Understanding Ethnic Variation in Pregnancy-Related Health Care in Rural Guatemala

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INTRODUCTION

Guatemala, one of the poorest countries in Latin America, experiences some of the highest maternal and infant mortality rates in the region. It is also one of the most stratified countries in the world with ethnicity playing a major role in the distribution of resources. Approximately half of the population is indigenous[1]—i.e. descendents of the Mayans or other pre-conquest groups who maintain separate cultural identities and language—while the ladino population, loosely defined as all non-indigenous people, regard themselves as part of the national Guatemalan culture, speak Spanish, wear western clothing, and are of mixed indigenous and European origins. The indigenous population is concentrated in the most disadvantaged segments of society, while the upper levels of the income and education distribution are dominated by ladinos (Steele, 1994).

The health care system in Guatemala is pluralistic; traditional providers are a major source of care and coexist with biomedical services. However, data from the 1995 Demographic and Health Survey (DHS) in Guatemala suggest that the use of biomedical care during pregnancy and birth varies widely by ethnicity. Ladinas were nearly twice as likely to see a biomedical provider for prenatal care as indigenous women (INE, 1996). Compared with the 1987 DHS, use of biomedical pregnancy care has increased more among indigenous women than ladinas (INCAP, 1989). Like most developing countries, births often occur at home and are typically attended by a midwife, but large ethnic differentials persist. Only a very small proportion of births to indigenous women occurred in a medical facility compared to a majority of births to ladinas. As compared to urban areas, use of biomedical services is particularly low in the rural areas, where about two-thirds of Guatemalans live. For normal pregnancies, traditional midwifery care may be adequate, but in the presence of complications, biomedical care and the availability of surgical delivery in a hospital can be important for improving maternal and birth outcomes. Large ethnic differences in use of biomedical services suggest that some indigenous women who need these services may not be getting them.

Previous analyses have failed to explain these large ethnic differences in type of pregnancy care.

[1] According to the 1994 Population Census, 43% of the population is indigenous, as classified by the enumerator,

For example, one study found that an ethnic differential in use of biomedical care remained even after controlling for various demographic, socioeconomic, and community characteristics (Pebley et al., 1996). Ethnographic evidence suggests the importance of cultural factors in determining choice of health care. Due to their location within the social structure, the indigenous population is also likely to face numerous barriers to biomedical health services, such as limited availability, lack of transportation, and financial constraints. Unfortunately, our knowledge of the factors that explain ethnic differences in use of biomedical care remains inadequate because previous surveys did not include these detailed measures of sociocultural factors and access to health services.

This study examines the extent to which access to health services and sociocultural factors explain ethnic differences in care during pregnancy and birth. After identifying how the type of care varies by ethnicity, multivariate models are used to identify the sociocultural factors and measures of access that may account for these ethnic differentials. Data come from the 1995 *Encuesta Guatemalteca de Salud Familiar* (EGSF), a multi-level survey of rural women that includes individual, household, community and provider level information. The EGSF collected detailed data on pregnancy, birth, and postpartum care as well as measures of access to services and sociocultural factors such as social networks, health beliefs, and women's autonomy in household decision-making. Unlike many studies of pregnancy in developing countries that are hospital-based (Liskin, 1992), this community-based study represents the large majority of rural Guatemalans who never use biomedical services during pregnancy.

This study provides important information about how ethnicity is related to the type(s) of care received during pregnancy and birth. Many Guatemalans combine biomedical health services with traditional pregnancy care, yet little is known about how and why women combine such different types of care and whether biomedical care replaces traditional care or simply amends such care. The latter possibility suggests that traditional and biomedical care serve different functions and that attempts to eradicate traditional care may be counter-productive. By understanding the factors that account for ethnic

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but many observers argue that the proportion is actually considerably higher.

differences, we can better determine whether women use traditional midwives because they lack access to biomedical services or because traditional care better coincides with their view of birth and their expectations from providers.

THEORETICAL FRAMEWORK

Ethnic stratification derives from use of ascribed traits, namely group membership, in the distribution of resources. Ascription describes a system by which differential opportunities, rewards, privileges, and power are allocated based exclusively on individual characteristics that are present at birth and normally cannot be changed (Lieberson, 1994). Ascribed status is described as involuntary, exclusive, and imperative, i.e. the individual does not have a choice in whether to invoke it in a particular situation (Barth, 1969). Ethnicity, however, is more fluid, with frequent movement across stable ethnic boundaries (Hannan, 1979; Horowitz, 1975). In Guatemala, this movement generally occurs in only one direction. Through assimilation, sometimes called "ladinization", indigenous people adopt ladino cultural traits, such as the Spanish language and western dress. This process often coincides with movement out of indigenous communities and social mobility.[2]

Ethnicity in Guatemala

The ethnic distinction between ladinos and the indigenous population is cultural rather than racial or phenotypic. After 450 years of contact, both groups share the same gene pool--mestizo; differences are primarily in terms of their distinctive cultural systems and differential access to society's crucial resources (Warren, 1989). Thus, ethnic boundaries are socially constructed based on both self-perception and social perceptions of ethnic identity, with outward markers of ethnicity, such as language and dress, playing an important part in signaling group membership to others. Yet, the indigenous population is not homogenous. They speak some 20 mutually distinct languages and allegiance is placed in the local community, with its own styles of dress, speech, and custom (Watanabe, 1995). For women, traditional dress (*traje*) consists of a skirt *(corte)* and hand-woven blouse *(huipil)* embroidered with a design

[2] High social status does not always imply assimilation. A more recent Pan-Mayan identity movement in Guatemala is characterized by the use of indigenous cultural symbols among a small group of educationally elite indigenous people (Watanabe, 1995).

specific to the community of origin (Hendrickson 1995; Smith 1995).

As shown in the DHS, most Guatemalan women, regardless of ethnicity, receive some form of care during pregnancy. However, there are large ethnic differences in whether they obtain biomedical care, with ladinas being much more likely to do so. Yet, analyses of the DHS (INE, 1996) did not examine the extent to which biomedical and traditional care are combined. We expect that many women, especially indigenous women, still visit a midwife even when they also seek biomedical care. Moreover, the DHS did not distinguish biomedical care received at government health centers or posts (HCPs), where care is free or very low cost, from other sources of care such as private doctors or clinics, where care is often very expensive. Due to issues of cost and availability, we expect that women, particularly indigenous women, are more likely to use HCPs than other biomedical providers.

Finally, we examine variation among indigenous women, some of whom speak Spanish and wear western clothing. The ability to speak Spanish may be very important in interactions with providers. Both language and dress may reflect how closely women identify with indigenous culture and beliefs. In addition, others who may treat them differently as a result easily recognize these outward symbols of ethnicity. We expect that the most traditional indigenous women, i.e. those who speak only a Mayan language and wear traditional dress, are least likely to use biomedical services during pregnancy and delivery.

In Guatemala, ladinos and indigenous people have differential access to resources as well as distinctive cultures, either or both of which may account for differential behavior by ethnicity. One explanation for differential behavior focuses on large-scale social structures that constrain social processes and affect individual behavior (Coser, 1975; Goode, 1975). Because of their location within the social structure, indigenous people may be less likely to use biomedical services due to lack of access. Second, a micro-level approach views individual choices as shaped by social and cultural context. Thus, the shared norms, values, and beliefs that define an ethnic group as a cohesive unit may influence choice of care independently of access to health services.

Access to Services

If ethnicity were primarily defined by socioeconomic status, then we would expect ethnic differences in care to be explained by access to resources. The ethnic subordination of the indigenous population dates back to the Spanish conquest in the 16th century when ladinos gained their dominant position by acquiring major landholdings and roles as *patrones* for indigenous laborers (Warren, 1989). Ethnicity and socioeconomic status are highly correlated in Guatemala, in part because the indigenous population was intentionally deprived of land during colonization in order to guarantee a large, underemployed and exploitable workforce for plantations (Melville and Lykes, 1992). Spatial distribution of the population also varies by ethnicity. While nearly half of ladinos live in urban areas, 80% of the indigenous population live in rural areas, often in the most remote mountainous regions of Guatemala where access to health services and public infrastructure is limited (Steele, 1994).

Given that health services vary in cost, financial constraints may be a key barrier to health care. Although services provided at HCPs are generally offered at a very nominal charge, transportation can be expensive. Midwives are usually more expensive than HCPs but their fee generally covers the entire pregnancy, including prenatal care, delivery, and postpartum care and they are still considerably cheaper than private physicians and nurses (Pebley et al, 1996).

Access is further constrained by the availability of services and transportation. Qualitative data suggest that among rural Guatemalans who visited a health center during pregnancy, most went only once; when asked why they did not go more often, a common reply was that there was no transportation and the walk was very long (Acevedo and Hurtado, 1997). The authors suggest that ethnic differences in use of formal prenatal care are due to problems of access. Other researchers found distance to nearest clinic inversely related to use of formal prenatal care and formal assistance at delivery (Pebley et al., 1996).

Finally, the indigenous population may encounter communication difficulties with biomedical providers since a third of indigenous people do not speak Spanish (Pan American Health Organization, 1998), a proportion that is even higher among women and in rural areas. Qualitative research suggests that language barriers may be a big obstacle to obtaining biomedical services for the non-Spanish speaking part of the indigenous population (Acevedo and Hurtado,1997).

We expect availability of biomedical services and transportation, financial resources, and health insurance to be positively related to the use of biomedical care. We expect to find that indigenous women are less likely to use such care because they have less access to services and fewer resources than ladinas.

Sociocultural Factors

Some argue that ethnicity is defined by distinct cultural systems rather than socioeconomic status (Warren, 1989; Watanabe, 1995), which suggests that differences in sociocultural factors may explain ethnic differences in care. In Guatemala, as in other Latin American countries, health beliefs are strongly influenced by traditional humoral medicine, which is based on a science of maintaining equilibrium and treating illness based on qualities of hot and cold. Some argue that the hot-cold typology is so basic and universally followed that it could interfere with delivery of modern care, while others suggest that its influence is overstated (Tedlock, 1987). Goldman et al. (1998) found that only non-Spanish speaking indigenous women held significantly different health beliefs about the causes of child diarrhea, while indigenous women who spoke Spanish did not differ from ladinas.

Smith (1995) argues that gender roles differ between indigenous and ladino culture; compared to ladinas, Mayan women are more autonomous both socially and economically within their communities. However, Seltzer et al. (1997) found that non-Spanish speaking indigenous women have less autonomy in household decision-making than ladinas. If women have less control over and less access to household resources, they may have difficulty obtaining higher cost biomedical health services such as the care of a private doctor. On the other hand, having more power in decision-making enables women to choose their preferred care. Several studies find that women, especially indigenous women, prefer to give birth at home with a midwife (Acevedo and Hurtado, 1997; Walsh, 1993).

Like innovation in fertility behavior (Montgomery and Casterline, 1996; Bongaarts and Watkins, 1996), diffusion of ideas and norms related to health behaviors may result from interactions with others. If indigenous communities have fewer connections with urban society, where biomedical model of health and disease is more readily accepted, they may be less likely to seek biomedical care. Goldman et al. (1998)

found that having a relative abroad or in Guatemala City was significantly related to ideas about child illness.

We expect biomedically-related health beliefs, autonomy in household decision-making, and social connections outside the community to be positively related to use of biomedical care and less common among indigenous women. Thus, differences in sociocultural factors are expected to explain less frequent use of biomedical care by indigenous women. However, we anticipate that access to health services will be at least as important as sociocultural factors in explaining ethnic differentials in the use of biomedical services during pregnancy and birth.

METHODOLOGY

Data

The data for this study come from the Guatemalan Survey of Family Health (known in Spanish as the *Encuesta Guatemalteca de Salud Familiar* or EGSF), conducted in 1995 by Princeton University, RAND, and the *Instituto de Nutrición de Centro América y Panamá* (Peterson et al. 1997). Interviews were conducted with 2,872 women aged 18 to 35 in 60 communities; approximately 50 women were administered questionnaires in each of 15 small rural communities in four departments of Guatemala. Departments were selected on the basis of social, economic, and geographical diversity, and ethnic composition: one primarily ladino (Jalapa); two predominantly indigenous (Chimaltenango and Totonicapán); and one mixed population (Suchitepequez). Within each department, small communities (those containing between 100 and 1800 households) were identified and the dominant language was determined in order to stratify communities by language. The few indigenous language-speaking (Poqoman) communities in Jalapa were excluded from the sampling frame. Communities from both the Spanish and an indigenous language (Kaqchikel) stratum were selected in Suchitepequez and Chimaltenango, while all communities in Totonicapán were indigenous (K'iche'). K'iche' and Kaqchikel are two of the largest indigenous language groups in Guatemala. Communities were selected with probability proportional to population size to yield self-weighting samples within departments.

The survey collected data on maternal and child health, treatment behavior, health beliefs and

numerous indicators of socioeconomic status, including land ownership, household consumption patterns, and possession of modern conveniences. A calendar-based approach was used to collect detailed information on pregnancy-related practices and complications for the last two live births that occurred since January, 1990 (n=3,350 births). Respondents were asked who they saw during each month of pregnancy. [3] Measures of ethnicity included self-reported ethnicity[4]; languages spoken; language used within the home; ethnicity of spouse/partner, parents, and siblings; and traditional indigenous dress (i.e. *huipil and corte*) of the respondent as observed by the interviewer. Versions of the questionnaire were fielded in Spanish, K'iche', and Kaqchikel.

In addition, three community informants (the mayor, a woman in a leadership position, and another person not in a leadership position) provided information about the community and a listing of health providers and facilities within a 20-km radius of the community. These listings were consolidated to construct a census of health providers and facilities for each community. Subsequently, the following types of providers were randomly selected from each community and interviewed: 1) the head of the health post or center (HCP) nearest the community; 2) a medical doctor; 3) a midwife; and 4) two other providers, including non-biomedical practitioners, such as curers (*curanderos*), herbalists, spiritists, and others. (The provider surveys were not used for this paper.) The community and provider questionnaires were administered only in Spanish.

Measures

Outcomes. We include two outcomes measuring the type of care received during pregnancy and birth. Very few women saw only a nurse was seen for prenatal care (n=48), so we combined doctors and nurses into one category. Because HCP services are nearly free while doctors and nurses are often quite expensive, it is important to distinguish between these biomedical services. Thus, we classify providers of pregnancy care into three types: doctor or nurse, health center or post (HCP), and midwife, allowing for all

[3] Respondents were asked, "Did you see someone during this pregnancy? IF SO, who? (PROBE: midwife, doctor, nurse) The term "provider" was purposefully not used, since it may influence the type of person that a woman reports.

[4] Respondents were asked, "Do you consider yourself indigenous (natural or maya) or ladina?" In the department of Jalapa, it was found to be considered offensive to ask about ethnicity, so this question was omitted and all

possible combinations of the three. The second outcome indicates whether the birth occurred in a medical facility. Most births in medical facilities occurred in hospitals or clinics, with only 13 births in an HCP, whereas all but nine of the births outside of a medical setting occurred at home (more than 97% of which occurred in the respondent's own home).

Ethnicity. The measure of ethnicity captures both self-perception of ethnicity as well as external markers that may affect social perceptions. The respondent's self-reported ethnicity was classified into two groups: indigenous and ladina. Only 1.5% of the sample reported being of mixed ethnicity and are included in the ladina group because analyses elsewhere (Pebley et al., 1998) indicate they are more similar to ladinas in terms of language and dress. We use two outward markers of ethnicity: traditional dress and ability to speak Spanish. Nearly all variation in dress occurred among indigenous women who speak Spanish; all non-Spanish speaking indigenous women wore traditional dress whereas 99% of ladinas wore western dress. Hence, ethnicity is represented by four mutually exclusive categories: 1) ladina; 2) indigenous/Spanish speaking/western dress; 3) indigenous/Spanish speaking/traditional dress; and 4)indigenous/non-Spanish speaking. The operational definitions and means of all independent measures are shown in Table 1.

Sociocultural factors. In multivariate models, we included several measures of sociocultural factors that may mediate the relationship between ethnicity and pregnancy care. First, biomedically-related health beliefs are indicated by whether the respondent presents any hygiene or contamination-related causes for a hypothetical case of child diarrhea (Goldman et al., 1998). Second, a measure of the respondent's autonomy in household decision-making was measured with an index developed by Seltzer et al. (1997). Respondents were asked who decides: 1) what food should be bought; 2) what medicine should be bought; 3) who the respondent should see if she is sick; and 4) who is in charge of the money for household expenses; items were coded 1 if the respondent alone decides or is in charge of expenses. The sum of these items ranges from zero to four with an alpha reliability of 0.64. Since women who were not in a marital or consensual union (n=221 births) were not asked these questions, we included a dummy

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respondents were coded as ladina.

variable indicating those in a marital or consensual union and an interaction between in union and the autonomy index. Social connections outside the community are represented by two dummy variables indicating whether the respondent has any relative(s) living abroad or in Guatemala City and whether migration abroad is common or very common in the community.[5] Finally, the percent non-Spanish speaking indigenous among respondents in each community indicates the ethnic composition of the community.

Accessibility to Health Services. We also included a number of measures of access to health services. Using the census of providers and facilities provided by community informants, we coded the proximity of services, with dummy variables indicating whether there is: a government hospital within half an hour of travel time; a doctor or private clinic in the community; and an HCP in the community.[6] Because all but two communities reported having a midwife in the community and those two communities had a midwife within 20 km, access to midwives does not appear to be a problem.[7] Distance in kilometers from the municipal capital to Guatemala City represents a measure of the remoteness of the community. The availability of transportation was measured by a dummy variable for whether bus service was available during the five years prior to the survey and the principal road was open year-round.[8] Finally, since the cost of services may also limit access, we included two dummy variables indicating whether the respondent has insurance that covers medical services and whether she reported access to free medical

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[5] The latter community-level variable is coded from the responses of up to three community informants in the following manner. If the majority of informants agreed, then that value was used. Otherwise, if there were three informants that did not agree, then the middle value was used and if there were only two non-missing responses, then the answer of the mayor or person who had lived longest in the community was used.

[6] In order to obtain one indicator for each community, it was necessary to first identify unique providers and facilities so that answers could be compared across multiple informants (see Peterson et al. 1997, for details). Then, if informants disagree regarding whether a facility/provider is in the community or a facility is government run we checked to see if two out of the three informants agreed. If so, we coded that response, otherwise the provider/facility was coded as outside the community or private, respectively. Distance was coded as the mean across all informants. For travel time and travel cost, we first selected the most accessible mode of transport (in both economic and other terms) and then coded the mean travel time and cost across all informants who reported on that mode of transport. More than one mode of transport was reported for only eight providers and 29 facilities and were selected in the following order: bus, bike, foot, car, taxi, and other. In six cases, informants disagree regarding how to classify a particular provider. In these cases, the least biomedical type was coded.

[7] Although we included only a few measures of accessibility in the analyses presented, we did explore whether having a doctor/private clinic or HCP outside the community but within half an hour travel time had any effect; neither significantly influenced choice of care.

[8] This community level measure is based on informants' reports and disagreement across informants is resolved as

services from a clinic or doctor in a cooperative, in a church or some other group.

Socioeconomic status. Socioeconomic status is represented by household resources and educational attainment. Per capita household consumption of staples and food, a variable developed for the EGSF by Gragnolati (1998a), is measured in quetzales (worth between 18 and 20 cents U.S. at the time of the survey).[9] Consumption is a better indicator of overall resources than income because it is less subject to short-term fluctuations and is likely to be more accurate (Deaton, 1989), especially in agricultural communities where food may be produced and consumed within the household. The respondent's educational attainment was measured in years of schooling.

Control Variables. Demographic variables include the age of the mother at birth and a set of dummy variables for the birth order of the child (i.e. 1st, 2nd, and 3rd born; reference group = 4th or higher order). We tested a quadratic term for age because the relationship between age and the probability of care may be curvilinear due to the higher risk of medical problems during pregnancy at very young and older ages (Morris et al., 1993; Stevens-Simon and White, 1991; Koonin et al., 1991). In an attempt to control for the level of risk that pregnancy may carry for the respondent, we include dummy variables for whether the respondent has ever experienced a fetal loss, whether she had a neonatal death prior to this pregnancy, and whether she had a prior Cesarean delivery. Due to data availability we were unable to confirm that a fetal loss occurred prior to the index birth, but it is likely that the vast majority of these fetal losses were prior to the last two births in the five years before the interview. A prior Cesarean delivery is likely to indicate a previous hospital birth as well as risk of complications.

Analytic Strategy

First, we performed simple cross-tabulations to explore the bivariate relationship between ethnicity and health care practices. Next, we used multivariate models to determine how sociocultural factors and access to services may mediate these relationships. For type of pregnancy care, we used continuation-ratio logits (Agresti, 1990) to estimate: 1) the probability of seeing a provider; and 2) the probability of

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described in footnote 8.
[9]This measure excludes firewood and has been trimmed for outliers (for details see Appendix E in Peterson et al., 1997).

seeing a biomedical provider given that the respondent saw a provider. Among those who saw a biomedical provider, we estimated a multinomial logit model predicting the following combinations of care: both midwife and doctor/nurse, both midwife and HCP (base group for comparisons), doctor/nurse, and HCP only.[10] Finally, we estimated a logit model predicting whether the birth occurred in a medical facility.

The clustered nature of the sampling design can lead to standard errors that are too small when calculated by standard methods that assume a simple random sample. Therefore, all models were estimated in STATA using a Huber/White/sandwich estimator to calculate robust standard errors that are corrected for clustering at the community level (StataCorp, 1999) but not at the family level. All multivariate models also included a set of dummy variables to indicate the department of residence to compensate for stratification of the sample by department.

We estimated multivariate models adding sets of covariates in stages. In the first model, we included only ethnicity as a factor. In the second model, we added sociocultural factors to assess how much of the variation by ethnicity may be explained by these variables. In the third model, we included only accessibility measures in addition to ethnicity. Fourth, we estimated a full model including socioeconomic status and control variables. We also include an interaction between ethnicity and education because previous literature suggests that indigenous people receive lower returns to education (Beckett and Pebley, 1999) and that education has less impact on health outcomes among the indigenous population (Gragnolati, 1998b). For models of place of delivery, an additional model included the type of provider seen during pregnancy. Rather than include a dummy variable for every possible combination of providers, we coded the following mutually exclusive categories: both a midwife and doctor/nurse; both a midwife and HCP; doctor/nurse; HCP only, and midwife only, where the reference group consists of those who did not see a provider.

RESULTS

Pregnancy and Delivery Care by Ethnicity

[10] These four mutually exclusive categories are created by giving precedence to doctors and nurses over HCPs for those respondents who saw more than one type of biomedical provider. If the respondent saw all three (doctor/nurse, HCP, and midwife) she is coded as seeing a midwife and doctor/nurse. Likewise, those who saw a

The distributions of pregnancy-related care by ethnicity are shown in Table 2. The vast majority of women, regardless of ethnicity, received some type of pregnancy care. Results indicate higher proportions seeing a provider during pregnancy than previous surveys have found. For example, the 1995 Guatemala Demographic and Health Survey (DHS) reported no prenatal care for 15% of births in rural areas (INE, 1996), whereas we find only four percent without a provider during pregnancy. It is likely that the EGSF was more successful at eliciting information about traditional providers as well as biomedical providers by using careful question wording and additional probes.

Ladinas were more likely to see a biomedical provider than indigenous women, but we also find variation among indigenous women. From the most traditional indigenous women--who speak only an indigenous language and wear traditional dress--to ladinas, the data show a decreasing proportion (from 100% to 76%) seeing a midwife and an increasing proportion (from 14% to 39% for a health center or post (HCP) and 2% to 24% for doctor/nurse) visiting a biomedical provider.

The most common form of pregnancy care was seeing only a midwife, especially among the most traditional indigenous women (84% versus 41% of ladinas). Ladina women were more likely than indigenous women to see a biomedical provider—whether doctor, nurse, or HCP—in addition to a midwife. Nearly one-quarter of ladina women combined midwife care with HCP care and one in 11 saw a doctor or nurse in addition to a midwife while 2% saw all three. Although indigenous women were less likely to combine traditional and biomedical care, a sizeable proportion (16 to 31%) did combine care, particularly with HCP services.

Among those who sought biomedical care during pregnancy, indigenous women were more likely than ladinas to combine this care with the traditional services of a midwife. In fact, none of the non-Spanish speaking indigenous women used only biomedical services, while nearly one-quarter of ladina women used only biomedical services. Interestingly, among those who saw a biomedical provider, the least traditional women—those who speak Spanish and wear western clothing—were nearly as likely as ladinas to see only a biomedical provider. Auxiliary analyses revealed that women who combined

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doctor/nurse and HCP (but not a midwife) are coded as seeing a doctor/nurse.

traditional and biomedical care made fewer visits, on average, to a biomedical provider than those who saw only a biomedical provider. However, the total number of prenatal visits per pregnancy was much higher among those who combined care. For example, those who saw both a midwife and doctor or nurse averaged 10.6 total visits compared to only 6.6 visits among those who saw only a doctor/nurse and 6.7 visits among those who saw only a midwife (data not shown).

Birth in a medical facility is uncommon among rural Guatemalans, even for ladinas. Most women give birth at home. Yet, there is a gradient across ethnic groups; nearly one-quarter of births to ladinas occurred in a medical setting (mostly hospitals), compared to less than 3% among non-Spanish speaking indigenous women. Again, indigenous women who speak Spanish and wear western clothing were more similar to ladinas than to the more traditional indigenous women.

In summary, we find that nearly all women saw a provider during pregnancy, with little ethnic variation. Although ladinas were more likely to use biomedical services than indigenous women, the majority of ladinas who saw a biomedical provider also saw a midwife. Nonetheless, ladinas were more likely to see only a biomedical provider while indigenous women, if they saw a biomedical provider, usually saw a midwife as well. Moreover, women were more likely to visit an HCP than a doctor or nurse, especially indigenous women. There is also substantial variation across indigenous groups, with the most traditional women in terms of language and dress being least likely to use biomedical services. In multivariate analyses, we attempt to identify the factors underlying these ethnic patterns in choice of care.

Multivariate Results

The mean levels of covariates used in multivariate models are reported by ethnicity in Table 1. Sociocultural factors vary by ethnicity as we might expect. Non-Spanish speaking indigenous women were somewhat less likely than other women to present biomedical causes, i.e. hygiene or contamination, for child diarrhea. They were also less likely to have autonomy in household decision-making or have relatives in Guatemala City or abroad. There appear to be greater differences between those who exhibit external signs of indigenous ethnicity, i.e. language or dress, and those who do not, than between indigenous and non-indigenous women. However, ethnic variation in measures of access to services are

less clear and not always in the expected direction. For example, non-Spanish speaking indigenous women were somewhat less likely than other women to live near a government hospital, have access to bus transportation, or have medical insurance. Given the relatively small differences in accessibility, these variables are unlikely to explain much of the ethnic differential in choice of care.

Due to the large number of coefficients and models being tested, we discuss only on results that are statistically significant at the 99% confidence level or higher. Given the lack of ethnic variation in the proportion never seeing a provider, we will not discuss the initial model predicting the probability of seeing any provider during pregnancy. Results from this model are included in the appendix.

Saw a Biomedical Provider Among Those who Saw a Provider. In Table 3, we present odds ratios from a logit model estimating the probability of seeing a biomedical provider conditional on seeing any provider during pregnancy. Odds ratios are calculated by exponentiating the coefficients and can be interpreted as a multiplier on the odds of the outcome. An odds ratio of 1.0 implies no change in the odds of seeing a provider, an odds ratio less than 1.0 indicates a decrease in the odds, and an odds ratio greater than 1.0 implies an increase in the odds relative to the omitted category.

As indicated in the bivariate analyses, indigenous women, particularly those who do not speak Spanish, were significantly less likely to see a biomedical provider for prenatal care than ladinas (Model 1). In models 2 and 3, we examine sociocultural factors and measures of access to services that we expect to help explain these ethnic differences.

Results support the hypothesis that differences in sociocultural factors help explain the ethnic variation in seeing a biomedical provider. After accounting for sociocultural differences (Model 2), indigenous women who speak Spanish and wear western clothing were no longer significantly different from ladinas in use of biomedical providers, although the odds ratios was still considerably smaller than 1.0. More traditional indigenous women were still significantly less likely to see a biomedical provider, however the magnitude of these differences are noticeably reduced. The effects of sociocultural factors are all in the expected direction; biomedically-related health beliefs, women's greater autonomy in household decision-making, and higher levels of contact with the outside world increased the use of

biomedical health services.

In contrast, we find no evidence to support the hypothesis that lack of access to services explains lower use of biomedical providers by indigenous women. After adding the set of variables measuring accessibility of services, the coefficients on ethnicity remain nearly unchanged from model 1 and none of the access measures are significant at the 99% confidence level (Model 3). Contrary to our expectations, results indicate that sociocultural factors associated with ethnicity are more decisive in explaining use of biomedical health services during pregnancy than measures of accessibility, at least within relatively small rural communities of Guatemala.

After accounting for all covariates, the ethnic differential is further reduced, however non-Spanish speaking indigenous women were still significantly less likely to see a biomedical provider even after adjusting for socioeconomic status (Model 4). While educational attainment is strongly related to use of biomedical care, household consumption is not. Substantively, these results suggest that it is not differences in financial resources or availability of services that explain ethnic differences in biomedical care. Instead, beliefs and norms appear to be more important in influencing use of biomedical care. However, the measures of accessibility used in this study capture only physical accessibility, not social accessibility, which could still be important.

Combination of Care Among Those Who Saw a Biomedical Provider. In Table 4, we show relative risk ratios from a multinomial logit model among those who saw a biomedical provider during pregnancy. Risk ratios are relative to the base group who saw both a midwife and an HCP.

As the descriptive analyses in Table 2 indicated, compared to ladinas, indigenous women, particularly those who do not speak Spanish, have a lower relative risk of seeking only biomedical services or combining midwife care with a doctor or nurse's care (Model 1). Although the risk ratios are well below 1.0, indigenous women who are similar to ladinas in language and dress did not differ significantly in combination of care.

Results from model 2 indicate that sociocultural factors account for at least part of the ethnic differential in the combination of care. The magnitude of ethnic differentials is attenuated, but remain

sizeable. Not surprisingly, biomedically-related health beliefs increase the likelihood of seeing a doctor or nurse (either solely or in combination with a midwife) relative to a midwife and HCP. Contact with the outside world, measured by having relatives in Guatemala City or abroad, is also positively associated with combining midwife care with that of a doctor/nurse rather than an HCP. While social connections outside the community may reflect exposure to different ideas and norms regarding health care, they may also represent access to additional economic resources, which is suggested by the fact that the effect is no longer significant once socioeconomic status is accounted for in model 4.

We find little evidence that differential access to services accounts for the ethnic variation in patterns of pregnancy care. Although having health insurance is strongly and positively related to seeing only a doctor or nurse relative to a midwife and HCP, accounting for selected measures of accessibility has little effect on the size or significance level of ethnicity coefficients.

Household consumption is positively related to seeing a doctor or nurse (with or without a midwife) but unrelated to visiting only an HCP (relative to the base group). Because financial constraints are less likely to be a barrier to seeking HCP services, these results are not surprising.

After accounting for differences in socioeconomic status and control variables, the magnitude of ethnic differentials are attenuated, especially in models that involve seeing a doctor or nurse. Nonetheless, sizeable ethnic differences remain, suggesting that more traditional indigenous women seek a midwife's services for different reasons than biomedical care and that these providers are not direct substitutes for one another. Auxiliary analyses reveal how the nature of pregnancy care differs across providers. In general, pregnant women visited midwives more frequently than doctors, but did so later in pregnancy. Women were more likely to say that they saw a doctor for a problem during pregnancy, as compared with HCPs and midwives, which women visited simply because they were pregnant. While doctors were more likely to measure blood pressure, take blood and give injections, medicines, or remedies than other providers were, midwives' practices were typically limited to checking the position of the baby and giving a massage or a steambath (a traditional indigenous treatment known as a *temascal* in Spanish).

Delivery in a Medical Facility. In Table 5, we present findings from a logit model predicting

whether the birth occurred in a medical facility. Model 1 confirms the bivariate analyses (Table 2) showing that indigenous women, especially those who display outward signs of ethnicity, are significantly less likely to give birth in a medical facility.

Once again, results support the hypothesis that sociocultural factors account for some of the ethnic variation in the place of birth, but there is no indication that these ethnic differences are due to differential access to health services. Accounting for socioeconomic status and control variables explains a large portion of the remaining ethnic differential in place of delivery (model 4). The impact of education on the probability of delivery in a medical setting is larger among ladinas as compared to indigenous women.[11] Indigenous women may be reluctant to delivery in hospitals because of the poor treatment they receive from medical staff. Cosminsky (1987) describes the inattention and condescending attitude that poor Guatemalan women often encounter in interactions with doctors and nurses.

We note that having had a previous Cesarean delivery has a huge positive effect on the probability of giving birth in a medical setting. While this measure identifies women who are likely to have more problems in pregnancy, it probably also captures those most likely to deliver in a medical setting and reflects that once a woman has a Cesarean delivery she is more likely to have a subsequent Cesarean delivery. Auxiliary analyses indicate that nearly half (47%) of those who had had a prior Cesarean delivery also delivered the reference birth by Cesarean, compared to only 2% of those who had never had a Cesarean delivery.

Finally, we find that the type of provider(s) seen during pregnancy is strongly related to the location of delivery (Model 5). Relative to those who saw no provider during pregnancy, women who saw only a midwife during pregnancy were much less likely to deliver in a medical facility. However, women who saw only a doctor or nurse for prenatal care had twice the odds of delivering in a medical setting. Interestingly, women who saw a midwife in addition to a biomedical provider during pregnancy were much

[11] The significance level of the interaction effect is sensitive to specification, although it remains in the same direction. Because few Guatemalans, especially indigenous women, have more than a few years of education, we have little power to test the effect of education.

less likely to give birth in a medical facility than those who saw only the biomedical provider.[12] However, these results should not be interpreted as indicating that choosing a biomedical provider for prenatal care leads one to deliver in a medical facility. Rather it is likely that unmeasured variables that determine choice of provider also affect whether delivery occurs in a medical setting.

DISCUSSION

With these data we can create a multi-faceted measure of ethnicity, identify multiple providers of pregnancy care, and include a much richer set of explanatory measures to account for ethnic differentials in choice of pregnancy and birth care. Thus, we can learn much more than has been previously known about how choice of pregnancy and delivery care varies by ethnicity. Nonetheless, despite the richness of these data, there are several limitations.

There are some additional factors that we are unable to measure but may be important in mediating the relationship between ethnicity and pregnancy care. Language barriers are one such factor. The EGSF data do not allow us to accurately determine whether providers in the community are able to speak indigenous languages. Cost of services is also is likely to be a big factor in choice of care. Women's reports of payments to providers indicate that doctors and nurses are by far the most expensive option while HCPs are very low cost. On average, those doctors that were paid for services (80%) charged about Q.29 (approx. $6 U.S.) per visit while midwives who were paid (89%) charged Q.7 per visit (approx. $1.50 U.S) and HCPs only Q.2 per visit (approx. 40 cents U.S.) if they charged at all (28%). However, most midwives charged one fee for the entire pregnancy and delivery rather than a per visit fee. The differences between doctors and midwives are even larger when considered in this light. Among those who charged one fee for pregnancy and delivery, midwives were paid an average of Q.38 (approx. $8 U.S.) while doctors were paid Q.1,032 (approx. $206 U.S.). Given the strong relationship between socioeconomic status and ethnicity, it is not surprising that socioeconomic differences account for a substantial portion of the ethnic variation in choice of care.

Finally, due to differential geographical distribution by ethnicity in the EGSF, department of residence

[12] Even among those who saw only a doctor or nurse during pregnancy, 37% gave birth at home.

and ethnicity are inevitably confounded. While there is nothing that a survey can do about the geographic distribution of the population, statistically it means that there is little leverage to isolate ethnic differences from regional differences in health behaviors.

CONCLUSION

In Guatemala, the social and economic divide parallels the ethnic distinction between indigenous people and ladinos. This ethnic stratification is revealed in large differentials in choice of pregnancy care and type of delivery by ethnicity. This study attempts to understand the circumstances that might account for these ethnic differences.

Using data from a survey of 60 rural communities in four departments of Guatemala, we explore ethnic differences in type of pregnancy care and delivery in a biomedical facility. As in many developing countries, traditional care from midwives is the dominant source of pregnancy-related health care. Yet, the health system is a pluralistic one and elements of biomedical care are often intermingled with traditional forms of health care. Ethnicity is a cultural distinction rather than racially based, one determined by self perception as well as social perceptions. With multiple indicators of ethnicity available in these data, we measure ethnicity based on self-reports and external markers such as language and dress. In Guatemala there is clear ethnic variation in the types of care sought by pregnant women and the use of medical facilities for delivery. Indigenous women, particularly those who do not speak Spanish or who wear traditional dress, were less likely to seek biomedical services. In addition, when they did seek biomedical services, they were much more likely to combine those services, particularly those of an HCP, with those of a midwife rather than to seek only a biomedical provider. Moreover, the estimates revealed a similar ethnic gradient of increasing likelihood of delivering in a biomedical setting, with ladinas most likely to do so.

Results indicate that sociocultural factors are more influential than access to health services in accounting for ethnic differences in pregnancy and birth care, at least in these relatively small rural communities. Traditional indigenous women are less likely to hold biomedically-related health beliefs, less

likely to have autonomy in household decision-making, and have fewer social connections outside the community than ladinas. These sociocultural differences appear to explain, in part, lower use of biomedical services by more traditional indigenous women. However, we find no evidence that differential access to health services explains the ethnic differentials in choice of care. Nonetheless, the measures of access used in this study focus on the proximity of services, not the cultural appropriateness or quality of care, which may still be important.

Differences in socioeconomic status also account for a large part of the ethnic differences in choice of care. Given the close relationship between ethnicity and socioeconomic status, it is not surprising that indigenous women, who are more likely to be poor, are less likely to use high cost pregnancy care options such as doctors and nurses and hospital-based delivery.

Another important finding is that indigenous women, especially non-Spanish speaking, were much less likely to simply replace midwife care with biomedical care and women who combine traditional and biomedical care during pregnancy were much less likely to deliver in a hospital than those who use only biomedical services. These results suggest that biomedical care serves a different function for those who combine care than for those who use only biomedical care. Ethnographic data suggest that visits to midwives may serve an important social function (Cosminsky, 1987; Jordan, 1993) that is not provided by biomedical providers. While this study provides important insight into the type of care women receive during pregnancy and birth, many questions about why they seek the care that they do remain unanswered. The reason women seek particular types of providers and the expectations that they have for those providers is perhaps better explored with qualitative methods.

Although this study is limited to the Guatemalan experience, the findings are relevant for other developing countries. The problems of maternal morbidity and mortality, the constraints that women face in obtaining health care, and the sociocultural factors which condition the use of traditional versus biomedical services are shared by many rural areas of poor countries in Latin America, Africa, and Asia. Understanding how the Guatemalan experience affects health care decisions can help inform us about how maternal health care might be improved throughout the developing world.

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Table 1. Operational Definitions and Means of Covariates by Ethnicity

	Total Sample	Indigenous			Ladina
		Cannot Speak Spanish	Speaks Spanish		
			Traditional Dress	Western Dress	
Number of Births	3,253	431	1,382	321	1,119
Sociocultural Factors					
Attributes child diarrhea to hygiene/contamination (%)	30.5	26.0	31.4	31.8	30.8
In union (%)	94.2	97.0	95.2	91.0	92.8
Interaction: In union x autonomy in household decision-making (mean)	0.9	0.6	0.9	1.4	1.0
Has relatives in Guatemala City or outside the country (%)	50.0	24.4	41.8	62.9	66.2
Community has frequent migration abroad (%)	26.8	23.4	33.4	18.1	22.4
Percent non-Spanish speaking indigenous in the community (%)	12.9	54.6	12.9	1.1	0.4
Accessibility					
Government hospital within a half hour of travel time (%)	6.9	0.2	12.4	5.3	3.0
Doctor or private clinic in the community (%)	27.7	22.7	28.3	44.5	23.9
Health center/post (HCP) in the community (%)	39.0	41.5	38.7	51.1	34.9
Distance from the municipal capital to Guatemala City (in km)	80.1	99.6	76.4	95.4	72.9
Bus service available in the past five years and road open year-round (%)	30.9	8.6	30.5	34.6	38.9
R has medical insurance that pays doctor, clinic, or hospital expenses (%)	3.9	0.2	2.3	10.9	5.2
Family has access to free health services (%)	17.2	11.1	19.5	21.5	15.3
Socioeconomic Status and Controls					
Per capita household consumption of food/staples in past month (in quetzales)	22.4	18.3	20.2	24.6	26.1
Highest grade of schooling completed (mean)	2.2	0.5	2.2	2.1	2.8
Age at birth (in years)	24.5	25.0	24.5	23.8	24.4
First birth (%)	18.6	14.2	18.0	22.4	19.9
Second birth (%)	18.9	16.2	19.6	21.5	18.2
Third birth (%)	18.4	18.3	18.2	17.1	19.0
Fourth or higher order birth (%)[†]	44.1	51.3	44.2	38.9	42.8
Ever had a fetal loss (miscarriage or stillbirth) (%)	20.1	13.9	19.0	22.4	23.1
Had a neonatal death (infant died in first 28 days) prior to index birth (%)	8.2	9.7	7.7	4.4	9.2
Had a Cesarean delivery prior to index birth (%)	4.1	2.1	4.3	4.0	4.5

[†]Reference Group

Note: Cases where data are missing for an outcome or explanatory variable (2.9% of all births) are excluded from all analyses. There were 6 cases missing information for one of the outcome variables; 40 cases were missing ethnicity; and 51 cases were missing another explanatory variable for a total of 97 cases out of 3,350 births.

Table 2. **Pregnancy-Related Health Care by Ethnicity**

	Total Sample	Indigenous			Ladina
		Cannot speak Spanish	Spanish-speaking		
			Traditional dress	Western dress	
Total number of births	3,253	431	1,382	321	1,119
Saw a provider during pregnancy(%)	96.1	97.4	96.7	97.2	94.6
Among those who saw a provider: Particular provider[a]					
Saw a midwife (%)	88.0	100.0	94.8	84.3	75.7
Visited a health center/post (HCP) (%)	27.8	14.3	24.1	23.7	38.9
Saw a doctor/nurse (%)	16.5	2.1	14.2	20.2	24.0
Among those who saw a provider: Care combinations					
Midwife only (%)	58.3	83.8	64.1	58.0	40.9
HCP and midwife (%)	19.7	14.0	19.2	16.4	23.5
Doctor/nurse and midwife (%)	8.1	1.9	9.3	9.0	9.0
Doctor/nurse, HCP, and midwife (%)	1.8	0.2	2.2	1.0	2.4
HCP only (%)	5.5	0.0	2.5	5.4	11.6
Doctor/nurse and HCP (%)	0.7	0.0	0.2	1.0	1.4
Doctor/nurse only (%)	5.8	0.0	2.5	9.3	11.2
	100.0	100.0	100.0	100.0	100.0
Birth in medical facility (%)[b]	14.3	2.6	9.1	18.1	24.0

[a] These percentages do not sum to 100% because a woman may see more than one type of provider.
[b]Medical facilities include hospitals, clinics, and health center/posts (HCP). Only 13 births were delivered in HCP. The remaining births occurred in the respondent's or someone else home with the exception of 9 births which occurred somewhere else (e.g. on the road).

Table 3. Logit Model Predicting Whether R Saw a Biomedical Provider Given Provider, Odds Ratios

Variable	(1)	(2)	(3)	(4)
Ethnicity				
(Ladina)				
Indigenous/Spanish/western dress	0.55**	0.67	0.52**	0.91
Indigenous/Spanish/traditional dress	0.29***	0.40***	0.30***	0.54
Indigenous/no Spanish	0.10***	0.17***	0.11***	0.26**
Sociocultural Factors				
Attributes diarrhea to hygiene/contamination	--	1.60***	--	1.33**
In union	--	0.67	--	0.68
In union x autonomy in decision-making	--	1.24***	--	1.23***
Has relatives in Guatemala City or abroad	--	1.55***	--	1.26*
Community has frequent migration abroad	--	1.61**	--	1.84***
% Indigenous/no Spanish in community	--	1.00	--	1.01
Accessibility				
Doctor/private clinic in the community	--	--	1.32	1.14
HCP in community	--	--	1.30	0.94
Distance to Guatemala City (in km)	--	--	0.98	0.97**
Bus service available and road open year-round	--	--	1.06	1.04
R has medical insurance	--	--	1.55	1.12
Family has access to free health services	--	--	1.11	0.94
Socioeconomic Status and Controls				
Per capita consumption (in quetzales)	--	--	--	1.01
Highest grade of schooling completed	--	--	--	1.20***
Highest grade x indigenous	--	--	--	0.96
Age at birth (in years)	--	--	--	1.04*
First birth	--	--	--	1.60*
Second birth	--	--	--	1.15
Third birth	--	--	--	1.21
(Fourth or higher order birth)				
Ever had a fetal loss	--	--	--	1.42**
Had a prior neonatal death	--	--	--	0.84
Had a prior Cesarean delivery	--	--	--	1.89**
N	3,127	3,127	3,127	3,127
Log Likelihood	-1969.8	-1895.0	-1935.9	-1794.5
Pseudo R^2	0.07	0.11	0.09	0.16

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Notes: All models include a set of dummy variables for department of residence and robust standard errors are calculated using a Huber/White/sandwich estimator to correct for clustering by community.

Table 4. Multinomial Logit Model of Provider Type(s) Given Biomedical Provider, Relative Risk Ratios

Base Group = Midwife & HCP	Midwife & Doctor/Nurse				Doctor/Nurse Only				HCP Only			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Ethnicity												
(Ladina)												
Indigenous/Spanish/western dress	0.56	0.62	0.50	1.08	0.51	0.55	0.43**	1.69	0.57	0.56	0.47*	0.61
Indigenous/Spanish/trad'l dress	0.51	0.68	0.47	1.17	0.16**	0.23**	0.16**	0.70	0.16***	0.17***	0.14***	0.17**
Indigenous/no Spanish	0.11***	0.34	0.12***	0.62	‡	‡	‡	‡	‡	‡	‡	‡
Sociocultural Factors												
Attributes diarrhea to hygiene/contam	--	1.79***	--	1.46*	--	2.70***	--	1.92*	--	0.99	--	0.83
In union	--	1.01	--	0.97	--	0.37*	--	0.36*	--	0.50	--	0.44
In union x autonomy in decision-making	--	0.99	--	0.96	--	1.14	--	1.09	--	1.15*	--	1.14*
Has relatives in Guatemala City or abroad	--	1.61**	--	1.20	--	1.30	--	0.72	--	0.85	--	0.86
Community has frequent migration abroad	--	1.02	--	1.01	--	1.00	--	1.11	--	0.87	--	1.60
% Indigenous/no Spanish in community	--	0.98*	--	0.98	--	0.98	--	0.98	--	1.00	--	1.01
Accessibility												
Doctor/private clinic in the community	--	--	1.75	1.57	--	--	2.06	1.36	--	--	1.49	1.33
HCP in community	--	--	0.72	0.73	--	--	1.39	1.24	--	--	0.56	0.49
Distance to Guatemala City (in km)	--	--	0.99	0.99	--	--	0.97*	0.96**	--	--	0.98*	0.97*
Bus service avail and road open all year	--	--	1.05	0.92	--	--	0.85	0.83	--	--	1.82	2.02*
R has medical insurance	--	--	2.91*	2.23	--	--	5.59***	4.43**	--	--	1.51	1.39
Family has access to free health services	--	--	1.31	1.11	--	--	1.49	1.04	--	--	1.45	1.44
Socioeconomic Status and Controls												
Per capita consumption (in quetzales)	--	--	--	1.02**	--	--	--	1.03***	--	--	--	1.00
Highest grade of schooling completed	--	--	--	1.20***	--	--	--	1.35***	--	--	--	1.05
Highest grade x indigenous	--	--	--	0.91	--	--	--	0.85	--	--	--	0.91
Age at birth (in years)	--	--	--	1.06*	--	--	--	1.07	--	--	--	1.01
First birth	--	--	--	1.46*	--	--	--	3.10**	--	--	--	1.12
Second birth	--	--	--	0.88	--	--	--	1.86	--	--	--	1.17
Third birth	--	--	--	1.18	--	--	--	1.30	--	--	--	0.87
Ever had a fetal loss	--	--	--	1.25	--	--	--	1.10	--	--	--	1.80*
Had a prior neonatal death	--	--	--	0.94	--	--	--	1.04	--	--	--	0.73
Had a prior Cesarean delivery	--	--	--	0.84	--	--	--	3.76**	--	--	--	1.61
N	1,305	1,305	1,305	1,305								
Log Likelihood	-1530.7	-1486.2	-1482.5	-1349.5								
Pseudo R^2	0.06	0.09	0.09	0.18								

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

‡This cell is empty, therefore the parameter estimate cannot be estimated.

Table 5. Logit Model Predicting Delivery in Medical Facility, Odds Ratios

	(1)	(2)	(3)	(4)	(5)
Ethnicity					
(Ladina)					
Indigenous/Spanish/western dress	0.36***	0.46**	0.38***	0.93	0.88
Indigenous/Spanish/traditional dress	0.14***	0.23***	0.15***	0.49*	0.59
Indigenous/no Spanish	0.04***	0.20***	0.06***	0.47	0.82
Sociocultural Factors					
Attributes diarrhea to hygiene/contam	--	1.45**	--	1.26	1.15
In union		0.42**		0.55*	0.70
In union x autonomy in decision-making	--	1.18**	--	1.17**	1.09
Has relatives in Guatemala City or abroad	--	2.08***	--	1.58**	1.63*
Community has frequent migration abroad	--	1.78*	--	1.67	1.47
% Indigenous/no Spanish in community	--	0.98*	--	0.99	0.98
Accessibility					
Govt. hospital within ½ hour of travel time	--	--	2.37***	2.18**	2.65**
Distance to Guatemala City (km)	--	--	1.00	1.00	1.01
Bus service avail and road open year-round	--	--	1.23	1.05	1.03
R has medical insurance	--	--	2.75***	2.16**	1.77*
Family has access to free health services	--	--	1.54*	1.24	1.27
Socioeconomic Status and Controls					
Per capita consumption (in quetzales)	--	--	--	1.01**	1.00
Highest grade of schooling completed	--	--	--	1.18***	1.12**
Highest grade x indigenous	--	--	--	0.88**	0.90*
Age at birth (in years)	--	--	--	1.11***	1.10***
First birth	--	--	--	15.06***	14.28***
Second birth	--	--	--	4.70***	4.64***
Third birth	--	--	--	2.10***	2.00**
(Fourth or higher order birth)					
Ever had a fetal loss	--	--	--	1.51*	1.36
Had a prior neonatal death	--	--	--	1.27	1.35
Had a prior Cesarean delivery	--	--	--	10.84***	10.12***
Type of Provider					
Both midwife and doctor/nurse	--	--	--	--	0.65
Both midwife and HCP	--	--	--	--	0.29***
Doctor/nurse only	--	--	--	--	2.00*
HCP only	--	--	--	--	1.47
MW only	--	--	--	--	0.19***
(No provider)					
N	3,253	3,253	3,253	3,253	3,253
Log Likelihood	-1214.9	-1145.5	-1183.4	-935.5	-850.7
Pseudo R^2	0.09	0.14	0.11	0.30	0.36

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Notes: All models include a set of dummy variables for department of residence and robust standard errors are calculated using a Huber/White/sandwich estimator to correct for clustering by community.

Appendix Table. Logit Models Predicting Whether R Saw Any Provider During Pregnancy, Odds Ratios

	(1)	(2)
Ethnicity		
(Ladina)		
Indigenous/Spanish/western dress	1.33	1.55
Indigenous/Spanish/traditional dress	1.09	1.35
Indigenous/no Spanish	2.01	4.29*
Sociocultural Factors		
Attributes diarrhea to hygiene/contam	--	0.65
In union	--	3.18***
In union x autonomy in decision-making	--	1.01
Has relatives in Guatemala City or abroad	--	1.05
Community has frequent migration abroad	--	0.81
% Indigenous/no Spanish in community	--	0.97***
Accessibility		
Doctor/private clinic in the community	--	0.83
HCP in community	--	4.13***
Distance to Guatemala City (in km)	--	1.00
Bus service available and road open year-round	--	0.38**
R has medical insurance	--	1.65
Family has access to free health services	--	0.53
Socioeconomic Status and Controls		
Per capita consumption (in quetzales)	--	1.00
Highest grade of schooling completed	--	1.10*
Age at birth (in years)	--	0.97
First birth	--	0.68
Second birth	--	0.83
Third birth	--	0.72
(Fourth or higher order birth)		
Ever had a fetal loss	--	1.25
Had a prior neonatal death	--	0.91
Had a prior Cesarean delivery	--	0.64
N	3,253	3,253
Log Likelihood	-521.7	-487.5
Pseudo R^2	0.02	0.08

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Note: All models include a set of dummy variables for department of residence and robust standard errors are calculated using a Huber/White/sandwich estimator to correct for clustering by community.