseline and at follow-up reporting hospitalization reported being employed at the corresponding survey. Thus, it seems unlikely that this decline in work hours for pay among treatment women substantially impacted hospitalization.

Among men, the baseline averages differed by less than an hour across treatment groups. The number of hours worked by treatment men remained fairly constant over time but increased by about two hours among the control group. If work hours impacted hospitalization, for example, we would expect an increase among hospitalization for control men and no change in

hospitalization for treatment men. Instead we saw no change in hospitalization for control men and a decrease for treatment men. Again, it seems unlikely that the subtle changes in work hours significantly impacted hospitalization.

Supplemental Table 1.10 Average number of hours worked over time among those who reported working at least one hour weekly on average, by treatment group and sex ($n=6,603$).

Group	Baseline			Follow-Up		
	No.	Mean (SD)	<i>t</i> test (<i>p</i> value)	No.	Mean (SD)	<i>t</i> test (<i>p</i> value)
Women			-2.65 (0.008)			0.23 (0.82)
Control	984	37.3 (0.65)		1,025	39.5 (0.65)	
Treatment	912	39.8 (0.66)		961	39.3 (0.69)	
Men			1.77 (0.076)			3.96 (<0.001)
Control	2,526	46.4 (0.33)		2,525	47.7 (0.34)	
Treatment	2,188	46.0 (0.35)		2,202	45.8 (0.33)	

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PAPER 2

**Spillover effects of the Colombian conditional cash transfer program
Familias en Acción on municipal mortality**

ABSTRACT

OBJECTIVES: The Colombian conditional cash transfer program, *Familias en Acción*, was implemented in 2002. We investigated the impact of the CCT program on municipal mortality in the treated municipalities.

METHODS: We pooled census data and mortality registry data from the National Administrative Department of Statistics of Colombia (DANE) along with prospective CCT data from the Colombian Department of National Planning. Eligibility for the CCT program was assigned at the municipal level in a quasi-experimental study design consisting of 122 municipalities. We applied a differences-in-differences approach to estimate the impact of the CCT program on mortality.

RESULTS: We found no statistically significant difference in the change of all-age mortality between municipalities receiving *Familias en Acción* and the control municipalities from the pre- to post-intervention periods (incidence rate ratio [IRR]=0.96; 95% CI, 0.91-1.03; $p=0.26$). Stratified analyses by age category revealed mixed findings. Child mortality was not impacted by the CCT program; however, when comparing mortality for adults aged 65 years and older across treatment and control municipalities, we observed a statistically significant difference in the change in mortality over time, indicating lower mortality rates associated with municipal exposure to *Familias en Acción* (IRR=0.93; 95% CI, 0.87-0.99; $p=0.048$).

CONCLUSIONS: Child mortality rates were not impacted by the CCT program despite targeted health conditionalities for this age group while older adult mortality appeared to be lowered

despite the absence of any targeted health conditionalities. Further research is warranted to understand the mechanisms influencing death and to assess the need for changes in the health components of the program.

INTRODUCTION

The Colombian government launched the conditional cash transfer program (CCT), *Familias en Acción*, in the midst of economic downturn. In 1999, two years before the CCT was piloted, annual GDP growth had dropped to -4.2% from 0.6 in 1998 and from 5.8 in 1994.¹ The CCT was intended to address poverty, particularly in rural areas. In 2002, when *Familias en Acción* was implemented, 27% of the Colombian population resided in a rural area and of those residents 61.7% lived in poverty.¹ Like many CCTs in Latin America, the goal of the Colombian CCT is to end the cycle of intergenerational poverty by fostering the human capital of children. This is achieved through investing in skills to ensure economic vitality, mainly education, and through protection of this investment, mainly the provision of health care. The human capital ideology is evident in the 2010 Colombian National Department of Planning document, *The Beaten Path: Ten Years of Familias en Acción*.²

“On the principle of equity, it is necessary that the public supports individuals and families to access social services to which they have a Constitutional right including among these health, education and nutrition, essential goods needed to get out of poverty.” (p. 46)^j

Human capital theory explains the selection of benefits and conditionalities of the CCT program which focus on education, health, and nutrition. The two key components of *Familias en Acción* which give structure to the program are targeting and conditionality. Targeting is achieved with the use of the Selection and Identification System for Social Program

^j Text translated by author EEV: “Por principio de equidad, es necesario que desde lo público se apoye a los individuos y familias a que accedan a los servicios sociales que por Constitución tienen derecho, entre ellos salud, educación y alimentación, activos fundamentales para salir de la pobreza.”

Beneficiaries (SISBEN); SISBEN generates an indicator of economic well-being for households corresponding to one of six levels and is calculated using a proxy means test.³ From 2002-2006, only households in SISBEN level I were eligible to receive *Familias en Acción* benefits; SISBEN^k I corresponds to the poorest sextile of households in Colombia, living in conditions consistent with most definitions of extreme poverty.⁴

The conditionality aspect of *Familias en Acción* requires that families complete specified behaviors in order to receive program benefits. Conditionality reinforces targeting through self-selection; households that do not need the benefits associated with the conditionalities are presumed to opt out of the program rather than complete the program requirements.⁵ Families with children less than 7 years of age receive a nutritional supplement of 40,000^l pesos (~US\$13.14), contingent upon the mother's attendance at health education workshops and the child's participation in growth and development check-ups which include immunizations.^m Families with children aged 7-17 years received 14,000 pesos (~US\$4.60) for each child enrolled in elementary school [2nd grade to 5th grade] and 28,000 pesos (~US\$9.20) for each child in secondary school so long as the child does not exceed 8 unexcused absences in a two-month period.^{2,6}

By design, *Familias en Acción* is intended to protect and promote health, particularly of young children. Existing evaluations indicate that *Familias en Acción* is associated with increased health care usage and routine pediatric appointments for children <7 years.⁷⁻⁹

Additionally, young children exposed to *Familias en Acción* were also less likely to be

^k The Selection and Identification System for Social Program Beneficiaries or SISBEN generates an indicator of economic well-being for households corresponding to one of six levels and is calculated using a proxy means test which is based on multiple socioeconomic variables.

^l Subsidy amounts reflect 2002 values in pesos. The USD conversion reflects August 2016 exchange rates. Subsidy amounts have changed since the program's inception.

^m Through Resolution 412 of 2000, the Ministry of Health and Social Protection outlines growth and development services. The frequency and content of visits is age dependent.

underweight or malnourished as compared to their control counterparts.¹⁰⁻¹² Mortality prevention aligns closely with the theoretical basis of the CCT program and ultimately the program aim to promote human capital. Yet, no studies have examined the impact of *Familias en Acción* on mortality.

Previous investigations in Brazil and Mexico reveal that CCTs have the potential to reduce child mortality as well as mortality among older adults. Barham (2011) evaluated the impact of the Mexican CCT on rural infant mortality. Using the proportion of households within a municipality enrolled in the CCT among total households as the explanatory variable, Barham observed 3 fewer infant deaths per 1000 among the treated municipalities.¹³ Barham also observed statistically significant declines in specific causes of death that would be expected to be impacted by the program components: malnutrition, respiratory infections, and intestinal infections.¹³ In the Brazilian context, the CCT program was associated with a 9.3% decline in the infant mortality rate and a 24.3% decline in the post-neonatal mortality rate.¹⁴ A dose effect has also been observed in Brazil such that higher municipal coverage is associated with greater reductions in infant mortality.¹⁵ Finally, researchers found that the Brazilian CCT is associated with declines in child deaths from malnutrition, respiratory and infectious disease, and diarrheal disease - similar to the findings from the Mexican CCT, these specific causes would be expected to be influenced by the specific interventions of the Brazilian CCT.^{14,15}

There is less empirical data on the impact of CCTs on adult mortality; however, there is evidence of a positive impact on older adult mortality in the Mexican context. Barham and Rowberry (2013) evaluated the impact of the Mexican CCT program intensity, the total number of households receiving benefits divided by the total number of households in the municipality, on the mortality rate of individuals aged 65 years and older. They observed a 4% decline in

average municipal-level mortality rate for this age group, along with declines in cause-specific mortality rates including a 22% decline in deaths attributable to infectious disease and a 15% decline in deaths attributable to nutrition or anemia.¹⁶

In the present work, we build on existing findings that demonstrate the ability of *Familias en Acción* to promote health and the ability of the CCT model in general to reduce mortality. To further evaluate the ability of *Familias en Acción* to promote human capital through the protection of health, we examined the impact of the CCT on all-cause mortality across all ages as well as the impact of the CCT on specific causes of death.

METHODS

Sources of Data

We obtained data for municipal exposure to the CCT using program evaluation data collected by the Colombian National Department of Planning (DNP) in conjunction with the Institute for Fiscal Studies from 2002-2006. This data is publically accessible through DNP. The DNP collected baseline data between June 20 and October 31, 2002; in each municipality the mayor was interviewed to obtain information about the local education infrastructure, the local health infrastructure, and commercial activity. Thus, in addition to providing program exposure data, the program evaluation data was also a source of municipal covariate values. We also obtained municipal spending data through DNP; DNP collected this fiscal data as part of the Territorial Development program.

We obtained birth and death data for the period 1998 to 2006 using microdata from the National Administrative Department of Statistics of Colombia (DANE). This information is accessible to the public through the National Data Archives. In 1998, Colombia created the Civil Registry and Vital Statistics System and DANE began collecting birth and death data for

statistical purposes.¹⁷ Through this system, live birth and death data are collected by medical doctors or other authorized medical personnel. In the event of a death due to an external cause, violence, or an unknown cause, the National Institute of Legal and Forensic Medicine (INML-CF) is required to complete the death certificate. When a live birth or death occurs without a health sector contact, officials from the notary and registration office complete the corresponding certificate. We also obtained data capturing municipal population and municipal housing deficiencies through DANE.

Sampling Procedure and Study Design

In 2002, *Familias en Acción* was implemented in 622 municipalities from 26 departments.ⁿ These municipalities met the following inclusion criteria in order to receive *Familias en Acción* during this initial phase: a population of less than 100,000 residents, an adequate health and education infrastructure, a bank, and cooperation from municipal authorities to provide necessary documentation including a list of SISBEN I households. Municipalities that were the capital of the department were ineligible during the 2002-2006 period.

For the program evaluation, researchers created 639 primary sampling units (PSUs) from the 622 treatment municipalities and 210 control municipalities. PSUs were defined by a single municipality or some cases multiple municipalities when the number of program-eligible households was less than 226.^o The treatment PSUs were categorized into 25 strata based on geographical region, proportion of residents in urban areas, a quality of life index,^o population size, and health and educational services infrastructure. Two treatment municipalities were

ⁿ Of the total 1,024 municipalities in Colombia, these municipalities met initial criteria for participation in the program.

^o The quality of life index considers access to services, housing, actual and potential human capital, education level of head of household, education level of individuals aged 12 years and older in household, school attendance, size and household composition, overcrowding, and proportion of children less than 6 years of age.²

randomly selected from each strata and then matched to control municipalities. The quasi-experimental study design resulted in a sample of 65 control and 57 treatment municipalities.

Study Variables

Because *Familias en Acción* was implemented at the municipal level, the exposure variable was defined as a dichotomous variable indicating whether or not the municipality received the intervention. The outcome variable was a count variable reflecting the number of deaths in a municipality. Covariates captured baseline socioeconomic characteristics as well as the health services infrastructure of municipalities and included the number hospitals, the number of health centers, the number of health posts, qualitative and quantitative measures of deficient housing, geographic region, an urban-rural classification, and municipal spending in the following categories: public health, water, subsidized health insurance, school nutrition, and municipal sports. The measures of deficient housing were developed by DANE. Qualitative deficiency refers to homes that have deficient public services or utilities, construction materials, structure, and space (i.e., crowding) while quantitative deficiency is the estimated number of homes that the municipality would need to add in order to have a one-to-one relationship between the needed number of homes and the supply of adequate homes. To obtain values of municipal housing deficiency, we conducted a linear interpolation creating estimates of 2002 values using Census data from 1993 and 2005. The urban-rural classification variable uses three categories used by DANE to categorize municipalities: a *municipal center* is established by the city council and is the administrative headquarters of the municipality; a *populated center* is defined as an area with at least 20 contiguous homes; and *rural, disperse* refers to an area characterized by dispersed houses or farms, a lack of named streets, and few public utilities.¹⁸

Statistical Analyses

To compare the changes in mortality across control and treatment municipalities following the implementation of *Familias en Acción*, we collapsed municipal deaths into pre-intervention totals using deaths between 1998-2001 and post-intervention totals using deaths between 2002-2006. By design, the program evaluation included those municipalities with less than 100,000 residents; consequently, there were some years in which municipalities had no births or deaths. As expected, the number of municipalities with zero deaths for a given year increased after stratifying by age. Combining pre-intervention years and post-intervention years thus enabled us to generate feasible and more precise estimates of mortality rates.

To statistically evaluate the impact of *Familias en Acción* on mortality, we used a difference-in-differences approach. Due to the quasi-experimental design of the *Familias en Acción* program evaluation, the municipalities in the sample were not randomly assigned to treatment; thus differences in mortality rates at the end of follow-up across treatment groups could be attributable to systematic differences prior to the CCT program implementation rather than the intervention itself. The difference-in-differences approach manages this problem by comparing changes in the outcome over follow-up across the treatment groups.

The primary assumption of this approach is known as the common trends assumption. Per this assumption, the trends in infant and child mortality would have remained parallel for treatment and control municipalities had *Familias en Acción* not been implemented. While it is not possible to observe the counterfactual in practice, we evaluated this assumption by assessing trends in mortality prior to the implementation of *Familias en Acción*. We reasoned that if the common trends assumption is supported in this population, the differences in mortality between

treatment and control municipalities would remain relatively constant over time prior to the intervention.

For the primary analysis we performed mixed effects negative binomial regression models specifying all covariates as fixed-effects and municipalities as random effects, which allowed the impact of the CCT program to vary across municipalities. Negative binomial regression is similar to Poisson regression in that it can be used with non-negative counts or incidence rates,¹⁹ however it differs by assuming overdispersion of the outcome and that its variance exceeds the mean.¹⁹ Due to the frequency of small municipal death counts and positive skew of our data, we used likelihood ratio testing to compare the fit of a mixed effects Poisson model with the negative binomial regression (Supplemental Table 2.1). Additionally, we chose to specify municipalities as random effects as opposed to fixed effects due to several advantages of this strategy: it does not deplete the degrees of freedom, it avoids over-parameterization of the model, and it estimates a population-level distribution that all of the municipalities are drawn from, enabling us to generalize the results to similar municipalities across Colombia. We generated the difference-in-differences estimate through an interaction of the dichotomous variables, treatment and time, where the time variable was equal to zero for pre-intervention years (1998-2001) and one for post-intervention years (2002-2006). We obtained model estimates using *menbreg* in Stata/SE version 14.1.²⁰

To assess the common trends assumption, we repeated the analysis described above using available pre-intervention data, 1992-2001. In the mixed effects negative binomial regression model, we specified three pseudo-intervention years in three separate models: 1995, 1997, and 1999. We combined mortality data for years prior to the pseudo-intervention year to create baseline values and combined data from the pseudo-intervention year onward to create post-

intervention values. Again, we estimated the difference-in-differences estimate with an interaction term between treatment assignment and time.

For the secondary analysis examining specific causes of death, we chose causes of death based on two criteria. First, we examined the leading causes of death among all Colombian municipalities during the corresponding time periods to ensure that there would be sufficient deaths in the control and treatment municipalities. We then selected the leading causes of death that we expected could be influenced by the CCT program such as malnutrition, diabetes, or intestinal infections. We also included homicide and motor vehicle deaths for all age groups to examine the impact of the CCT on causes of death that we did not expect to be impacted by the CCT.

The study was reviewed by the Institutional Review Board of the Harvard T.H. Chan School of Public Health; who determined that the protocol met exemption criteria per the Code of Federal Regulations [45 CFR 46.101(b)(2)].

RESULTS

There were 122 municipalities included in the program evaluation. During follow-up, 13 control municipalities began receiving cash transfers.¹⁰ We excluded these 13 municipalities from the analysis. Table 2.1 displays municipal characteristics of municipalities at baseline, stratified by treatment assignment. Nearly half (45.6%) of treatment municipalities were located in the Atlantic or Pacific regions of the country, compared to 30.8% of control municipalities. Control municipalities tended to have less health infrastructure when compared to treatment municipalities with a lower mean number of health posts (\bar{x} =3.0 vs. \bar{x} =5.1) and a greater percentage of municipalities without a hospital (40.4% vs. 9.7%). Treatment municipalities tended to have higher levels of spending on public health, subsidized insurance, water and school

feeding when compared to control municipalities; however, these differences were not statistically significant. Differences in the proportion of homes with qualitative deficiencies were similar across control and treatment municipalities. Treatment municipalities had larger quantitative housing deficits indicating that the percentage increase in the supply of homes needed in order to meet demand was greater in treatment municipalities when compared to control municipalities.

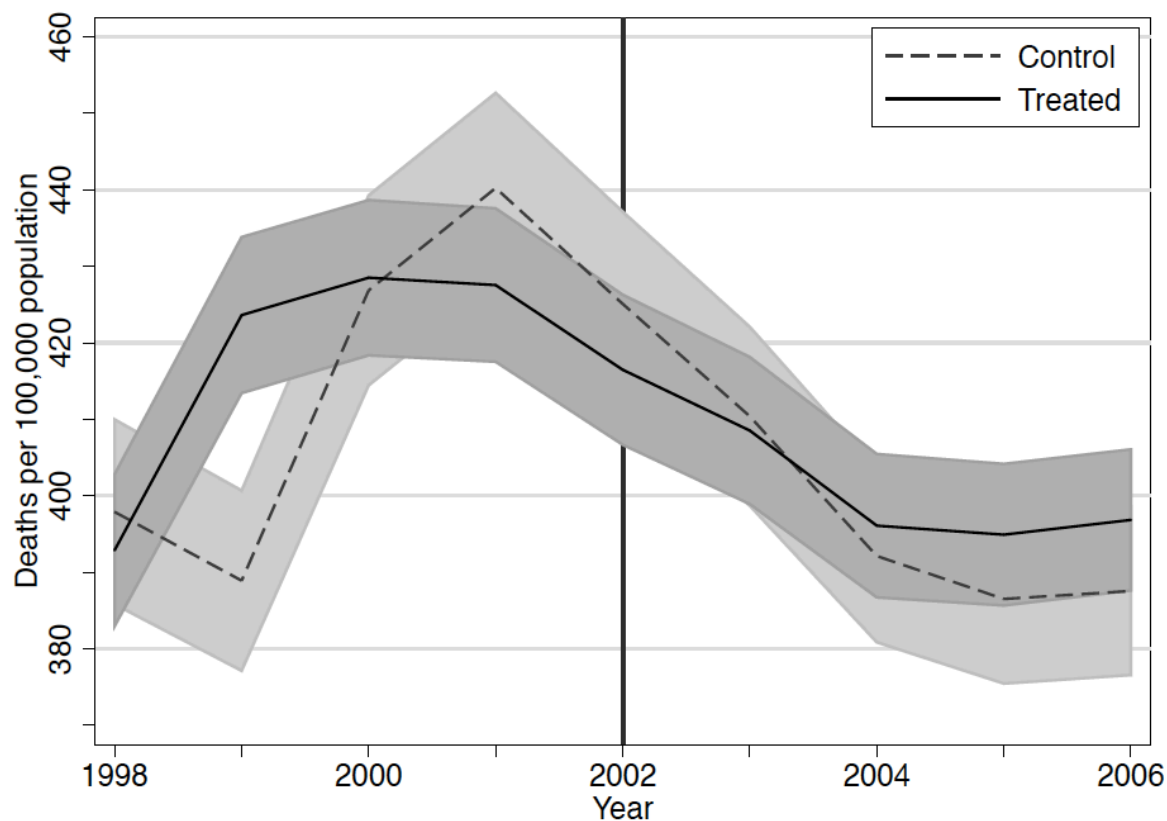
Table 2.1 Baseline municipal characteristics.

Characteristic	Control (n=52) mean(SD) or %	Treated (n=57) mean(SD) or %	t-test or χ^2 statistic (p value)
Urban-rural classification			9.6 (0.008)
Municipal center	53.9	38.6	
Populated center	46.2	45.6	
Rural, dispersed	0.0	15.8	
Region			2.7 (0.440)
Atlantic	23.1	33.3	
Eastern	34.6	24.6	
Central	34.6	29.8	
Pacific	7.7	12.3	
No. hospitals			10.1 (0.006)
0	40.4	9.7	
1	59.6	87.1	
2	0	3.2	
No. health centers			5.9 (0.316)
0	42.3	41.9	
1	44.2	35.5	
2	9.6	6.5	
3	0	6.5	
4	0	0	
5	0	3.2	
6	3.9	6.5	
No. health posts	3.0 (5.3)	5.1 (4.3)	-2.3 (0.025)
Spending (CO pesos)			
Public health	89,631	130,281	-1.94 (0.55)
Subsidized insurance	889,107	1,147,641	-1.71 (0.091)
Water	479,717	521,803	-0.77 (0.444)
School feeding	47,425	52,311	-1.03 (0.307)
Deficient housing			
Quantitative	9.3	11.6	-2.04 (0.044)
Qualitative	47.6	52.2	-1.15 (0.255)

The common trends assumption was supported by our analysis suggesting that there were parallel trends in mortality across treatment and control municipalities in the decade prior to the implementation of the CCT program. Thus, there were no statistically significant differences in the change in mortality prior to and after the pseudo-intervention years when comparing treatment and control municipalities. This finding was consistent when specifying 1995 as the pseudo-intervention year (IRR=1.04; 95% CI, 0.94-1.15; $p=0.47$), when specifying 1997 as the (IRR=1.07; 95% CI, 0.97-1.19; $p=0.18$), and when specifying 1999 as the pseudo-intervention year (IRR=1.07; 95% CI, 0.97-1.19; $p=0.19$).

Figure 2.1 displays age and sex standardized mortality rates by treatment assignment and year. For both treated and control municipalities, the all-age mortality rate increased in the late 1990s and peaked around 2001 before declining. At baseline, 2002, the control municipalities had a standardized mortality rate of 425.1 deaths per 100,000 population (95% CI 413.0-437.1) while treated municipalities had a slightly lower rate of 416.5 deaths per 100,000 population (95% CI 406.7-423.6). During follow-up, both treatment and control municipalities experienced a decline in all-age mortality. At the end of follow-up, 2006, control municipalities had a lower mortality rate (387.5 deaths per 100,000 population; 95% CI 376.6-398.5) as compared to the treatment municipalities (396.8 deaths per 100,000 population; 95% CI 387.6-406.1).

Figure 2.1 Age and sex adjusted mortality rates before and after the CCT program implementation by treatment assignment and year.



Notes: The shaded areas depict 95% confidence intervals. Age and sex adjusted mortality rates are per 100,000 standard population.

The effects of *Familias en Acción* on mortality by age group are displayed in Table 2.2

There was not a statistically significant difference in the change of all-age mortality between municipalities receiving *Familias en Acción* and the control municipalities from the pre- to post-intervention periods (IRR=0.96; 95% CI, 0.91-1.03; $p=0.26$). The stratified analyses by age category revealed mixed findings. For children less than five years of age, municipal exposure to *Familias en Acción* was not associated with a statistically significant change in mortality between pre- and post-intervention periods (IRR=0.94; 95% CI, 0.85-1.04; $p=0.22$). We also observed null findings in the age categories of 5-14 years, 15-44 years, and 45-65 years. When comparing mortality among adults aged 65 years and older across treatment and control

municipalities, we observed a statistically significant difference in the change in mortality over time, indicating a protective effective associated with municipal exposure to *Familias en Acción* (IRR=0.93; 95% CI, 0.87-0.99; $p=0.048$).

Table 2.2 Difference-in-differences estimates for multilevel negative binomial models: Change in mortality among municipalities exposed to *Familias en Acción* compared to their control counterparts, stratified by age group.*

Age group	Unadjusted model		Adjusted model	
	IRR (95% CI)	<i>p</i> value	IRR (95% CI)	<i>p</i> value
<5 years old				
Treatment	1.06 (0.92, 1.22)	0.44	1.02 (0.90, 1.16)	0.79
Time	0.95 (0.87, 1.03)	0.21	0.97 (0.88, 1.06)	0.48
Interaction	0.93 (0.84, 1.03)	0.16	0.94 (0.85, 1.04)	0.22
5-14 years old				
Treatment	1.00 (0.81, 1.25)	0.97	1.02 (0.85, 1.22)	0.86
Time	0.90 (0.79, 1.02)	0.10	0.93 (0.79, 1.09)	0.36
Interaction	0.98 (0.81, 1.19)	0.86	1.00 (0.82, 1.22)	0.99
15-44 years old				
Treatment	0.96 (0.77, 1.19)	0.68	1.00 (0.83, 1.20)	0.98
Time	0.89 (0.81, 0.97)	0.01	0.92 (0.83, 1.03)	0.15
Interaction	1.04 (0.92, 1.17)	0.53	1.06 (0.94, 1.21)	0.33
45-64 years old				
Treatment	1.04 (0.88, 1.23)	0.64	1.16 (1.02, 1.32)	0.03
Time	0.91 (0.85, 0.97)	0.004	0.90 (0.83, 0.97)	0.01
Interaction	0.99 (0.91, 1.07)	0.75	0.99 (0.91, 1.08)	0.84
≥65 years old				
Treatment	1.00 (0.85, 1.17)	0.98	1.12 (0.98, 1.28)	0.08
Time	1.11 (1.05, 1.18)	0.00	1.09 (1.03, 1.16)	0.003
Interaction	0.92 (0.86, 0.99)	0.03	0.93 (0.87, 0.99)	0.048
All ages				
Treatment	0.99 (0.83, 1.17)	0.87	1.14 (1.00, 1.30)	0.05
Time	1.05 (1.00, 1.11)	0.049	1.05 (0.99, 1.11)	0.12
Interaction	0.95 (0.90, 1.02)	0.14	0.96 (0.91, 1.03)	0.26

*The adjusted models adjust for municipal spending, region, municipal health infrastructure, and housing deficiency within municipalities.

Consistent with the primary analysis, the secondary analysis focusing on cause-specific mortality revealed minimal differences in changes in mortality trends between municipalities exposed to *Familias en Acción* and their counterparts (Supplemental Table 2.2). There was no statistically significant association of *Familias en Acción* and all-age mortality attributable to the

following causes: infectious intestinal disease, ischemic heart disease, malnutrition, pneumonia, or suicide (Supplemental Table 1.1). *Familias en Acción* was not associated with changes in mortality attributable to motor vehicle accidents or homicide; the null effect on motor vehicle accidents and homicides was observed for the all-age analysis as well as the stratified analyses. We did not observe an impact of the CCT program on deaths attributable to infectious intestinal disease, pneumonia, or malnutrition for children less than 5 years or for children between 5 and 14 years. Similarly, there was no statistically significant change in mortality attributable to cerebrovascular disease, HIV/AIDS, ischemic heart disease, or suicide for individuals 15 to 44 years of age. Findings for those 45-64 years of age and 65 years and older were mixed. We did not observe an impact of the CCT program on deaths attributable to ischemic heart disease, pneumonia, or cerebrovascular disease for these older age groups; however, there was a statistically significant change in mortality attributable to diabetes for the adults 45-64 years old (IRR=0.79; 95% CI, 0.66-0.93; $p=0.01$) and individuals 65 years of age and older (IRR=0.81; 95% CI, 0.68-0.97; $p=0.02$).

DISCUSSION

Mortality reduction closely aligns with the goals of the Colombian CCT program, *Familias en Acción*, to foster human capital development. Previous investigations in Mexico and Brazil demonstrated the ability of a CCT program to reduce mortality among young children and older adults. In the present study, we built on existing evidence that *Familias en Acción* improves health outcomes and health service utilization and explored the relationship between the CCT program and mortality in the Colombian context. Our analysis focused on the 2002-2006 period of the *Familias en Acción* program which targeted the nation's poorest sextile of families in predominantly rural, underserved areas of the country. By combining program

evaluation data and mortality registry data, we were able to compare changes in mortality across municipalities with similar socioeconomic and health infrastructure characteristics. Our findings indicate that *Familias en Acción* did not impact trends in all-age mortality among municipalities receiving the intervention, when compared to control municipalities. Further exploration of the impact on specific age groups yielded mixed findings; for instance, while mortality trends among children less than 5 years of age were not impacted by the CCT program, *Familias en Acción* was associated with reduced mortality among adults aged 65 years and older.

The lack of an impact of the Colombian CCT program on child mortality is an unexpected finding. Why didn't municipalities exposed to *Familias en Acción* experience reductions in child mortality attributable to the CCT? One explanation is that *Familias en Acción* did not sufficiently target key mechanisms. Between 1998-2006, 70.6% of deaths for children less than 5 years of age were attributable to 10 causes. Half of these leading causes of death are attributable to obstetric complications, perinatal infections or other perinatal problems, and congenital malformations. Interventions targeting perinatal care would likely impact mortality in these categories. *Familias en Acción* did not include perinatal programmatic components. In contrast, the CCT programs in Brazil and Mexico both included a prenatal care component which may help to explain the statistically significant impacts of these programs on child mortality.^{21,22} Another plausible explanation is that the CCT program did impact key mechanisms, suggesting an appropriate design for reducing mortality, but that the strength of the impact was insufficient. Recent evaluations support this possibility and indicate that gains in child health have been modest with the Colombian CCT program. Using the 2002-2006 program evaluation data, Lopez Arana et al. (2016) observed that *Familias en Acción* was associated with a reduction in thinness among children in households receiving benefits when the baseline

prevalence of thinness was less than 2%.²³ The CCT had no impact on either stunting or overweight despite baseline prevalence of 30% and of 15%, respectively,²³ and no impact on mother's caregiving attitudes or practices.²⁴

This study uncovered gains in older adult health mortality associated with *Familias en Acción* which can be explained by a spillover effect. There are no clear pathways from programmatic components of *Familias en Acción* through which we would have expected an impact on older adult mortality. This differs from the Mexican context in which the Mexican CCT program was associated with reductions in older adult mortality.¹⁶ The Mexican CCT program specified health conditionalities for all individuals living in the household. Older adults were required to attend an annual preventive examination.²² Additionally, the Mexican CCT program's health benefit was a free basic package of health services provided to beneficiary families by participating institutions, and the covered services focused on preventive interventions including immunizations, screening and control of arterial hypertension and diabetes mellitus, and basic sanitation.²²

One mechanism which may explain the spillover effect we observed in older adults is through reductions in communicable disease. If *Familias en Acción* reduced communicable illness among children in intervention municipalities through vaccination, improved hygienic practices in the home, and promotion of general health and adequate nutrition, this may have led to a reduced risk of community transmission. For example, populations known to be at high risk of developing influenza-related complications include children less than 5 years of age, adults aged 65 years and older, and with other comorbidities such as immunosuppression or diabetes mellitus.²⁵ A prior simulation study assessed the impact of increasing influenza vaccination among children aged 2-16 years and estimated an indirect impact on older adults mainly through

reduced transmission.²⁶ A separate observational study reported that adults in households of children attending schools with an influenza vaccination program experienced 50 fewer cases of flu-like illness per 1,000 households, when compared to adults in households of children attending schools without an influenza vaccination program.²¹ The influenza vaccination example highlights that older adults could be at high risk of complications from communicable diseases acquired from children, and may therefore stand to benefit from CCT programs such as *Familias en Acción* even if there is no measurable benefit in mortality in children. Although a prior evaluation of the Colombian CCT program observed mixed findings regarding changes in the incidence of acute diarrheal disease or respiratory disease among children¹², this evaluation was based on two questionnaires performed at baseline and at the end of follow-up which asked about acute communicable illness in the 15 days prior. Longitudinal surveillance of communicable disease would be required to establish a sustained difference in communicable disease incidence during the intervention period.

This study also uncovered unexpected findings when examining cause-specific mortality. There was no association between the CCT program and deaths attributable to causes we expected to be influenced by the CCT program for individuals younger than 45 years of age. Particularly for the age group less than 5 years, this supports the aforementioned explanations that the programmatic components were not targeting the key mechanisms or that the impact was insufficient. For adults aged 45 years and older we found that *Familias en Acción* reduced deaths attributable to diabetes. These results for adults 45 years and older should be interpreted with caution.

Our analysis for cause-specific mortality includes only the primary cause of death and research evaluating deaths attributed to diabetes indicates that death certificate errors are

common particularly when comorbidities are present. Researchers evaluating death certificates across the United States examined multiple causes of death reported on certificates and identified errors in the cause of death causal sequence.²⁷ In this US sample, 21% of death certificates incorrectly reported diabetes as a cause of another medical condition contributing to death while 11% incorrectly attributed a cause of death as a consequence of diabetes.²⁷ Overall there was over-reporting of the diabetes mortality rate and great variation across states. In our Colombian sample, there may be variation in misclassification of deaths across the municipalities particularly if there is between-municipal variation in the credentials and training of individuals completing death certificates and the prevalence of diabetes.

We recognize additional limitations to the analysis. Our analysis included deaths among all municipal residents, not solely deaths among those residents living in households receiving CCT benefits. Consequently, we might expect the effect of *Familias en Acción* to be small in municipalities where the proportion of eligible households is low. Although Colombia designed their CCT to be implemented at the municipal level and targeted municipalities with high levels of poverty for the 2002-2006 period which helps to minimize this concern. Underreporting of deaths in Colombia is another limitation and recognized problem, one that impacts the quality of death registry data.²⁸⁻³⁰ Our assumption is that the underreporting is non-differential across the matched control and treatment municipalities in our sample in which case underreporting will not bias the results of our primary analysis. A final limitation of our study is generalizability. The municipalities included in the program evaluation and eligible to receive the CCT program from 2002-2006 were selected based on particular criteria (e.g., population, urban-rural classification, and poverty prevalence) that distinguish them from other Colombian municipalities. Since 2006, the Colombian CCT has been scaled up nationally and the household eligibility as well as the

municipal eligibility criteria have changed. Thus, while our findings may be generalizable to Colombian municipalities with similar socioeconomic and geographical characteristics, their generalizability to the entire nation is limited.

The results of our study present an unexpected scenario in which child mortality is not impacted by the CCT program despite targeted health conditionalities for this group while older adult mortality is impacted in the absence of any targeted health conditionalities. Although the findings are less surprising when we consider the program health conditionalities and health benefits. *Familias en Acción* has modest health conditionalities and health benefits when compared to the Mexican CCT program, for example. In order to reduce older adult mortality further and to significantly impact child mortality through the Colombian CCT program, further research is warranted to understand the mechanisms influencing death and to assess the need for changes in the health components of the program.

SUPPLEMENTAL MATERIAL

Supplemental Table 2.1 Difference-in-differences estimates for multilevel Poisson and negative binomial models, and likelihood-ratio test comparison of the Poisson model nested in the negative binomial model.

Model	Unadjusted model		Likelihood-ratio test	
	IRR (95% CI)	<i>p</i> value	χ^2 statistic	<i>p</i> value
Poisson			227.95	<0.001
Treated	0.98 (0.84-1.14)	0.778		
Time	1.03 (1.01-1.05)	0.001		
Interaction	0.97 (0.94-0.99)	0.009		
Negative binomial				
Treated	0.99 (0.84-1.15)	0.865		
Time	1.05 (1.00-1.10)	0.033		
Interaction	0.95 (0.90-1.01)	0.132		

Supplemental Table 2.2 Difference-in-differences estimates for multilevel negative binomial models: Change in mortality for specific causes of death among municipalities exposed to *Familias en Acción* compared to their control counterparts, stratified by age group.*

Age group	Adjusted model	
	IRR (95% CI)	p-value
<5 years old		
Infectious intestinal disease	0.86 (0.65-1.15)	0.32
Malnutrition	1.01 (0.91-1.36)	0.95
Pneumonia	0.96 (0.78-1.18)	0.71
Respiratory disorder (perinatal)	no convergence	no convergence
Auto accident	1.05 (0.88-1.24)	0.61
Homicide	1.11 (0.91-1.36)	0.31
5-14 years old		
Infectious intestinal disease	0.86 (0.64-1.15)	0.31
Malnutrition	1.01 (0.75-1.34)	0.97
Meningitis & other CNS diseases	no convergence	no convergence
Pneumonia	0.95 (0.76-1.17)	0.66
Auto accident	1.03 (0.87-1.21)	0.74
Homicide	1.11 (0.90-1.36)	0.32
15-44 years old		
Cerebrovascular disease	1.01 (0.91-1.23)	0.80
HIV/AIDS	1.21 (0.83-1.76)	0.32
Ischemic heart disease	0.97 (0.86-1.09)	0.58
Suicide	1.05 (0.81-1.36)	0.70
Auto accident	1.05 (0.89-1.24)	0.55
Homicide	1.13 (0.92-1.39)	0.24
45-64 years old		
Cerebrovascular disease	1.02 (0.91-1.14)	0.72
Diabetes mellitus	0.79 (0.66-0.93)	0.01
Ischemic heart disease	0.97 (0.85-1.09)	0.57
Stomach cancer	0.83 (0.67-1.03)	0.09
Auto accident	1.05 (0.89-1.25)	0.55
Homicide	1.13 (0.92-1.39)	0.23
≥65 years old		
Cerebrovascular disease	1.05 (0.95-1.17)	0.34
Diabetes mellitus	0.81 (0.68-0.97)	0.02
Ischemic heart disease	0.99 (0.87-1.11)	0.83
Pneumonia	1.00 (0.82-1.22)	0.97
Auto accident	1.09 (0.91-1.30)	0.34
Homicide	1.15 (0.94-1.41)	0.18
All ages		
Diabetes mellitus	0.79 (0.66-0.94)	0.01
Infectious intestinal disease	0.87 (0.65-1.16)	0.35
Ischemic heart disease	0.96 (0.85-1.09)	0.55
Malnutrition	1.03 (0.77-1.37)	0.86
Pneumonia	0.97 (0.79-1.18)	0.75
Suicide	1.05 (0.81-1.36)	0.71
Auto accident	1.05 (0.89-1.24)	0.57
Homicide	1.13 (0.92-1.38)	0.25

*Note: The offsets for each model were adjusted to account for differences in the age distribution of the population. For example, the offset for the first model was the <5 years old population for the corresponding time period, while the offset for the all ages model was the total population

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PAPER 3

The political economy of health protection in conditional cash transfer programs

ABSTRACT

Conditional cash transfer programs (CCTs) have been widely adopted across Latin America in an effort to reduce poverty and build human capital. Despite research indicating the positive impact that CCTs can have on health, the emphasis on health among Latin American programs varies widely. It is unclear why countries elect to protect and promote health to differing degrees. Through case analysis, this investigation aims to uncover the factors that impact policy adoption, specifically in relation to the health components of CCTs. We analyze the Colombian program and this country's partial adoption of the Mexican CCT investigating the primary research question: What were the mechanisms that led to partial adoption of the Mexican CCT design in the Colombian program? We investigate this research question using qualitative data and guide the analysis with a conceptual framework that pits four possible theories of policy diffusion against each other: *external pressure framework*, the *normative imitation framework*, the *rational learning framework*, and the *cognitive heuristic framework*. The study suggests that Colombian policymakers' decision to adapt the Mexican CCT model were motivated by rational learning and offers insight regarding the factors that support or obstruct policy designs to optimize human capital development of children and health among nations' most vulnerable residents.

BACKGROUND

Conditional cash transfer programs (CCTs) have diffused rapidly throughout Latin America since the late 1990s. In 1997 there were only a few CCTs in the region including *PROGRESA* in Mexico.^p By 2008, 16 Latin American nations had adopted this new model of poverty reduction programming.¹ CCTs vary extensively across the region regarding program components ranging from initial population coverage to payment mechanisms.^q However, there are underlying commonalities reflected in the defining features of CCTs. The 2009 World Bank Report defines CCTs in the following way, “The common definition of a conditional cash transfer program is one that transfers cash to poor households if they make prespecified investments in the human capital of their children” (p. 31).¹ The definition emphasizes a shared goal of CCTs, human capital development.

While the general structure of CCTs in Latin America tends to be similar, the program designs diverge especially in relation to health benefits and health conditionalities. The majority of programs include health conditionalities specific to young children (generally those age seven or younger) and require that these children attend regular health examinations where they receive immunizations and growth and development monitoring (Table 3.1). CCTs in Bolivia, Chile, and Costa Rica are the exception focusing more exclusively on education and include no health conditionalities for any age group.¹⁻⁴ There is greater variation within the region for adult health

^p *PROGRESA* is an acronym for Programa de Educación, Salud, y Alimentación or Program for Education, Health, and Nutrition. The program name was changed to *Oportunidades* in 2002 under President Fox’s administration. In 2014, the program name was changed again to *Prospera*. For the purposes of this proposal, I will refer to the Mexican CCT as *PROGRESA* and the discussion of the program design will pertain specifically to the design of *PROGRESA*.

^q Relevant factors that vary across programs include initial coverage, scale-up, budget, size of the benefits, role of the policy (such as temporary economic relief v. ongoing social assistance), benefit structure, targeting, monitoring of program adherence, conditionalities, program evaluation, and payment mechanisms. See Fiszbien & Schady (2009) for a discussion of variations in programmatic components across CCTs worldwide.

conditionalities. Of the 16 countries examined, seven have no health conditionalities for adults, five have adult health conditionalities that solely apply to pregnant women, two programs require that a parent (generally the mother) attend health education workshops, and two programs have more than one adult health conditionality as well as conditionalities that apply to adults other than pregnant women. The two countries with more extensive adult health conditionalities, Peru and Mexico, are unique. The Peruvian program includes conditionalities that are public health interventions which target all members of the family; households are required to use chlorinated water and anti-parasitic medication.⁵ Mexico is particularly unique among the group, because it is the only CCT that offers an extensive health package including basic services and conditionalities that target all members of the household. The Mexican design will be discussed in greater detail subsequently.

Table 3.1 Health conditionalities by age group within Latin American CCT programs.

Country	Program	Health Conditionalities	
		Pediatric	Adult
Argentina ^{1,6}	Programa Familias	Adherence to the National Immunization Plan for children <19 years	Bimonthly health exams for pregnant women
Bolivia ^{1,2}	Juancito Pinto	None	None
Chile ³	Chile Solidario	No health behavior requirements; conditionalities linked to families' social service contracts and participation in the program	
Colombia ⁷	Familias en Acción	Regular health exams for children <7 years	Parental attendance at health education workshops
Costa Rica ⁴	Superémonos	None	None
Dominican Republic ^{1,8}	Solidaridad	Bimonthly health exams for children <1 year; health exams for children 1-5 years every four months	None
Ecuador ⁹	Bono de Desarrollo Humano	Bimonthly health exams for children <6 years; nutritional supplements for children <6 years	None
El Salvador ¹⁰	Red Solidaria	Immunization adherence for children <5 years; regular health and nutrition monitoring for children <2 years	None
Guatemala ^{1,11}	Mi Familia PROGRESA	Regular health exams for children 0-16 years	Regular health exams for pregnant women
Honduras ¹²	Programa de Asignación Familiar I	Regular health exams for children <6 years	None
Mexico	PROGRESA/Oportunidades/Prospera	(Table 3)	
Nicaragua ¹³	Red de Protección	Preventive health exams for children <5 years	Attendance at health education workshops held every other month
Panama ¹⁴	Red Oportunidades	Periodic health exams with assigned provider for children <5 years	For pregnant women: periodic health exams with assigned provider for prenatal and postnatal care
Paraguay ^{15,16}	Red de Promoción y Protección Social	Growth and development monitoring health exams for children <5 years; medical exams and preventative dental care for children 5-14 years	For pregnant women: prenatal and postnatal health exams
Peru ⁵	Juntos	Use of National Nutritional Assistance program for children <3; use of chlorinated water; use of anti-parasitic medication	For mothers of children <14 years: complete vaccinations, health exams including prenatal and postnatal care; attendance at health education workshops; use of chlorinated water; use of anti-parasitic medication
Uruguay ¹⁷	Plan de Asistencia Nacional a la Emergencia Social	Health exams for children <5 years	Health exams for pregnant women

CCTs have particular relevance for public health; however, the health impact likely depends on the structure and design of the program. There are multiple mechanisms through which CCT programs can impact health. First, CCTs provide monetary cash transfers to families that can be used to ensure the nutritional health of the household members, in particular children's nutritional status. Second, monetary cash transfers conditional upon adherence to health promotion and disease prevention behaviors such as regular health exams directly impact health. And third, CCTs target vulnerable populations, usually the nation's poorest families, which provides a means of reducing health disparities by socioeconomic within a nation.

Research evaluating the impact of CCTs on health is minimal compared to evaluations focused on economic or educational outcomes. Still, existing research suggests that CCTs can positively impact the health of children and adults. Considering that the majority of health conditionalities across countries are routine exams for young children and that there is a simultaneous push for monetary transfers to be used to improve the nutritional status of children, it is not surprising that the majority of evaluative findings correspond closely. CCTs have been linked to an increase in health care usage and routine pediatric appointments for children < 7 years in Nicaragua, Colombia, Honduras.^{13,18,19} Young children exposed to the CCT programs in Mexico, Nicaragua, and Colombia were also less likely to be underweight or to be malnourished as compared to their control counterparts.^{13,20,21}

Health findings for adults are mostly confined to Mexico. There is one exception, a study of the Colombian program, indicating an increase in BMI and an increased odds of obesity among women 18 years and older who were exposed to the program as compared to those who were not.²² In contrast, studies of weight among program-exposed adults in Mexico indicate a lower average BMI and a lower prevalence of obesity as compared to control subjects.^{23,24}

Additional studies of the Mexican program have yielded that adults 18-50 years exposed to the CCT program report fewer days of impairment due to health problems and fewer days in bed due to health problems.²⁵ The Mexican program has also yielded benefits for older adults, those at least 50 years of age, including fewer reported sick days in the last month, reduced self-reported hypertension, increased ability to do vigorous physical activities, an increased likelihood to report working for an income in the previous week, reductions in mortality for conditions feasibly linked to program impacts, and increased vaccination coverage.²⁵⁻²⁷ The plethora of adult health outcomes reported in Mexico and the void of it other Latin American countries is likely due to the extent of adult health data that was collected in each country and the program design regarding health. As mentioned above, Mexico is the only country in the region with extensive health programming for adults, thus an impact on health is expected whereas a spillover effect for adult health in other countries may not be as likely.

CCTs offer a means of promoting health and preventing illness among a nation's poorest residents, but it is unclear why countries elect to promote and protect health to differing degrees. *PROGRESA* in Mexico was one of the earliest programs in Latin America and boasts the most extensive health package in its policy design. Yet, as the CCT policy diffused throughout Latin America, the health packages designed and adopted were much less extensive and in some cases omitted entirely. Thus, the goal of this research is to uncover the mechanisms that led to partial adoption of the Mexican CCT design focusing specifically on the policy adoption and design process in Colombia. Colombia was chosen because Mexico and Colombia shared similar values of economic, health, and educational indicators at the start of their CCT programs. Additionally, the Colombian program launched five years after the Mexican program and partially adopted the health components of the Mexican policy. Finally, both CCT programs exist to this day and have

been scaled up to the national level. At the 10 year review, the Colombian program covered 25% of the country, 55% of the nation's poor, and 70% of eligible families.²⁸ Similarly in Mexico, the CCT benefits 5.8 million or a fourth of the population.²⁹ Applying the goal of this research to the Colombian case, our primary research question is then: What were the mechanisms that led to partial adoption of the Mexican CCT design in the Colombian program?

CCT Development Context in Mexico and Colombia

For many countries, economic downturn was a motivating factor in CCT adoption. In the 1990s, both Mexico and Colombia were hit with economic shocks and both countries subsequently launched CCTs. The Mexican CCT, *PROGRESA*, was implemented in 1997. Preceding this implementation, Mexican GDP growth ranged from 3.6-5.1% between 1990-1994 before experiencing negative growth, -5.7%, in 1995.³⁰ Similarly in Colombia, where the CCT *Familias en Acción* was initiated in 2002, GDP growth declined from 5.8 in 1994 to 0.6 in 1998 and dropped further to -4.2% in 1999.³⁰ The CCTs in Mexico and Colombia were intended to address rural poverty in particular, and both countries had similar proportions of the population living in rural areas as well as a high prevalence of rural poverty.³⁰ In 1997 26% of the Mexican population lived in a rural area and per 1996 data 80.7% of rural residents lived in poverty.³⁰ In 2002, 27% of the Colombian population resided in a rural area and of those residents 61.7% lived in poverty.³⁰

Faced with similar economic situations, Mexico and Colombia had comparable general health and educational characteristics at the start of their CCTs (Table 3.2). The under 5 mortality rate in Mexico was 31/1,000 in 1997 and 24/1,000 in Colombia in 2002.³⁰ Mexico spent 4.8% of total GDP on health in their CCT's starting year while Colombia spent 5.7% in their starting year.³⁰ School enrollment was also fairly similar between the two nations. Mexican

net enrollment was 96% for primary school in 1997 and 50% for secondary school in 1996. Colombian net enrollment was 93% for primary school in 2002 and 58% for secondary school in 2004 (the earliest year for which data was available).³⁰ Finally, at the time of CCT adoption, Human Development Index scores were similar between the two countries with a value of 0.77 in Colombia and 0.79 in Mexico.³¹

Table 3.2 Cross-country comparison of economic, social, and health indicators.

Indicator	Mexico (1997)	Colombia (2002)
Pre-program GDP growth	-5.7% (1995)	-4.2% (1999)
Rural population	26%	27%
Rural poverty	80.7% (1996)	61.7%
>5 Mortality Rate	31/1000	24/1000
% GDP on Health	4.8%	5.7%
Primary school enrollment	96%	93%
Secondary school enrollment	50% (1996)	58% (2004)
Human Development Index	0.77	0.79

Comparing Program Design in Mexico and Colombia

Before detailing the specifications of each program, it warrants recognizing that the policy response in Mexico and Colombia to widespread poverty was accompanied by an ideological shift in the two nations' approach to social welfare. The theoretical basis of the CCTs in Mexico and Colombia is the human capital theory. Certainly this is not a new theory. In fact Adam Smith is credited with being the first person to apply the concept of human capital; in *The Wealth of Nations* published in 1776 he explained that improvements in a worker's skills were associated with improvements in economic welfare and progress. He further explained that investment in workers' skills and human capital leads to personal economic welfare for the worker.³² Thus, per this theory the poor are poor because they have fewer skills than the non-poor and fewer skills associated with economic gain in a given sociopolitical context than the non-poor.³² Applied to social policies, the theory postulates that poverty persists due to

intergenerational transmission of poverty and the lack of investment in human capital to enable young people to escape poverty.³³

The goals of constructing social equity and fostering the development of human capital are evident in *PROGRESA* and *Familias en Acción* and can be used to understand the rationale behind programmatic components. In the Rules of Operation of the PROGRESA Program published in the *Diario Oficial* (Official Daily) on March 15, 2000, the purpose of the Mexican CCT is clearly stated³⁴:

“The purpose of the Education, Health and Nutrition Program (PROGRESA) is to support families living in extreme poverty with the aim to expand opportunities and capacities of family members to achieve better levels of wellbeing and also to conduct activities that elevate living conditions through improvements in education, health, and nutrition.” (p. 1)^r

Similarly, in the 2010 Colombian National Department of Planning document, *The Beaten Path: Ten Years of Familias en Acción*, the authors specify the underlying motivations of *Familias en Acción*²⁸:

“On the principle of equity, it is necessary that the public supports individuals and families to access social services to which they have a Constitutional right including

^r Translated by EEV from original text, “Que el Programa de Educación, Salud y Alimentación (PROGRESA) tiene como propósito apoyar a las familias que viven en condición de pobreza extrema con el fin de ampliar las oportunidades y capacidades de sus miembros para alcanzar mejores niveles de bienestar y que, asimismo, se propone llevar a cabo acciones que propicien la elevación de sus condiciones de vida a través del mejoramiento de oportunidades de educación, salud y alimentación...”

among these health, education and nutrition, essential goods needed to get out of poverty” (p. 6).^s

In addition to a shared theoretical foundation, there are many commonalities between the designs of the Mexican *PROGRESA* and the Colombian *Familias en Acción*. Both programs use a targeting mechanism to identify the most economically vulnerable families. Additionally, both programs distribute a monetary transfer dependent upon adherence to behavioral conditionalities. The Mexican CCT and the Colombian CCT focus on education, nutrition, and health. Benefits include educational monetary transfers to families with school-aged children dependent upon school enrollment and attendance and nutritional monetary transfers to families with children less than 7 years dependent upon adherence to the health conditionalities.

Despite the seemingly parallel designs, there is one significant difference between the Mexican and Colombian programs, the role of health and health conditionalities. In Colombia, the health component focuses on children under 7 years. In Mexico, there is particular attention given to young children, but the CCT program does target all household members. The Mexican health benefit is a free basic package of health services provided to beneficiary families by institutions participating in the program. A list of the services provided by the package reveals an emphasis on preventive interventions; immunizations, prevention and control of arterial hypertension and diabetes mellitus, and basic sanitation are a few of the items demonstrating this slant (Supplemental Figure 3.1). An excerpt from the 1999 evaluation of *PROGRESA* authored by the Secretary of Social Development reveals an intention to reorient providers and families alike to focus on preventive care:

^s Translated by EEV from original text, “Por principio de equidad, es necesario que desde lo público se apoye a los individuos y familias a que accedan a los servicios sociales que por Constitución tienen derecho, entre ellos salud, educación y alimentación, activos fundamentales para salir de la pobreza.”

“Basic health care for all family members, promoting change in the allocation and use of health services, with the participation of both families and service providers, that is based on prevention through the promotion of self-care and appropriate monitoring of family nutrition” (p. 23).^{35,t}

The Colombian health interventions focus on prevention as well, but the prevention efforts are largely focused on young children. The health conditionalities in Colombia, aside from the health workshops for mothers, apply only to young children. In contrast, health conditionalities for *PROGRESA* apply to all household members. Table 2 offers a side-by-side comparison of the health conditionalities corresponding to various ages in the two national contexts. In both countries, all household members must comply with the health visit guidelines for their age in order for the household to receive the nutritional subsidy.

Table 3.3 Health conditionalities of CCT programs by age and country.

Age group	Colombia, <i>Familias en Acción</i>	Mexico, <i>PROGRESA</i>
0-6 years	Immunizations * Growth, height, and weight monitoring	Immunizations * Growth, height, and weight monitoring
7-16 years	None	Immunizations * Growth and development checks * Early disease detection * Teenager attendance at health talks
Pregnant women	None	Nutritional counseling * Pregnancy growth monitoring * Iron Supplementation * Tetanus vaccination
Postpartum and lactating women	None	Family planning * Newborn care * Nutritional counseling * Breastfeeding promotion
Mothers (or designated recipient of cash transfer)	Attendance at health talks	Attendance at health talks
17-60 years	None	Annual visit: family planning; early disease detection; reproductive health
60+ years	None	Annual visit: early detection of chronic disease and neoplasms

^t Translated by EEV from original text, “Atención básica a la salud de todos los miembros de la familia, fomentando un cambio en la orientación y utilización de los servicios de salud, con la participación, tanto de las familias como de las instituciones proveedoras de servicios, que derive en una actitud preventiva mediante el fomento al autocuidado de la salud y la adecuada vigilancia de la nutrición familiar.”

Clearly both the Mexican CCT and the Colombian CCT incorporate preventive health care and health conditionalities into their programs. The main difference is that that Colombian program is less extensive and narrower, focusing only on children less than 7 years of age and to a lesser extent to the mothers of these children. Thus, while creators of *Familias en Acción* adopted a program design closely resembling the *PROGRESA* design, they deviated from the Mexican model when developing health conditionalities.

CONCEPTUAL FRAMEWORK

Kurt Weyland has written extensively on policy diffusion, particularly in Latin America, and conducted a theoretical analysis of four possible frameworks of policy diffusion.³⁶⁻³⁹ The analysis offers insight through exploring factors that impact adoption at a national level. Weyland's work provides a useful theoretical approach for uncovering the mechanisms that led to partial adoption of the Mexican CCT design in Colombia.

The four frameworks described by Weyland (2005) are the *external pressure framework*, the *normative imitation framework*, the *rational learning framework*, and the *cognitive heuristic framework* (Supplemental Figure 3.1). *External pressure* explains policy diffusion through forces external to the country while the remaining three frameworks present internal explanations for policy diffusion. As the name suggests, *external pressure* attributes diffusion to influence from the international context and to international organizations in particular.³⁶ International organizations can influence policymakers through incentives for adoption or design through technical provisions and support or monetary assistance. Additionally, they can discourage deviations from recommendations through sanctions and coercion.^u This is a reasonable explanation to consider in the Colombian context since *Familias en Acción* was initially financed

through a loan approved by two international organizations, the World Bank and the Inter-American Development Bank.⁴⁰

Per the *normative imitation framework* policymakers are drawn to a policy idea that looks modern and appropriate. Eager to gain international acceptance and to appear at the forefront of policy innovation, policymakers conform to international trends.^{5,36} Certainly there was an international trend in CCTs in Latin America considering the majority of countries in the region adopted a CCT policy between 1997-2008.¹ Colombia was an early adopter in Latin America; *Familias en Acción* was created in 2000, pilot tested throughout 2001, and launched in 2002.²⁸ Assuming that Colombian policymakers viewed the Mexican CCT, which had been created just a few years before, as innovative and perhaps as the new norm to imitate, the *normative imitation framework* may have explanatory ability for the Colombian case.

In contrast to *normative imitation*, the *rational learning framework* emphasizes self-guided interest and selection. That is, policymakers select a particular policy based on their assessment of the utility of that particular policy to address the local problems.³⁶ Policymakers act autonomously and the international acclaim or popularity of the policy is not the deciding factor. In the Colombian context, this framework suggests that policymakers considered various solutions to address the consequences of economic downturn, in particular poverty. Ultimately, they selected the conditional cash transfer policy and developed the design of *Familias en Acción*, because it was the best perceived solution for Colombia. The way in which *Familias en Acción* was implemented provides reasonable support for exploring the *rational learning framework*. Unlike *PROGRESA* in Mexico which replaced the existing social welfare policy program National Solidarity Program (PRONASOL), Colombia's *Familias en Acción* was not a stand-alone policy nor did it replace existing programming.³⁵ Instead *Familias en Acción* was

one of three antipoverty programs created as part of a temporary economic relief package.⁴⁰ This policy package has features unique to Colombia and could reflect a Colombian attempt to design a policy that addressed local issues. (Appendix for a discussion of the political and economic historical context leading up to the CCT adoption in Mexico and Colombia)

The final framework, the *cognitive heuristic framework*, explains policy diffusion and adoption as determined by the cognitive processes of policymakers. The assumption behind the *cognitive heuristic framework* is that human rationality is bounded by the limitations of human memory and processing; thus, heuristics enable decision-making in a social environment saturated with information.³⁶ There are three types of heuristics or mental shortcuts that decision-makers draw from in order to make decisions. The *availability heuristic* leads decision-makers to place importance on information that happens to be available, impresses them, or captures their attention.³⁶ For example, what information regarding the Mexican CCT program was “available” to Colombian decision makers and policy designers? Were they aware of the extensiveness of the health conditionalities and services in the Mexican policy? The second type of heuristic, the *representativeness heuristic*, suggests that how decision-makers evaluate successes and failures ultimately influences their decisions regarding policy adoption.³⁶ For the Colombian case, the analysis explores how Colombian policy designers evaluated the Mexican CCT program and whether they incorporated those features of the Mexican CCT program that they viewed most favorably. Lastly, the *anchoring heuristic* persuades policymakers to assign an inappropriate and excessive weight to initial values and this initial assessment proves to endure over time.³⁶ Accordingly, the analysis must examine the initial values that Colombian policymakers applied to the Mexican CCT program and the “stickiness” of those values.

METHODS

To assess the four theories of policy diffusion we collected data on the design phase of *Familias en Acción* from key informant interviews as well as documents from the following sources: peer-reviewed journals, the Mexican government, the Colombian government, international finance organizations, and non-governmental organizations. We conducted 13 key informant interviews speaking with Colombian scholars, government employees involved in the design and operation of *Familias en Acción*, and individuals from international finance organizations involved in the design and development of the CCT program. The sampling procedure for key informant interviews relied on a combination of convenience and snowball sampling - initially identifying individuals through program materials and evaluations, and then asking interviewees to assist in the identification of other key actors. We used a semi-structured interview schedule to assess the conceptual framework. Seven faculty members across five universities internationally with expertise in political economy and/or political science reviewed drafts of the interview schedule and offered input to ensure that the research question could be evaluated in its entirety. Interviews were recorded and transcribed and accompanied by interviewer notes taken during the exchange. All transcriptions, interview notes, and documents reviewed were analyzed using ATLAS.ti version 1.0.43 for Macintosh which enabled the coding and tracking of evidence for the theories and aided the process of triangulation.⁴¹ The study was reviewed by the Harvard T.H. Chan School of Public Health IRB and determined that criteria met exemption per regulations found at 45 CFR 46.101(b)(2).

RESULTS

External Pressure Framework

Assessing the ability of the External Pressure Framework to explain the partial policy adoption requires assessing the extent of external actor involvement, examining the rhetoric of external actors, and evaluating the interplay of internal and external actors to understand the latitude of Colombian policymakers in designing *Familias en Acción*.

There were various external actors involved in the development of the *Familias en Acción* program and more broadly in the discussion and financing of social protection in Colombia at the time of the program development. As mentioned in the social welfare discussion above, Colombia received loans from international finance organizations for the development and implementation of a three-program social protection package which included *Familias en Acción*.⁴² The UNDP was also involved in the design of *Familias en Acción* through Misión Social, a group of technocrats financed by UNDP but immersed within the Colombian National Department of Planning (DNP).^v

Having established involvement of external actors in the design of *Familias en Acción*, it is necessary to determine whether the external actors were advocating for changes consistent with the program components of *Familias en Acción* and in particular with the health components. In 1994, the World Bank published a report entitled "Poverty in Colombia" which pointed out the concentration of poverty in rural areas, the duplication of social protection services, the failure of services to reach the intended beneficiaries, and the lack of clarity regarding the population intended to benefit from particular programs.⁴³ The World Bank authors encouraged Colombia to look abroad for potential solutions writing, "Several countries in Latin

^v Interview with academic researcher and former director at DNP; Bogotá, Colombia; September 11, 2015.

America have expressed interest in, and in several cases adopted, innovative social programs that began in Colombia...Colombia should look at good programs in other countries to strengthen its approach to poverty reduction" (p. 180). Three aspects of this report align with the eventual design of *Familias en Acción*: (1) *Familias en Acción* targeted rural poverty, (2) *Familias en Acción* used the SISBEN to target program eligibility and benefits, (3) Colombia adopted an anti-poverty policy from another Latin American country. While the alignment suggests that the World Bank had a hand in guiding these decisions, the reality is that poverty was concentrated in rural areas making a focus on this geographic area a rational decision. What is more, the Colombian government had already committed to targeting; the 1991 Constitution mandated that social programs be targeted, Law 100 of 1993 specified targeting of health insurance benefits based on socioeconomic status, and CONPES 022 of 1994 described a targeting tool for social spending.^{44,45}

The influence of UNDP and Misión Social is difficult to tease apart from the Colombian government since Misión Social was housed and operated within DNP, the government body assigned to design *Familias en Acción*. For example, Misión Social and DNP coauthored CONPES 022 of 1994. However, a primary role of Misión Social was to further human development in Colombia and with DNP and UNDP, Misión Social conducted human development studies. The growing interest in human capital is evident when comparing the 1998 and 1999 Human Development Reports. The 1998 report uses the phrase "human capital" 8 times in the 169-page document while the 1999 report uses the phrase 71 times within 198 pages and includes an entire chapter dedicated to the accumulation of human capital.^{46,47} For health in particular, the reports make a link between health and human capital without concentrating on any particular age group; the 1999 report reads, "As an investment, good health status facilitates

education, work, and life in general; like good consumption, current health status is an aspect of wellbeing" (p. 67).^{47.w} These documents uniquely provide insight into the ideology embraced by external and by internal actors. Here there is some suggestion that when building human capital, the health of all ages is relevant. If this idea could be attributable to an external actor, we would again conclude that Colombian policymakers acted independently by concentrating health components on young children.

Upon exploring the interplay of external actors (primarily IFOs) and internal actors, there is a consensus that the IFOs were promoting a CCT to address poverty in Colombia and suggesting Mexico's CCT as a model. In the Human Capital Project Summary (2006), World Bank authors write, "The [DNP] was in charge of the design of the Familias en Acción program. Based on a study tour of the Mexico Oportunidades program, the [DNP] team developed an operational manual for the Familias program which guided its implementation" (p. 5).⁴⁸ A director at DNP, who has worked within policy evaluation and public inversion at the agency, echoed this explanation of the process and the actors' roles explaining, "The technical teams from the banks [the] World [Bank] and IABD assisted us and financially they assisted as well and... the conceptual and empirical basis of the program [Familias] was Progresá, Oportunidades, and Bolsa Escola adapted to the Colombian conditions... so then what we did, if you will, was an adaptation of these initiatives to the Colombian case based on all of the objective information on poverty, basic needs, and living conditions of these households."^{xy} Ensuring local adaptation

^w The report is written in Spanish and this quotation was translated by EEV from the original text, "Como inversión, un buen estado de salud facilita el estudio, el trabajo y la vida en general; como bien de consumo, el estado de salud en el presente es un elemento del bienestar."

^x Interview with DNP director; Bogotá, Colombia; September 7, 2015.

^y Comment translated by Esther Velásquez, original version: "Nos acompañaron en la formulación los equipos técnicos de los bancos, (el Banco) Mundial y BID y financieramente se hizo con ellos también y digamos que la base empírica y conceptual del programa (Familias en Acción) era Progresá, Oportunidades y Bolsa Escolar adoptada a las condiciones de Colombia... entonces lo que hicimos fue

required advocacy, and there was push back from the Colombian DNP team in working with the Banks against adopting the Mexican model without modifications due largely to contextual differences between the countries. For example, Mexico has a much larger indigenous population which constitutes a significant portion of the rural, poor population; this is not the case in Colombia.^z Consequently, the team advocated to ensure that the program was adapted to the local condition, and the cross-country programmatic differences, particularly in the health conditionalities, indicate that the DNP team did successfully make changes to the Mexican CCT model.

IFOs involved in the design of *Familias en Acción* had the powerful combination, described by Dobbin (2007), of both control of resources and ideas supported and promoted by epistemic communities that are connected to policymakers.⁴⁹ Yet to further bolster the argument that Colombia acted with latitude when designing *Familias en Acción*, consider Weyland's argument that nation state may be the actor directing the moves of the external actors.³⁶ In Mexico, for example, the technocratic creators of the CCT involved international organizations to ensure continuity of the program; Mexico contracted the International Food Policy Research Institute to conduct an external evaluation, which was funded in part by IADB.⁵⁰ The findings indicating program benefits were presented internationally, and the data were made available to scholars all of which created pressure to continue the program. Additionally, Mexico signed a loan in 2001 prior to the Fox Administration, which prevented the government from changing certain aspects of the CCT without approval from IADB, a move which was intended to ensure survival of the program despite changes in political leadership.⁵¹ A similar pattern was seen in

hacer si quiere como una adaptación de esta iniciativas al caso colombiano sobre la base de toda la información objetiva sobre pobreza, necesidades básicas, y condiciones de vida de estos hogares.”

^z Interview with former DNP employee and part of the *Familias en Acción* design group formed in 2000; Bogotá, Colombia; September 9, 2015.

Colombia. *Familias en Acción* was developed during the Pastrana Administration (1998-2002), and evaluated externally by the Institute for Fiscal Studies. Findings from the initial impact evaluation indicated positive gains, which made it difficult for the Uribe Administration (2002-2010) to scrap the program particularly in the midst of an increasing Latin American trend in CCT adoption. Thus, external actors had a key role in the development of *Familias en Acción* through shaping the social protection rhetoric and through resource provision. And, it is clear that IFOs were promoting the CCT program to Colombia, yet the adopted policy included an adapted health component, which suggests that at least in the realm of health, the government policymakers directed the ultimate program design.

Normative Imitation Framework

This section will explore three primary assumptions of the Normative Imitation Framework to evaluate the evidence of this theory as an explanation for partial policy adoption in Colombia. First, were CCTs "normative" when Colombia adopted *Familias en Acción*? Second, was the Mexican CCT model innovative? Third, what was the evidence burden associated with the policy in order for it to gain adequate political support?

To evaluate the normative status of CCTs, we considered the international trends in CCT adoption and the timing of the identification of the solution versus the problem. Colombia was an early adopter of a CCT; however, five other countries in Latin America adopted a CCT or were in the design or pilot phase by 2000 including *PRAF-BID* in Honduras, *Red de Protección Social* in Nicaragua, *Beca Escolar* in Ecuador, *Progresas* in Mexico, and *PETI* and *Bolsa Escola* in Brazil.⁵² As more nations adopt a policy, the pressure for a nation state to adopt the same policy is expected to increase.³⁶ Regarding the health component, a minimal health component could be considered more normative since Mexico had the only program among this early adopter group

with a comprehensive health component (Table 3.1). However, Brazil, Ecuador, Honduras, and Nicaragua were in the design and adopt phase at the same time as Colombia (~1998-2000), and thus the minimal health component was an emerging norm but perhaps not one that would have been evident in the midst of these planning years.³¹

Collaborations between Latin American nation states during this period support the normative focus on poverty reduction and social protection reform. Colombia was a member of the Poverty Reduction and Social Protection Network (PRSPN) along with Argentina, Bolivia, Brazil, Chile, Costa Rica, Ecuador, Honduras, Jamaica, Nicaragua, Paraguay and Uruguay. The 2000 PRSPN meeting agenda, organized with assistance from the World Bank and IADB included sharing social protection experiences across the globe, mechanisms to protect social protection spending in the budget, and targeting human development programs as a tool for social protection.⁵³ Thus, from 1995-2000 there is evidence of international CCT adoption and discussion of key aspects of CCT programs in the international community such as targeting social protection. These developments suggest CCTs were increasingly perceived as normative. There is not, however; evidence of CCT planning in Colombia prior to the 1998 economic crisis which would have indicated that the “solution” preceded the “problem” and provided greater support for the Normative Framework.

Like evidence regarding the normative nature of the Mexican policy, evidence for innovation is mixed. In Mexico, the 1997 creation of the CCT program preceded the 2004 health care reform, which established entitlements for 50 million Mexicans who previously had no access to publically provided health insurance.^{54,55} Therefore, the CCT health component was innovative for Mexico because it provided free preventive and health promoting health care services to entire households that likely had no health insurance previously and utilized health

services only when illness or impairment became severe enough to warrant the cost. In Colombia, the 1993 Law 100 created a universal health care system in which the government purchased health insurance for individuals with insufficient income as determined by SISBEN.⁴⁵ The goal of the Colombian reform was to equalize access to health services through the provision of insurance that enabled the purchase of care in both the private and the public sector.⁵⁶ Thus, poor Colombians enrolling in a CCT in 2002 should theoretically already have had access to health services. Mexico stimulated demand for preventive services among adolescents and adults through health conditionalities. Colombia had intended to stimulate demand through the provision of health insurance. Yet, the Colombian approach fell short of the innovation in the Mexican model because even when health services are free, there are indirect cost of care such as transportation and work hours lost. Creating conditionalities can thus stimulate preventive care use among a population who could benefit from them but who is also less likely to use them.

Weyland (2005) argues that as the evidence burden for policies increases in order to obtain political support, the Normative Imitation Framework loses predictive power.³⁶ Redistributive policies, for example, are likely to face resistance from constituencies who oppose the redistribution of resources. In the case of *Familias en Acción*, the framing and design reduced the burden of evidence and simultaneously produced evidence. Prior to *Familias en Acción*, there had been minimal formal evaluation of previous social protection programs in Colombia. In contrast, *Familias en Acción* was pilot-tested and formally evaluated by an independent group, which supplied evidence of the program efficacy. Additionally, the program was framed as a temporary relief program operating under the Office of the President and did not replace any existing social service programs or change the functioning of existing Ministries thereby

reducing the burden of evidence required. Had Colombia adopted the Mexican CCT health components and required adolescents and adults to receive health services in order to receive cash transfers, the burden of evidence would have been higher because the program would need to ensure adequacy on the supply side (e.g., sufficient health system infrastructure including health clinics, health providers, and health insurance coverage). Consequently, the Normative Imitation Framework maintains predictive power in the Colombian case when examining burden of evidence. Nevertheless, overall support for the Normative Imitation Framework is mixed. CCTs became increasingly normative in the mid to late 1990s, although there were not clear norms regarding the health component when *Familias en Acción* was designed. Regarding innovation, a call to equitable healthcare access was not innovative in Colombia, but further increasing demand for health services to address health disparities would have been.

Rational Learning Framework

To assess the Rational Learning Framework we examined the alignment of the *Familias en Acción* rationale with the program components, efforts made to evaluate the model policy from Mexico, the health and health service needs of the Colombian population, existing programs to address health, and logistical barriers to adopting the Mexican health conditionalities.

There is dissonance between the goal of *Familias en Acción* and the health conditionalities of the program, which call the rationality of the program into question. Like the Mexican CCT, *Familias en Acción* aims to end intergenerational poverty by fostering the human capital of youth; *Familias en Acción* invests in the education of children and protects this investment through early childhood health services. However, the program fails to protect the health of school-aged children through health conditionalities for this age group. Additionally,

the educational investment could be threatened by illness or impairment among parents, but the program does not address adult health needs. Consider the program objectives from a 2000 version of the Operation Manual: "1.4.2. Objectives. The objectives of the sub-program are: (a) reduce absence and dropout among students in primary and secondary school; (b) complement the income of families with children younger than 7 years in extreme poverty to increase spending on food; (c) increase health service use among children less than 7 years of age; (d) improve care practices of children in relation to health, nutrition, early stimulation, and the prevention of intra-family violence"(p. 5)^{aa57} In sum, Colombia adopted the same program goal as Mexico, but only partially adopted the objectives outlined to achieve the goal. This suggests that the goal will only be partially achieved and in fact adopting the health components intact would have been more rational for the program goal.

Next we explore the extent to which Colombian policymakers evaluated the Mexican CCT policy to determine the appropriateness of the policy for the Colombian context. The World Bank and IADB organized a study tour for Colombian policymakers to visit Argentina, Chile, and Mexico in order to see social protection programs in operation.^{bb} The World Bank also organized exchanges between Mexico and Colombia linking directors with similar roles in the two countries in order to share ideas regarding the programs.ⁱ Formal evaluations of social protection programs were unusual prior to this period, but the evaluative findings coming out of Mexico and Brazil in particular enabled the Colombian team to more readily assess the efficacy of the CCT.ⁱ Early Mexican and Brazilian evaluations indicated that there was a need for greater

^{aa} EEV translated from original text, "1.4.2 Objetivos.- Los objetivos del Subprograma son: (a) reducir la inasistencia y deserción de los alumnos de educación primaria y secundaria; (b) complementar el ingreso de las familias con niños menores de siete años en extrema pobreza para incrementar el gasto en alimentación; (c) aumentar la atención de salud de los niños menores de siete años; y (d) mejorar prácticas de cuidado de niños en aspectos tales como salud, nutrición, estimulación temprana y prevención de la violencia intrafamiliar."

^{bb} Telephone interview with World Bank employee who worked at DNP as part of the group design *Familias en Acción* in 2000; October 10, 2015.

community involvement, and in particular the involvement of mothers; and Colombia used these findings to inform the design of *Asambleas Municipales*, which were meetings of mothers receiving transfers to elect a municipal representative, exchange ideas, and share grievances.^{i,58} If early evaluations of the Mexican program, suggested no positive impact on adolescent or adult health, the partial policy adoption would be considered a rational response similar to the creation of the *Asambleas Municipales*. We will explore the availability of the evaluation data in the Cognitive Heuristics section.

Another consideration of whether the Mexican policy offered a rational model for Colombia relates to the health service access and needs of the Colombian population. In 2002 when *Familias en Acción* was launched, the price of healthcare should not have been a barrier to healthcare access since care was free through public service, social security, or the Maternal and Infant Care Plan following the 1993 health care reform.⁴⁶ This suggests that, it was unnecessary to offer a free basic package of health services to beneficiary families as was done in Mexico. That said, other barriers to care persisted as is evident by Table 3.4 which indicates that ~15% of Colombia's poor faced barriers to health care access, a prevalence three times higher than the prevalence for upper income individuals. Additionally, gaps remained in health insurance enrollment, and in 1997 about 70% of the poor had no health insurance. Disparities in health care access help explain inequalities in the likelihood of seeing a provider when ill. The 1998 Human Development report indicates that 92.9% individuals from the tenth decile reported seeing a provider when ill as compared to 65% of the first income decile.⁴⁶ Disparities also existed in prenatal care. In 2000, only about 60% of the poorest 20% attended four or more skilled antenatal care visits as compared to approximately 91% of the richest 20%.⁵⁹ Similarly, skilled birth attendance was about 64% among the poorest 20% compared to about 98% among the

richest 20%.⁵⁹ Thus, there were disparities in healthcare access and use by socioeconomic status in Colombia; and stimulating both demand and supply of health services among the poor through health conditionalities would have been a rational response to reduce these disparities.

Table 3.4 Colombian health insurance coverage and barriers to health care services by socioeconomic status (1997 and 2010).

	No health insurance		Barriers to health service access	
	1997	2010	1997	2010
Poor	~70%	~25%	~15%	~10%
Vulnerable	~63%	~22%	~10%	~8%
Middle class	~45%	~11%	~5%	~3%
Upper class	None	None	None	None

Poor: households with a per capita income below the poverty line (US\$4.06)
Vulnerable: households with a per capita income between the poverty line and \$US10 PPP
Middle: households with a per capita income between US\$10 and US\$50 PPA
Upper: households with a per capita income above US\$50 PPA

Source: Table constructed using data from "Angulo R. Cuatro lecciones aprendidas con la implementación del programa de transferencias monetarias condicionadas de Colombia. March 2016."⁶⁰

Despite disparities in health care access, the Colombian health care reform was designed to eliminate inequities in access and quality of care. Law 100 created a Basic Health Care Plan that included health promotion (especially among high risk groups like older adults and informal workers), disease prevention, and surveillance and monitoring (particularly for identifying and controlling high risk populations).⁴⁷ Additionally, health service package providers, known as *Entidades Promotoras de Salud* (EPS), are required to offer 11 health promotion and prevention programs which encompass the activities outlined by the Mexican CCT program such as screening for cancers and cardiovascular disease. However, the EPS package is more comprehensive than the Mexican CCT package and includes targets ranging from the prevention of substance use to the promotion of oral health and hygiene (Supplemental Table 3.2). Creating a package of health services linked to *Familias en Acción* was unnecessary because a more comprehensive package existed. What is more, had the Colombian program stipulated health conditionalities for adults, it is possible that families would have been unable to comply unless

efforts were simultaneously made to increase health insurance enrollment and to ensure adequate supply.

Finally, we consider the logistical barriers to adopting the Mexican health conditionalities in Colombia. The existing institutional strength and infrastructure in Colombia enabled the adoption of a CCT, a program that relies upon cooperation from multiple sectors, including health and education, to monitor activity and provide services.^{i,cc} The high institutional capacity; however, also contributed to an insistence in verifying the conditionalities and not simply having them on paper.^{dd} In fact, since the initial implementation of *Familias en Acción*, various pilots have been attempted such as a program to educate households about nutrition in order to encourage consumption of healthy foods.^{n,o} Ultimately, these pilots were not scaled up due to cost but also due to the difficulty of verification.^{n,o} There are technical barriers to collecting and verifying data within the health system that exist to this day and prevent the expansion of conditionalities.^{k,cc} What is more, the low coverage of health insurance especially among poor households was a major barrier to requiring adult health conditionalities.^g The desire to prevent more than one transfer per child also influenced the decision to limit health conditionalities to young children; thus, older children receiving transfers through educational conditionalities were not also made eligible to receive transfers through health conditionalities.^g A final logistical barrier is linked to the framing of *Familias en Acción*. At its conception, *Familias en Acción* was not housed within a ministry but instead under the Office of the President. Consequently, the program did not benefit from the guidance of a specific ministry mission and thus had a broad orientation to boost social protection.^o

^{cc} Current DNP employee involved in policy evaluation and employed at DNP during *Familias en Acción* but who was not directly involved in the design; Bogotá, Colombia; September 4, 2015.

^{dd} Telephone interview with former director at DPS; September 18, 2015.

^{ee} Telephone interview with member of the World Bank team working in Bogotá and assisting the CCT project; September 22, 2015.

In summary, the evidence for the Rational Learning Framework is mixed. In support of the framework we determined that the Colombian policymakers engaged in evaluative activities to assess the Mexican model, and on paper, the more comprehensive health component was unnecessary given the health promotion and prevention objectives of the reformed health care system. Detracting from the support for the framework, there is a mismatch between the *Familias en Acción* program goal and the health components; in reality the health care reform initially had limited impact on boosting the health status of the poor due to low levels of coverage.

Cognitive Heuristics Framework

At the time *Familias en Acción* was being designed and launched, the Mexican government, the external evaluator of the Mexican CCT program (IFPRI), and the World Bank had described the impact of the Mexican CCT on health from. In addition to reporting impact findings, the 1999 initial evaluation of the Mexican CCT also explained the rationale for health conditionalities and services targeting all family members; the nutritional transfer is linked to the attendance of all family members in health services as this promotes both individual and family hygiene as well as contributes to the environment of co-responsibility of families and the health system in promoting health.³⁵ Initial results indicated there was an increase in prenatal visits, child development and growth check-ups, diabetes screens, and screens for arterial hypertension; this is not surprising given the conditionality of attending regular health exams.⁶¹ A finding of greater interest relates to the ability of the program to reduce socioeconomic disparities; based on self-report and clinic registry data, screens for diabetes and arterial hypertension saw greater improvement in more marginalized communities, characterized as those in which beneficiary

mothers had lower levels of education and were more likely to have an indigenous language as their first language.⁶¹

The IFPRI produced prolific documentation of the preliminary impact of the Mexican CCT in 1999 and 2000. One of the 39 IFPRI reports from 1999-2000 reporting findings on health and while the reduction of health disparities was not mentioned, there were positive gains across the lifespan. In addition to increasing outpatient visits, the CCT reduced hospitalizations.⁶² Children less than 5 years of age experienced reductions in illness.⁶² Adults 19-50 years reported fewer days of illness and greater ability to walk without tiring and adults aged 50 and older reported fewer days of impairment or bedridden due to ill health as well as greater ability to walk without tiring.⁶² The report points to two possible mechanisms as a causal pathway between the CCT program and adult health while noting that "little of PROGRESA was targeting to improving adult health" (p. 14): (1) the health conditionality specifying adult attendance at annual preventive exams (2) increases in household food availability and consequently changes in the quality and quantity of calories.⁶²

In 2000, the World Bank published a report on the impact of CCTs and described the impact of the Mexican CCT program on health; however, depiction of the IFPRI results is inconsistent. In the executive summary, the report states, "The evidence on health outcomes is still not available, but crude data on access and usage of services suggests the programs have had a positive impact" (p. 2).⁵² The body of the report summarizes findings from Gertler (2000), "Preliminary results of the evaluation of the impact of Progresa on health by Gertler (2000) finds Progresa has a positive and significant effect on both access and outcomes" (p. 14). The authors emphasize improvements in utilization, prenatal care, and illness reduction among children 0-2 years.⁵² Essentially, the report paints a narrower scope of impact on health than was reported by

Gertler; however, the timing of publication makes it difficult to discern what information was available to the Colombian policymakers. The World Bank report cites a preliminary version of Gertler (2000) and was published in June 2000 as was CONPES 3081, which described *Familias en Acción* as part of the Social Protection Network (RAS). The Gertler piece was published by IFPRI in November 2000. In general, the availability of data on health impacts was minimal at this point in time and the summaries of the impact differed across sources. In this case, the *Familias en Acción* health component most reflects the World Bank summary that the health impact was nominal and concentrated to mothers and young children.

Availability is influenced by the timeline of the model program launch and policy adoption in Colombia. While six years passed between the Mexican pilot launch and the Colombian launch, the Colombian program was designed within a year of the release of Mexico's initial evaluations indicating a quick adoption. Consequently, there was minimal data on health, all of the findings from 1999-2000 were preliminary, and the evidence for health benefits was modest in comparison to the evidence available in subsequent years. These realities influenced the representative heuristic, which is captured by the perceived failures and successes of the policy. There was no evidence from interviewees indicating that the Mexican CCT health component was perceived negatively by Colombian policymakers; however, had the data been more ample and conclusive for a health benefit, particularly among adults, policymakers in Colombia may have had greater interest in a more complete adoption of the Mexican policy in the realm of health.

The anchoring heuristic posits that policymakers will place undue weight on initial values and consequently make minimal adaptations to the policy for the local circumstances. The cognitive heuristic effectively explains the adoption of a CCT in general in Colombia; there were

minimal adaptations, and the CCT was packaged with other programs and presented to the public as a temporary relief package, which made it less radical than social protection reform. Yet for the health component of the policy, this cognitive heuristic is not a convincing explanation since *Familias en Acción* incorporated major adaptations to the local circumstances. A DNP director, who was involved in the design of *Familias en Acción*, was unfamiliar with the cross-country differences in the health component and offered a rational explanation for adaptations in health stating, "I think that [*Familias en Acción*] would have been the same or at least very similar to what we have today and the reason is that the resources were limited. You have to focus on the household members where the incidence of healthcare use is greater. And obviously the incidence among children in infancy is much greater."^{i,ff} Had Colombian policymakers not made adaptations to the health component of the Mexican CCT, this would have provided greater support for the anchoring heuristic. Instead, the Colombian policymakers made adaptations to this component arguing that the resources did not exist to adopt the policy as it was designed in Mexico.

In conclusion, there is little evidence that Colombian policymakers relied on cognitive heuristics when adopting a CCT and designing *Familias en Acción*. Data regarding the impact of the Mexican CCT on health was limited and summarized differently by different sources. While Colombia adopted the policy in a relatively short period of time, they made adaptations to the policy. The evidence presented in this section and in the Rational Learning Framework suggests that the adaptation was motivated by limitations in resources and technical capacity.

^{ff} EEV translated original comment, "Yo creo que hubiese sido igual o muy parecido al menos a lo tenemos hoy y la razón es que los recursos eran limitados. Tenéis que enfocarles en los miembros del hogar donde la incidencia de la atención de la salud es mayor. Y claramente la incidencia en los niños en primera infancia es mucho mayor."

DISCUSSION

This study aimed to identify the mechanisms that led to partial adoption of the Mexican CCT design in the Colombian program. We evaluated evidence for four theories of policy diffusion, using a framework developed by Weyland (2005) to uncover explanations for the modified health services and conditionalities component of the CCT. The research revealed evidence to support each of the four theories of policy diffusion, which speaks to the appropriateness of the conceptual framework for the research question and data linked to this project.

We approached the analysis by first determining whether external forces drove the design of *Familias en Acción* or if Colombian policymakers retained significant latitude. External actors were involved directly and indirectly in the design of *Familias en Acción*. Additionally, there is evidence of both coercion and conditionality – two concepts encompassed by the External Pressure Framework. Coercion as an explanation for social policy diffusion suggests that the pressure from external forces can take the form of incentives such as monetary support and technical assistance in addition to threats or force.⁴⁹ Conditionality as an explanation for social policy diffusion suggests that the pressure from external forces emerges from a context in which an international organization requires that a nation state adhere to particular conditions in order to receive aid.⁴⁹ Colombia received monetary and technical assistance from international finance organizations through loans that specified particular conditions. Thus, Colombia experience external pressure, but the theory fails to explain why the nation would adapt the health component of the model. In fact, the historical review revealed that the rhetoric of international finance organizations aligned with ongoing efforts in Colombia and the only notable deviation was recommendations from IFOs to address failures in the health system. Colombia's CCT did

not address the highlighted failures in health and consequently demonstrated independent policy design in health.

Next, the analysis assessed whether Colombian policymakers were motivated by utilitarian motives such as fitting the CCT to the local needs and resources or instead sought to become an early adopter of a new policy for the purpose of being a leader in innovation. Research has confirmed the power of normative influence. Sugiyama (2011) examined the predictive ability of internal and external factors on CCT adoption among 19 Latin American countries and found a strong "neighborhood effect", that is, increased likelihood of adoption as the numbering of neighboring countries with a CCT increased.³¹ The "neighborhood impact" or normative impact per the current framework is unclear in the realm of health; unlike the earliest CCTs that followed, Mexico had a comprehensive health component. The argument that the less extensive health component was in fact the norm lacks explanatory power since Mexico was the model for the Colombian policy. Also, because Colombia was among the early adopters with a minimal health component, the norm of a minimal health component was still emerging. What is more, the intervention to promote equitable access to health care among the poor was less innovative in Colombia than Mexico due to the previous health reform efforts in Colombia. Consequently, the normative argument is lacking.

In the final step of the analysis we explored the evidence for the Rational Learning and Cognitive Heuristic Frameworks. Within the Cognitive Heuristic Framework, we found partial support for both the *availability heuristic* and the *representative heuristic*. However, the Colombian adaptation of the policy contradicts the *anchoring heuristic*. Colombian policymakers quickly adopted the Mexican CCT in the midst of limited data but rather than adopting it as is, they made significant changes to the health component. The adaptation coupled with the

reasoned explanation for this adaptation, makes the Rational Learning Framework the best explanation of the partial policy adoption in Colombia. The Mexican CCT health component had the potential to impact health more significantly in Colombia as compared to the health component Colombia adopted, but there were rational barriers to the successful implementation of a more extensive health component including overlap with existing health benefits and limitations in health insurance coverage. What is more, the Colombian health reform, whose implementation was incomplete but underway when *Familias en Acción* was designed, was more comprehensive than the health component of the Mexican CCT. Thus, there already existed a movement and an instrument to improve the health of poor Colombians.

There are several limitations to the current study. The present analysis examines a single case. The downfall to observing a single case at one point in time is that there is no variation in the independent or dependent variable that prevents causal claims. The second limitation is that interviewees who were involved in the policymaking process were asked to report on events that occurred approximately 10 years ago. Thus, recall bias is a concern; participants may not remember the details of the policy process and/or their reports may be influenced by experiences since that time. Additionally, the time lapse influenced data collection through interviews making it difficult to locate some individuals who were involved in the process and perhaps decreasing the motivation for participation. Finally, there may be explanatory factors not explored in the analysis. The intentional design of a flexible and iterative theoretical approach helped to ensure that key explanatory factors were not missed. Still, the omission of relevant explanatory factors at the outset could hinder efficiency of the study.

CONCLUSION

The current study contributes to academic research in CCTs as well as to policymakers involved in designing and reforming poverty policies. Quantitative evaluations initially dominated the work on CCTs. Political economy research related to CCTs has gradually increased but much remains unknown, including the reasons for variations in health benefits and conditionalities across countries. Health benefits and conditionalities are of interest because they promote population health but also because failure to protect health can diminish the human capital gains of the CCT. Understanding the reasons for partial policy adoption in Colombia is informative to the global community, and offers insight regarding the factors that support or obstruct policy designs to optimize human capital development of children and health among nations' most vulnerable residents.

SUPPLEMENTAL MATERIAL

CCT Development Context in Mexico and Colombia Continued

Social Welfare in Mexico

Prior to the launch of PROGRESA, the Mexican response to poverty largely focused on building infrastructure and providing in-kind benefits for poor communities. In 1989 Mexican President Salinas created the antipoverty program, the National Solidarity Program (PRONASOL) which was an umbrella program with projects in diverse areas such as health, education, infrastructure, housing, and nutrition.³¹ Salinas also created a new ministry, the Social Development Secretary (SEDESOL), to handle program operations and the annual budget; initially at \$680 million, the budget jumped to \$2.5 billion in 1993 with funds from tax revenues and the World Bank.⁶³ PRONASOL operated as a credit system that targeted poor rural areas. Communities could receive funding if they created a committee and a plan for using the money for social development purposes. Usually the projects related to infrastructure (i.e. paving roads or improving water supply).⁶³ Communities were required to contribute toward the costs and provide most of the labor to foster efficiency and community buy-in.⁶³

Despite the wide breadth of PRONASOL and large budget, the program had a limited impact. Investing in infrastructure is a reasonable response to poor economic, health, and education indicators. However, when poverty is concentrated in rural areas, as was the case in Mexico, investing in health and educational services alone is likely not a cost-effective option and may not be feasible given resource constraints.⁶⁴ This proved to be true in Mexico. Resources were highly centralized and communities that received the money were often not the poorest- not surprising since the poorest have fewer resources to create and support a plan.⁶³

Additionally, there were widespread complaints that PRONASOL was used as a tool by the Institutional Revolutionary Party (PRI) to garner political support.^{31,63}

By the economic downturn of the mid-1990s, administrative experience among the Cabinet and empirical evidence in relation to poverty programs along with criticisms of PRONASOL fostered a climate for changes in social welfare policy.⁶⁵ The change in administration in 1994 created an opportunity for reform and under President Ernesto Zedillo PROGRESA was initiated on August 8, 1997.³⁵ While generally recognized as Mexico's first CCT, in many ways the program resembles, Children in Solidarity, a program launched in 1991 under PRONASOL, which provided cash, food supplements, and basic medical services to children in poverty conditional on primary school attendance.⁶⁶ Another similarity of PROGRESA and PRONASOL was that Zedillo created a new agency to oversee operations of PROGRESA just as Salinas had done with PRONASOL.⁸⁸ However, PROGRESA did bring fundamental changes; mainly the program was targeted to the most vulnerable families, the focus was on providing social assistance in the form of cash transfers, and distribution of funds was streamlined such that families received the money directly from the federal government which reduced the possibility of the clientelism that plagued PRONASOL.

Social Welfare in Colombia

Familias en Acción broadened the social protection strategy in Colombia but the intent of the program was not to replace existing antipoverty programming as was the case in Mexico.

Familias en Acción was originally launched as an emergency response to the economic crisis of

⁹⁹ The National Coordination of PROGRESA was created to oversee PROGRESA. Technically, this new agency operated under the Ministry of Social Development but in practice was largely autonomous. The resources for the different components of the program were managed by the corresponding ministries, such that educational subsidies were budgeted by the Ministry of Education, nutritional subsidies by the Ministry of Social Development, and the health component and nutritional supplements by the Ministry of Health and Mexican Institute of Social Security respectively (Levy, 2006). To coordinate the cooperation of the various ministries, the Ministry of Finance was given control over the budget and allocated funds.

the late 1990s. President Andrés Pastrana created the *Social Support Network* to address economic and social needs of Colombians.⁶⁷ The initiative was financed through loans approved by the World Bank, the Inter-American Development Bank, and the Development Bank of Latin America (CAF) and included three antipoverty programs; (1) *Familias en Acción*, (2) a workfare program, and (3) a training program for unemployed urban youth.⁴⁰ One aspect of the Colombian CCT creation that is similar to the Mexican case relates to the institutional operations. Rather than house *Familias en Acción* in an existing ministry, the program was operated by the Presidential Agency for Social Action and International Cooperation^{hh} which was created to house domestic and foreign-funded programs for vulnerable Colombians.⁶⁹ In the same year that *Familias en Acción* was launched, the Ministry of Labor and Social Security and the Ministry of Health were fused to form the Ministry of Social Protection.⁶⁴ Still *Familias en Acción* remained dependent on the presidency for operation and was not integrated with other social assistance programming.

The Colombian Institute of Familial Wellbeing (ICBF), created in 1968, was the primary agency providing services and benefits to families in poverty prior to the development of *Familias en Acción*. ICBF services include daycare for young children, food distribution and nutrition, school feeding, preventive and health care, in-kind support for school-aged children, and various programs for adolescents.⁶⁴ *Community Welfare Homes (CWH)* are a principle program of ICBF in which women from the community provide daycare to young children.⁶⁴ The program serves children less than 7 years of age from low-income families and focuses on ensuring adequate nutrition and fostering cognitive, emotional, and physical development.

Because CWH as well as other ICBF programs were operating at the launch of *Familias en*

^{hh} As of 2010, Social Action (or *Acción Social*) was dissolved and the agencies responsibilities were incorporated into the Department for Social Prosperity (DPS). Currently, the Colombian CCT, now called “Más Familias en Acción”, is run by the DPS.⁶⁸

Acción and continued to operate, there was some redundancy in programming. The solution was to limit participation; young children enrolled in CWH were not eligible for *Familias en Acción* benefits and vice versa.⁷

Supplemental Table 3.1 Mexican conditional cash transfer associated packet of basic health services.

Basic sanitation at the household
Family planning
Prenatal, delivery, and puerperium care; newborn care
Infant nutrition and growth monitoring
Immunizations
Case management of diarrhea in the home
Anti-parasitic treatment of families
Management of acute respiratory infections
Prevention and control of pulmonary tuberculosis
Prevention and control of arterial hypertension and diabetes mellitus
Accident prevention and initial management of lesions
Community training for self-care
Detection and control of uterine cervical cancer

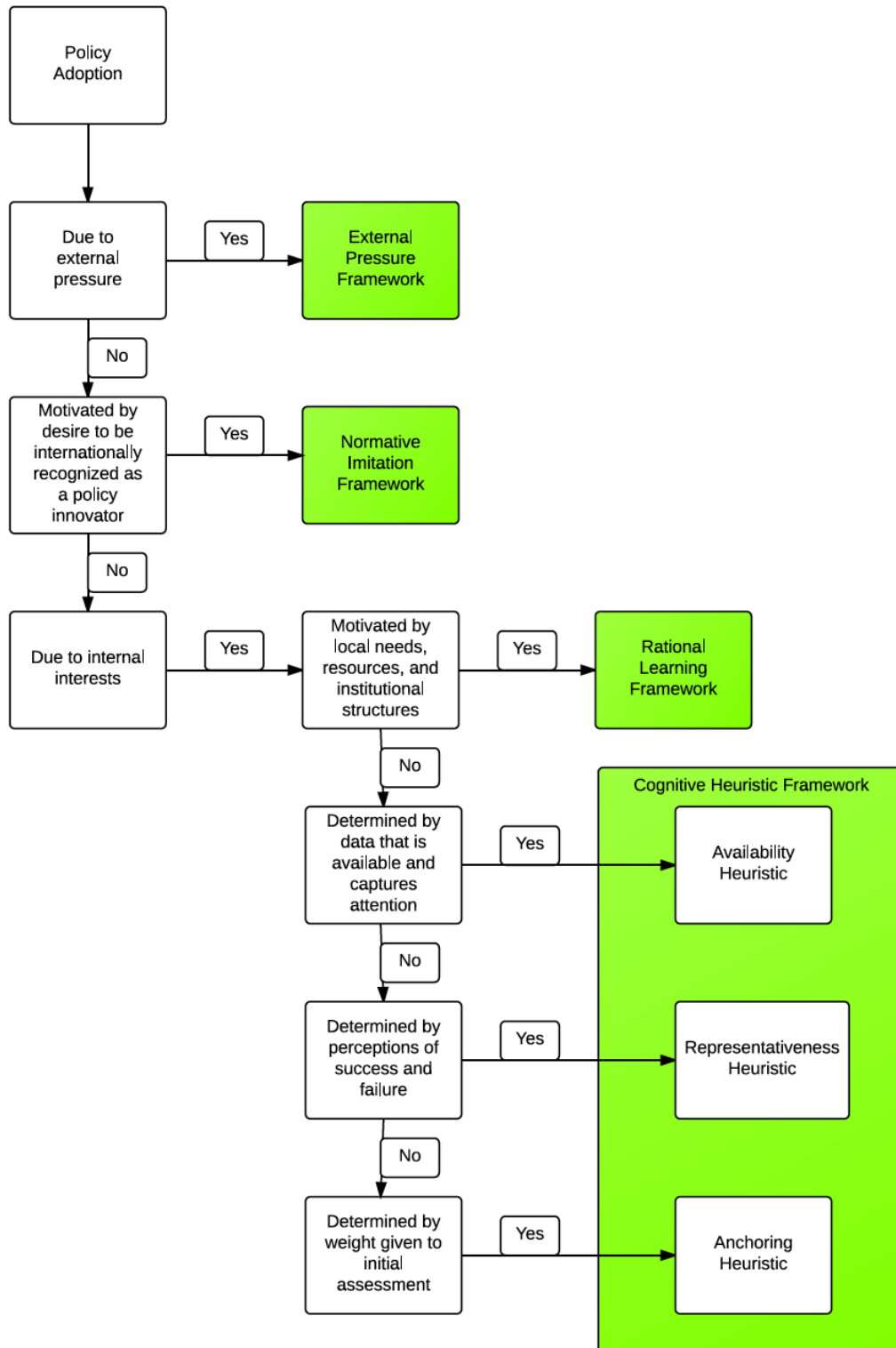
Source: Table generated using data from "Secretaría de Desarrollo Social. *Más Oportunidades Para Las Familias Pobres*. Mexico; 1999:1-406."

Supplemental Table 3.2 Colombia's mandatory health care compliance program: Prevention and promotion activities

1.	Prevention of growth and development failure among children less than 12 years.
2.	Prevention of sensory disturbances through the management of visual and auditory health among children less than 12 years.
3.	Prevention of acute respiratory infections and acute diarrheal disease among children less than 5 years.
4.	Prevention of vaccine-preventable diseases through the Expanded Immunization Program (PAI).
5.	Prevention of alterations in the growth of the oropharynx or stomatognathic system, of caries and periodontal disease through the use of sealants, fluoridation, and oral hygiene measures.
6.	Prevention of diseases associated with pregnancy, labor, and the puerperium.
7.	Prevention of sexually transmitted infections and HIV/AIDS.
8.	Prevention of cardiovascular and cerebrovascular disease.
9.	Prevention of cancer; especially cervical, breast, and stomach cancers.
10.	Prevention of tobacco use, alcoholism, and drug dependence.
11.	Prevention of complications from chronic and degenerative diseases.
Other activities: Health promotion and disease prevention education; education to beneficiaries regarding coverage linked to the Obligatory Health Plan (POS); proper use of the EPS (Health Promotion Entities) services, appropriate use of medications, and management of recreational time. Design, creation, and distribution of didactic material to the affiliated population focusing on topics that promote healthy lifestyles, work, and habits as well as risk prevention. Didactic publications to reinforce health promotion and disease prevention activities.	

Source: "Departamento Nacional de Planeación, Misión Social, Programa de las Naciones Unidas para el Desarrollo. *Informe De Desarrollo Humano Para Colombia 1999. 2000:1-198.*"

Supplemental Figure 3.1 Decision tree for Weyland's four theoretical explanations for policy diffusion.



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