

**HEALTH INEQUALITY IN THE ANDES:
AN ETHNICITY-CENTERED APPROACH**

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Introduction and Background

Latin America constitutes one of the most unequal regions globally, with the Gini coefficient indicating the region is 30 percent more unequal than the world on average (Lustig 2015). While economic growth and government programs aimed at poverty alleviation during the first decade of the twenty-first century have resulted in modest reductions in wealth disparities, slowed economic progress since has given to concern that continued inequality reduction may be unsustainable (Messina and Silva 2018). Further concerning, inequality in this previous research refers solely to vertical inequality, which is inequality between individuals or households across all segments of society (Stewart, Brown, and Cobham 2009). These trends overlook what may be a more insidious form of social disparity in horizontal inequality, referring to the inequality between different groups, rather than individuals, within one society. As a result, a nation may achieve a reduction in overall vertical inequality while some groups remain at the same level of marginalization. Horizontal inequalities thus exert their effects on the most disadvantaged groups within a nation, rooted in a long history of political and social relationships (Gradstein and Schiff 2006).

Within Latin America, horizontal inequalities have emerged along very specific lines which result in the long-term subjugation of certain groups. Specifically, indigenous peoples have been relatively unaffected by changes in national poverty rates, suggesting they may be somewhat insulated from economic shocks, yet maintain the greatest levels of impoverishment in the region (Marquez et al. 2007). For instance, in Peru, while overall poverty declined between 2004 and 2010 from 48.6 percent to 31.3 percent, the rate in overwhelmingly indigenous rural regions remained stable around 60 percent (Thorpe and Paredes 2010). As a result, inequality between indigenous groups and the rest of the population is likely to continue to grow due to structural

barriers specific to ethnicity (World Bank 2015). These trends are most obvious throughout the Andean region, which contains a large percentage of Latin America's indigenous populations (Layton et al. 2006).

Socioeconomic inequality and its intersection with ethnic identity is especially concerning as it relates to health outcomes in the Andean region. To this end, a significant body of work has been devoted to examining the relationship between socioeconomic status and health outcomes, predominately malnutrition indicators, in the Andes. Larrea and Freire (2002) found that Bolivia, Ecuador, and Peru—the countries with the largest indigenous populations in South America—have both greater child malnutrition in general as well as larger regional disparities as compared to Colombia, a country with a smaller indigenous population. While this study does not provide causal analysis suggesting that ethnicity is the driving force behind inequality in child nutrition, it does suggest an interplay between socioeconomic status, ethnicity, and health outcomes.

In Peru, for instance, infant mortality has been as much as five times more likely in the nation's poorest quintile, meaning the bottom fifth of income earners, compared to the richest quintile (Casas, Dachs, and Bambas 2001). Furthermore, these authors report that among Bolivian indigenous populations, individuals are twice as likely to be injured or fall ill and as a result miss twice as many work days as their non-indigenous counterparts. In addition to an increased likelihood of contracting illness, those at the lower end of the socioeconomic gradient in the Andes are less likely to obtain medical attention when ill. For instance, it has been reported that those in the wealthiest quintile are at least twice as likely to seek medical care when ill as compared to the bottom quintile (Dachs et al. 2002). Thus, the most disadvantaged groups in Latin America are the most likely to experience illnesses, yet they are also the least likely to receive medical attention.

Examining health care inequalities among Andean indigenous groups is not a straightforward issue, as these inequalities are intertwined with a complex history of indigenous interaction with the state. One rather simple explanation that has been offered is that the challenging topography of the mountainous rural regions occupied by groups such as the Quechua and Aymara makes healthcare delivery difficult. In addition, health care resources have historically been preferentially allocated to urban centers (Perry and Gesler 2000). Simply explaining away existing healthcare inequalities in terms of issues of basic access proves problematic, however. While access is certainly one contributing aspect to ethnic health disparities, allocation of resources and raw distance are inadequate in predicting health outcomes.

For instance, Urke, Bull and Mittelmark (2011) originally hypothesized that socioeconomic status would be a weak predictor of health outcomes, operationalized as child malnutrition, in poor rural regions. This hypothesis was predicated on the idea that healthcare access within poor regions would be relatively uniform, resulting in consistent outcomes regardless of local differences in income. However, contrary to their prediction, socioeconomic status strongly predicted child malnutrition in rural Andean regions, suggesting that local context, rather than pure availability, has strong predictive importance in determining health outcomes. The authors do not, however, provide strong claims regarding the causal pathway between socioeconomic status and health in this rural setting, nor do they tackle issues relating to ethnicity, which provides ample opportunity for future research.

While these broader statistical studies provide insight regarding overall trends regarding health in the Andean region, they do not offer much with respect to the experience and production of health inequalities at the local level. To this end, existing ethnographic work proves essential in understanding some of the experiential aspects of ethnicity and health. McIntyre et al. (2006), for

example, found marked differences in terms of how households respond to illness, within a similarly impoverished setting, according to small differences in local socioeconomic status. Her argument places illness in the context of “direct” and “indirect” costs. The former include expenses such as fees paid at the clinic and costs associated with travel to seek healthcare, whereas the latter may include such issues as lost productivity. When costs exceed 40 percent of the household income, they are deemed as potentially catastrophic, which is defined as “likely to force households to cut their consumption of other minimum needs, trigger productive asset sales or high levels of debt, and lead to impoverishment” (Prescott 1999; Russell 2004).

In poor rural contexts, McIntyre identifies differing scales of coping strategies depending on each household’s position in the socioeconomic ladder. For those with sufficient income, mobilizing cash savings is the predominant immediate response to illness. However, most families lack sufficient funds and rely on a reduction in consumption (Foster 1994). Further strategies require sale of assets or borrowing from social networks, which can reduce household’s capacity to participate in social exchange in the future (McIntyre 2006). Indirect costs of healthcare thus multiply when coping strategies reduce future prospects for productivity at the household level, as might occur if parents are forced to withdraw their children from school in order to maintain production in the short-term (Mutangadura, Mukurazita, and Jackson 1999). In other words, these studies identify that while direct healthcare expenses can be substantial in the rural setting, local socioeconomic differences truly exert their effects with respect to the indirect costs of illness.

Leatherman and Jernigan (2015) take this framework of local coping strategies and apply it specifically within the context of the Peruvian Andes. The study relies on the idea of illness and poverty as existing in a mutually constitutive relationship, whereby exposure to one increases individual propensity for the other (Farmer 1999). The principal component this ethnographic

approach, which focused on household production in the face of illness in the southern Peruvian Andes, adds is the assertion that “strong associations between poverty and poor health are clearly evident [in the Andes], but...there are a myriad of factors that shape short and long-term consequences of illness on individual household economies and that create different...relationships between poverty and poor health” (Leatherman and Jernigan 2015).

Their study identified a significant burden of direct costs, in this case a \$5 fee paid to the clinic upon visit. In response, many families were forced to sell animals and borrow money in order to meet medical expenses, forcing some household members to leave agricultural production in order to enter the cash-based economy. The ethnographers identified as well that meeting labor demands when household members fell ill often required calling on one’s social networks in order to meet immediate production needs. However, in comparison to more established households, poorer families suffered a two-fold effect. First, others were less likely to work for them due to a fear that the labor could not be reciprocated in the future. Additionally, wealthier families were able to meet immediate labor needs by directly hiring paid labor, which significantly increases monetary costs but maintains the household’s production level. All of this culminates in the finding that even in poor rural contexts, the poorest households are especially vulnerable to the costs of illness due to their limited range of available coping strategies and more detrimental long-term effects of those coping strategies available to them.

As a result, illness presents a substantial challenge for those whose livelihood already hangs in a delicate balance. As has been identified, short-term losses in production may undermine a household’s ability to achieve nutrition and good health, leading to an exacerbation of existing poverty (Deere 1990). To prove most efficacious, however, these ethnographic findings must be linked to the broader structural realities which shape the trajectories of local outcomes. To

understand the perpetuation of health inequalities specifically affecting Andean indigenous populations, a review of existing health policy merits consideration.

Not unexpectedly, the health outcomes indigenous groups experience have their roots in the legacy of colonization and subsequent state-building which often served to isolate indigenous peoples to the margins of society (Walker et al. 2017). In Peru, the arc of exclusion of indigenous peoples from mainstream public health can be traced from the origins of the national programs operating currently. In essence, there exist three separate systems of healthcare in Peru which serve to classify and differentially service segments of the population. A relatively small fraction of households purchase private insurance, formal sector employees access social security insurance (ESSALUD), and the general public is provided national health insurance (SIS).

Such divisions have been so marked at points in history that it has been commented that “one could readily identify a person’s social class by examining the way he obtained medical care” (Roemer 1964). The divisions are problematic primarily because each arm of healthcare is vertically integrated, meaning that each branch maintains distinct funding and delivery services which are hardly equitable (Cotlear et al. 2015). While the system utilized by many indigenous households, operated by the Ministry of Health, made significant progress in reaching poor communities during periods of economic growth, stagnant progress since then has resulted in the implementation of user fees which impose a significant burden on households operating outside of the cash economy. The Peruvian case is paralleled by that of fellow Andean countries Bolivia and Ecuador, where the government provides just one-fourth the amount of funding given to social security programs to public insurance programs. In this case, user fees were introduced to account for the budget deficit between public and social security insurance (Hartman 2016). Even where

health services are accessible, indigenous communities often encounter the issue that existing services are culturally insensitive and thus difficult to navigate (Montenegro and Stephens 2006).

Such inequalities in the health care coverage for indigenous communities occur in the light of a relatively recent transition to universal coverage according to a human rights-based approach to healthcare (Yamin and Frisancho 2015). Such an approach places the onus of provision on the government to oversee the well-being of all citizens. It can be difficult to parse out, however, exactly to what extent universal health coverage is achieved and what definition ought to be used to conceptualize coverage. As has been identified, user fees present a unique challenge to universal coverage in that services may be provided to indigenous populations yet entirely inaccessible on account of their cost (Heredía et al. 2015). Recent health care reforms have resulted in decreases in out-of-pocket expenditures for all three health systems in Peru, yet the failure to eliminate these payments stands firmly in the way of implementation of universal healthcare. For those without insurance, which includes a significant fraction of indigenous households, these out-of-pocket expenses are likely to impose a significant burden, meaning that reforms intended to improve healthcare access may at times further reinforce inequalities (Atun et al. 2015).

There are bright points within this healthcare landscape, however, as Peru has undertaken innovative policies which seem to ameliorate some healthcare issues. The conditional cash transfer program *Juntos*, for instance, has played a role in improving child and maternal health in rural areas. This is credited both to the financial benefits offered by the program as well as the contingencies in place requiring recipients to report for periodic medical checkups and educational programs. One issue with the program, however, is that it asks poor individuals to seek out healthcare services which may not exist or be adequately equipped to handle a large influx of rural patients (Cecchini and Soares 2015).

Furthermore, Peru and other Andean nations have been moving towards more participatory approaches to healthcare delivery, which rely on discourse between the government and local community members to improve healthcare resources. While such programs have significant potential, they at times lack efficacy for isolated indigenous communities who are both wary of state interaction in light of a problematic past and are asked to travel significant distances to participate in dialogue (Bowyer 2005).

In summary, there exists a significant body of work on health inequalities in the Andes. However, much of this literature provides somewhat fragmented pieces of a complex whole with respect to the production of health disparities among indigenous groups in the region. Existing quantitative studies primarily examine socioeconomic status as it relates to health outcomes and only tangentially address the role of ethnicity. Furthermore, nearly all of these studies use child malnutrition as their sole dependent variable when greater complexity exists regarding health outcomes. In addition, these quantitative studies do not address how health-seeking behavior is affected by local factors, including indigeneity. In essence, existing quantitative literature fails to offer explanatory mechanisms for inequalities in health, largely overlooking the complexity of the problem as a social issue. Complementing these works with ethnographic studies serves to bridge some of the gap between the trends identified and the local experiences they represent. These studies provide richer analysis of the experiences of indigenous peoples but often fall short of examining health factors specifically and cannot often be used to track group-level health outcomes.

As a result, the present study aims to bridge studies focusing on local indigenous illness experiences with quantitative data analysis conducted through an ethnicity-focused lens. To a large extent, previous work explains the links between ethnicity and poor health outcomes solely in

terms of socioeconomic status, which ignores the possibility that there are ethnicity-specific factors beyond poverty which contribute to health disparities. As such, this analysis will be couched within the structural realities of the existing health systems which serve the Andean populations in order to contextualize and make inferences about the observed trends. This work suggests there are a number of structural issues unique to the experiences of indigenous populations which contribute to entrenched horizontal inequalities in health outcomes that afflict indigenous groups in Peru.

METHODS

As the objectives of the study suggest, the present research calls for a mixed-methods approach focused on literature analysis and quantitative methods. The literature review and analysis are primarily aimed at placing the existing health realities within the context of a new theoretical framework which will provide greater depth to existing arguments. Specifically, I aim to rearticulate existing literature within the context of Amartya Sen's (2000) framework regarding social exclusion and its limitations on human functioning. This argument builds upon existing quantitative and ethnographic research to demonstrate how social exclusion has structured indigenous interaction with the healthcare system and subsequent health outcomes in the last decade. This includes exploration of the possibility that the current Peruvian health care system serves as an exclusionary force with respect to indigenous people.

In order to make inferences regarding the relationship of ethnicity and health inequality, quantitative analysis of existing survey datasets was conducted. Two primary surveys were utilized throughout the course of this study: USAID's 2012 Demographic and Health Survey (DHS) for Peru and the 2017 Encuesta Demográfica y de Salud Familiar (ENDES) survey conducted by the Peruvian Instituto Nacional de Estadística e Informática (INEI). The DHS dataset contains survey questions regarding a large number of household characteristics, including wealth,

access to public services, and residency type, and additionally contains questions regarding healthcare decision-making and barriers. This study specifically made use of the DHS Individual Recode (IR) data for Peru because it includes information regarding ethnicity for all respondents. DHS data were primarily utilized in order to characterize experiences and factors specifically relating to ethnicity which may have an impact on health outcomes. In order to accomplish this, DHS data were aggregated by ethnicity according to the categories of “Quechua,” “Aymara,” “Spanish” (non-indigenous), and “Other Indigenous.” Unfortunately, the only ethnicity-specific question in the dataset is that regarding first-language, so DHS data were aggregated according to first-language spoken rather than self-identified ethnicity. This means that the “Spanish” classification assuredly contains a number of responses from self-identifying indigenous individuals since a small but growing portion of the indigenous population no longer speaks their native tongue as a first language (Canessa 2007).

While the DHS data was utilized to aggregate responses by ethnicity, the ENDES data was utilized to form regional estimates of demographic and health-related variables. Individual responses were thus aggregated by region, and proportions of responses by region were calculated. These regional-level data were utilized to create distribution maps of certain variables across the regions of Peru and were additionally used for inferential statistics. This included correlations between regional variables, as well as multiple regressions which sought to estimate the effect of different variables on healthcare outcomes.

Building upon the quantitative analysis, the present work further places the results in the context of Peruvian societal realities and health care system structure. Previous studies are called upon in order to explore further some of the relationships observed throughout my own work and offer some systematic understanding to ethnicity-related health inequality. By critically examining

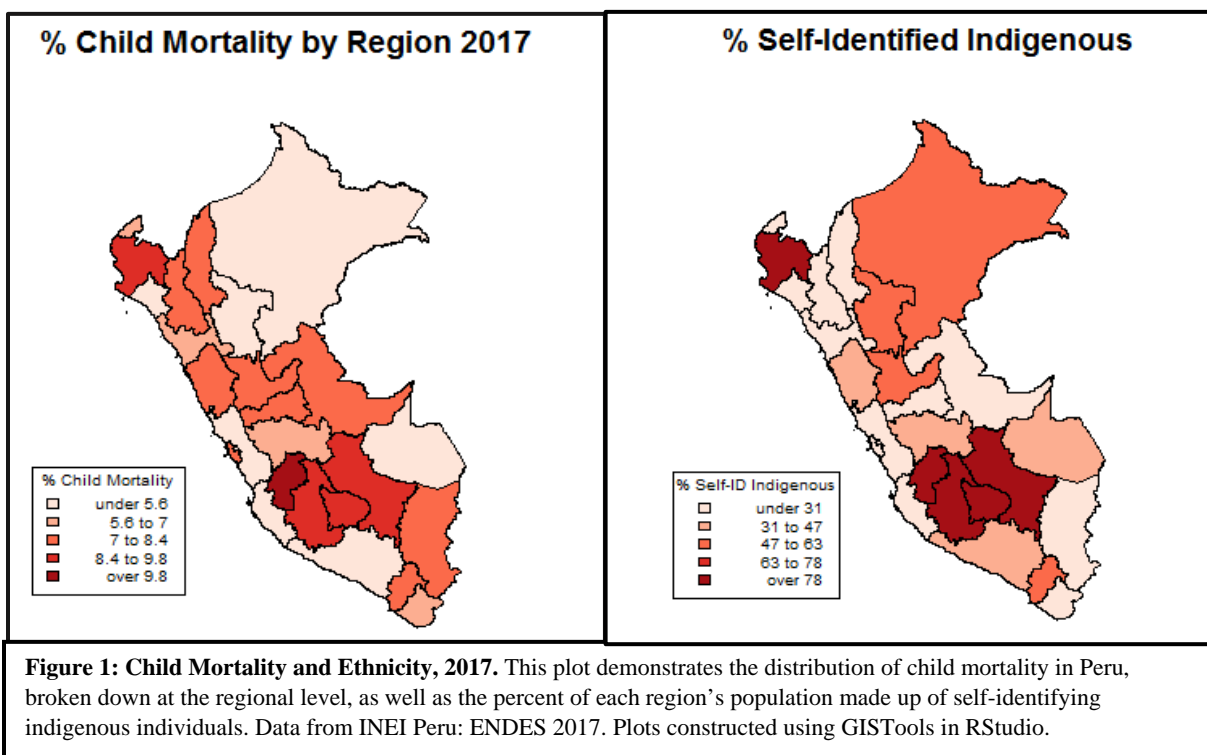
the structure of Peruvian systems of health insurance, I offer possible recommendations for moving towards a more inclusive health structure.

Ultimately, this study explores the question of ethnicity-related health inequalities in the Andes through a normative framework. This aspect adds an ethical imperative to the recommendations offered, thus offering an exploration of why health inequality is unjustifiable as it exists in the Andes. Nussbaum's (2011) human capabilities-based approach to poverty offers a useful framework for analysis. This viewpoint examines issues of poverty as they relate to their limiting of human functioning and opportunity, which fundamentally relates to illness-related limitations. Furthermore, a Rawlsian (1971) theory of justice is applied in relation to the Peruvian healthcare system in order to argue that the distribution of healthcare resources disproportionately favors some segments of the society at the expense of others. In relation to this, the present work utilizes Amartya Sen's (2000) framework of social exclusion to determine the degree to which health outcomes are both the result and reinforce of ethnic exclusion. While I anticipate counterarguments from a utilitarian standpoint (Mill 1863), I will attempt to rebut such arguments on the basis of benefits derived from overall health inequality reduction.

ANALYSIS

Regional Distribution of Health Inequality

The aim of the present study was to study health inequalities in modern-day Peru, specifically examining the issue through an ethnicity-centered lens. While previous work has been devoted to the relationship between socioeconomic status and health inequalities on the national and regional level, few quantitative studies have made ethnicity the central focus of their analysis. As such, my analysis aims to address the relationship between ethnicity and a number of health-

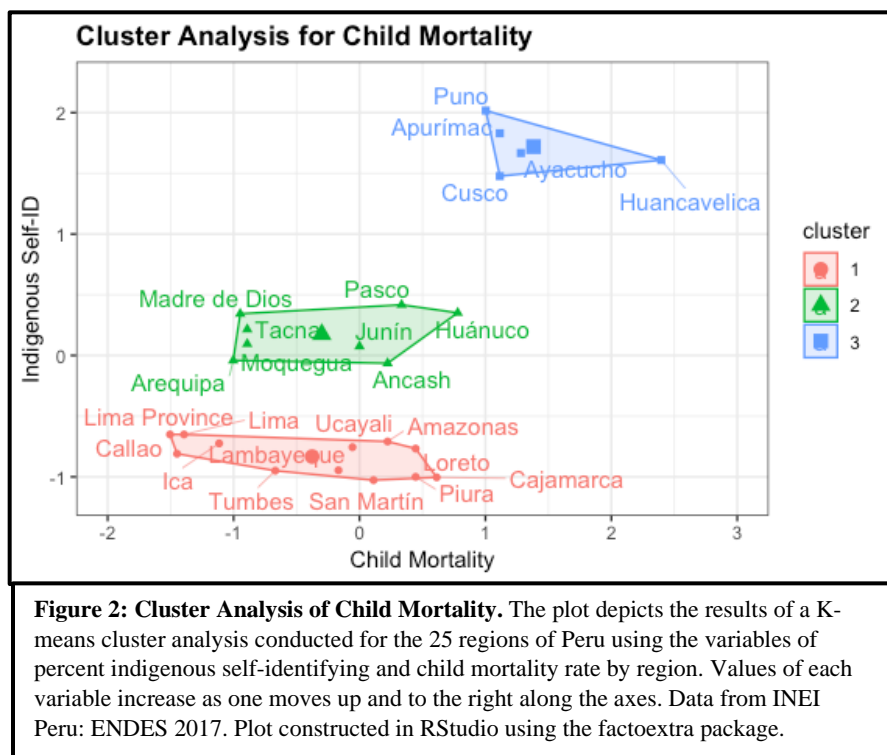


related variables on the regional and national level to better understand the mechanisms by which Peru's indigenous population achieves poorer health.

The primary outcome variable examined in this study is child mortality, which has been used as a means of assessing overall healthcare quality and “a health indicator of society in general” (Grandi 2015). Thus, while child mortality constitutes only a narrow view of the overall picture when it comes to health, the results may potentially be generalized to make inferences about other health inequalities. Child mortality is, however, a rather limited measure, and future analyses would benefit from development of survey datasets which include more robust health data spanning a number of categories. Within Peru, the distribution of child mortality is highly uneven, with some regions displaying mortality rates which far exceed the average rate for low-income countries while other regions fall below this average (Figure 1; WHO 2019). Interestingly, elevated child mortality rates seem to cluster primarily in regions through which the Andes

mountain range runs, with rates falling off on either side. As a whole, it is thus clear that there are regional clusters of risk with respect to child mortality. This section aims to explore what particular factors are unique to these areas of elevated child mortality.

Much like child mortality rates, there a markedly uneven distribution of Peru's indigenous population across the country's regions. Initially, inspection of the regional distributions seems to



identify some overlap between the rate of child mortality and percent of individuals identifying as indigenous within a region (Figure 1). Strikingly, the five regions with the highest incidence of child mortality additionally display the highest percentage of indigenous

households. K-means cluster analysis confirmed this finding, grouping the most indigenous regions together as those with the highest rates of child mortality (Figure 2). However, the relationship between indigeneity and child mortality is assuredly more complex than a direct association, as a linear correlation between the two variables displayed significant heteroscedasticity (Figure 3). While increases in regional indigeneity did seem to correspond with higher rates of child mortality, some of the regions with the smallest indigenous populations displayed higher-than-expected mortality rates. Cajamarca presents an interesting case in that 98.6

percent of the region's survey respondents speak Spanish as their first language and 83.9 percent identify as non-indigenous, yet the region suffers from one of the nation's highest child mortality rates. As such, there are certainly a number of mediating factors which serve to establish the mortality rate for a given region.

There are a number of factors which may contribute to the child mortality rate in a given

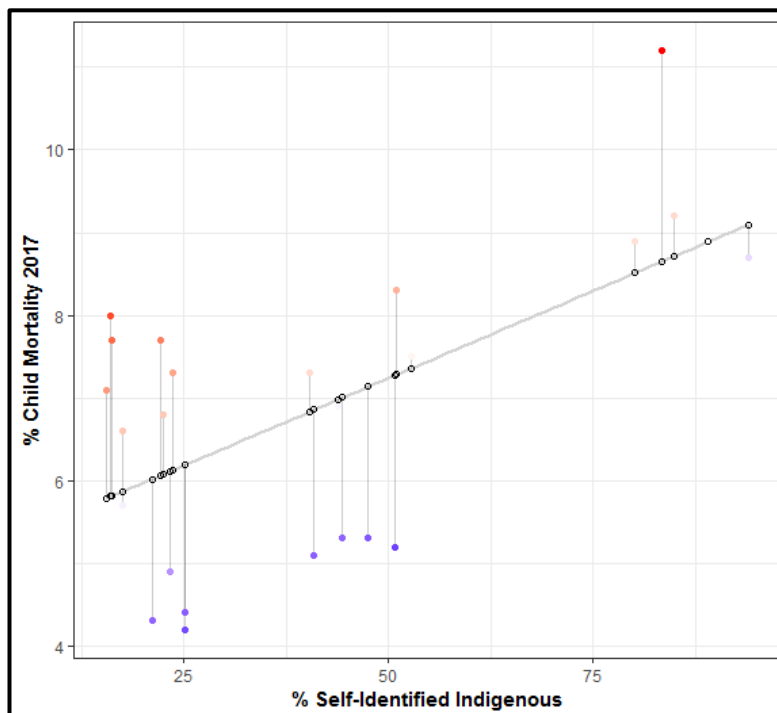
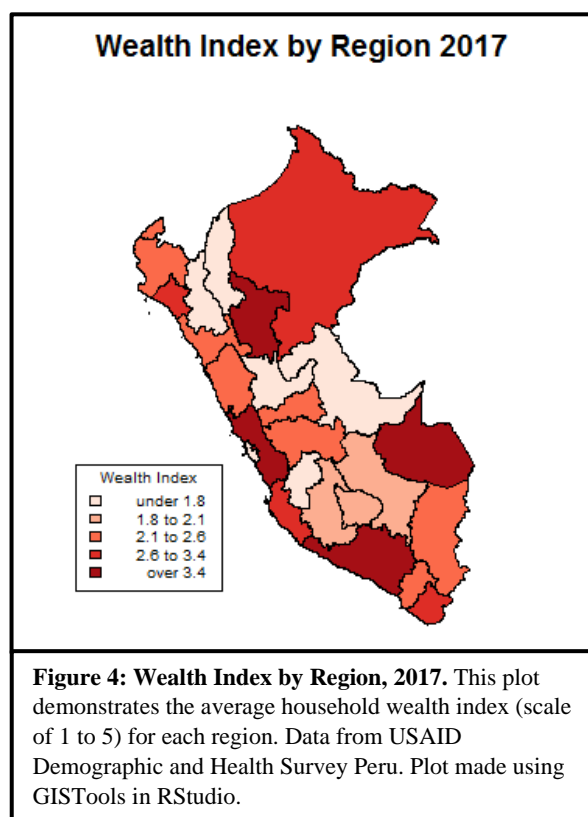


Figure 3: Child Mortality versus Percent Indigenous, 2017. The plot above depicts the result of a linear correlation between the child mortality rate and percent self-identified indigenous at the regional level. Vertical lines indicate distance of observed data from their predicted value at each point, and the intensity of shading of individual points increases with distance from the line of best fit to show relative value of residuals. Predicted values for each point are shown as unshaded circles along the line of best fit. Data from INEI Peru: ENDES 2017. Plots constructed using ggplot2 in RStudio.

region. As discussed in the literature review, much attention has been devoted to socioeconomic status as a predictor of diminished health outcomes. It was thus expected that socioeconomic status would play a significant role in predicting a region's child mortality rate, though it was not expected that inclusion of this variable in a linear model would completely account for the effects of ethnicity. For the purposes of this study, the variable of wealth index from the Demographics and Health Survey (DHS) was utilized as a marker for socioeconomic status. The DHS wealth index is constructed on the household level and ascribes each respondent a wealth level ranging from 1 to 5. As such, the assigned score can essentially be thought of as a wealth quintile. This score is tabulated based on ownership of specific assets such as a car or television, characteristics

of the home, and access to basic services such as water or electricity (Howe et al. 2009). It has been noted that the wealth index can fail to distinguish extreme poverty from other poor households, which suggests it may have limited application at the tail ends of Peru's wealth distribution, but the marker should serve as an adequate estimate of relative socioeconomic status (Rutstein 2008).

As with ethnicity and child mortality, wealth inequalities are pervasive at the regional level in Peru. Wealth chiefly accumulates along the Peruvian coastline and is less predominant in the mountainous Andean region (Figure 4). In order to determine the degree to which wealth is responsible for differences in child mortality



between regions, a linear model was constructed to estimate the effect of wealth as a predictor of mortality. The results of the linear regression model are summarized in Table 1. First, a bivariate regression of child mortality on regional wealth index revealed a strong negative effect of wealth on mortality. This regression estimated that for every quintile (or 20 percent) increase in a region's wealth index, the regional child mortality rate would decline by 2 percent. This finding was expected and in accordance with previous literature which has identified that socioeconomic status is a strong predictor of health outcomes in both the Andes and broader global context (Larrea and Freire 2002; Casas, Dachs, and Bambas 2011). This negative effect of wealth on mortality was somewhat reduced when percent indigenous was incorporated into the model, which displayed its

own modest positive association with child mortality. The positive effect of indigeneity on child mortality persisted throughout incorporation of all other controls. Upon addition of percentage of households covered by Seguro Integral de Salud (SIS)—national health insurance—however, the impact of wealth on child mortality decreased markedly. In addition, once SIS coverage and primary educational attainment were added to the model, wealth no longer predicted child mortality at a significant level. In essence, this means that once ethnicity, health insurance coverage, and education are accounted for, wealth does not estimate child mortality to a greater

	Child Mortality Rate				
	1	2	3	4	5
Wealth Index	-2.012 (.257) ^{***} p = 0.000	-1.726 (.211) ^{***} p = 0.000	-.940 (.441) [*] p = .045	-.530 (.479) p = .282	.194 (.587) p = .745
Percent Self-ID Indigenous		.025 (.006) ^{***} p = .001	.074 (.025) ^{**} p = .008	.056 (.026) [*] p = .045	.094 (.031) ^{**} p = .008
Percent SIS Coverage				.036 (.020) p = .091	-.001 (.027) p = .957
Percent with Only Primary Schooling					.102 (.053) p = .070
Wealth:Indigenous Interaction			-.024 (.012) p = .060	-.015 (.012) p = .241	-.028 (.013) p = .052
Constant	11.977 (.677) ^{***} p = 0.000	10.197 (.684) ^{***} p = 0.000	8.541 (1.049) ^{***} p = 0.000	5.515 (1.974) [*] p = .012	3.065 (2.249) p = .190
Observations	25	25	25	25	25
R ²	.727	.843	.868	.886	.905
Adjusted R ²	.715	.829	.849	.863	.880
Residual Std. Error	.958 (df = 23)	.742 (df = 22)	.696 (df = 21)	.663 (df = 20)	.622 (df = 19)

Table 1: Linear Regression Model of Child Mortality on Wealth Index. This table summarizes the results of a linear regression of child mortality on wealth index at the regional level. Each number given alongside a variable name provides the estimated effect of that variable on the outcome variable. Standard error is provided beneath estimates in parentheses. Data from USAID Demographic and Health Survey Peru and Peru INEI: ENDES 2017. Regression table was constructed using the Stargazer package in RStudio.

degree than these other variables. In addition, large levels of variance are observed for the effect of wealth index in the final model, suggesting it is a less reliable predictor of child mortality when other factors are accounted for.

Importantly, percent indigenous was the only variable which predicted child mortality at a significant level throughout all iterations of the model. As a result, significant effects of indigeneity on child mortality persist even when controlling for a number of other sociodemographic variables including wealth and education. The interaction of wealth and indigenous identity neared significance in this model, which suggests that the magnitude of the effect of indigeneity may differ across wealth quintiles. Improvements in indigenous households' wealth may thus be associated with gains in terms of health outcomes, yet inequality still persists for indigenous households independent of wealth.

Providing a clear interpretation of this linear regression proves challenging, however, because the causal relationship between the included variables is difficult to establish. Furthermore, the small sample size present in the model suggests the results should be taken with great caution and should not be interpreted to establish definite causal explanations. Regardless, the regression seems to provide evidence that when it comes to child mortality, wealth, ethnicity, and health insurance coverage all make substantial contributions to the establishment of the regional rate. While increases in wealth do reduce the mortality rate, indigeneity and low levels of education both display positive relationships with child mortality. It is difficult to assess the effects of factors such as education and insurance status on this broad regional level, as well, because such variables are intrinsically linked to both wealth and ethnicity. In addition, estimates on the regional level must be accepted with caution because regional percentages mix data from survey respondents who crosscut a wide range of socioeconomic and geographic positions. Thus, while

regional data are useful in visualizing trends, they fail to provide much precision or clarity when it comes to the mechanisms operating behind the phenomena observed.

Health-Related Trends by Ethnicity

In order to explore in greater detail the broad effects garnered from regional data analysis, data were also aggregated by ethnicity in order to determine how health-related variables differed between ethnic groups. This approach further allows for more close approximation of a basic mechanism behind health

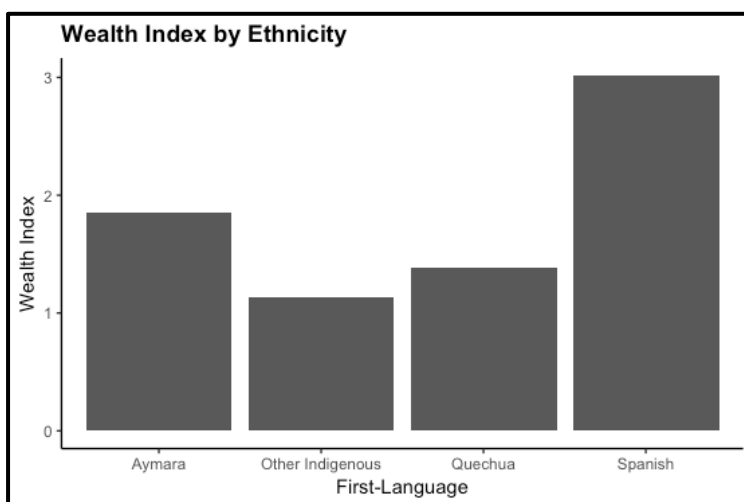
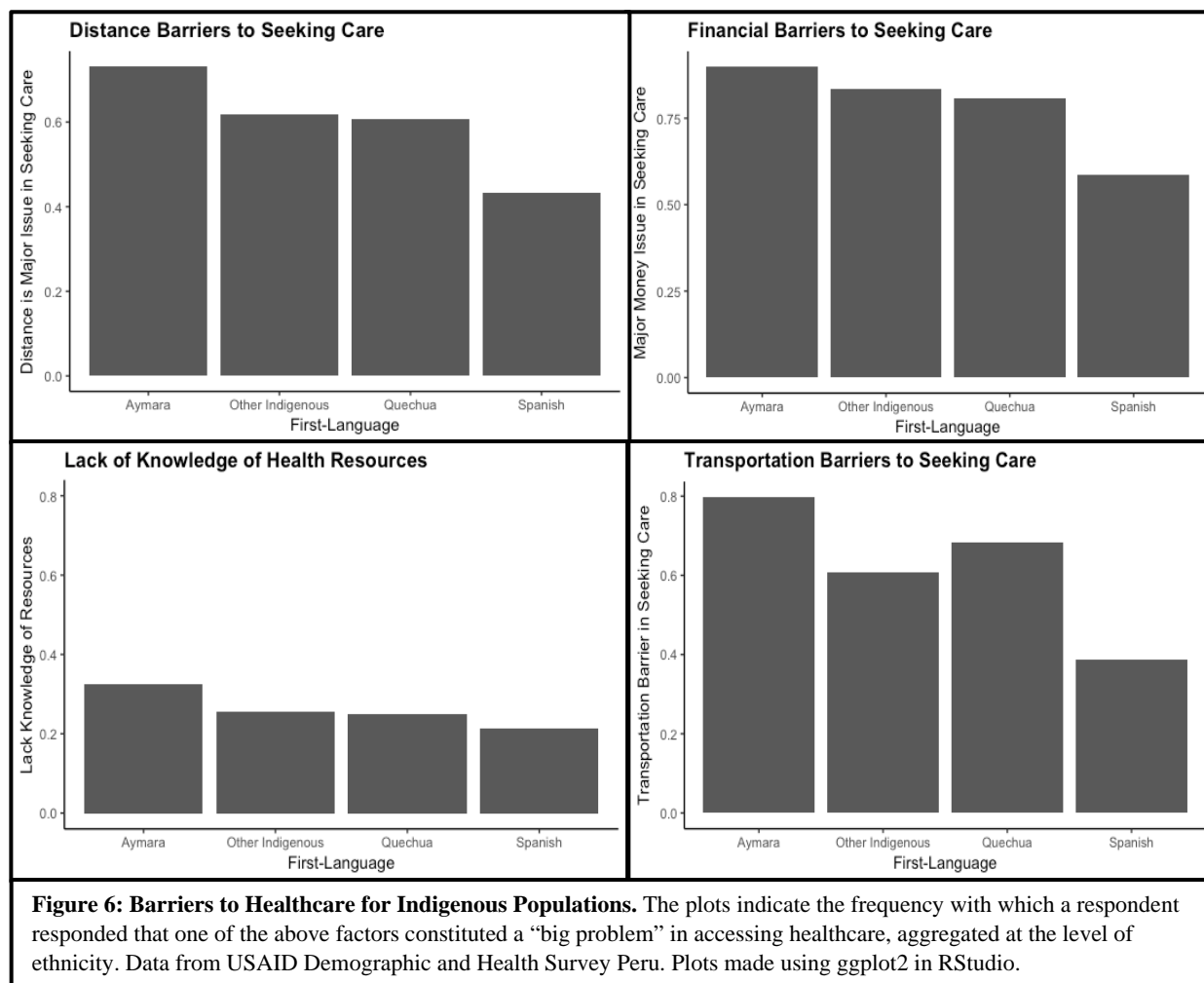


Figure 5: Wealth Index by Ethnicity. Wealth index scores aggregated at the level of ethnicity, as defined by first-language spoken. Data from USAID Demographic and Health Survey Peru. Plot made with ggplot2 in RStudio.

inequalities by describing unequal distribution of risk factors for diminished health along ethnic lines.

Upon aggregating the DHS survey data by ethnicity, it becomes immediately clear that ethnicity is associated with nearly all of the risk factors for diminished health included in the survey. First, all indigenous groups in Peru display an average wealth index that is markedly reduced compared to their mestizo counterparts (Figure 5). This is not unexpected, as it has long been the case that indigenous groups in Peru are on average poorer than the non-indigenous population (Marquez et al. 2007; Thorpe and Paredes 2010). Previous work on health inequalities using the DHS datasets, however, has focused only on socioeconomic status as a predictor of poor health while ignoring the independent effect of ethnicity. As the previous section dictates, ethnicity likely exerts an effect above and beyond the role played by socioeconomic status.



When it comes to accessing the medical system, the DHS data suggests that indigenous populations are at an extreme disadvantage. For each metric measuring barriers to accessing healthcare in Peru, indigenous groups fared worse than non-indigenous respondents (Figure 6). Distance and financial factors are cited as major issues in accessing care as frequently as 70 and 80 percent of the time, respectively, by indigenous groups, whereas the rate of this response did not exceed 50 percent for native Spanish speakers. Furthermore, differences were even more profound in terms of transportation as a major issue, reaching as high as 80 percent for Aymara-speaking individuals. Surprisingly, lack of knowledge of health resources was not a consistent barrier across all indigenous groups, suggesting that indigenous individuals are aware what

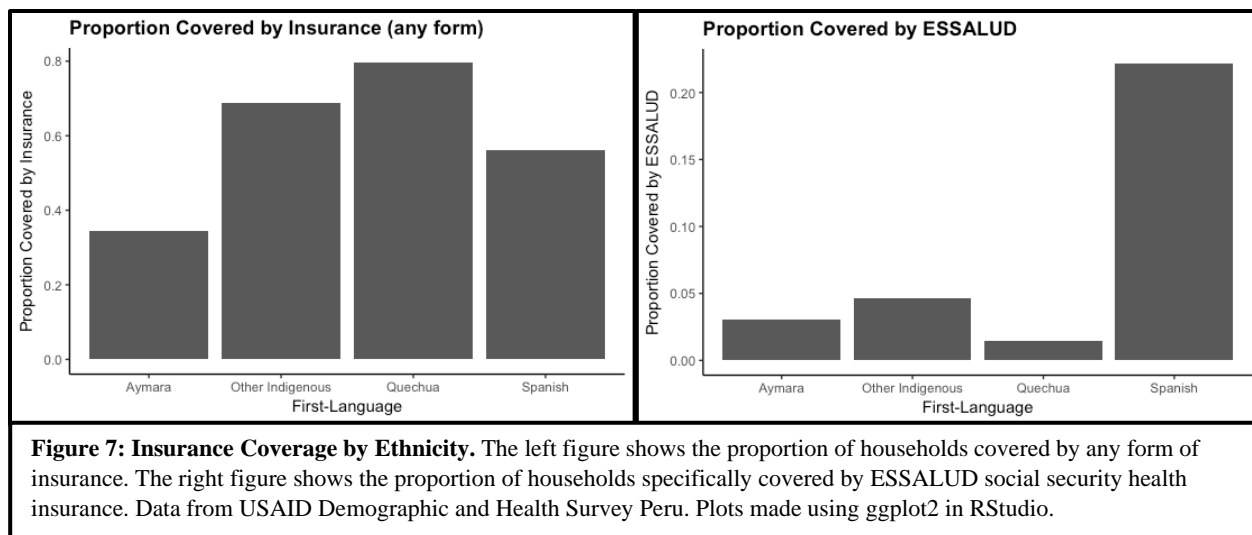
healthcare resources exist yet face structural barriers to accessing them. There may be reason to believe that these differences between indigenous groups and the non-indigenous population could be even more extensive, because the classification of Spanish as a first language still includes a significant portion of indigenous-identifying individuals who simply do not speak their indigenous language at home.

With respect to the other variables included in the regional linear regression, indigenous individuals also display a greater prevalence of risk. On average, all indigenous groups are three times more likely to live in a rural setting than native Spanish speakers¹. They are also far less likely to have completed even a primary education, which is another contributing factor to health and economic outcomes¹. In sum, all of the identified factors which may contribute to poorer health outcomes in the Andes seem to affect indigenous households at a disproportionate level, and indigenous individuals report greater structural barriers to accessing healthcare compared to non-indigenous populations.

Regional, Ethnic Inequalities in Health Insurance Coverage

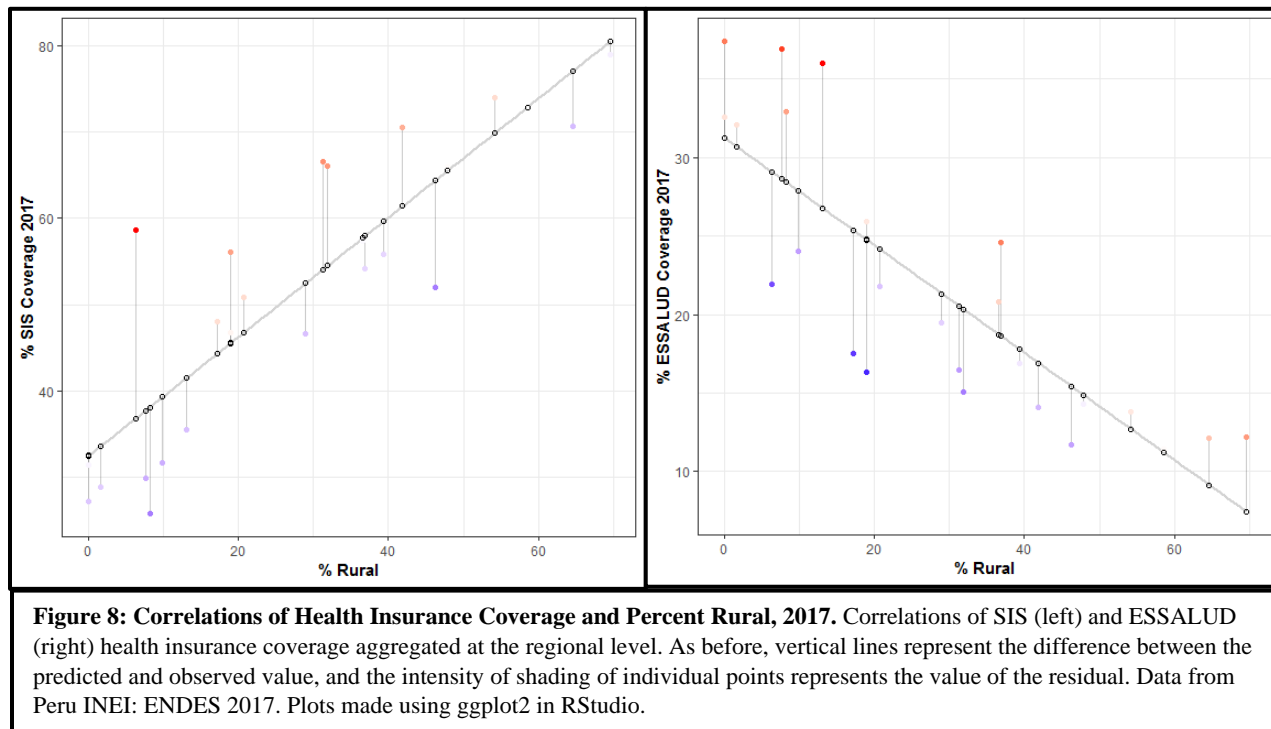
One area where rurality mitigates the relationship between ethnicity and health outcomes may be in the realm of health insurance. As discussed in the review of literature, Peru operates under a tiered healthcare system divided between private health insurance, social security insurance (ESSALUD), and national health insurance (SIS). While the DHS surveys revealed that only a small fragment of the population holds private insurance, ESSALUD and SIS are major government programs utilized by 30 and 60 percent of the population, respectively (PHO 2011). Coverage by SIS insurance has a complex relationship with child mortality, but it is likely that the type of insurance one holds carries implications for health outcomes in Peru. SIS was expanded

¹ Data not shown.



following the passage of a Universal Health Insurance Law in 2009, and since 2015 all uninsured newborns are immediately registered for the program (Oxford Business Group 2016). ESSALUD, on the other hand, is funded through payroll taxes of formally employed citizens. Therefore, this program requires participation in the formal economy, whereas SIS is Peru's means of attempting to provide universal coverage.

SIS has allowed Peru to achieve substantial progress. However, the healthcare system remains demarcated along the lines of class and ethnicity, despite advances in coverage. As shown in Figure 6, some indigenous groups are actually more likely than native Spanish speakers to have health insurance. Overwhelmingly, however, indigenous populations fail to access the social security funded ESSALUD (Figure 7). Part of the reason for the exclusion of indigenous people from this program stems from the labor systems available to indigenous groups in Peru. In urban areas, indigenous people are far more likely than mestizo individuals to be relegated to the informal economy, which is not eligible for payroll tax contributions necessary for ESSALUD (Del Aguila 2016).



The larger story, perhaps, is the gulf between the relative prevalence of health insurance systems in rural versus urban healthcare landscapes. While ESSALUD is technically available to individuals self-employed in the agricultural sector, as many indigenous families who subsistence farm are, participation requires cash contributions which are not feasible for many poor, socially excluded indigenous households. For this reason, individuals working in agriculture are far less likely to self-contribute to social security programs compared to those employed in other sectors (Auerbach, Genoni, and Pages 2007). Thus, health insurance may be proscribed according to one's dwelling in a rural versus urban environment. This study confirmed this finding, as a strong positive linear relationship was identified between SIS coverage and rural residency, and a strong negative linear relationship was found between ESSALUD coverage and rural residency (Figure 8). In these relationships, while there is a large degree of heteroscedasticity for more urban regions, majority rural regions consistently lack ESSALUD coverage.

At this point, one might question why it is problematic to have separate public health insurance schemes, one geared at formal sector employment and the other for vulnerable populations. Much of this stems from the funding and physical resources that each system of insurance governs. ESSALUD receives its funding through a mandatory nine percent payroll tax from formal sector employers, meaning that money is earmarked for its services at the point of collection (Seinfeld and Besich 2014). This contrasts with the SIS system which receives its funding from general taxation and voluntary contributions. This form of funding public healthcare is referred to as healthcare fragmentation, which has been shown to decrease efficiency and coverage (Montenegro et al. 2011). In addition to differences in funding sources, each system also maintains its own physical resources, meaning that ESSALUD insurance holders go to ESSALUD hospitals, whereas SIS holders must utilize public hospitals.

This is not to ignore the fact that the creation of SIS services is better than leaving large segments of the population completely uninsured, and the move towards universal health coverage is praiseworthy. Studies have found, for instance, that SIS increases medical consumption for individuals who have visited a doctor (Bernal, Carpio, and Klein 2017). Upping one's medical consumption, however, requires financial resources which simply may not be available to poor indigenous populations. This is in line with the findings of Petrera (2012), who identified that SIS coverage increases the *possibility* of access to care but fails to protect families from catastrophic healthcare episodes, defined as out-of-pocket spending constituting at least 40 percent of the household's total income after immediate living expenses for a given period (Seinfeld and Besich 2014; Yazdi-Feyzabadi 2018). This is confirmed by Neelsen and O'Donnell's (2017) finding that SIS coverage was followed by an increase in likelihood of accessing formal health care yet did not demonstrate a corresponding decrease in out-of-pocket expenditures. Thus, significant challenges

posed by the SIS system are the persistence of high levels of out-of-pocket spending, which constituted 36 percent of total Peruvian spending on healthcare in 2014, as well as greater healthcare utilization rates among the upper wealth quintiles than lower quintiles (Seinfeld and Besich 2014).

Even where healthcare is theoretically free, indigenous families often face structural barriers to accessing care, such as those identified in Figure 6, or encounter an insufficient supply of resources wherein necessary medical provisions may either be out of stock or require out-of-pocket payments due to implicit rationing (Fagan et al. 2017). In addition, many of the health services available to the rural population are quite limited, meaning that many rural dwellers must travel several hours for care when facing serious illness (Wheelock 2011). This is confirmed by the finding that while three-quarters of the Ministry of Health's SIS facilities are found in rural areas, 97 percent of its hospitals are located in wealthier urban centers (Du Bois, Chavez, and Cusato 2004; Seinfeld and Besich 2014). In this study, it becomes clear why such a high proportion of indigenous individuals identified transportation as a major issue in accessing care. Not only is public transportation infrastructure largely absent in the rural countryside, but indigenous individuals are also less likely to have access to a car to make necessary trips for medical care².

Adding to this situation, these health system differences are most pronounced in an already harsh rural environment. In the rural sector, injury and poor health are both more common and more problematic when they occur. As Leatherman and Jernigan (2015) identify, in the rural Andes productivity losses associated with poor health and injury play a key role in reproducing extreme poverty. They demonstrate that the physical costs associated with obtaining care,

² Data not shown.

including transportation costs and out-of-pocket expenses, couple together with days of labor lost which harm the most vulnerable households of the rural sector.

In the present study, a linear regression model identified that more individuals suffer from multiple physical disabilities in regions with a greater percentage of indigenous individuals, even when controlling for the rurality of

	Percent with Two Physical Disabilities		
	1	2	3
Percent Self-Identified Indigenous	.080 (.018)*** p = .001	.052 (.018)** p = .009	.095 (.025)** p = .002
Lives in Rural Region		2.943 (1.018)** p = .009	6.495 (1.821)** p = .002
Rural:Indigenous Interaction			-.076 (.033)* p = .034
Constant	15.507 (.868)*** p = 0.000	15.834 (.764)*** p = 0.000	14.412 (.939)*** p = 0.000
Observations	25	25	25
R ²	.469	.615	.691
Adjusted R ²	.446	.580	.647
Residual Std. Error	2.236 (df = 23)	1.946 (df = 22)	1.785 (df = 21)

Table 2: Disability Regression on Indigeneity. This table represents the output of a linear regression of individuals suffering from two physical disabilities on percent self-identified indigenous, for whether the region was rural (defined as 40 percent of households identifying as rural residence). Data from Peru INEI: ENDES 2017. Regression table constructed using Stargazer in RStudio.

region (Table 2). The model estimated that living in a region in which 40 percent of households are rural-dwelling increased the likelihood of suffering two disabilities by about 6.5 percent. Beyond this effect, each 1 percent increase in percent indigenous increased the probability of suffering two disabilities by 0.1 percent. Furthermore, a significant interaction effect suggests that the effect of indigenous identity on disability is different for those living in a predominately urban versus rural region. Overall, this model suggests that even within the rural sector, indigenous individuals may be more likely to be injured and suffer disability than non-indigenous populations. As Leatherman (1998) identifies, poor health and diminished productivity under these circumstances become a mutually-reinforcing cycle in which compromised health reduces one's ability to participate in labor, and a reduced ability to work undermines one's ability to pay for necessary medical care. In such cases, more vulnerable households may delay seeking medical

treatment, allowing minor injuries and illnesses to grow into costly and debilitating chronic impairments.

Under these circumstances, it is no wonder that Peru faces high levels of entrenched poverty and healthcare inequality, particularly among its ethnic minorities. This study provides evidence that wealth and socioeconomic status alone are insufficient in describing the state of health disparities. The nature of this study has remained primarily on the level of observational, rather than inferential, with respect to Peruvian health inequalities as they relate to indigeneity partially owing to the metrics currently in place for measuring health inequality. The barriers about which the DHS and IENES surveys inquire are truly only those barriers which could apply to any poor individual in Peru.

While experience of these barriers seems to be heightened for indigenous households (see Figure 6), they constitute only a small fraction of the structural barriers indigenous households likely face in obtaining quality medical treatment. For instance, the questionnaires do not contain any questions which provide insight into the cultural competency of health providers, which can have an enormous impact on healthcare experience and usage (Betancourt et al. 2005). Questions regarding trust of one's available medical practitioner or ability to obtain medical information in one's native language ought to be included in household level surveys as well. Greater characterization of healthcare facilities available in rural settings is also necessary to understand the degree to which rural facilities are even equipped to deal with treating vulnerable populations if the resources can be accessed. As has been previously identified, the SIS health insurance scheme has perhaps had the effect of increasing demand for health services without sufficiently increasing the supply of medical services (Jimenez et al. 2017). Addition of these ethnicity-centered questions to the next iteration of the DHS or ENDES surveys would be fairly simple yet

would provide researchers with the tools to make much more powerful quantitative statements regarding the health inequalities and structural barriers to care documented in this work.

Developing statistical measures of health inequality through an ethnicity-focused lens, while necessary, may not be the most efficient course of action forward. Small movements undertaken by nongovernmental organizations to improve intercultural health training for medical practitioners seem to have improved trust between indigenous communities and healthcare providers and could be expanded under a broader governmental program (IDRC 2017). As one of the major issues identified in this paper was the existence of separate health insurance systems with disparate funding schemes, it is possible that Peru ought to consider an integrated health care system as they look to the future. According to the current system, pools of health risks are separated financially and thus funded separately, which often has the result that less financial attention is directed to the health problems of the poor (Montenegro et al. 2011). As such, a greater statistical characterization of the barriers indigenous households face in achieving good health is necessary, yet structural change with respect to health insurance schemes and health delivery programs could feasibly address many of these barriers.

Ethical Considerations: Are Separate Systems Just?

From an ethical perspective, the current state of the health system as directed towards indigenous populations cannot be justified. The normative approach utilized here is one focused on capabilities, as originally elaborated by Martha Nussbaum and Amartya Sen (1985). A capabilities-based approach examines specifically what individuals in a particular society are able to do, essentially focusing on the various opportunities and actions available for an individual to perform. Not surprisingly, the primary capabilities proposed as essential under this theory relate to maintenance of uncompromised bodily health and pursuit of a life of normal length (Nussbaum

2011). In this framework, the physical toll which illness places on indigenous bodies is unjustifiable in that it limits the range of opportunities such individuals are able to pursue in their efforts to obtain a quality standard of living. In the context of increased prevalence of illness, one may find their ability to work impaired, further limiting their ability to access a number of opportunities to grow and live a dignified life.

In the context of rural indigenous Peru, the concept relating to capability-deprivation which seems most pertinent is that of social exclusion. As Amartya Sen (2000) identifies, “social exclusion can...be constitutively a part of capability deprivation as well as instrumentally a cause of diverse capability failures.” In other words, being socially excluded both contributes to a loss of capabilities and is a capability loss itself. The way in which social exclusion is structured often takes place on an institutional level, as is the case with the Peruvian healthcare system at present. As Sen (2000) writes, “our opportunities and prospects depend crucially upon what institutions exist, how they function, and how inclusionary they are. Not only do institutions contribute to our freedoms, their roles can sensibly be evaluated in light of their contributions to our freedoms.”

How inclusionary is the state of the public health insurance system in Peru currently? On a broad level, the implementation of SIS was an inclusionary effort which has reaffirmed historical exclusionary boundaries. Stemming from a colonial classificatory scheme obsessed with ethnic difference, indigenous groups have a long-history of being sidelined when it comes to institutions and development of the Peruvian state (Thurner 1997). Continuing to operate a healthcare system which separates the poor and indigenous from much of the modern medical landscape is unethical on this exclusionary basis. The separation of funding and facilities between ESSALUD and SIS systems has an eerie familiarity to justifications of “separate but equal” which have propped up unjust social institutions in the past. In response to this, some may argue that the poor and

vulnerable have an ability to contribute to ESSALUD through employment or self-contribution and thus are not formally excluded from its services. This stance is invalid, however, because many of those excluded from accessing social security insurance are excluded on the basis of structural barriers which prevent them from obtaining employment which qualifies for the payroll tax contribution or self-contribution necessary for reception of benefits.

Ultimately, the question of improving health inequalities for indigenous groups in Peru is one of justice. This idea is founded upon the ethical principles developed by John Rawls (1971) which argue for fairness as a social contract which respects the dignity of each person in society. In this framework, actors agree to the principles which guide society behind a veil of ignorance, meaning they are blind to their own position in society. As an epistemological tool, this is meant to allow a society to arrive at a set of unbiased principles which allow for the protection of individual liberties. Under this condition, Rawls argues, one of the key principles people would first protect is fair equality of opportunity. In this framework, it is likely that reasonable individuals would agree to the protection of basic human health, and a just healthcare system to achieve this end, as one of the principles upon which society is founded. This would be agreed upon because without a guarantee of good health and bodily integrity, the range of opportunities which are available to an individual become drastically reduced. As such, unbiased actors would likely prefer the implementation of a substantive rural health program to address the unique threats to one's health which come from living in harsh physical environments. It is unlikely, however, that they might agree to a system in which different segments of the population pool their resources separately to spend on their own health needs.

The counterargument to a Rawlsian approach to issues of justice and poverty often stems from the school of utilitarianism, most famously advocated for by John Stuart Mill (1863). The

chief aim of a utilitarian approach is to make decisions which deliver the maximum amount of happiness to the greatest number of people. On this basis, one might argue that decreased spending on indigenous, rural healthcare is justifiable from an ethical perspective because the resources which would be spent on this population can be used elsewhere for the benefit of a larger number of people. Utilitarianism is often problematic when it comes to health resource allocation, however, because such approaches at times enable the unequal distribution of resources along specific racial and ethnic lines (Lowe, Kerridge, and Mitchell 1995). This argument aside, research demonstrates that improved national health, and specifically reductions in health inequality, actually improve the overall economy (Bloom and Canning 2008). A utilitarian approach thus cannot negate the ethical argument that an unequal health system is unjustifiable and in fact would support efforts to reduce inequality proposed here.

On these bases, then, there is an ethical compulsion to address the current state of health inequalities suffered by indigenous populations. Stated simply, the reduced health indigenous groups experience in Peru severely constrains the opportunities available to them, and the concurrent suffering thus deprives such groups of a certain aspect of their human dignity. In order to respect the humanity of these populations, a more equitable healthcare system should be adopted.

CONCLUSIONS: A BETTER WAY FORWARD?

The results of this study demonstrate that on a regional level, socioeconomic status differences alone are insufficient in explaining the health inequalities from which Peru's indigenous population suffer. Indigenous populations in Peru demonstrate mortality rates which cannot be solely explained by socioeconomic status, which is both an extension and critique of previous research on the topic. While socioeconomic status certainly plays a role, there are a

myriad of factors relating to the unique structural barriers indigenous households face which are not accounted for in a single unified metric.

This study identifies that indigenous people report multiple barriers to accessing healthcare at a higher rate than non-indigenous counterparts, including financial, geographic, and transportation problems. The survey questions included in the present study offer only broad categories of access barriers, meaning there are assuredly a number of other issues which were overlooked in this study. Future work should look to provide greater quantitative breadth to the study of health inequality in an ethnicity-mindful framework so that more targeted interventions focused on indigenous populations might be developed. This includes revising existing surveys utilized in the collection of demographic information to include basic ethnicity-specific questions which would much better explain healthcare experiences from an indigenous perspective.

Limitations aside, this study adds to growing research that Peru is due for structural change with regard to healthcare. Simply put, the current system does not allow for equitable distribution of resources and thus perpetuates some of the problems it aims to address. Peru's recent transition towards universal health coverage is laudable in terms of its aspirations, but the SIS program has yet to go far enough in addressing structural barriers faced by indigenous groups in accessing care and maintaining good health. Moving forward, addressing regional health inequality will require multi-level approaches aimed at decreasing barriers to care and improving the inclusivity of the existing system. Possible steps towards solutions include integration, at some level, of the Peruvian insurance schemes, improving indigenous access to formal sector employment, lowering barriers for self-employed agriculturalists to access ESSALUD, and further investment in developing human medical capital in the rural sector. Peru has made substantial progress in reducing overall poverty and mortality in recent decades, but now significant attention must be directed at

addressing the entrenched horizontal inequality which exists despite national-level gains. Solutions which recognize the exclusionary social structures and government systems which reinforce this inequality at the level of ethnicity should be at the forefront of this movement.

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