The Effects of Decentralized Health Service Delivery Models on Women’s Health

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THE EFFECTS OF DECENTRALIZED HEALTH SERVICE DELIVERY MODELS ON WOMEN’S HEALTH

by

ALAN ANDRZEJ ZARYCHTA

B.S., Northwestern University, 2007

A thesis submitted to the

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The Effects of Decentralized Health Service Delivery Models on Women’s Health
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The final copy of this thesis has been examined by the signatories, and we
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The Effects of Decentralized Health Service Delivery Models on Women’s Health

Thesis directed by Associate Professor Krister Andersson

Poor, rural citizens in developing countries have access to fewer health services and experience worse health outcomes than their richer, urban counterparts. While numerous governments have decentralized their health systems in response to this disparity, we have little evidence on whether these systems are producing healthier citizens. In this paper I investigate the effectiveness of decentralized health service delivery models in the department of Intibucá, Honduras. I implement a difference-in-differences research design at the sub-regional level, creating a new longitudinal dataset that links quantitative health outcome data with original survey data as well as socio-economic and institutional information. My analysis shows that the average effect of decentralization on the decentralized health centers is an annual increase of 1,205 family planning consultations, 2,407 prenatal consultations, and 662 postpartum consultations, and that information, accountability, and connectedness may be key causal mechanisms. These results are robust to specifications including covariates, excluding compositional differences, and using weighted estimation; they also pass falsification tests using placebo treatments, placebo dependent variables, and outcome randomization. Most importantly, this analysis suggests that health sector governance reforms can generate positive incremental improvements in health outcomes for women, and thus possibly lead to wider change with respect to household well-being and economic development across rural communities.
ACKNOWLEDGMENTS

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1 Introduction

International donors have touted the decentralization of political power to subnational and local governing units as a strategy for improving the provision of public services in developing countries (Burki et al. 1999, World Bank 1999). This is one significant response to the fact that poor, rural citizens in those countries have access to fewer health services and experience worse health outcomes than their richer, urban counterparts (Braveman & Tarimo, 2002). The trend in decentralization as a strategy for health sector reform began with the World Health Organization (WHO) emphasizing the importance of community participation and local resources for primary healthcare in its 1978 Alma-Ata Declaration (Section VII). This was a major endorsement of moving authorities and accountability for public health away from national institutions and toward local institutions and organizations, and paved the way for health sector decentralization reforms in numerous developing countries over the subsequent decades. While decentralization reforms continue to be implemented, there exists little systematic evidence as to whether and how they improve public health outcomes.

This lack of understanding with respect to decentralization stands in stark contrast to the high priority local health system performance receives as a pathway to better community health. The World Health Organization (WHO) devoted its entire 2000 World Health Report to the topic of improving health system performance, and three of the eight United Nations Millennium Development Goals are explicitly about health. In these ways the global health community has emphasized the importance of addressing health sector deficiencies and the resulting effects on human suffering present in many less developed countries. Furthermore, local health systems delivering services to underserved individuals can be pivotal in the connection between human well-being, productivity, and economic development; improving public health through better
functioning health systems has the potential to pay significant dividends in social and economic
development (WHO 2000).

In light of this, and with significant support from international donors, the Honduran
Ministry of Health (MOH) has implemented decentralized health service delivery models
throughout the country. Currently, almost one million Hondurans receive their primary health
services through decentralized providers, and the MOH intends to expand coverage to 2.5
million individuals over the next several years (MOH 2010). In this study I create an original
longitudinal data set to investigate the effects of decentralization reforms on women’s health
outcomes in one department (state) of Honduras. Given the current stage and proposed
expansion of the health sector decentralization reform, this study is well-placed to make
substantial empirical and policy contributions. The analysis presented here aids in understanding
the effects of health sector decentralization, and establishes a foundation for future research into
the conditions and causal mechanisms underlying those effects.

2 Decentralization and Decentralized Health Service Delivery Models

Decentralization is a type of governance reform that aims to improve the delivery of
public services through changes in the vertical distribution of authorities, responsibilities, and
accountability across levels of government (Rondinelli et al. 1989). In Honduras specifically, the
MOH has implemented decentralized health service delivery models at the regional and local
levels. These models represent a combination of deconcentration of oversight from the national-
level MOH to the Regional Health Authorities, and a delegation of certain functions from the
Regional Health Authority to local community-based or governmental organizations.
Concretely, the MOH establishes a contract with a local organization whereby it transfers public
funds to that organization in exchange for administering a network of health units, with this administration being supervised and regulated by the relevant Regional Health Authority.

In short, the Honduran MOH uses decentralized health service delivery models as a vehicle to transfer authorities and responsibilities for health system management and health services provision to local organizations, and to situate regulation and oversight at the regional level. The fundamental idea underlying the decentralization strategy is that the health services provided to the country’s population can be improved through changes in the structure of administration within the public health sector, and that this will lead to better system performance and ultimately better individual health status (MOH 2009).

The Honduran MOH implements decentralized health service delivery models to achieve two specific goals: (1) increasing access to health services for underserved populations and, (2) improving the efficacy and efficiency of those services. The MOH introduced decentralized health service delivery models on a pilot basis in 2004-2005 with seven community-based organizations administering 29 health centers. The decentralization strategy was subsequently formalized in the country’s Health Sector Reform Policy, with the MOH’s commitment to the strategy being strengthened further in the 2010-2014 National Health Plan (MOH 2009 & 2010). As of 2011, over 200 health centers, or about 15% of the country’s health units, were managed by 30 municipal associations, non-governmental or community-based organizations. These decentralized systems operate in over 70 municipalities and provide health services to approximately one million Hondurans.
Since about 2007-2008, Regional Health Authority #10 has supported and implemented the MOH’s decentralization strategy in the department of Intibucá (see map in figure 1). As of 2011, twenty-two of the department’s fifty primary care health centers belong to one of three decentralized health systems, and the remaining twenty-eight are under traditional or centralized administration.\(^1\) The three managing organizations of the decentralized systems vary in institutional form: one is a rural banking cooperative, the second is an association of municipalities, and the third is a non-governmental organization. Outside of one urban center, the municipalities in this department are uniformly rural, culturally homogenous, and largely poor (Instituto Nacional de Estadística Honduras). The Regional Health Authority has the explicit goal to implement the decentralization reform in all health centers within the department; nonetheless, financial resources for this implementation have been limited resulting in the

\(^1\) The department of Intibucá has 56 total public health units, 51 of which are primary care facilities. One of these health centers was newly opened in late 2011 (Guachipilincito), and it is excluded for a lack of data. Five of the health units are infant and maternal centers, rather than primary care facilities, and thus excluded as well.
current partial level of decentralization. I capitalize on this partial decentralization within a homogenous department to study the effects of the reform on women’s health outcomes.

3 Theory and Findings on Decentralization

The goal of this project is to better understand how human produced systems of organization and management within the health sector deliver (or not) the primary inputs that enable individuals to live productive lives. The implementation of decentralized health service delivery models is a reform that aims to improve health system performance through changes in the vertical distribution of power across levels of government and between the public and private or non-governmental sectors. The academic literature on decentralization varies widely in its theoretical bases, geographical coverage, and themes, and is characterized by significant theoretical and empirical disagreements.

Proponents of decentralization argue that local actors are better positioned to make decisions and implement policies because they have access to superior information relative to their national counterparts and because they are more directly accountable to local constituents (Hayek 1945, Oates 1977, Diamond & Tsalik 1999). The causal logic here hinges on matching information and accountability structures to the policy problem at the appropriate level of authority. Thus, problems that have confined or local effects are best addressed by governance actors situated at that local level and who will thus be responsive and accountable to the individuals affected. The general conclusion among proponents is that devolving decision-making to regional and local actors will ease informational shortcomings, clarify accountability, and ultimately lead to more appropriate decisions with respect to the delivery of public services.

Opponents of decentralization, however, highlight that devolving political decision-making can reinforce and entrench existing local power dynamics to the detriment of the poor
(Crook & Manor 2000, Agrawal & Ribot 1999). This perspective focuses on the relative weakness of institutions generally, and local institutions especially, in many of the developing countries where decentralization reforms have been implemented. Most importantly, opponents of decentralization reforms are concerned that elites are able to capture local institutions; empowering these governing bodies will allow elites to further enrich themselves and/or target resources in a particularistic fashion that improves their standing within the local community while being detrimental to the broader public’s interests. Institutional weakness and corruption are likely to hinder, rather than improve, decision-making at the local level, and thus opponents expect these reforms to have negative consequences for public services.

Finally, a third group of scholars and policymakers emphasize that implementing decentralization reforms does not automatically translate into outcomes, positive or negative. Instead, they argue that it is crucial to analyze the processes in the middle of a causal chain linking interventions with outcomes, and thus have a preference for conditional hypotheses about the effectiveness of decentralization. Scholars in this group have arrived at four core findings. First, positive outcomes are unlikely from decentralized governance without popular participation in local government decision-making (Singleton 1998, Blair 2000, Larson 2002, Andersson & van Laerhoven 2007, Agrawal & Ribot 1999, Agrawal & Ostrom 2001). Second, positive outcomes from decentralization rely on local governments being downwardly accountable to citizens (Crook & Manor 1998, Smoke 2003, Ribot 2002, Yilmaz & Serrano-Berthet 2008). Third, successful decentralized governance hinges on the technical capacity of the local unit to which governance responsibilities are devolved (e.g., Andersson 2004, World Bank 1988, Pacheco 2000, Contreras & Vargas 2001). And fourth, without a secure source of
funding, local governments will be unable to provide consistent, quality public services (Fiszbein 1997, de Mello 2000, Kaimowitz et al. 2000, Pacheco 2000).

Moving beyond these theoretical claims and empirical findings on decentralization from the broader literature, studies focusing specifically on the relationship between decentralization reforms and health outcomes have inconsistent results and suffer from data and research design limitations. Authors have argued that decentralization has no significant impacts on health services (Bossert et al. 2003a, Jeppson & Okuonzi 2000), negative consequences for service delivery (Campos & Hellman 2005), mixed results for medicine logistics systems (Bossert et al. 2007), and positive impacts for equity and infant mortality rates (Bossert et al. 2003b, Robalino et al. 2005, Guanais & Macinko, 2009). These inconsistent findings are strongly related to the significant limitations of many studies on health sector decentralization: selection and endogeneity problems related to the assignment of the intervention, and reliance on weak national-level data sources. In short, we still know relatively little about what makes health sector decentralization succeed or fail.

This study implements a quasi-experimental research design and rigorous data collection effort at the regional level in Honduras to make a significant contribution to the ongoing debate about the effectiveness of decentralization policy (Bardhan & Mookherjee, 2006; Treisman, 2007). The motivating questions for the present study are: 1) what are the effects of decentralized health service delivery models on women’s health outcomes, and 2) what factors underlie the effectiveness or ineffectiveness of decentralized health service delivery models? This initial analysis represents the first phase of larger research program aimed at understanding why some local health systems in developing countries perform better than others.
4 Hypotheses on the Effects and Mechanisms of Decentralized Health Service Delivery Models

Proponents of decentralization argue that local administration of health systems enables greater access to information and clearer accountability structures, thereby promoting better overall performance. In the case of Intibucá, Honduras, this local control manifests in three distinct ways through the managing organizations for the decentralized health service delivery models. First, these organizations have greater flexibility than the Regional Health Authority over a significant portion of their budgets. While complaints are common from these organizations about difficulties in motivating and reprimanding tenured health staff and recurring delays in receiving their contracted payments from the Honduran government, they do nonetheless have funds in their budgets that they can allocate as they see fit to hire additional staff, purchase medications, or make other locally-specific expenditures. Second, these organizations are mandated by their contracts to directly monitor, evaluate, and support the local health centers to a greater degree than what the centrally-administered health centers experience. This monitoring is itself supervised by staff from the Regional Health Authority, and the managing organizations are financially penalized when their health centers to not meet certain goals and if they themselves fall short of administrative targets. And third, the Regional Health Authority dedicates significant time and resources in supporting the managing organizations. In addition to supervision, they occasionally participate in local campaigns put on by the decentralized managing organizations. More importantly, the Region holds meetings with all of the managing organizations each trimester following their evaluations to review challenges and share best practices. The implementation of the reform provides the managing organizations substantial access to key policymakers and support staff at the Region, access that likely contributes to marshaling limited resources, gaining relevant information, and obtaining
assistance in solving difficult local problems in ways that does not occur for staff in centrally-administered health centers.

Opponents of decentralization focus on weak local institutions and the associated risks of elite capture. This concern, while relevant in many contexts, is less applicable to decentralized health service delivery models in Intibucá. This is primarily because the Regional Health Authority has contracted with community-based and non-governmental organizations. While it is possible that these groups might lack certain competencies with respect to health system administration, it is less obvious that they would be subject to the type of weakness and elite capture envisioned by opponents of decentralization. These local organizations are involved in municipal politics, but they are not subject to the same sorts of pressures and incentives that elected officials face. Furthermore, the one overtly political organization that administers a decentralized health service delivery model in Intibucá, an association of mayors, has its influence and susceptibility to capture curtailed because its formal powers are limited, its standing budget is based on voluntary contributions from the participating municipalities, and its authorities span multiple political boundaries.

Based on these two sets of factors – profound positive changes in access to information and accountability, as well as relatively little risk of elite capture and minimal impacts of any weaknesses in local institutions – I hypothesize that health sector decentralization will be associated with improvements in local health system performance within the department of Intibucá. Furthermore, I anticipate that the primary mechanisms through which decentralization has its beneficial effects will be improvements in local-level information and accountability, namely greater amounts of supervision and support for staff in decentralized health centers, as well as increases in resources and connectedness for these units. These mechanisms of change
stemming from the decentralization reform should manifest in the following observable ways: improved targeting of funds through the decentralized managing organization, higher levels of resources and support overall, increased supervision, and stronger connections between the health center and other actors within the local health system.

5 Empirical Strategy

I utilize difference-in-differences (DiD), a quasi-experimental research design, to evaluate the effects of decentralized health service delivery models on women’s health outcomes in the department of Intibucá, Honduras. The primary purpose of the research design and analysis presented here is to identify effects of decentralization if they exist. Following the DiD analysis, I utilize original survey data collected for health center staff in the department to present a preliminary exploration of the potential mechanisms underlying the effects of decentralized health service delivery models on women’s preventive care.

I take advantage of the fact that Regional Health Authority #10 has the explicit goal of decentralizing all health centers in its department, but as of 2011 had only been able to implement the reform in about half of its primary care health centers due to resource constraints. This circumstance leaves the balance of health centers under centralized administration and therefore available to serve as a control group in the analysis. In the next section I describe the original data collection I completed for this project, in the following section I present the DiD approach, and in the last sections I discuss the dependent and independent variables utilized in the DiD analysis.

5.1 Data Collection
Scholars commonly criticize the decentralization literature for its reliance on weak, low-quality data, or its inability to empirically test claims because data do not exist or are too difficult to obtain (Bossert 1998, Bardhan 2002). One significant contribution of this project is the creation of an original, longitudinal dataset linking health outcome indicators with socio-economic and institutional data for the entire department of Intibucá. During the summer of 2012, I spent six weeks conducting fieldwork in Honduras in collaboration with the Regional Health Authority and with support from two Honduran research assistants. Together, we implemented a four-phase data collection strategy.

First, we compiled existing health outcome data for each of about fifty primary care health centers in the department of Intibucá. On a monthly basis, staff members in the health centers are required to complete a set of forms where they report aggregate information for various health indicators, ranging from total consults provided and numbers of vaccinations administered, to cases of diarrhea and numbers of family planning consultations. These individuals fill out a set of standardized paper forms and deliver them to the Regional Health Authority. Regional staff reviews the forms for completeness and accuracy, after which they enter those data into an array of spreadsheets. I worked with staff in the regional statistics department to compile spreadsheets of health outcome data for the department between 2005 and 2012, to uniquely identify the records, and to enter the information into a database where it can be queried and analyzed comprehensively. These data necessarily have errors and omissions due to imperfect recording at the health center level and on account of the number of individuals involved in transferring information from paper forms to the current database. Nonetheless, I have confidence that errors will be overshadowed by signal in this information given the volume

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2 The quality review process at the regional-level can be characterized as superficial – staff mainly check the forms for completeness, verify that some of the manually-calculated totals are correct, and attempt to identify any major inconsistencies or other obvious errors.
of data I collected over time (more than 5,000 health center-year-months for the primary health indicators). Moreover, this type of local-level quantitative data is exceedingly rare in studies of decentralization and is the best information available for evaluating the effects of decentralized health service delivery models in Honduras.

Second, we administered surveys to staff in fifty-five health units within the department (primary care health centers as well as infant and maternal centers). Our goal was to survey the three principal types of actors associated with each health center: a doctor or nurse, a community health worker, and a community health volunteer. Given our limited time and financial resources, we had only a single day allotted for each health center and did not have the ability to follow-up visits. Thus, we were restricted to surveying a convenience sample of the individuals who were at the health center on the day we visited. In total, we administered surveys to 166 respondents, 135 of whom fit into one of the three aforementioned categories. The balance, 31 respondents, falls into the “other” category consisting of community leaders, individuals who participate in some relevant local committee and who were available to be interviewed for the survey on the day we visited. These survey data obviously have limitations with respect to representativeness, but they nonetheless reflect opinions and perceptions of some health center staff and community members in Intibucá. These data will be more fully described and analyzed in the section 7 following the DiD analysis.

Third, I also compiled existing demographic, socio-economic, and institutional context data for the population under each health center or in each municipality. I obtained demographic data from both the Regional Health Authority and from the National Institute of Statistics, human development data from the United Nations Development Program in Honduras, data on numbers of community and non-governmental organizations from the Unit for the Registry of
Civil Society, electoral data from the National Electoral Tribunal, data on cash transfer programs from the Family Allocation Program, and schooling data from the Department of Education.

Finally, I supplemented the aforementioned quantitative data with two types of qualitative data collection. First, I conducted semi-structured interviews with seven health system administrators at the regional-level and representatives from two of the three decentralized managing organizations. Time constraints prevented me from interviewing representatives from the third organization; however, I had previously spent two years working for that organization in Honduras. These formal interviews are additions to the numerous informal conversations I had with staff at all levels of the MOH hierarchy during my fieldwork. Second, I collected documentation of the final decentralization contracts signed between the MOH and each of the three managing organizations. These contracts provide contextual information on the expectations and incentives between the two parties vis-à-vis the administration and performance of the local health systems. Moreover, the contracts serve as the official record of the year in which decentralization was implemented in each treated health unit.

5.2 Difference-in-Differences

Figure 2: Difference-in-differences Estimator by OLS Regression

<table>
<thead>
<tr>
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<th>Post (T=1)</th>
<th>Pre (T=0)</th>
<th>Post - Pre</th>
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<tbody>
<tr>
<td>Treated, D=1</td>
<td>( \mu + \gamma + \delta + \alpha )</td>
<td>( \mu + \gamma )</td>
<td>( \delta + \alpha )</td>
</tr>
<tr>
<td>Control, D=0</td>
<td>( \mu + \delta )</td>
<td>( \mu )</td>
<td>( \delta )</td>
</tr>
<tr>
<td>Treated - Control</td>
<td>( \gamma + \alpha )</td>
<td>( \gamma )</td>
<td>( \alpha )</td>
</tr>
</tbody>
</table>

(Hainmueller 2012)

While I was an employee of a health and development NGO during those two years, and not an active researcher, my observations during that time naturally influence the research design and analysis in the current study.
Difference-in-differences (DiD) is a quasi-experimental research design for estimating the effects of a specific treatment or intervention using observational data. This approach compares two changes to gain leverage on the causal identification problem: the difference before and after an intervention for the group that is treated and the same difference for an untreated group. The difference between those differences, if significant, is then interpreted as the average effect of the treatment on the treated (ATET), subject to meeting the assumptions of the approach (Hainmueller 2012, Bertrand et al. 2004). The major identifying assumption for DiD is parallel dynamics in the treated and control groups prior to the intervention (Hainmueller 2012). In short, the treated and control units do not have to be identical before treatment, but they do need to exhibit parallel trends; if one group is systematically diverging from the other prior to the treatment, DiD will produce a biased estimate of the ATET. In section 6, I present time-series plots to justify the parallel trends assumption prior to implementing the DiD estimator using ordinary least squares regression. My baseline models and the models including covariates follow the specifications shown in figure 2; the coefficient on the interaction term, alpha, estimates the difference in the differences, or the average effect of decentralization on the decentralized health centers. Furthermore, I implement several falsification testing throughout the analysis presented in section 6 to confirm the validity of the DiD approach for estimating the effect of decentralized health service delivery models on women’s health outcomes in Intibucá.

5.3 Dependent Variables: Production vs. Health Status

As envisioned by the Honduran MOH, decentralized health service delivery models affect community-level health outcomes through improvements in the administration and performance of local health systems. In short, this is predominantly a supply-side intervention; more and better health services are delivered to individuals and they in turn become healthier
over time. Therefore, the short-term success or failure of this particular form of decentralization should be judged by indictors that reflect the operating logic of the intervention, namely production-based outcomes that can be affected by governance reforms over one to three years.

Community health is a product of complex interactions among socioeconomic, cultural or attitudinal, political, and health system factors, and generally changes slowly over relatively long periods of time (Huicho et al. 2010, Murray & Frenk 2000). Despite this, policy-makers and evaluators want to know if health interventions produce incremental changes in the short-run in order to target resources to strategies that work and abandon those that do not. These two dynamics create a tension between focusing on health status or quality of health indicators at the community-level (e.g., rate of infant mortality, proportion of children with normal growth), or instead utilizing production-based indicators (e.g., number of prenatal consultations, number of well-child visits). Naturally, there is hope that progress on the latter indicators will in fact translate into improvements on the former indicators with enough time. In the case of governance reforms like decentralization, however, I argue that it is incorrect to judge short-term success using health status or quality of health indictors. Instead, following the logic of an intervention targeted at improving the delivery of health services, short-term success is only appropriately judged with respect to production-based health indicators.

Accordingly, I choose to focus on three such indicators as the primary dependent variables in this study, all normalized to the health center catchment population and expressed as yearly counts per 1,000 individuals: number of family planning (Depo-Provera) consultations, number of follow-up prenatal consultations, and number of postpartum consultations.\(^4\)

Specifically, I utilize administrative records to construct yearly counts of the three types of

\(^4\) I chose Depo-Provera consultations as a measure of family planning because anecdotally it is the method preferred by women in this region; an injection is administered privately during a generic consultation, it lasts three months, there is no need to inform one’s partner, and no direct action is required immediately prior to intercourse.
consultations by health unit between 2005 and 2012. Increases in the counts of these three normalized indicators correspond to improvements in local health system performance. A growing body of research emphasizes differences in decision-making and intra-household resource allocation between men and women, and the highlights the impact that targeting resources to women in developing countries may have for the health of children and the overall well-being of the household (Lundberg et al. 1997, Duflo 2003, Ward-Batts 2008, Banerjee & Duflo 2011). This is evidenced most starkly by the fact that almost all microfinance programs provide loans exclusively to women (Banerjee et al. 2010). Following this literature, I select production-based indicators of women’s health because of the potential multiplier effects that improvements in these areas may have for children’s health and household economic status.

I also implement the DiD analysis using two health status indictors as placebo outcomes, also normalized to health center catchment population and expressed as yearly counts per 1,000 individuals: number of under-5 first diarrhea consultations and number of children classified as having normal growth. As described previously, I do not expect that a governance intervention will be able to affect these health indicators within one to three years of implementation. Thus, these placebo outcome analyses serve as a falsification test for the primary DiD results.

5.4 Decentralization as Treatment

The key independent variable in this analysis is a dichotomous indicator of whether or not a particular health center is part of a decentralized health service delivery model. In short, I am analyzing decentralization as a treatment that was applied to some health centers and not to others at specific points in time, and comparing average outcomes between the treated and control health centers before and after the treatment was implemented (Andresson & Ostrom 2008). Twenty-two of the fifty primary care health centers in the department of Intibucá have
been decentralized, and they comprise the treated group in the analysis, while the other twenty-eight health centers remained under centralized administration and thus form the control group.

Decentralization in Intibucá is not the clean, unambiguous treatment as would be ideal for using quasi-experimental research methods to identify causal effects. This intervention was not implemented in all twenty-two treated health centers simultaneously; instead, most of the twenty-two the decentralization contracts were first signed in 2008, with a few additional health centers entering existing decentralized systems in 2009 and 2010. Moreover, each first contract was preceded by an extended negotiation and socialization process, upwards of a year in some cases, involving staff from the MOH, Regional Health Authority, decentralized managing organization, and the relevant health centers. These factors likely influenced the treated health centers prior to when the contracts were officially signed, and may have also affected un-treated health centers. To best account for this, I use the real treatment year in calculating averages for all decentralized health centers and take 2008 as the pre- and post-period dividing year for all control health centers. To justify the validity of this simplification, I estimate two placebo treatment models as falsification tests (taking 2006 and 2011 as the effective intervention years) for each of the three primary dependent variables, and also implement a weighted least squares robustness check where the unit-level values are weighted by the number of years of data available for calculating their pre- and post-period averages.

5.5 Covariates

The practice of including time-varying covariates in DiD regression analyses in an effort to explain trends across periods or between groups has been criticized because such covariates are often related to the treatment, and may thus introduce endogeneity that compromises the causal interpretation of the approach (Hainmueller 2012). For this reason, the baseline models I
present do not include covariates. Nonetheless, I do run models for each dependent variable where I add relevant covariates to the baseline specifications as a robustness check. I include the following municipal-level covariates: number of elderly individuals receiving cash transfers (2007, 2011; per 100 individuals), human development index (2005, 2007), margin of victory for the mayor (2005, 2009; proportion), electoral participation (2005, 2009; proportion), the interaction of margin of victory for the mayor and electoral participation (2005, 2009), and number of civil society groups (2007, 2011; per 100 individuals).

6 Effects of Decentralized Health Service Delivery Models

As described in the previous section, I implement the DiD estimator through OLS regression to estimate the average treatment effect of decentralized health service delivery models on three production-based women’s health outcomes in Intibucá, Honduras. Following the recommendation in Bertrand et al. (2004), I collapse my time-series data into pre- and post-treatment averages for the decentralized (treated) health centers and the centrally-administered (control) health centers (267-269). Thus, my sample includes a pre-treatment and a post-treatment average values for the relevant dependent variable for each of about 50 health centers. In the following section I present the primary analyses where I estimate baseline, placebo treatment, and covariate models for each of the dependent variables; I then estimate baseline and covariate models for the two placebo indicators and implement outcome randomization as additional falsification tests in the subsequent sections; and finally, I re-estimate the primary baseline models removing compositional differences between pre- and post-periods and using weighted least squares as additional robustness checks.

---

5 Strictly speaking, the dependent variables are over-dispersed counts of different types of consultations reported by each health center. I implement the analysis using ordinary least squares regression because the counts are sufficiently high to justify a normal approximation for the negative binomial distribution.
6.1 Women's Health Indicators: Baseline, Placebo Treatment, and Covariate Models

Figure 3 below presents monthly data on family planning consultations per 1,000 individuals averaged for treated and control health centers between 2005 and 2012. Month 37 corresponds to January of 2008 in all following figures, the first month of the intervention as discussed in section 5.4. Prior to the treatment, the average values on this indicator track very closely for decentralized and centrally-administered health centers, maintaining roughly parallel pre-intervention trends. The divergence in the trends between the two groups begins around the time of the intervention, in the early months of 2008, and this separation grows over time, with the treated health centers reporting consistently and increasingly higher numbers of family planning follow-up consultations than the control health centers. Figure 3 provides visual evidence that the parallel dynamics assumption for DiD is not significantly violated for this indicator, and suggests that decentralization may have improved health system performance in terms of family planning consultations.

Figure 3: Family Planning (Depo-Provera) Follow-up Consultations per 1,000 Individuals, Treatment vs. Control, 2005-2012 (Smoothed)
Table 1 presents four regression models with cluster-robust standard errors at the health center level based on the data displayed in figure 3. Model 1 in table 1 is the baseline specification with no covariates. The ATET is estimated by the coefficient on the interaction of the period and decentralized variables. As seen in the table, this coefficient is positive and significant, indicating that the average effect of decentralization is to increase annual family planning follow-up consultations by 18 per 1,000 individuals across the decentralized health centers. This effect is robust to the inclusion of covariates; the coefficient on the ATET in model 4 is positive, significant, and slightly larger than that in model 1.

The decentralized health centers in Intibucá serve approximately 62,000 individuals. For this population, the ATETs estimated in models 1 and 4 represent about 1,205 additional family planning consultations across the decentralized health centers over the course of a year, which is a 24% increase above the anticipated number of such consultations based the trajectory of the control health centers. In short, the decentralization reform is associated with a significant improvement in the performance of these local health systems in providing family planning services to their populations. The full substantive effects of decentralization on the three indicators of women’s preventive care – beginning with family planning, moving through prenatal care, and concluding with postpartum follow-up consultations – are summarized in table 4 at the end of this section.

Table 1 also presents the first of several falsification tests. In models 2 and 3 I re-estimate the baseline specification with placebo treatments, first taking 2006 as the effective year for the intervention and then taking 2011 as intervention year. In both cases, the coefficient estimating the ATET is insignificant as expected, providing support for the validity of the DiD approach and the associated estimates from models 1 and 4.
Table 1: Effect of Decentralization on Family Planning Follow-up Consultations

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatment</td>
<td>Placebo 2006</td>
<td>Placebo 2011</td>
<td>Treatment (w/ covs.)</td>
</tr>
<tr>
<td>ATET</td>
<td>18.38∗</td>
<td>17.37</td>
<td>12.28</td>
<td>20.50∗</td>
</tr>
<tr>
<td>(Period · Decentralized)</td>
<td>(8.254)</td>
<td>(10.272)</td>
<td>(8.231)</td>
<td>(9.429)</td>
</tr>
<tr>
<td>Decentralized</td>
<td>9.080</td>
<td>1.087</td>
<td>15.88∗</td>
<td>21.29**</td>
</tr>
<tr>
<td>(control=0, treated=1)</td>
<td>(5.440)</td>
<td>(6.158)</td>
<td>(6.096)</td>
<td>(6.931)</td>
</tr>
<tr>
<td>Period</td>
<td>43.02***</td>
<td>50.56***</td>
<td>33.34***</td>
<td>48.44***</td>
</tr>
<tr>
<td>(pre=0, post=1)</td>
<td>(5.521)</td>
<td>(6.516)</td>
<td>(4.328)</td>
<td>(8.347)</td>
</tr>
<tr>
<td>No. Elderly Receiving Cash Transfers (Muni.)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0.510</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.610)</td>
</tr>
<tr>
<td>Human Development Index (Muni.)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-179.9**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(59.990)</td>
</tr>
<tr>
<td>Margin Victory for Mayor (Muni.)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-86.46</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>(51.097)</td>
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<tr>
<td>Electoral Participation (Muni)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>69.88</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(48.022)</td>
</tr>
<tr>
<td>Margin Victor for Mayor · Participation</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>269.1*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(115.282)</td>
</tr>
<tr>
<td>No. Civil Society Grps. (Muni.)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-82.64*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(31.010)</td>
</tr>
<tr>
<td>Constant</td>
<td>27.49***</td>
<td>11.81***</td>
<td>45.68***</td>
<td>88.27</td>
</tr>
<tr>
<td></td>
<td>(2.215)</td>
<td>(2.875)</td>
<td>(3.872)</td>
<td>(58.771)</td>
</tr>
<tr>
<td>N</td>
<td>96</td>
<td>95</td>
<td>99</td>
<td>96</td>
</tr>
<tr>
<td>adj. $R^2$</td>
<td>0.51</td>
<td>0.05</td>
<td>0.34</td>
<td>0.62</td>
</tr>
<tr>
<td>F statistic</td>
<td>56.705</td>
<td>4.075</td>
<td>36.826</td>
<td>21.632</td>
</tr>
<tr>
<td>Prob &gt; F</td>
<td>0.000</td>
<td>0.012</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Cluster-robust standard errors in parentheses: * p < 0.05, ** p < 0.01, *** p < 0.001

I next implement this same estimation and falsification strategy for the other two primary dependent variables. Figure 4 presents time-series data for prenatal follow-up consultations per 1,000 individuals averaged for treated and control health centers. Figure 5 does the same for
postpartum follow-up consultations. In both cases, the DiD assumption of pre-treatment parallel dynamics is confirmed visually. In fact, for both of these indicators the treated and control health centers are almost identical on average during the pre-treatment period. Furthermore, the divergence between the two groups on both indicators occurs in the early months of 2008, just after the decentralization intervention was implement in the majority of treated health centers, and in both cases the treated units outperform the control health centers, with the decentralization dividend growing over time. These time-series plots provide visual evidence consistent with decentralization having a positive effect on the performance of local health systems in producing these two additional types of preventive health consultations for women.

Table 2, following figure 4, and table 3, following figure 5, present the four regression models for these two indicators, again utilizing cluster-robust standard errors. In both tables, model 1 is the baseline specification that estimates the ATET with no covariates, and model 4 adds covariates. The coefficient characterizing the ATET for prenatal follow-up consultations is positive and highly significant in both model specifications. The same is true for postpartum follow-up consultations. Models 2 and 3 in both of the tables present the placebo treatment falsification test, again taking 2006 and 2011 respectively as the effective year for the intervention. As expected, the coefficient estimating the ATET for the 2006 placebo treatment is insignificant for both outcomes. The ATET on the 2011 placebo treatment, however, is weakly significant in both cases. It is likely that this effect is related to three factors: 1) the staggered implementation of the decentralization reform, with a few units receiving the treatment as late as 2010, 2) the incremental time-lag between the implementation of these reforms and observable changes in outcomes at the health center level, and 3) learning and improvement by the decentralized managing organizations over time. Absence of pre-treatment divergence between
the groups on the outcome of interest is fundamental for the validity of the DiD approach, and the data show no evidence of such divergence. A weakly significant post-treatment effect is less concerning and I suspect it can be attributed to the three aforementioned factors. Overall, the placebo treatment falsification tests provide additional evidence supporting the DiD approach and reinforcing the validity of the ATET estimates.

Substantively, the models presented for prenatal and postpartum consultations, just as for family planning consultations, provide evidence of significant improvement in health system performance from decentralization. Specifically, the estimates indicate decentralization is associated with an average annual increase of 2,407 prenatal follow-up consultations across the decentralized health centers in Intibucá, as well as an additional 662 postpartum follow-up consultations. These additional consultations represent a 60% and 70% increase in performance respectively over the anticipated number of such consultations considering trends for the control units and the pre-treatment performance levels for the decentralized units. Overall, the results presented in this section provide strong support for my primary hypothesis that decentralization should improve local health system performance in Intibucá. Moreover, given the important role played by women in promoting children’s health and household well-being discussed previously, substantively large increases in preventive health consultations for women in this rural region of Honduras have the potential for generating important health and economic benefits within these underserved communities.
Figure 4: Prenatal Follow-up Consultations per 1,000 Individuals, Treatment vs. Control, 2005-2012 (Smoothed)

Table 2: Effect of Decentralization on Prenatal Follow-up Consultations

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatment</td>
<td>Placebo 2006</td>
<td>Placebo 2011</td>
<td>Treatment (w/ covs.)</td>
</tr>
<tr>
<td>ATET (Period · Decentralized)</td>
<td>35.41***</td>
<td>19.58</td>
<td>16.96*</td>
<td>42.24***</td>
</tr>
<tr>
<td></td>
<td>(7.326)</td>
<td>(11.689)</td>
<td>(8.009)</td>
<td>(8.206)</td>
</tr>
<tr>
<td>Decentralized (control=0, treated=1)</td>
<td>0.0733</td>
<td>3.894</td>
<td>15.97*</td>
<td>7.800</td>
</tr>
<tr>
<td></td>
<td>(7.582)</td>
<td>(12.395)</td>
<td>(7.651)</td>
<td>(9.270)</td>
</tr>
<tr>
<td>Period (pre=0, post=1)</td>
<td>6.775</td>
<td>-3.462</td>
<td>8.615**</td>
<td>16.35*</td>
</tr>
<tr>
<td></td>
<td>(3.881)</td>
<td>(3.731)</td>
<td>(3.163)</td>
<td>(6.506)</td>
</tr>
<tr>
<td>No. Elderly Receiving Cash Transfers (Muni.)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-1.516**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.547)</td>
</tr>
<tr>
<td>Human Development Index (Muni.)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-73.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(74.509)</td>
</tr>
<tr>
<td>Margin Victory for Mayor (Muni.)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>50.91</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(47.918)</td>
</tr>
<tr>
<td>Electoral Participation (Muni)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>126.6*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(56.585)</td>
</tr>
<tr>
<td>Margin Victor for Mayor · Participation</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-15.41</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(93.584)</td>
</tr>
</tbody>
</table>
Table 3: Effect of Decentralization on Postpartum Follow-up Consultations

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatment</td>
<td>Placebo</td>
<td>Placebo</td>
<td>Treatment (w/ covs.)</td>
</tr>
<tr>
<td>ATET</td>
<td>10.15***</td>
<td>4.092</td>
<td>3.453*</td>
<td>11.20***</td>
</tr>
<tr>
<td>(Period · Decentralized)</td>
<td>(2.061)</td>
<td>(3.124)</td>
<td>(1.594)</td>
<td>(2.485)</td>
</tr>
<tr>
<td>Decentralized</td>
<td>-0.713</td>
<td>1.650</td>
<td>4.244*</td>
<td>0.631</td>
</tr>
<tr>
<td>(control=0, treated=1)</td>
<td>(2.305)</td>
<td>(3.131)</td>
<td>(2.015)</td>
<td>(2.670)</td>
</tr>
<tr>
<td>Period</td>
<td>-0.0761</td>
<td>-0.371</td>
<td>1.004</td>
<td>0.439</td>
</tr>
<tr>
<td>(pre=0, post=1)</td>
<td>(1.279)</td>
<td>(1.540)</td>
<td>(0.890)</td>
<td>(1.889)</td>
</tr>
<tr>
<td>No. Elderly Receiving Cash Transfers (Muni.)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0.139</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.254)</td>
</tr>
</tbody>
</table>

Cluster-robust standard errors in parentheses: * p < 0.05, ** p < 0.01, *** p < 0.001

Figure 5: Postpartum Follow-up Consultations per 1,000 Individuals, Treatment vs. Control, 2005-2012 (Smoothed)
Table 4: Substantive Effects of Decentralization: Pre- and Post-Period Averages, ATETs, Anticipated Production, and Attributed Consults

<table>
<thead>
<tr>
<th>Status</th>
<th>Period</th>
<th>Family Planning Consults</th>
<th>Prenatal Consults</th>
<th>Postpartum Consults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Administration (control)</td>
<td>Pre</td>
<td>27.49</td>
<td>55.32</td>
<td>15.46</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>68.17</td>
<td>62.36</td>
<td>15.41</td>
</tr>
<tr>
<td>Decentralized (treatment)</td>
<td>Pre</td>
<td>40.39</td>
<td>57.62</td>
<td>15.31</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>96.90</td>
<td>96.77</td>
<td>24.72</td>
</tr>
<tr>
<td>Anticipated production for decentralized units (based on trend for control units)</td>
<td></td>
<td>81.07</td>
<td>64.66</td>
<td>15.27</td>
</tr>
<tr>
<td>Avg. Treatment Effect on Treated Units</td>
<td></td>
<td>19.44</td>
<td>38.83</td>
<td>10.68</td>
</tr>
<tr>
<td>Percent Above Anticipated Production</td>
<td></td>
<td>24%</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>Additional Number of Yearly Consults attributed to Decentralization</td>
<td></td>
<td>1,205</td>
<td>2,407</td>
<td>662</td>
</tr>
</tbody>
</table>
6.2 Falsification Test: Placebo Dependent Variables

I implement an additional falsification test by estimating the baseline model specification and the specification with covariates for two placebo dependent variables, indicators that I do not expect a governance reform to be able to affect in the short-run. The two indicators are the number of under-5 first diarrhea consultations and the number of children classified as having normal growth for their age. These indicators are direct reflections of health status or quality of health within a community, rather than being production-based like the previous three indicators. As discussed in section 5.3, these quality of health indicators should not be expected to change significantly within one to three years of implementing decentralization. Figures 6 and 7 present the time-series data for these two indicators. In both cases, the trends for the treated and control health centers remain fairly close throughout the eight year period, and where there is slight divergence between the groups, it does not corresponded to the intervention year. Most significantly, the two groups essentially converge during the last twelve months of the time series. Visually, there is little evidence to suggest that the decentralization intervention has had any significant effect on health center performance with respect to the number of diarrhea consultations or children displaying normal growth.

This absence of an effect is confirmed when I estimate the baseline and covariate specifications of the DiD regression models for both indicators utilizing cluster-robust standard errors, presented in table 5. As expected, the coefficient on the interaction of the period and decentralized variables, estimating the ATET, is insignificant in all four models. Furthermore, as judged by the proportion of variance explained, these four models perform very poorly in comparison to all of the previous non-placebo models. This is further evidence in support of the
validity of the original DiD models and their estimates of the average effect of decentralization on the production-based women’s health indicators.

The falsification test using placebo dependent variables also speaks to a potential criticism of focusing on production-based indicators of health outcomes, namely that this reduces a substantive intervention to a record-keeping reform. The logic of this criticism is that consultations being attributed to decentralization post-treatment are not in fact real, but rather artifacts of greater diligence in filling out the monthly administrative forms. These consults were always occurring, but they were being included in the official tallies. If it were the case that the effect of decentralization was strictly to improve record-keeping, I would anticipate this effect to act on both production-based indicators and health status outcomes. This implies that some effect of decentralization would be observed on diarrhea consultations or numbers of kids with normal growth. However, these placebo dependent variables do not display any such effect, ameliorating concerns that decentralization is just a record-keeping reform, and supporting the use of production-based indicators for evaluating the effects of governance reforms.

Figure 6: Under-5 First Diarrhea Consultations per 1,000 Individuals, Treatment vs. Control, 2005-2012 (Smoothed)
Figure 7: Number of Children Classified with Normal Growth per 1,000 Individuals, Treatment vs. Control, 2005-2012 (Smoothed)

Table 5: Effect of Decentralization on Placebo Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ATET</td>
<td>ATET</td>
<td>ATET</td>
<td>ATET</td>
</tr>
<tr>
<td></td>
<td>(Period · Decentralized)</td>
<td>(Period · Decentralized)</td>
<td>(Period · Decentralized)</td>
<td>(Period · Decentralized)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>-3.215</td>
<td>-2.387</td>
<td>19.31</td>
<td>18.89</td>
</tr>
<tr>
<td>(w/ covs.)</td>
<td>(6.352)</td>
<td>(7.060)</td>
<td>(42.970)</td>
<td>(49.075)</td>
</tr>
<tr>
<td>Decentralized</td>
<td>6.052</td>
<td>4.683</td>
<td>30.62</td>
<td>32.39</td>
</tr>
<tr>
<td>(control=0, treated=1)</td>
<td>(6.758)</td>
<td>(6.478)</td>
<td>(40.942)</td>
<td>(49.131)</td>
</tr>
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<td>Period</td>
<td>-6.949*</td>
<td>-8.424</td>
<td>33.20</td>
<td>53.43</td>
</tr>
<tr>
<td>(pre=0, post=1)</td>
<td>(2.730)</td>
<td>(4.537)</td>
<td>(22.665)</td>
<td>(29.266)</td>
</tr>
<tr>
<td>No. Elderly Receiving Cash Transfers (Muni.)</td>
<td>-</td>
<td>0.0627</td>
<td>-</td>
<td>1.175</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.349)</td>
<td></td>
<td>(3.099)</td>
</tr>
<tr>
<td>Human Development Index (Muni.)</td>
<td>-</td>
<td>1.035</td>
<td>-</td>
<td>-466.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(59.446)</td>
<td></td>
<td>(434.171)</td>
</tr>
<tr>
<td>Margin Victory for Mayor (Muni.)</td>
<td>-</td>
<td>22.30</td>
<td>-</td>
<td>239.2</td>
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<td></td>
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<td>(31.035)</td>
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<td>(223.883)</td>
</tr>
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<td>Electoral Participation (Muni)</td>
<td>-</td>
<td>62.12*</td>
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<td>233.6</td>
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<tr>
<td></td>
<td></td>
<td>(27.025)</td>
<td></td>
<td>(228.454)</td>
</tr>
<tr>
<td>Margin Victor for Mayor · Participation</td>
<td>-</td>
<td>-2.320</td>
<td>-</td>
<td>-511.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(63.814)</td>
<td></td>
<td>(477.128)</td>
</tr>
</tbody>
</table>
6.3 Falsification Test: Outcome Randomization

Next, I implement outcome randomization as a last falsification test to evaluate the validity and uncertainty of the DiD estimates produced in the primary analyses. Monte Carlo simulations and commonly used rules-of-thumb suggest that researchers need at least fifty groups for cluster-robust standard errors to correctly represent the estimation uncertainty of statistical models (Rader 2011, Erikson et al. 2010), while Rader (2011) finds that cluster-robust standard errors can be too small even for datasets with fifty groups. The principal analyses presented in this paper utilize data clustered by fifty health centers, and when compositional differences are removed (see section 6.4 below), there are forty-six health centers; thus, these analyses fall right at or just below the number of groups for which cluster-robust standard errors are conventionally thought to perform well. Additionally, the randomization test can be thought of as an extreme version of the placebo treatment strategy, randomly permuting the outcomes of interests across units to characterize the uncertainty of the ATET estimates. With these two purposes in mind I implement outcome randomization tests for each of the three baseline analyses of production-based women’s health outcomes.

Randomization tests are a non-parametric approach for conducting hypothesis testing, and Rader (2011) finds that these tests accurately characterize estimation uncertainty for models
on grouped data even where cluster-robust standard errors are overconfident. Rather than relying on distributional assumptions like traditional hypothesis tests, the randomization approach involves constructing a reference distribution from the data themselves through permutation. I proceed with each randomization test in the following manner: 1) I re-estimate the real baseline model without utilizing cluster-robust standard errors and save the t-statistic on the ATET for the given outcome, 2) I retain the treatment, period, and ATET covariates in the dataset and implement a simple permutation of the outcome variable without replacement (Kennedy & Cade 1996, Erikson et al. 2010), 3) I re-estimate the baseline model using this permuted outcome dataset, saving the t-statistic on the ATET, and 4) I repeat the previous two steps 999 additional times. This procedure produces a distribution of 1,000 t-statistics on the ATET from the baseline model for each production-based women’s health outcome. The three distributions of t-statistics are presented in figure 8, with the value of the t-statistic from the real model highlighted.

The primary goal of hypothesis testing in the context of regression analysis is to retrieve a p-value for evaluating the null hypotheses that a particular parameter estimate is equal to zero; in short, the p-value is the probability of getting an estimate as extreme or more extreme than the estimate actually obtained simply due to random chance. Low p-values are taken as evidence against the null hypothesis of no effect, and parameter estimates are typically considered significant with p-values of 0.05 or smaller, with this sometimes being relaxed to 0.10. The t-statistic distributions presented in figure 8 carry this same interpretation; in each case, permuting the outcome variable while retaining the structure of the other covariates allows me to characterize how likely or unlikely the result from the real model is simply due to random chance. The ATET of decentralization for family planning consultations had greater uncertainty than the other two outcomes, though it was still significant by the conventional 0.05 standard
with exactly 50 t-statistics from the 1,000 permutated datasets being as extreme or more extreme than the t-statistic from the real model. The uncertainty on the ATET estimates for prenatal consultations and postpartum consultations are highly significant based on the randomization tests; two of the t-statistics from the 1,000 permuted datasets are as or more extreme than the real t-statistic on the ATET for prenatal consults, while there is only one such t-statistic for postpartum consults. Overall, the results of the randomization tests lend further support for the primary DiD results and show that the uncertainty on these estimates is acceptably low for family planning consultations, and extremely low for prenatal and postpartum consultation.

Figure 8: Distributions of T-Statistics from Randomization Tests on ATETs for Three Production-based Women’s Health Outcomes
6.4 Robustness Check: Removing Compositional Differences

I next address the concern that compositional differences in the pre- and post-treatment samples can introduce bias to the DiD estimator (Hainmueller 2012). After 2009, four new or previously-shuttered primary care health centers opened in the department. Three of these health centers were in areas that had been decentralized, so there were incorporated under those existing contracts, while one was in a centrally-administered area. I do not have pre-treatment health outcome data for these units, but their post-treatment data are included in the primary analyses. To verify that these few units are not driving or biasing the presented results, I drop them from the sample and re-estimate the baseline model specification for the three women’s health dependent variables and for the two placebo dependent variables using the remaining 46 health centers. Table 6 presents these models. As expected, the coefficients estimating the ATET are positive and highly significant for the production-based women’s health dependent variables and are insignificant for the placebo indicators. These results provide additional confirmation of the validity of the original results discussed throughout this section.
### Table 6: Effects of Decentralization on Women’s Health and Placebo Indicators Removing Compositional Differences

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Family Planning</td>
<td>Prenatal Consults</td>
<td>Postpart. Consults</td>
<td>Diarrhea Consults</td>
<td>Normal Growth</td>
</tr>
<tr>
<td></td>
<td>Real DV</td>
<td>Real DV</td>
<td>Real DV</td>
<td>Placebo DV</td>
<td>Placebo DV</td>
</tr>
<tr>
<td>ATET</td>
<td>23.50***</td>
<td>34.73***</td>
<td>10.56***</td>
<td>-1.250</td>
<td>34.90</td>
</tr>
<tr>
<td>(Period · Decentralized)</td>
<td>(8.211)</td>
<td>(7.697)</td>
<td>(2.131)</td>
<td>(6.134)</td>
<td>(43.230)</td>
</tr>
<tr>
<td>Decentralized</td>
<td>9.080</td>
<td>0.0733</td>
<td>-0.713</td>
<td>6.052</td>
<td>30.62</td>
</tr>
<tr>
<td>(control=0, treated=1)</td>
<td>(5.449)</td>
<td>(7.594)</td>
<td>(2.309)</td>
<td>(6.768)</td>
<td>(41.008)</td>
</tr>
<tr>
<td>Period</td>
<td>38.51***</td>
<td>7.080</td>
<td>-0.0264</td>
<td>-8.601***</td>
<td>21.36</td>
</tr>
<tr>
<td>(pre=0, post=1)</td>
<td>(4.756)</td>
<td>(3.908)</td>
<td>(1.351)</td>
<td>(2.102)</td>
<td>(21.683)</td>
</tr>
<tr>
<td>Constant</td>
<td>27.49***</td>
<td>55.32***</td>
<td>15.46***</td>
<td>34.24***</td>
<td>231.4***</td>
</tr>
<tr>
<td></td>
<td>(2.218)</td>
<td>(4.767)</td>
<td>(1.167)</td>
<td>(2.570)</td>
<td>(24.072)</td>
</tr>
<tr>
<td>N</td>
<td>92</td>
<td>92</td>
<td>92</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>adj. $R^2$</td>
<td>0.53</td>
<td>0.24</td>
<td>0.20</td>
<td>0.06</td>
<td>0.03</td>
</tr>
<tr>
<td>F statistic</td>
<td>52.610</td>
<td>14.348</td>
<td>15.118</td>
<td>6.812</td>
<td>1.987</td>
</tr>
<tr>
<td>Prob &gt; F</td>
<td>0.000</td>
<td>0.000</td>
<td>0.001</td>
<td>0.01</td>
<td>0.129</td>
</tr>
</tbody>
</table>

*Cluster-robust standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
6.5 **Robustness Check: Weighted Least Squares**

The ideal circumstance for implementing the DiD estimator through OLS regression with time-series data collapsed to pre- and post-treatment averages is when the treatment is uniformly applied at a single point in time (Banerjee et al. 2004). This is not the case here. Of the twenty-two decentralized health centers in the baseline analyses, 2008 is the first effective year of the intervention for twelve of them, 2009 is the effective year for five other health centers, and 2010 is that year for the final five health centers. As described previously, I utilize 2008 as the pre-post dividing year for all control health centers because it is the modal year of the intervention. Thus, the pre- and post-period averages calculated for the DiD analyses using the 2005-2012 data do not contain the same number of years of information for all health centers. This heterogeneity in the total amount of information encapsulated in the average values of the outcome variables at the health center level motivates the use of weighted least squares as a robustness check of the primary DiD results.

Table 7 below presents the baseline models for the real and placebo outcomes re-estimated through weighted least squares. Each average value in the dataset is weighted by the number of years of data used to calculate that average, meaning that observations with more years of data going into the average will have higher weights in this analysis relative to those observations whose averages are calculated from fewer years of data. As demonstrated in the table, the weighted least squares analyses are largely consistent with primary results. The ATET for family planning consultation loses its prior significance; as seen in the randomization test, the uncertainty on this estimate is substantially higher than the other two production-based outcomes and the weighting causes it to be become insignificant at the conventional 0.05 level. The ATETs for prenatal and postpartum consultations remain significant as expected, and the
estimates for the placebo dependent variables are insignificant as expected. While the weighted least squares robustness check demonstrates the higher uncertainty of the effect of decentralization on family planning consultations, it is generally consistent with the results of the principal analyses and further confirms the validity of the DiD approach.
Table 7: Effects of Decentralization on Women’s Health and Placebo Indicators, Weighted Least Squares

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Family Planning</td>
<td>Prenatal Consults</td>
<td>Postpart. Consults</td>
<td>Diarrhea Consults</td>
<td>Normal Growth</td>
</tr>
<tr>
<td></td>
<td>Real DV</td>
<td>Real DV</td>
<td>Real DV</td>
<td>Placebo DV</td>
<td>Placebo DV</td>
</tr>
<tr>
<td>ATET (Period · Decentralized)</td>
<td>17.21</td>
<td>35.68**</td>
<td>10.21**</td>
<td>-2.924</td>
<td>24.22</td>
</tr>
<tr>
<td></td>
<td>(10.943)</td>
<td>(11.289)</td>
<td>(3.165)</td>
<td>(6.957)</td>
<td>(51.850)</td>
</tr>
<tr>
<td>Decentralized (control=0, treated=1)</td>
<td>6.156</td>
<td>0.00256</td>
<td>-0.737</td>
<td>6.498</td>
<td>28.54</td>
</tr>
<tr>
<td></td>
<td>(7.087)</td>
<td>(8.070)</td>
<td>(2.253)</td>
<td>(5.408)</td>
<td>(40.406)</td>
</tr>
<tr>
<td>Period (pre=0, post=1)</td>
<td>49.31***</td>
<td>6.731</td>
<td>-0.0842</td>
<td>-7.560</td>
<td>27.99</td>
</tr>
<tr>
<td></td>
<td>(7.228)</td>
<td>(7.459)</td>
<td>(2.091)</td>
<td>(4.671)</td>
<td>(34.845)</td>
</tr>
<tr>
<td>Constant</td>
<td>27.49***</td>
<td>55.32***</td>
<td>15.46***</td>
<td>34.24***</td>
<td>231.4***</td>
</tr>
<tr>
<td></td>
<td>(4.460)</td>
<td>(5.295)</td>
<td>(1.475)</td>
<td>(3.719)</td>
<td>(27.833)</td>
</tr>
<tr>
<td>N</td>
<td>96</td>
<td>96</td>
<td>96</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>adj. $R^2$</td>
<td>0.56</td>
<td>0.26</td>
<td>0.20</td>
<td>0.06</td>
<td>0.02</td>
</tr>
<tr>
<td>F statistic</td>
<td>40.794</td>
<td>12.210</td>
<td>8.763</td>
<td>3.035</td>
<td>1.711</td>
</tr>
<tr>
<td>Prob &gt; F</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.033</td>
<td>0.170</td>
</tr>
</tbody>
</table>

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
6.6 Summary of Analysis

In the previous sections I have implemented a difference-in-differences estimation strategy to evaluate the effect of decentralized health service delivery models on three production-based women’s health indicators: family planning consultations, prenatal consultations, and postpartum consultations. This approach hinges on the validity of the difference-in-differences quasi-experimental research design for the fifty health centers in the department of Intibucá, specifically that control and treatment units exhibit parallel trends prior to the intervention. I demonstrate the parallel trends assumption is not violated using monthly time-series data from 2005 to 2012, and then collapse this time-series into pre- and post-treatment averages at the health center level for the DiD regression analysis. This analysis is then a direct test of my hypothesis that decentralization will be associated with improvements in local health system performance within the department of Intibucá. Overall, the baseline models using the real treatment year show that decentralized health service delivery models do have a positive and significant effect in improving the performance of the health centers in producing family planning, prenatal, and postpartum consultations.

In addition to estimating these baseline models using the real treatment period, I also implement a series of falsification tests and robustness checks of my main results. Specifically, for each women’s health indicator I estimate the baseline model taking 2006 and 2011 as placebo treatment periods, with covariates, weighting by the number of years used in calculating each average, and removing compositional differences. Furthermore, I estimate the baseline model for two placebo dependent variables – cases of diarrhea and number of children exhibiting normal growth, outcomes I do not believe decentralization can affect in the short-run – with covariates, using weighted least-squares, and removing compositional differences. Finally, I
utilize randomization tests on the baseline model for the three production-based outcomes as a non-parametric strategy for characterizing the uncertainty of the estimates.

Looking comprehensively across all of the models and tests there is a strong case for decentralized health service delivery models in Intibucá having a substantial effect in increasing the number of preventive care consultations for women. The coefficients quantifying the average treatment effect on the treated and their ninety-five percent confidence intervals from all models estimated in this analysis are presented in following four coefficient plots. In figures 9, 10, 11, and 12, the coefficients represented in black are expected to be significant and those represented in gray are expected to be insignificant if my hypothesis about the effectiveness of decentralization is correct.

Of the twenty-six coefficients in the four figures, twenty-three match my expectations and thus provide evidence consistent with my hypothesis. Two of three coefficients that suggest the hypothesis might be wrong, the 2011 placebo treatment models for prenatal and postpartum consultations, are very close to being insignificant as expected, and as I discussed earlier, the implementation of the intervention over a few years makes the 2011 placebo treatment models less relevant falsification tests than the 2006 placebo treatment models. Notably, in no case do the treatment and control groups begin diverging in their performance prior to the intervention, and I have not identified any factor or condition that might explain their post-treatment divergence in performance that happened to coincide with the timing of decentralization.

Importantly, the coefficient plots clearly display the moderate and sometimes large levels of uncertainty in the ATET estimates. This is not unexpected given the relatively small sample size for the study. It is clear, however, that the family planning results are notably weaker than the results for prenatal and postpartum consultations; the uncertainty around the point estimates of
the ATETs is significantly larger than for the other two production-based indicators. This conclusion is reinforced by the results of the randomization tests which demonstrate the higher uncertainty of the family planning results. Family planning is a more sensitive and controversial topic in this region of Honduras than prenatal or postpartum care, and thus these data are likely to be less reliable and generally noisier than for the other indicators. Nonetheless, these results, while less certain, are still largely consistent with my hypothesis.

In summary, there is strong and comprehensive evidence showing that decentralized health service delivery models can significantly improve the production of preventive care visits for women in the department of Intibucá. My analysis shows that this effect is stronger and more certain for prenatal and postpartum consultations than for family planning consultations, but the results are consistently robust across all three indicators. Moreover, the analysis demonstrates, as expected, that a governance reform like decentralization is unlikely to improve quality of health indicators in just a few years, again confirming my general hypothesis. Considering the point estimates only, decentralization is associated with an annual increase of 1,205 family planning consultations, 2,407 prenatal consultations, and 662 postpartum consultations across all of the treated health centers; these are improvements of 24-, 60-, and 70-percent respectively relative to the trend among the control units for these outcomes. Decentralization is thus associated with a substantial improvement in the performance of the local health centers in delivering preventive care to women in this rural region of Honduras.
Figure 9: Coefficient and 95% CI on ATET for Family Planning Consultations, All Models

Figure 10: Coefficient and 95% CI on ATET for Prenatal Consultations, All Models
Figure 11: Coefficient and 95% CI on ATET for Postpartum Consultations, All Models

![Graph showing coefficient and 95% CI for various models including Treatment, Placebo, Treatment with Covariates, Treatment, WLS, and Treatment, w/o Comp. Diffs.]

Figure 12: Coefficient and 95% CI on ATET for Placebo DVs, All Models

![Graph showing coefficient and 95% CI for various models including Diarrhea, Diarrhea with Covariates, Growth, Growth with Covariates, Diarrhea, WLS, Growth, WLS, Diarrhea w/o Comp. Diffs., and Growth w/o Comp. Diffs.]

Expected Significant
Expected Insignificant
N = 92 - 99
N = 92 - 96
7 Mechanisms Underlying Decentralization’s Effects

Having thoroughly demonstrated that decentralized health service delivery models have substantial positive effects on women’s preventive care, I undertake a preliminary analysis of survey data collected for health center staff to highlight the factors and conditions that could be underlying that effectiveness. In the following section I discuss the survey in greater detail and elaborate on its strengths and limitations, and in the subsequent section I implement simple difference in means tests between control and treated health centers on a set of key factors related to the effectiveness of decentralized health service delivery models.

7.1 Survey Data

As described in section 5.1, we surveyed 166 individuals across 55 of the 56 public health units in the department of Intibucá. Of the total respondents, 135 were health center staff – doctors, nurses, or community health workers – with the balance being community leaders. As already discussed, our limited resources prevented us from surveying a representative sample of key health staff in the department; instead, we implemented a systematic sample of staff in each health center on a given day as well as relevant community leaders associated with the health center where applicable. Overall, we queried respondents on a series of topics related to social and institutional conditions at the local level, administration and reform within the health sector, and overall health system performance. Our goal in this survey effort was to generate data about the potential mechanisms through which decentralization could be affecting health system performance, and the conditions that might be moderating those effects. The full survey instrument is included as an appendix in section 11.

The survey design and its implementation have significant limitations. First, and most importantly, the responses obtained through the survey do not purport to represent the viewpoints
of all health sector staff in the department. What we have are data that reflect the opinions and perspectives of some health workers in Intibucá and thus the subsequent analysis of those data is chiefly illustrative. Moreover, as participation in the survey was voluntary and in no way compelled by the survey staff or the Regional Health Authority supporting the project, it is possible that there were systematic differences between respondents and those who were not surveyed. Most health centers in the department have only a few regular staff, and our goal was to survey the senior doctor, nurse, and community health worker in each unit. Almost no individual approached for a survey refused. However, we cannot know if particular individuals were strategically absent from the health center on the day we visited. While we publicized the overall study, we generally avoided notifying the staff of a particular health center that we would be visiting until the afternoon of the day prior to our arrival in order to minimize the possibility of strategic absences as much as possible.

Second, this survey data, like all survey data, is subject to numerous sources of potential error and bias. There is often a concern that questions are not asked and interpreted uniformly across survey staff during questionnaire administration and that this introduces measurement error potentially threatening both the validity and reliability of the responses. For reasons of cost and burden on the respondents, I chose not to send a different survey pair to a subsample of health centers to re-administer the questionnaire as a check of reliability. Instead, I focused on up-front training and supervision to ensure a common understanding of question prompts and a uniform interpretation of potential answers. Measurement error may also threaten the validity of the responses to the extent that interviewees were unable to understand the questions. Again, given foreseeable comprehension issues in the population of interest, I chose to invest heavily in pre-survey training and supervision during early survey implementation, ensuring that the survey
staff understood the goal of each question and that they were able to explain each prompt in multiple ways using vocabulary common to the local population. And finally, the survey data reflect the views and opinions of particular individuals on the social and institutional conditions in their local communities; these opinions may or may not concord with measurements of similar concepts using observational data. Nonetheless, I argue that the opinions of the key staff working in the health center on critical social and institutional factors do matter for health system performance through their effects on the behavior of these individuals. Overall, I am reasonably confident in both the validity and reliability of the survey data.

Third, the introduction of uncontrollable confounding is another threat common to the validity of survey research. In this case, errors during the data entry process are the most likely source. In an effort to counter this risk, completed questionnaires were reviewed on a daily basis by the enumerators and I reviewed the forms on a weekly basis during the field research. Furthermore, I entered the data collected on the hard-copy forms into a relational database through user-friendly screens. The data entry screens had checks built into them to guard against illogical or impossible combinations of responses, and I implemented a quality control process of querying the data, looking for gaps or unusual trends, and then verifying the entry where necessary. I expect that despite our best efforts some errors in data entry persist, but whatever errors do remain should be random and minimal so as to not pose a significant threat to validity.

Lastly, the survey data characterizing social and institutional factors are cross-sectional for a single point in time. Unlike the difference-in-differences research design, my analyses of the survey data will not have the potential for a causal interpretation. Rather, the analysis presented in the subsequent section is primarily intended to highlight evidence suggestive of potential causal mechanisms underlying the effectiveness of decentralized health service delivery.
models, and to set a foundation for future research. While the survey data have many obvious limitations, they nonetheless provide a view into the opinions and perspectives of the staff charged with providing care under the decentralization reform and therefore illuminate the factors and conditions potentially important for understanding its effects.

7.2 Differences between Decentralized and Centrally-Administered Health Centers

Table 8 below presents a series of two-sample difference in means tests with significance values adjusted for clustering at the health center level. The variables collected during the survey are grouped into seven major categories: respondent characteristics, civil society, local politics, oversight, resources, decentralization, and outcomes. These are the major categories of factors and conditions that have been identified in existing literature as affecting or conditioning the effectiveness of decentralization reforms in a variety of contexts.

Several important observations emerge from the differences in table 8 that are significant and those that are not between centrally-administered and decentralized health centers. First, respondents within the decentralized health centers are generally younger and less-experienced than their counterparts in the centrally-administered health centers. Health staff in decentralized units responding to our survey are more than five years younger, had three fewer years of experience working in the health sector, and two fewer years in residence at their current locations compared to respondents in the control health centers. Interviews with regional staff and participant observation during fieldwork indicate a potential explanation for this difference. The managing organizations for the decentralized systems have resources and flexibility to hire supplemental staff for their health systems, resources they typically use to contract employees on a yearly-basis and to add community health workers (which are not guaranteed positions in all

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6 I have included the 2011 values for the three production-based indicators of women’s health under the outcomes category; all other values in the table are based on responses to the survey.
Table 8: Differences in Means between Centrally-Administered and Decentralized Health Centers on Key Factors and Conditions

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean Centralized</th>
<th>Mean Decentralized</th>
<th>Diff.</th>
<th>P-Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respondent Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>40.67</td>
<td>35.09</td>
<td>-5.59**</td>
<td>0.00</td>
<td>Years, 20-65</td>
</tr>
<tr>
<td>Female</td>
<td>0.44</td>
<td>0.54</td>
<td>0.11</td>
<td>0.22</td>
<td>Proportion</td>
</tr>
<tr>
<td>Years Worked in Health</td>
<td>8.76</td>
<td>5.41</td>
<td>-3.36**</td>
<td>0.00</td>
<td>Years, 0-32</td>
</tr>
<tr>
<td>Years Worked at Current Health Center</td>
<td>5.76</td>
<td>3.59</td>
<td>-2.18**</td>
<td>0.02</td>
<td>Years, 0-31</td>
</tr>
<tr>
<td><strong>Civil Society</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cit. Participation in Identifying and Planning Actions</td>
<td>3.18</td>
<td>3.24</td>
<td>0.06</td>
<td>0.71</td>
<td>1-5, low to high participation</td>
</tr>
<tr>
<td>Cit. Participation in Executing Actions</td>
<td>3.19</td>
<td>3.06</td>
<td>-0.12</td>
<td>0.43</td>
<td>1-5, low to high participation</td>
</tr>
<tr>
<td>Change in No. of NGOs over last 5 Years</td>
<td>2.97</td>
<td>3.01</td>
<td>0.05</td>
<td>0.74</td>
<td>1-5, decrease to increase, 3 is no change</td>
</tr>
<tr>
<td>Freq. of Expression on Health Issues by NGOs</td>
<td>2.89</td>
<td>2.95</td>
<td>0.05</td>
<td>0.70</td>
<td>1-5, never to very frequently</td>
</tr>
<tr>
<td>Change in No. of Comm. Orgs. over last 5 Years</td>
<td>3.26</td>
<td>3.27</td>
<td>0.00</td>
<td>0.99</td>
<td>1-5, decrease to increase, 3 is no change</td>
</tr>
<tr>
<td>Freq. of Expression on Health Issues by Comm. Orgs.</td>
<td>3.28</td>
<td>3.33</td>
<td>0.05</td>
<td>0.75</td>
<td>1-5, never to very frequency</td>
</tr>
<tr>
<td><strong>Local Politics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationship with Municipal Government</td>
<td>4.60</td>
<td>3.83</td>
<td>-0.77**</td>
<td>0.00</td>
<td>1-6, no to a good and fluid relationship</td>
</tr>
<tr>
<td>Influence of Local Elites on Municipal Government</td>
<td>2.61</td>
<td>2.61</td>
<td>0.00</td>
<td>1.00</td>
<td>1-5, no to much influence</td>
</tr>
<tr>
<td>Accusations against Muni. Gov. for Misuse of Funds</td>
<td>1.83</td>
<td>1.94</td>
<td>0.11</td>
<td>0.45</td>
<td>1-4, never to very frequently</td>
</tr>
<tr>
<td>Level of Corruption in Muni. relative to 2008</td>
<td>3.17</td>
<td>3.97</td>
<td>0.80**</td>
<td>0.00</td>
<td>1-6, much less to much more than 2008</td>
</tr>
<tr>
<td><strong>Oversight</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationship with Regional Health Authority</td>
<td>5.02</td>
<td>5.00</td>
<td>-0.02</td>
<td>0.87</td>
<td>1-6, no to a good and fluid relationship</td>
</tr>
<tr>
<td>Freq. of Evaluation Visits by Region</td>
<td>3.36</td>
<td>3.29</td>
<td>-0.06</td>
<td>0.66</td>
<td>1-5, never to very frequently</td>
</tr>
<tr>
<td>No. of Evaluation Visits by Region in Last Year</td>
<td>2.56</td>
<td>2.03</td>
<td>-0.53</td>
<td>0.16</td>
<td>Count, 0-15</td>
</tr>
<tr>
<td>Total No. of Evaluation Visits in Last Year</td>
<td>2.56</td>
<td>6.05</td>
<td>3.50**</td>
<td>0.00</td>
<td>Count, 0-24</td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of Resources relative to Responsibilities</td>
<td>3.02</td>
<td>3.27</td>
<td>0.24</td>
<td>0.13</td>
<td>1-5, very low to very high, 3 is adequate</td>
</tr>
<tr>
<td>No. of Connections to Sources of External Support</td>
<td>4.08</td>
<td>4.81</td>
<td>0.73*</td>
<td>0.07</td>
<td>Count, 0-17</td>
</tr>
<tr>
<td><strong>Decentralization</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of Decentralization in Admin. of Health Center</td>
<td>2.40</td>
<td>3.41</td>
<td>1.01**</td>
<td>0.00</td>
<td>1-5, very central. to decentralized, 3 is equal</td>
</tr>
<tr>
<td>Appropriate Control in Admin., Muni. vs. Central</td>
<td>2.23</td>
<td>2.73</td>
<td>0.50**</td>
<td>0.00</td>
<td>1-5, very central. to decentralized, 3 is equal</td>
</tr>
<tr>
<td>Opinion of Decentralization in Health Sector Admin.</td>
<td>1.82</td>
<td>2.94</td>
<td>1.12**</td>
<td>0.00</td>
<td>1-5, bad to good, 3 is indifferent</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reported Health Status of Pop. under Health Center</td>
<td>3.08</td>
<td>3.42</td>
<td>0.34**</td>
<td>0.05</td>
<td>1-5, bad to excellent, 3 is good</td>
</tr>
<tr>
<td>Reported Change in Health Status of Pop., last 5 Years</td>
<td>4.48</td>
<td>4.18</td>
<td>-0.30**</td>
<td>0.04</td>
<td>1-5, sig. decline to improve., 3 is no change</td>
</tr>
<tr>
<td>No. of Family Planning Consults (per 1000 pop.), 2011</td>
<td>77.08</td>
<td>108.74</td>
<td>31.66**</td>
<td>0.00</td>
<td>Count, 0-187</td>
</tr>
<tr>
<td>No. of Prenatal Consults (per 1000 pop.), 2011</td>
<td>66.52</td>
<td>94.24</td>
<td>27.72**</td>
<td>0.00</td>
<td>Count, 0-167</td>
</tr>
<tr>
<td>No. of Postpartum Consults (per 1000 pop.), 2011</td>
<td>15.88</td>
<td>24.11</td>
<td>8.23**</td>
<td>0.00</td>
<td>Count, 0-38</td>
</tr>
</tbody>
</table>

Notes: * p < 0.10, ** p < 0.05
health centers). Both types of employment, contact-based and community health work, tend to be lower paid and more often filled by recent graduates.

Second, the control and treated health centers are largely identical with respect to civil society; there are no differences in the level of citizen participation or the behavior of NGOs and community organizations. Overall, levels of participation and activity by citizens and civil society groups is reported to be in the low to moderate range in the communities around both types of health centers, which appears to reflect a perception by health staff of relatively low levels of civil society involvement across the region.

Third, with respect to local politics, staff in the decentralized health centers reports significantly worse relationships with members of the relevant municipal government and higher levels of corruption than their colleagues in centrally-administered health centers. In both cases, the difference between control and treated health centers is substantively important. The average characterization of the relationship between the health center and the municipal corporation moves from there not being much contact in the decentralized units to being described as fairly good by staff in the centrally-administered units. Interviews and participant observation during fieldwork also indicate a potential explanatory dynamic here: mayors often treat staffing positions at local health centers as opportunities for patronage, a practice that the decentralized managing organizations have reportedly resisted. As for corruption, staff members in centrally-administered centers report constant and low levels of corruption while those in decentralized health centers report constant and high levels of corruption; neither group reports change in corruption on average, but their perceptions are substantially different. Levels of influence by local elites on the municipal government and the frequency with which that government is publically accused of misusing funds, however, do not vary across the two groups.
Fourth, the oversight practices of the Regional Health Authority are very similar and generally low for both centrally-administered and decentralized health units. There are no significant differences in the responses of staff in the two types of health centers on either the frequency or total number of supervisory site visits conducted by the Regional Health Authority; on average, staff in both types of units report between two and three evaluation visits by the Region over the previous year. Absent decentralization, health center staff can expect to be supervised in-person at their location once every four to six months. Moreover, it does not appear that the Region has augmented their supervision practices due to the decentralization reform; based on employee reports, they have not shifted resources to more frequently supervise the centrally-administered units. Therefore, the entirety of the average difference in the total number of evaluation visits, which is simply the sum of visits by the Region and by the decentralized managing organization, must be attributed to decentralization and the associated transfer of supervisory responsibility to a local managing organization. This supervisory activity is confirmed in the data where staff in decentralized health centers report almost four additional yearly evaluation visits over the number reported by their counterparts. Following the reform, staff in decentralized health centers can expect to be supervised once every other month.

Fifth, the evidence is weakly suggestive of increased levels of resources and numbers of connections to sources of external support for decentralized health centers relative to centrally-administered units. The first variable under resources in table 8 characterizing the level of resources relative to responsibilities is a single question on the survey. The second variable, number of connections to external support, is a composite measure created from multiple survey items. Specifically, we asked respondents to report whether the health center does or does not receive a series of different resources (direct funds, equipment, political support, etc.) from three
types of key actors: NGOs, community organizations, and the municipal government. The sum of the affirmative responses to this series of questions is what is reported as the second variable under resources in table 8. This measure captures the number of connections that the local health center has to key external actors and operationalizes the strength of the overall connectedness of the health unit within its local health system using objective transfers of resources. Accordingly, higher values correspond to greater connectedness of the health center within its local system.

Staff in decentralized health centers report higher resources relative to responsibilities and more connections to external actors than individuals in centrally-administered health centers; the difference in connections is weakly significant while the difference in resources is suggestive but insignificant at conventionally-acceptable levels.

Finally, the decentralization reform appears to have real impacts on the experiences of staff in the health centers, and while staff members in decentralized health centers have less negative views on the reform, it is generally disliked by all respondents. When describing the type of administration they experience, staff in decentralized health center reports significantly more local and/or municipal control while their counterparts report more central control. With respect the appropriate location of control over health center administration, individuals in decentralized units favor balanced or equal control between central and local authorities. Those individuals in centrally-administered centers, however, prefer a high level of central control with only some local discretion. Notably, neither group believes that high levels of local or municipal control are appropriate in health sector administration. These views are consistent with respondents’ opinions of the decentralization reform. Individuals within decentralized health centers are agnostic, responding that it is neither a good nor a bad reform, while staff members in
centrally-administered health centers differ significantly in believing that decentralization is a bad reform but acknowledge that it could work in some cases or under certain conditions.

7.3 Summary and Further Research into Causal Mechanisms of Decentralization

In summary, the key significant differences between centrally-administered and decentralized health centers highlighted in this analysis provide tentative and suggestive evidence that is consistent with my two hypotheses about the mechanisms underlying the reform’s effectiveness: improved information and accountability, and greater resources and connectedness. Most strongly, staff members in decentralized health centers receive a significantly and substantially higher number of supervision visits each year than their centrally-administered colleagues. And as the amount of supervision by the Region does not differ between the two types of health centers, the entire increase in supervision is directly attributable to the decentralized managing organization. The combined evidence of the difference-in-differences analysis and the survey data analysis suggests that this supervision makes a difference in improving performance. More weakly, the survey data provide tentative indications that resources and connectedness could also be a channel through which the decentralization reform improves health outcomes. The connectedness measure, albeit somewhat blunt, is higher for the decentralized units and nearing conventional significance levels; the difference on single measure of overall resources for each health center is positive but falls short of even weak significance. Additional analyses with larger numbers of health centers and more refined measures for the key concepts are needed to robustly test the two hypotheses about causal mechanisms underlying the effectiveness of decentralized health service delivery models. Despite their many limitations, these survey data and this preliminary analysis do provide preliminary evidence that information and accountability may be instrumental in driving
the effectiveness of decentralization, and suggest very tentatively that the strength of connections between the health center and key actors within the local health system may also be important.

8 Conclusions

Disparities in health outcomes between developed and developing countries, as well as between socio-economic classes within developing countries, are well documented. These disparities represent significant human suffering and a depreciation of human capital within these countries, thus having a negative effect on well-being and economic development. Over the past thirty years, international organizations and donors have responded to these circumstances by promoting different types of health sector decentralization reforms as strategies for improving the performance of local health systems. Unfortunately, there is little systematic, high-quality empirical evidence on the effectiveness of these reforms, with inconsistency characterizing the findings in the literature. As a result, policy-makers interested in knowing if decentralization works for public health and development have little guidance. In this paper I provide a systematic test of the effectiveness of decentralized health service delivery models on women’s health outcomes in the department of Intibucá, Honduras, and also explore the causal mechanisms underlying those effects.

I make three empirical contributions to the debate over the effectiveness of decentralization reforms in this study. First, I create a new longitudinal dataset that links quantitative health outcome data with original survey data as well as socio-economic and institutional information for fifty rural health centers. Second, I leverage the partial decentralization of health centers within the department of Intibucá to implement a difference-in-differences research design at the sub-regional level. Together, these two contributions allow me to test whether decentralized health service delivery models are effective in improving women’s
health in this department. And third, I collect new survey data for local health workers to 
explore the factors and conditions related to decentralization and its effectiveness. My analysis 
shows that the average effect of the decentralization reform on the decentralized health centers is 
an additional 1,205 family planning consultations, 2,407 prenatal consultations, and 662 
postpartum consultations. These results are largely robust to specifications including covariates, 
excluding compositional differences, and using weighted estimation; and they generally stand up 
to falsification tests using placebo treatments, placebo dependent variables, and outcome 
randomization. My analysis of survey data for health workers in decentralized and centrally-
administered health centers provides tentative evidence that information and accountability at the 
local health center level, and the connectedness of that health center within its local health 
system, could be important causal channels between decentralization and improvements in health 
outcomes. Most importantly, my analysis shows that health sector governance reforms can 
generate positive improvements in health outcomes for women in rural regions of developing 
countries. Given the growing literature demonstrating the important role played by women in 
development, these findings lend support to the possibility of decentralization reforms generating 
wider change in household well-being within rural communities.
9 References


Bardhan, Pranab, and Dilip Mookherjee, eds. 2006. Decentralization and Local Governance in Developing Countries: A Comparative Perspective. The MIT Press.


10 Appendices
### 10.1 Health Center Personnel Survey

**Encuesta de Personal de la Unidad de Salud**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Departamento</td>
</tr>
<tr>
<td>2.</td>
<td>Municipio</td>
</tr>
<tr>
<td>3.</td>
<td>Unidad de Salud (US)</td>
</tr>
<tr>
<td>4.</td>
<td>Fecha (<em>año/mes/día</em>)</td>
</tr>
<tr>
<td>5.</td>
<td>Promotor</td>
</tr>
<tr>
<td>6.</td>
<td>Cargo de Encuestado</td>
</tr>
</tbody>
</table>

1) Medico(a)  2) Enfermero(a)  3) Promotor(a)  4) Voluntario(a) de Salud  5) Otro: ______________________

**El Encuestado / La Encuestada**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Fecha de Nacimiento (<em>año/mes/día</em>)</td>
</tr>
<tr>
<td>8.</td>
<td>Sexo</td>
</tr>
<tr>
<td>9.</td>
<td>¿Cuántos años ha trabajado en el sector de salud?</td>
</tr>
<tr>
<td>10.</td>
<td>¿Cuántos años ha trabajado en este centro de salud?</td>
</tr>
</tbody>
</table>
| 11. | ¿Vive en la misma comunidad donde está su centro de salud?  
|   | 1) Sí  2) No |

**Atributos de la US y la Comunidad**

**La US**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12.</td>
<td>¿Cuántas personas trabajan diariamente en la US?</td>
</tr>
<tr>
<td>13.</td>
<td>¿Cuántos días de la semana está abierta la US con personal para atender a pacientes?</td>
</tr>
</tbody>
</table>
| 14. | ¿La US está en un municipio que forma parte de una mancomunidad?  
|   | 1) Sí  2) No |

**Participación Ciudadana**

<p>| | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>15.</td>
<td>¿Cómo caracterizaría la identificación y planificación de acciones municipales en cuanto al grado de participación ciudadana?</td>
</tr>
</tbody>
</table>

1) No existe prácticamente ninguna participación ciudadana  2) Una participación ciudadana muy limitada  3) Una participación ciudadana limitada  4) Bastante participación ciudadana  5) Mucha participación ciudadana
1) ¿Cómo caracterizaría la **ejecución** de acciones municipales en cuanto al grado de participación ciudadana?

| 1) No existe prácticamente ninguna participación ciudadana  
| 2) Una participación ciudadana muy limitada  
| 3) Una participación ciudadana limitada  
| 4) Bastante participación ciudadana  
| 5) Mucha participación ciudadana |

6) **¿Cómo ha cambiado el número de organizaciones no-gubernamentales** en el municipio durante los últimos 5 años?

| 1) Ha disminuido mucho  
| 2) Ha disminuido un poco  
| 3) No ha cambiado  
| 4) Ha aumentado un poco  
| 5) Ha aumentado mucho |

7) **¿Con qué frecuencia expresan las organizaciones no-gubernamentales sus opiniones acerca de salud?**

| 1) Nunca  
| 2) Muy de vez en cuando  
| 3) De vez en cuando  
| 4) Frecuentemente  
| 5) Muy frecuentemente |

8) **¿La US recibe los siguientes tipos de recursos de algunas organizaciones no-gubernamentales?**

| a. Fondos directos  
| b. Empleados pagados por la ONG  
| c. Apoyo humano (labor)  
| d. Equipo (materiales, maquinas, otras cosas)  
| e. Apoyo político con la Corporación Municipal  
| f. Apoyo político con la Región  
| g. Apoyo político con el Gestor  
| h. Otros recursos:  |

| 1) Sí  
| 2) No |

9) **¿Cómo ha cambiado el número de organizaciones comunitarias** en el municipio durante los últimos 5 años?

| 1) Ha disminuido mucho  
| 2) Ha disminuido un poco  
| 3) No ha cambiado  
| 4) Ha aumentado un poco  
| 5) Ha aumentado mucho |

10) **¿Con qué frecuencia expresan las organizaciones comunitarias sus opiniones acerca de salud?**

| 1) Nunca  
| 2) Muy de vez en cuando  
| 3) De vez en cuando  
| 4) Frecuentemente  
| 5) Muy frecuentemente |

11) **¿La US recibe los siguientes tipos de recursos de algunas organizaciones comunitarias?**

| a. Fondos directos  
| b. Empleados pagados por la organización  
| c. Apoyo humano (labor)  
| d. Equipo (materiales, maquinas, etc.)  
| e. Apoyo político con la Corporación Municipal  
| f. Apoyo político con la Región  
| g. Apoyo político con el Gestor  
| h. Otros recursos:  |

| 1) Sí  
| 2) No |
| 12) ¿Cómo caracterizaría la relación entre la US y la corporación municipal? | 1) No existe ninguna relación  
2) La relación es problemática y preocupante  
3) No hay mucho contacto porque la relación esta tensa  
4) No hay mucho contacto, pero no hay problemas de la relación  
5) Bastante buena  
6) Muy buena y fluida |
|---|---|
| 13) ¿Qué grado de influencia tiene la elite de la política local en las decisiones de la Corporación Municipal? | 1) Ninguna influencia  
2) Muy poca influencia  
3) Un poco de influencia  
4) Bastante influencia  
5) Mucha influencia |
| 14) ¿La US recibe los siguientes tipos de recursos de la Corporación Municipal? | a. Fondos directos  
1) Sí  
2) No  

b. Empleados pagados por la Corporación  
1) Sí  
2) No  

c. Equipo (materiales, máquinas, etc.)  
1) Sí  
2) No  

d. Apoyo político con la Región  
1) Sí  
2) No  

e. Apoyo político con el Gestor  
1) Sí  
2) No  

f. Otros recursos: _____________________________ |
| 15) ¿En los últimos 5 anos, el pueblo ha denunciado al gobierno municipal por mal uso de recursos? | 1) No, nunca  
2) Sí, pero muy de vez en cuando  
3) Sí, de vez en cuando  
4) Sí, muy frecuentemente |
| 16) ¿Cómo caracterizaría el nivel de corrupción en el municipio antes y después de 2008? | 1) Hay mucho menos corrupción ahora que antes de 2008  
2) Hay un poco menos corrupción ahora que antes de 2008  
3) No hay diferencia, siempre se ha visto poca corrupción  
4) No hay diferencia, siempre se ha visto mucha corrupción  
5) Hay un poco más corrupción ahora que antes de 2008  
6) Hay mucha más corrupción ahora que antes de 2008 |
| 17) ¿Cómo caracterizaría la relación entre la US y la Región? | 1) No existe ninguna relación  
2) La relación es problemática y preocupante  
3) No hay mucho contacto porque la relación esta tensa  
4) No hay mucho contacto, pero no hay problemas de la relación  
5) Bastante buena  
6) Muy buena y fluida |
| 18) ¿Con que frecuencia viene la Región para apoyar a la US? | 1) Nunca  
2) Muy de vez en cuando  
3) De vez en cuando  
4) Frecuentemente  
5) Muy frecuentemente |
| 19) ¿Cuántas veces ha venido la Región para apoyar a la US durante el último año? | 1)  
2)  
3)  
4)  
5)  |
<p>| | |</p>
<table>
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</table>
| 20) ¿Con qué frecuencia viene la Región para evaluar y/o monitorear la US? | 1) Nunca  
2) Muy de vez en cuando  
3) De vez en cuando  
4) Frecuentemente  
5) Muy frecuentemente |
| 21) ¿Cuántas veces ha venido la Región para evaluar y/o monitorear la US durante el último año? | 1) No existe ninguna relación  
2) La relación es problemática y preocupante  
3) No hay mucho contacto porque la relación está tensa  
4) No hay mucho contacto, pero no hay problemas de la relación  
5) Bastante buena  
6) Muy buena y fluida |
| 22) ¿Cómo caracterizaría la relación entre la US y el Gestor? | 1) Nunca  
2) Muy de vez en cuando  
3) De vez en cuando  
4) Frecuentemente  
5) Muy frecuentemente |
| 23) ¿Con qué frecuencia viene el Gestor para apoyar a la US? | 1) Nunca  
2) Muy de vez en cuando  
3) De vez en cuando  
4) Frecuentemente  
5) Muy frecuentemente |
| 24) ¿Cuántas veces ha venido el Gestor para apoyar a la US durante el último año? | 1) Nunca  
2) Muy de vez en cuando  
3) De vez en cuando  
4) Frecuentemente  
5) Muy frecuentemente |
| 25) ¿Con qué frecuencia viene el Gestor para evaluar y/o monitorear la US? | 1) Nunca  
2) Muy de vez en cuando  
3) De vez en cuando  
4) Frecuentemente  
5) Muy frecuentemente |
| 26) ¿Cuántas veces ha venido el Gestor evaluar y/o monitorear la US durante el último año? | 1) Muy bajo  
2) Bajo  
3) Adecuado  
4) Alto  
5) Muy alto |
| 27) ¿Cómo caracterizaría el nivel de recursos que tiene la US en relación con las responsabilidades de la US? | La Salud  
1) Uso muy bajo  
2) Uso bajo  
3) Uso adecuado  
4) Uso excesivo  
5) Uso muy excesivo |
| 28) ¿Cómo caracterizaría la frecuencia del uso de los servicios de salud por la población bajo la US? | 1) Uso muy bajo  
2) Uso bajo  
3) Uso adecuado  
4) Uso excesivo  
5) Uso muy excesivo |
<p>| 29) ¿Qué porcentaje de la población debe venir a la US con más frecuencia? |   |</p>
<table>
<thead>
<tr>
<th>Número</th>
<th>Pregunta</th>
<th>Opciones</th>
</tr>
</thead>
</table>
| 30)    | ¿Qué porcentaje de la población viene a la US demasiado?                  | 1) Mal  
2) Regular  
3) Bueno  
4) Muy bueno  
5) Excelente |
| 31)    | ¿Cómo caracterizaría el estado de salud actual de las personas bajo esta US? | 1) Un empeoramiento significativo  
2) Un empeoramiento pequeño  
3) No hubo cambio  
4) Un mejoramiento pequeño  
5) Un mejoramiento significativo |
| 32)    | ¿Cómo caracterizaría el cambio en el estado de salud de la personas bajo esta US durante los últimos 5 años? | 1) Un empeoramiento significativo  
2) Un empeoramiento pequeño  
3) No hubo cambio  
4) Un mejoramiento pequeño  
5) Un mejoramiento significativo  
| a. ¿Porque? | _______________________________________________________________ |
|        | La Descentralización                                                      |                                                                          |
| 33)    | ¿Cómo caracterizaría el nivel de descentralización en la administración de la US? | 1) Muy centralizado (mucho control central)  
2) Centralizado (algún control central)  
3) Igual nivel de control municipal/local y control central  
4) Descentralizado (algún control municipal/local)  
5) Muy descentralizado (mucho control municipal/local) |
| 34)    | ¿Cuál es la forma (el equilibrio) de control más conveniente entre el gobierno municipal y el gobierno central en la administración de salud? | 1) Muy poco control del gobierno municipal, un control muy elevado por parte del gobierno central  
2) Cierto control por parte del gobierno municipal, un alto control por el gobierno central  
3) El mismo grado de control por parte del gobierno municipal y el gobierno central  
4) Un alto control por parte del gobierno municipal, cierto control del gobierno central  
5) Un control muy elevado por parte del gobierno municipal, muy poco control del gobierno central |
| 35)    | ¿Cómo caracterizaría su opinión de la descentralización en la administración del sector de salud? | 1) La descentralización es una mala reforma y no se debe implementar en ninguna unidad de salud  
2) La descentralización es una mala reforma, pero puede funcionar en algunos casos específicos o bajo ciertas condiciones  
3) La descentralización es ni una buena ni una mala reforma  
4) La descentralización es una buena reforma, pero solo puede funcionar en algunos casos específicos o bajo ciertas condiciones  
5) La descentralización es una buena reforma y se debe implementar en todas las unidades de salud |
10.2 Health Administrator Interview Protocol

Entrevista con Administradores de Salud

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<table>
<thead>
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<td>1.</td>
<td>Departamento</td>
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<td>2.</td>
<td>Municipio</td>
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<td>3.</td>
<td>Sexo de Encuestado</td>
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<td>4.</td>
<td>Fecha de Nacimiento de Encuestado</td>
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<td>5.</td>
<td>Cargo de Encuestado</td>
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<td>6.</td>
<td>Fecha (año/mes/día)</td>
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<tr>
<td>7.</td>
<td>Entrevistador</td>
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8. Por favor, describe su experiencia en el sector de salud en Honduras.

9. ¿Actualmente, mantiene algún cargo oficial con el Ministerio de Salud?

10. ¿Cómo caracterizaría la gestión o la administración de salud en Honduras?

11. ¿Cuáles son las fortalezas del sistema actual para la gestión de salud en Honduras?

12. ¿Cuáles son los desafíos principales en el sector de salud en Honduras?

13. ¿Cuáles son las debilidades del sistema actual para la gestión de salud en Honduras?

14. ¿Qué ha sido el rol de organizaciones no-gubernamentales o comunitarias en el sector de salud en Honduras?

15. ¿Qué ha sido el rol de organizaciones comunitarias en el sector de salud en Honduras?

16. ¿Puede describir la reforma de descentralización en el sector de salud en Honduras?

17. ¿Cómo se llegó a decidir descentralizar aspectos de la gestión de salud en Honduras?

18. ¿Cuáles eventos en la historia de la descentralización de salud han sido los más importantes?

19. ¿Cómo funciona el proceso para elegir municipios o sistemas locales de salud particulares para descentralizar? ¿Cómo se seleccionan lugares para implementar la reforma de descentralización en salud?

20. ¿Cómo caracterizaría o calificaría la experiencia con descentralización en el sector de salud en Honduras?

21. ¿Bajo cuáles condiciones puede funcionar la descentralización para mejorar resultados de salud?
22. ¿Bajo cuáles condiciones no puede funcionar la descentralización para mejorar resultados de salud?

23. ¿Cuáles son los desafíos principales en la reforma de descentralización de salud?

24. ¿Cuáles sugerencias o recomendaciones daría usted a los gerentes actuales del programa de descentralización de salud?

25. ¿Qué otras opiniones o comentarios puede compartir usted con respecto a la gestión de salud en Honduras?
10.3 Data Collection Verbal Consent Protocols

Guión para Consentimiento Verbal – Encuestas

Hola, me llamo [utilice su nombre]. Estoy colaborando con un estudiante en el programa doctorado de ciencias políticas en la Universidad de Colorado en los Estados Unidos, Sr. Alan Zarychta, en levantar un estudio académico de la administración y los resultados dentro sistemas locales de salud en Intibucá. Me gustaría preguntarle sobre la gestión de sistemas locales de salud en Honduras.

Su perspectiva y la información que usted me puede facilitar ayudarían en analizar e entender mejor los determinantes sociales de salud. Específicamente, su participación nos ayudaría en evaluar la gestión de los servicios de salud en el departamento de Intibucá, y formar recomendaciones para la posible sistematización de dicha gestión.

La encuesta tomará aproximadamente una media hora. Mantendré confidencial toda nuestra conversación y la información que usted me brinda. No voy a anotar su nombre y tampoco vincularé su identidad a sus respuestas en mis apuntes ni en los informes futuros de este estudio; por estas razones casi no hay riesgo de una violación de confidencialidad. Tampoco hay otros tipos de riesgos conectados con su participación en el estudio.

Su participación en el estudio es completamente voluntaria. Si usted decidiera no participar, no habría ninguna sanción ni perdida de beneficios a cuales usted tiene derecho. Usted puede declinar responder a cualquier pregunta, y también puede parar su participación en cualquier momento durante el transcurso de la encuesta sin sanción y sin pérdida de beneficios a cuales usted tiene derecho.

Si usted tiene preguntas adicionales con respecto al estudio o su participación, puede comunicarse conmigo, con el director del estudio, Sr. Alan Zarychta, con su colega en el diseño del estudio, Dr. Krister Andersson, o con la oficina de estudios de la Universidad de Colorado.

¿Tiene alguna preguntas sobre el estudio?

¿Está de acuerdo con participar en la encuesta? Si sí, podemos empezar.

Guión para Consentimiento Verbal – Entrevistas

Hola, me llamo Alan Zarychta. Soy un estudiante en el programa doctorado de ciencias políticas en la Universidad de Colorado en los Estados Unidos. Estoy aquí en Honduras para levantar un estudio académico de la administración y los resultados dentro sistemas locales de salud en Intibucá. Me gustaría preguntarle sobre la gestión de sistemas locales de salud en Honduras.
Su perspectiva y la información que usted me puede facilitar ayudarían en analizar e entender mejor los determinantes sociales de salud. Específicamente, su participación nos ayudaría en evaluar la gestión de los servicios de salud en el departamento de Intibucá, y formar recomendaciones para la posible sistematización de dicha gestión.

La entrevista tomará aproximadamente una media hora. Mantendré confidencial toda nuestra conversación y la información que usted me brindará. No voy a anotar su nombre y tampoco vincularé su identidad a sus respuestas en mis apuntes ni en los informes futuros de este estudio; por estas razones casi no hay riesgo de una violación de confidencialidad. Tampoco hay otros tipos de riesgos conectados con su participación en el estudio.

Su participación en el estudio es completamente voluntaria. Si usted decidiera no participar, no habría ninguna sanción ni perdida de beneficios a cuales usted tiene derecho. Usted puede declinar responder a cualquier pregunta, y también puede parar su participación en cualquier momento durante el transcurso de la entrevista sin sanción y sin pérdida de beneficios a cuales usted tiene derecho.

Si usted tiene preguntas adicionales con respecto al estudio o su participación, puede comunicarse conmigo, con mi colega en el diseño del estudio, Dr. Krister Andersson, o con la oficina de estudios de la Universidad de Colorado.

¿Tiene algunas preguntas sobre el estudio?

¿Está de acuerdo con participar en la entrevista? Si sí, podemos empezar.

Datos para Comunicarse con el Personal del Estudio

Sr. Alan Zarychta  
Estudiante en el Programa Doctorado  
Departamento de Ciencias Políticas  
Universidad de Colorado en Boulder  
Campus Box 333  
Boulder, CO 80309-0333  
Teléfono Estados Unidos: (303) 492-7871  
Celular Local: 9780-1380  
Correo: alan.zarychta@colorado.edu

El colaborador de la facultad de ciencias políticas para el estudio es:  
Dr. Krister Andersson  
Departamento de Ciencias Políticas  
Universidad de Colorado en Boulder  
Campus Box 333
El colaborador local para el estudio es:
Dr. Luis Israel Giron Aguilar
Director Región Sanitaria No. 10
La Esperanza, Intibucá, Honduras
Teléfono: 27-83-00-46
Correo: rsdintibuca@yahooes

Se puede comunicar con Dr. Krister Andersson y/o con Dr. Luis Israel Giron Aguilar si usted tiene preguntas con respecto al estudio o si usted se siente perjudicado a causa de su participación en el estudio.

Si tiene preguntas sobre sus derechos como participante en el estudio, usted puede comunicarse con el personal de la Oficina de Revisión Institucional de la Universidad de Colorado, 3100 Calle Marine, Cuarto A15, 563 UCB, (303) 735-3702. Usted se puede comunicar con ellos para discutir preocupaciones o quejas sobre el estudio con alguien quien no es parte de equipo del estudio.
10.4 Local Collaborator Support Letter

CIRCULAR

DE: DR. LUIS ISRAEL GIRÓN
DIRECTOR REGION SANITARIA No. 10

PARA: UNIDADES DE SALUD REGIÓN SANITARIA NO. 10

Por este medio se les comunica, que a partir del 27 de Junio del presente año, se estará realizando un estudio del impacto de la Salud Pública en las diferentes Unidades de Salud del Departamento. Por lo que se le solicita brindar el acceso y apoyo a los Señores Alan Zarychta, Ceferino del Cid Hernández y José Melvin López Márquez.

La Esperanza Intibucá, 27 de junio de 2012

Email - rsdintibuc@yahooes
Tel/Fax - 27830046
10.5 IRB Exempt Certification

Exempt Certification

Zarychta, Alan
Protocol #: 12-0318
Title: The Effects of Decentralization on the Provision of Health Services and Health Outcomes in Rural Western Honduras

04-Jun-2012

Exempt Certification

Dear Alan Zarychta,

The Institutional Review Board (IRB) has reviewed this protocol and determined it to be of exempt status in accordance with Federal Regulations 45 CFR 46.101(b). Principal Investigators are responsible for informing the IRB of any changes or unexpected events regarding the project that could impact the exemption status. Upon completion of the study, you must submit a Study Closure via eRA. It is your responsibility to notify the IRB prior to implementing any changes.

Certification Date: 04-Jun-2012
Exempt Category: 2,4
Associated Documents: * 12-0318 Protocol (4Jun12); Protocol; VerbalConsentScript_Surveys; LocalReviewLetter; HealthCenterPersonnelSurvey_Translation; HealthAdministratorsInterview_Translation; ContactInfoSheet; VerbalConsentScript_Surveys_Translation; VerbalConsentScript_Interviews; VerbalConsentScript_Interviews_Translation; ContactInfoSheet_Translation; LocalReviewLetter_Translation; HealthRecordTrackingForm; HealthRecordTrackingForm_Translation; HealthCenterPersonnelSurvey; HealthAdministratorsInterview; Initial Application - eForm; Number of subjects approved: 5200

* To find the approved documents log into eRA, open this protocol, expand the Management folder, and click on the Versions subfolder.

The IRB has reviewed this protocol in accordance with federal regulations, university policies and ethical standards for the protection of human subjects. In accordance with federal regulation at 45 CFR 46.112, research that has been approved by the IRB may be subject to further appropriate review and approval or disapproval by officials of the institution. The investigator is responsible for knowing and complying with all applicable research regulations and policies including, but not limited to, Environmental Health and Safety, Scientific Advisory and Review Committee, Clinical and Translational Research Center, and Wardenburg Health Center and Pharmacy policies.

Please contact the IRB office at 303-735-3702 if you have any questions about this letter or about IRB procedures.

Douglas Graefel
IRB Admin Review Coordinator
Institutional Review Board