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**HEALTH INSURANCE AND ACCESS TO SERVICES, THE
CHALLENGES OF ACHIEVING UNIVERSAL HEALTH
COVERAGE: THE CASE OF PERU**

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Abstract

In molti paesi il livello di accesso ai servizi sanitari è una questione importante e che va migliorato, l'assicurazione sanitaria è uno degli strumenti che sono stati usati per affrontarlo per poter raggiungere la Copertura Sanitaria Universale. Tuttavia, vi sono molte altre barriere che limitano l'accesso ai servizi sanitari, queste possono essere culturali, comportamentali, economiche, politiche o geografiche. Questi ostacoli si manifestano tramite il livello educativo, lo stato socioeconomico, e la posizione geografica della famiglia. Il Perù è un ottimo esempio su questo tema, in quanto negli ultimi vent'anni è riuscito ad ottenere grandissimi miglioramenti sulla copertura sanitaria (tramite il sistema assicurativo pubblico SIS), ma ancora oggi fatica nell'offrire servizi nelle aree rurali del paese e per coloro che non si qualificano per l'assicurazione gratuita, ma non possono permettersi i piani a pagamento. Dai dati su un campione di bambini peruviani abbiamo potuto vedere che le barriere menzionate prima sono molto significative nella determinazione dello stato di salute del bambino e che la correlazione tra stato socioeconomico e salute non è diminuita insieme all'espansione della copertura assicurativa, dimostrando l'importanza di intervenire sul maggior numero di barriere possibili contemporaneamente, al fine di garantire miglioramenti e risultati su più fronti.

In many countries access to healthcare services is a key issue that needs to be overcome, health insurance is one of the tools that has been used to address it and achieve Universal Health Coverage. However, various barriers create the limits to healthcare access, from cultural, to behavioral, economic, political, and geographical. These barriers manifest through education, socioeconomic status, and geographical location of the household. Peru is a great example for analyzing this topic because it has achieved great increases in insurance coverage in the past twenty years (through the public insurance program SIS) but still struggles with the provision of health services in rural areas and to certain fractions of the population who do not qualify for free insurance but cannot afford to pay. From data on Peruvian children, we found that the barriers mentioned above are very significant in determining health and that the correlation between socioeconomic status and health has not decreased with the expansion of health insurance to the poorer population, meaning that it is important to target as many of the barriers as possible simultaneously, in order to achieve improvements on multiple fronts.

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1. Introduction

Health Economics and Development Economics are two subjects that often intertwine, especially in approaching access to healthcare services. Health is necessary for development and development is necessary to improve health care. Many of the barriers and issues that are discussed in health research can be traced back to development economics: for example, good educational attainment can be traced back to good health during childhood, and ability to contribute to the workforce also relies on good health. Because health is so fundamental for children's development and future contribution to the economy, it is extremely important to improve the outside factors that can influence it in a positive way. The goal of this paper is to explore Health and Development Economics in the same context, to use the tools that come from the analysis of developmental and healthcare sectors and apply them to see which policies can be the most successful in improving health and access to healthcare services in developing countries.

Furthermore, we will focus on the factors that explain the disparities in health outcomes, namely regional disparities, which had remained unexplored for many years, but have now been analyzed by a few great studies that will be mentioned in the next chapter. The main focus of the chapter will be the barriers to healthcare access, especially in low and middle-income countries. We will explore which factors determine where, when, and how people are able to access health services, and the limits that generate these barriers, from cultural, to behavioral, to economic and geographical, deriving from households and communities, health systems and factors related them, as well as government policies and actions. Empirical evidence from numerous studies will exemplify the current hurdles that countries are trying to overcome to achieve universal health coverage, and highlight the ones that had greater effects on the population.

In the third chapter we will study the case of Peru, a country that has lived through many political and economic battles in the past decades, and achieved great successes in health and development. We will first look at the socioeconomic configuration of the country, and later at its health care system. Despite great economic growth Peru remains an example of growing inequalities and a health system full of contradictions. Health inequality is a particularly important issue, as it directly influences future economic growth, through education and the working sector. Children from the same country cannot benefit from equal opportunities because a specific group is in a situation of disadvantage from the start and cannot even aim to reach the goals that are instead attainable to more privileged parts of the population.

In the following chapter we will then analyze the health status of a sample of Peruvian children, using data from the longitudinal study Young Lives, to apply the knowledge gained in the first two chapters and draw further conclusions from the results. Using logistic regressions on the health status of children we will compare different segments of the populations: from wealth groups, to regions, and provide additional evidence to the health disparities that were observed by previous studies.

2. Literature review: the barriers to achieving Universal Health

Coverage

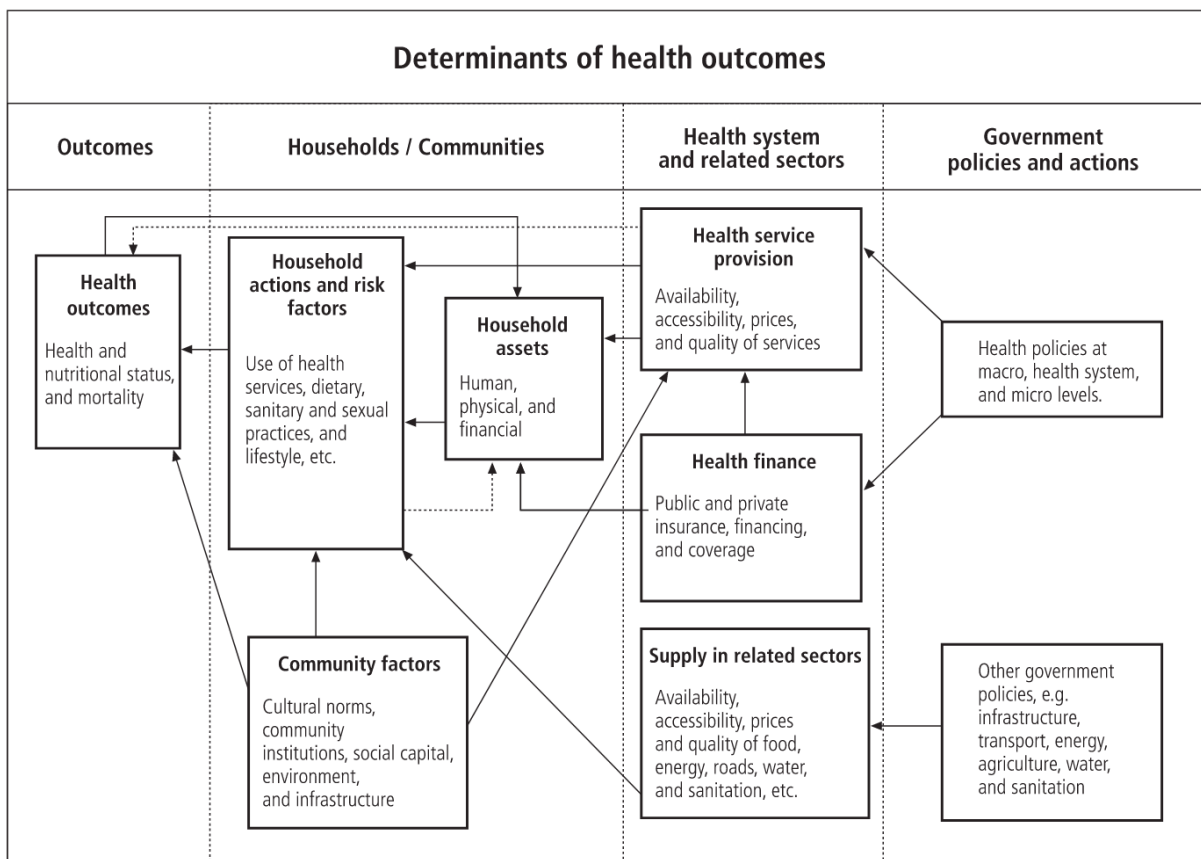
Universal Health Coverage means that “all people have access to the health services they need, when and where they need them, without financial hardship” (WHO, 2022). The first point in this definition is access to services, because in order for treatments to be affordable, they first have to be present and accessible to the people wherever they are located.

In the past forty years, countries mainly focused on providing better resources and advancing medical methods, which requires copious amounts of funding and investments for R&D in medical education, science, and technology. Vietnam for example, like many other developing countries in that period, introduced user fees in health in the 1990s; proponents argued that it would bring resources in the health sector and improve services, but Ensor and San (1996) studied the effects of those fees on the poor: they appeared to pay more than the rich at health facilities, and overall pay more in poorer areas than in richer ones, independently of income. These results had several policy implications, the most important being that poorer regions should be exempt from payments and instead be offered subsidies to improve health centers. Today, Universal Health Coverage is often evaluated by the number of people who are covered by health insurance, which eliminates the financial hardship of receiving care. This metric, however, overlooks the important point of accessing these health services. A more effective metric of health in a country is health inequality, this is still one of the biggest challenges in countries that have a good population health status, and is extremely serious in developing countries. Inequality can be regional, rural-urban and socioeconomical. The causes of health inequality are complex and have led researchers to interpret data differently; factors that determine health can be biological, but also come from inequalities in economic development, public health expenditures and health care services (Fang et al., 2010).

Dawkins et al. (2021) reviewed over 50 articles, identifying different factors that influence healthcare access in low- and middle-income countries (LMIC) and high-income countries. For the purpose of this review, we focused on barriers that appear prevalent in developing countries (Figure 1: Determinants of health outcomes (Wagstaff, 2002)). A consistent barrier in all settings is gender: women face disadvantage in terms of access, specifically in poor and traditional households; women who have caring responsibilities also report time constraints to dedicate time to personal health, because all of their day revolves around caring for the house and the family. Lack of education is another prevalent factor that highly limits access to healthcare, most likely through a lower demand of treatments because of misinterpretations of

one's own needs. In poorer countries, lack of access to money is the main reason for lack of care-seeking: even in countries where healthcare is free, indirect costs are relevant enough to deter the use of services, some of these costs may include transportation, the opportunity cost of missing work to go to a clinic, the uncertainty of receiving appropriate care. Additionally, Patients who had bad experiences in the past due to under-resourcing are more prone to mistrust medical care and not be confident in seeking services. Unsatisfactory care can happen because of high absence rates, shortages in personnel, lack of experience and training, which are all very common in health systems that are not highly developed or well organized, since even in high-income countries, it's a common struggle both in public hospitals that do not receive appropriate funding, and in rural areas where medical personnel is scarce. The connection between health inequalities and inequalities in health determinants is striking, and in this the failure of publicly financed healthcare to reach the poor in almost all developing countries, needing the attention of governments and aid agencies (Wagstaff, 2002).

Figure 1: Determinants of health outcomes (Wagstaff, 2002)



In 2015 the American Hospital Association created a Task Force on Ensuring Access in Vulnerable Communities to understand ways in which hospitals and health systems can help in accessing health care services in vulnerable communities (Bhatt and Bathija, 2018). The Task Force found that in many situations, even when quality care is available, social determinants of health may prevent people from accessing healthcare or achieving health goals. The World

Health Organization defines social determinants of health as “the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life.” (WHO, 2018). Some of these factors that haven’t already been mentioned are the neighborhood and the environment in the area, the Social and Community context, ethnicity, gender identity and sexual orientation. These are usually better perceived in developed countries, where a majority of the population has high educational levels and higher wealth, and thus studies tend to focus on deeper and less obvious factors, which go beyond mortality or illness rates.

Eric Arthur (2019) studied the effect of household socioeconomic status on the demand for child healthcare services in Ghana, Kenya and Zambia, based on the Grossman model for the demand of healthcare. By socioeconomic status we refer to income, wealth, occupation, and education levels. This analysis focused on including important factors like the birth order of a child, and the decision-making structure of the household among those that influence demand. The results showed that the odds of seeking care increase with household wealth, insurance, and proximity to clinics—consistent with the barriers mentioned above—and it decreases with birth order and age. The latter is a common factor contributing to the lack of child healthcare in developing countries, as most parents value the health of the first born the most, and usually have similar bias towards girls, who seem to offer lower returns in the future (Qian, 2008).

Peters et al. (2008) organized the barriers mentioned in this review into four dimensions that include both supply and demand elements: Geographic Accessibility, Availability, Financial Accessibility, and Acceptability. The latter explicitly refers to how responsive health care providers are to the social and cultural expectations of individuals and communities. Regarding availability, an appropriate organization of the health care system is crucial for the distribution of resources: on paper many countries offer free healthcare to all citizens from any income, but the resources that are provided are usually concentrated in urban areas, leaving rural populations in harsh conditions. Rural areas typically suffer from lack of funding and are often not included in the reforms. This excludes indigenous populations from accessing proper care: for these people, trust is an important factor to break cultural barriers and seek care (Dawkins et al., 2021) but healthcare providers are often unable to keep their trust due to poor quality of treatments.

Shin et al. (2017) examined the relationship between regional disparities in child malnutrition and local variation in health resources in Peru. The goal was to highlight health inequalities, which have increased in many developing countries in the past decade, despite the investments and improvement in health outcomes. These improvements do not necessarily reduce inequalities but can enforce them by benefiting mostly more advantaged groups. Their findings

provide strong evidence of health outcomes being explained by local poverty—even after accounting for food insecurity—suggesting that general environmental poverty deserves particular attention. Additional results confirmed previous evidence that most health care resource items are not related to child nutritional status (only the number of medical professionals per capita remained significant after controlling for local poverty), implying that healthcare development alone cannot eliminate regional health disparities, and should be implemented together with more general resources focused on regional development. The growth that is seen in countries like Peru in the past ten years is in fact mostly concentrated in affluent regions, raising questions regarding equity.

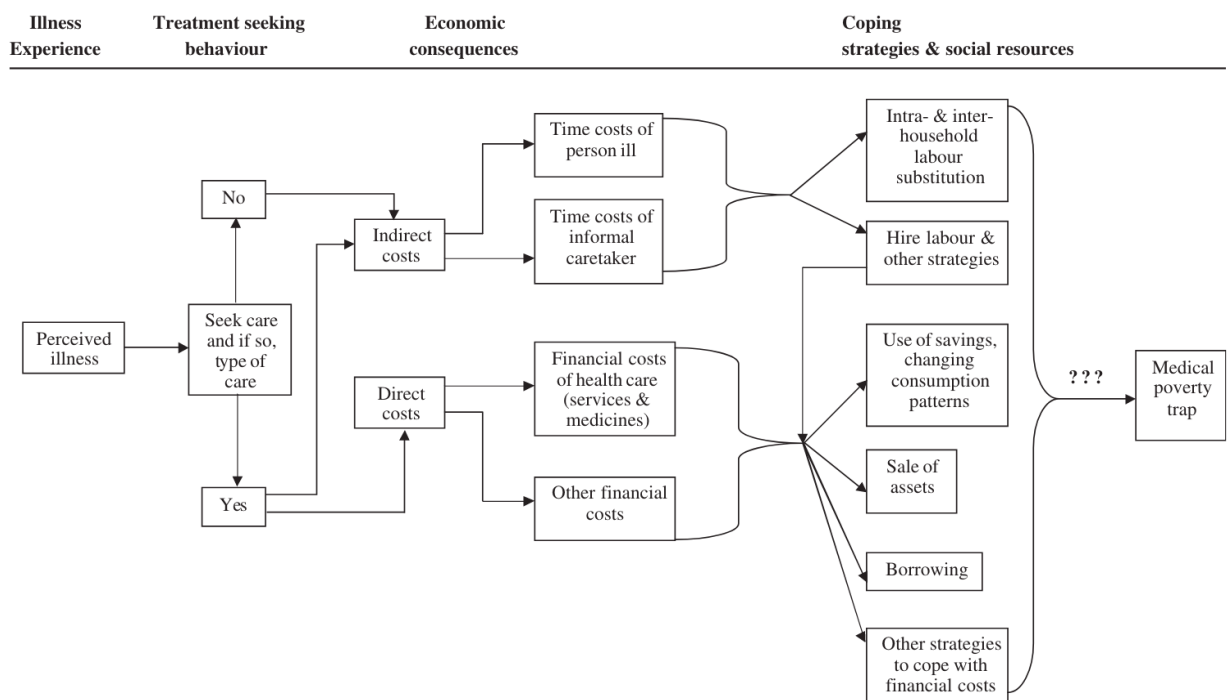
(Urke et al., 2011) discovered that, contrary to previous evidence, the correlation between socioeconomic status and chronic child malnutrition is not less prominent in poor regions such as the Andes in Peru. These findings increase the importance of public health policy to overcome the disadvantages incurred by children in low-income households: health disparities in children might persist until adulthood and highly affect productivity and life expectancy. Because of this the American Academy of Pediatrics strongly encourages further and more precise research, specifically investigating the life course effects and ways to reduce the negative outcomes (Cheng et al., 2015)

A study by Mackenbach et al. (2008) across 22 European countries found that rates of health and poorer self-assessment are almost everywhere higher in groups of lower socioeconomic status, and consistent for almost all causes of death. They suggest not only improving access to healthcare to reduce inequalities, but also improving educational opportunities, income distribution and other social determinants of health—all consistent with other findings (Arthur, 2019; Berkman and Epstein, 2008; Bhatt and Bathija, 2018; Ensor and San, 1996; Uddin and Mazur, 2015).

The relationship between poverty and access to services can be analyzed in both directions: lack of resources creates barriers in accessing health services when needed, and delaying or not obtaining care worsens health outcomes. This in turn generates lost income and higher costs, perpetuating the cycle where “poverty leads to ill health and ill health maintains poverty” (Peters et al., 2008). Most of the earlier research in development and health only acknowledged the dependency of health on poverty, with some exceptions: Gerald Spurr (1983), demonstrated, 40 years ago, the relationship between malnutrition and lower productivity, showing that stunting and anemia led to lower productivity and wages, which could potentially further compromise health.

A case study from the Peruvian Andes analyzed the reproduction of poverty and poor health among small-scale producers, often described as medical poverty traps, with the goal of highlighting the high number of factors that shape the relationship between poverty and poor health. The results not only confirmed how poverty, malnutrition, inequalities and illness are mutually ingrained, but also showed that the outcomes are not easily predictable or homogeneous, instead influenced by the region’s labor power, social networks, and sources of income (Leatherman and Jernigan, 2014)

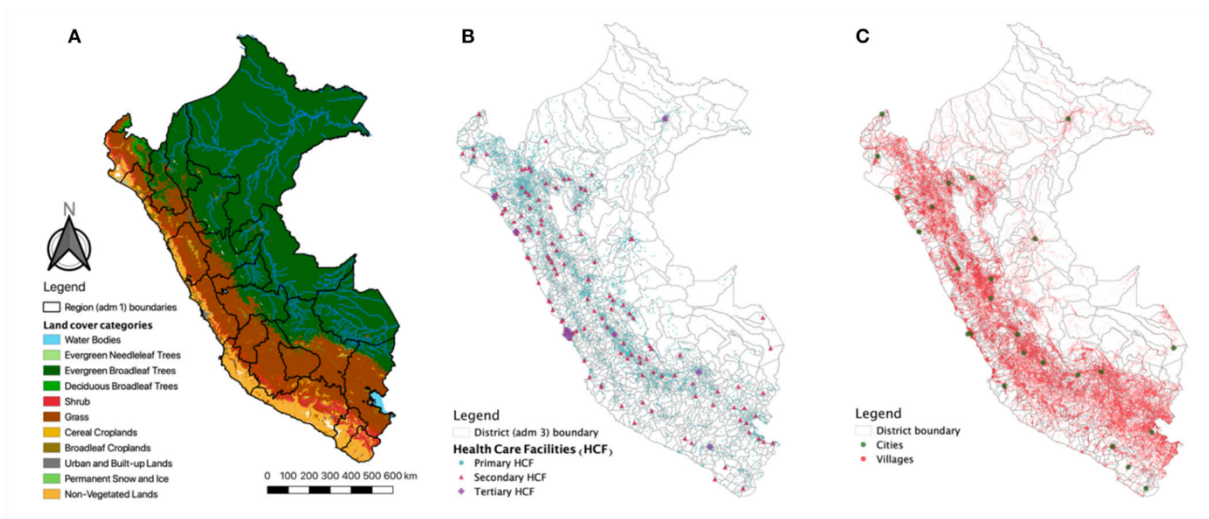
Figure 2: Simplified flow-chart of key issues relating to the economic consequences of illness (McIntyre et al., 2006)



3. Healthcare in Peru

Peru is a developing country that has largely improved its healthcare in the past 20 years, but that still suffers from people that are not covered by any insurance or do not have access to proper services. These characteristics make it a perfect example to further analyze the barriers to Universal Health Coverage and verify whether they hold in this specific context. Figure 3 gives a first glance at the different topics that will be discussed in this chapter: starting at A with the geography of Peru and its different regions; B shows the special location of health care facilities; and C shows the spatial location of villages and cities.

Figure 3: “Study area (A) Land coverage and major ecological areas (Coast, Andes, and Jungle) in Peru. Solid black lines represent the 25 Departments (administrative level 1). (B) Spatial location of primary, secondary, and tertiary health care facilities (HCF). (C) Spatial location of villages and cities. Maps were produced using QGIS, and the base map was derived from satellite images from MODIS MCD12Q1 product.” (Carrasco-Escobar et al., 2020, p.3)



3.1 Socioeconomic context

Peru, with a population of 33 million, is the eighth biggest country by population in the Americas, the third largest in South America. The country celebrated 200 years of independence in 2021, after experiencing many environmental, economic, social, and political challenges over the course of its history. In only the past 6 years it has seen 5 presidents and 11 Ministers of Health. Despite these challenges, which have negatively impacted the population’s health, stability and well-being, Peru has made significant progress in research, science, and innovation (Carrillo-Larco et al., 2022).

Despite great economic growth in the past 25 years, a considerable part of Peru’s population remains poor. The poverty rates have dramatically decreased, from 59% to 22% between 2005

and 2015, greatly reducing the share of population living under the extreme poverty line. Their GDP per capita is 6,126 USD as of May 2022, compared to 4,196 in 2009, averaging a 2.9% growth rate in the past decade. The geography of the country plays a key role in the distribution of wealth and development: the majority of the population lives on the Coast, specifically around the capital Lima – which is highly urbanized and benefited from extreme growth in the past decades – while there is a lower population density in the Andes and the Amazonian rainforest. The geographical conformation of the country makes it a challenge to equally distribute resources, especially in the mountainous region of the Andes, and created a preamble for inequality and income disparities (PRB, 2002).

The level of inequality is comparatively low among other countries in Latin America but remains higher than most other developed countries. Peru's Gini coefficient is 0.438 in 2020, a slight increase from its lowest point in 2019, probably due to the Covid-19 pandemic and following the trend of other countries. This value is much higher than the OECD average of 0.31. It is important to highlight that these growth figures do not spread equally across the whole country: access to services disparities are evident by the percentage of people who have at least one basic need not met (Figure 5: Population with at least one basic need unmet (INEI, 2014, as cited by OECD, 2017)), which is three times higher in rural areas than in urban areas. These disparities are similarly evident in the quality and availability of health care services (OECD, 2017). In 2013 the Gini coefficient was 7% lower in the coastal region than it was in the highland and forest (Castillo, 2020; INEI, 2014, as cited by OECD, 2017), and similarly the regional growth rate went from 3.0% annually in Pasco, in central Peru, to 8.5% in Ica, a coastal region south of Lima (Figure 4: Gini index evolution by geo-regions. Peru, 2007 – 2017 (Castillo, 2020)).

Figure 4: Gini index evolution by geo-regions. Peru, 2007 – 2017 (Castillo, 2020)

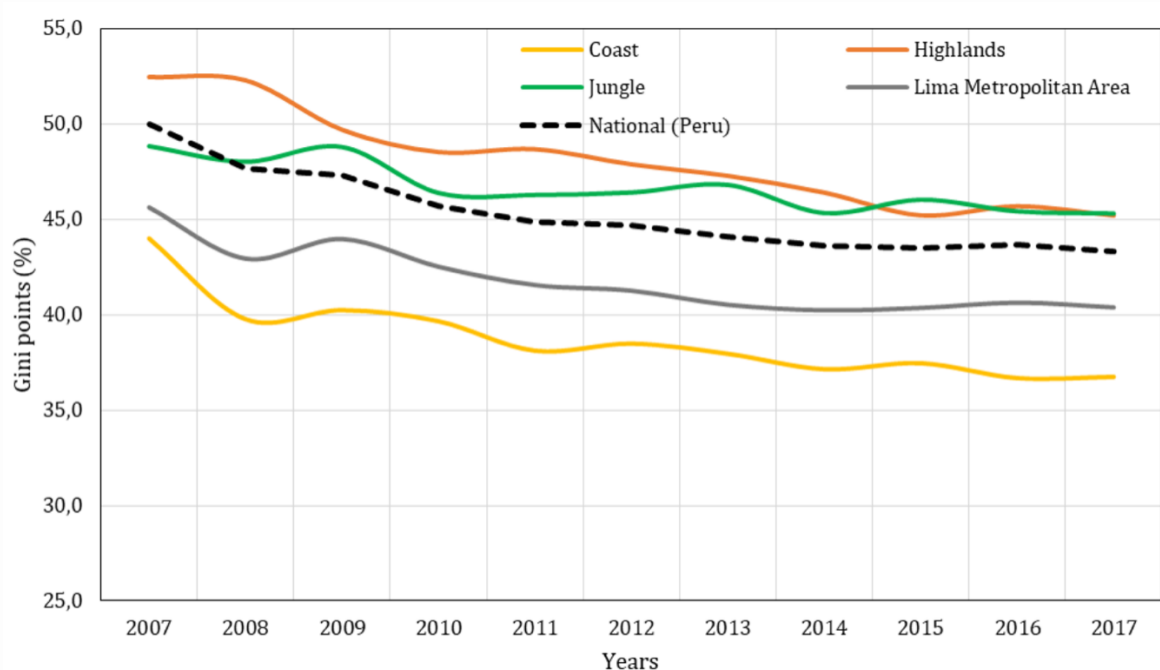


Figure 5: Population with at least one basic need unmet (INEI, 2014, as cited by OECD, 2017)

Percentage of total population

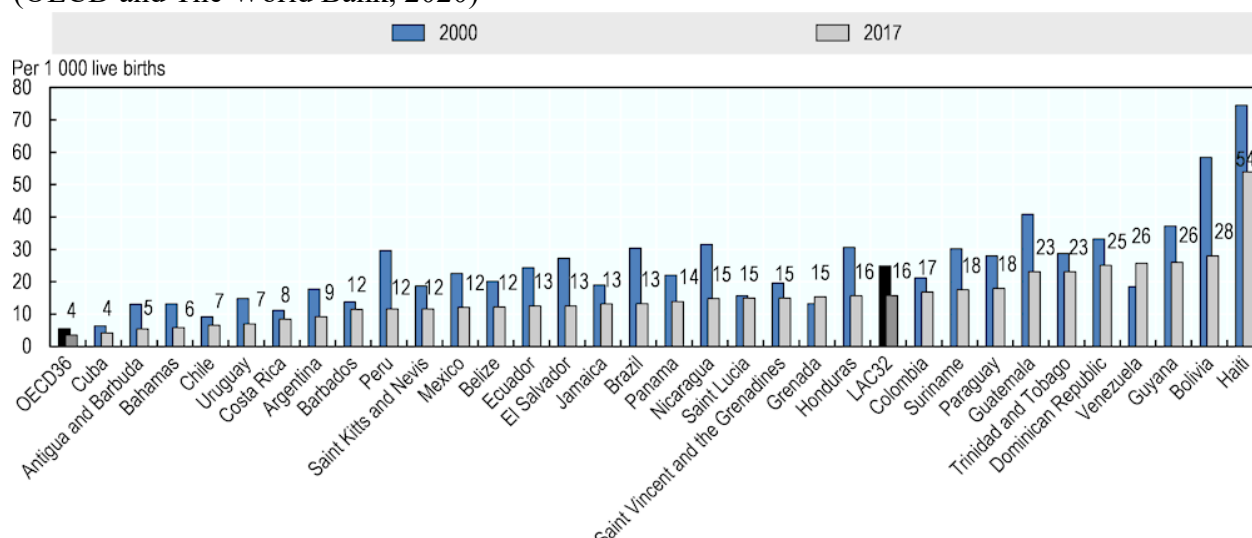
Scope	2007	2008	2009	2010	2011	2012 (est.)
Urban	19.1	19.5	18.5	15.8	15.8	14.4
Rural	59.1	53.5	49.6	46.5	44.9	43
Coast	16.4	17.5	16.5	14	14.5	12.9
Mountain ranges	41.9	36.5	32.5	28.8	27.4	26
Rainforest	57.3	56	55	52.5	49.6	46.9

The unemployment rate was 3.03% in 2019, it increased to over 16% in 2020 and is around 8% in 2022. In 2014 nearly 17% of urban youth was neither employed nor in education or training, with higher percentages for young women (around 16%). Peru is however characterized by a substantial fraction of informal employment. Although informal employment has decreased in the past twenty years, it still accounts for more than half of total employment, under the definition of the National Institute of Statistics and Informatics (INEI)—informal employment is thus defined as “any self-employed worker within the informal sector, salaried workers not contributing to pensions and unpaid family workers.” (OECD, 2017:49). However, since these activities are less productive and mostly concentrated in agriculture, this only accounts for one fifth of the national GDP. The differences across departments explain the disparities in economic growth outcomes explained above.

Regarding population health Peru has made remarkable progress: the population has increased four times in the past 80 years, infant mortality has dropped more than 12 times (12.5 per 1000

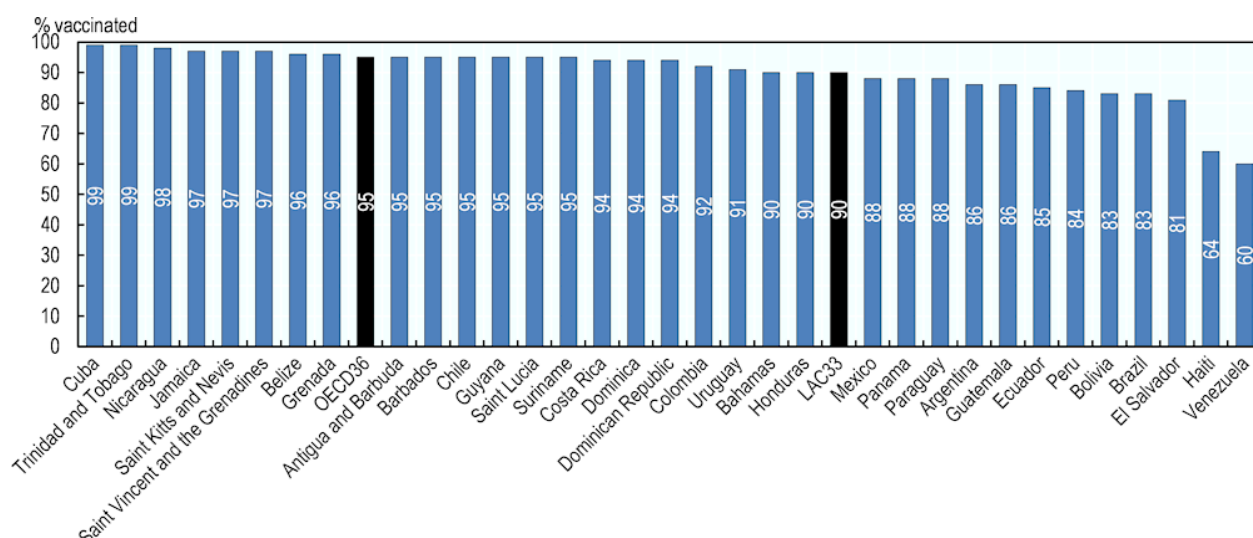
live births in 2019) (Figure 6: Infant mortality rates in Latin American Countries, 2000 and 2017 (or nearest year) (OECD and The World Bank, 2020)), and life expectancy at birth has risen from 43.8 to 76.8 years (Carrillo-Larco et al., 2022). The population remains relatively young in comparison to OECD countries, but life expectancy trends suggest a transition similar to the one we have seen in developed countries. The population pyramid's base is becoming narrower and the number of older adults increasing. This transition will pose a challenge for the country as it implies a much smaller number of working-age people and simultaneously a higher number of elderly people, putting pressure on the health care system. This issue has had dramatic repercussions in developed countries over the past decades, and it will put Peru's system to a test that, under the current level of organization, it will struggle to pass (Bengtsson and Scott, 2010).

Figure 6: Infant mortality rates in Latin American Countries, 2000 and 2017 (or nearest year) (OECD and The World Bank, 2020)



Peru's biggest increase in vaccinations happened at the end of the 20th century and since June 20, 2003, Peru has had a general vaccine law (Law 28010). The budget allocated to vaccines and syringes has increased over thirty times from 2000 to 2017, introducing several new vaccines in the schedule for children, for example Influenza, Yellow fever, Hepatitis B et cetera. However, vaccination rates were stagnant if not decreasing during the same period. Additionally, certain regions reported rates as low as 54% for DPT coverage in 2012, when the national average was around 90%, showing substantial geographical disparities (OECD, 2017) In 2018 vaccination rates for Peru were below the average of Latin America and Caribbean countries (Figure 7: Vaccination rates for diphtheria, tetanus toxoid and pertussis (DTP3), children aged around 1 in 2018 (WHO, Global Health Observatory 2019, as cited by OECD and The World Bank, 2020)).

Figure 7: Vaccination rates for diphtheria, tetanus toxoid and pertussis (DTP3), children aged around 1 in 2018 (WHO, Global Health Observatory 2019, as cited by OECD and The World Bank, 2020)



3.2 Legal framework and policy interventions

Peru first granted constitutionally the right to social security in 1979, and in the 1990s the Private Pension System was created. In health care, in 1997 with the General Health Law, the system was divided into a universal public health sector and a private subsector, turning the state into a subsidiary instead of a provider and promoting the participation of private companies under the supervision of the Superintendence of Health Care Providers (OECD, 2017).

In 2001 the Integral Health Insurance (Seguro Integral de Salud, SIS) was established to fund health services for the parts of the population that did not have insurance due to poverty; it was then expanded in 2007 to include a semi-subsidized regime for people that have low ability to pay. In 2009 the Congress passed the Universal Health Insurance Law (AUS). This law established the right to quality and timely health services for all; it also defined the Essential Health Insurance Place (PEAS), which entitles all Peruvian citizens to a basic package of health benefits and is part of the SIS insurance.

The entire Peruvian health system is overseen by the Ministry of Health (MINSA). The ministry and its committees oversee the national health system through integrated networks and implement the actions to pursue universal health coverage together with more intersectional policies aimed at benefiting the health and well-being of the population (gob.pe, 2022). In 2013 the National Health Superintendence (SUSALUD) was created as the supervising institution, with administrative, economic, and financial autonomy, as well as sanctioning powers. Its functions include monitoring, authorizing, and administering health assurance funds,

supervising the institutions that provide health services (listed below), as well as other health agencies.

The peculiarity of the Peruvian system (Figure 8: The Peruvian health system (Videnza Consultores, 2021)) is its decentralization into various subsystems that operate independently for different population groups, contrary to the unified nation-wide approach that many countries have, meaning that functions that are usually horizontally organized across the healthcare system are instead vertically integrated in each subsystem. All residents are mandated to register with the healthcare system, and according to their socioeconomic characteristics they will enroll into a different scheme (OECD, 2017):

1. SIS – Seguro Integral de Salud – founded in 2001, manages funds coming from the government and tax revenue to provide comprehensive health insurance. SIS prioritizes vulnerable populations who are in situations of poverty and extreme poverty. Over the years it was expanded to include wider sections of the population, meaning that today it can be split into two regimes: first the subsidized regime financed by general taxes, and second the semi-contributory regime financed also by household contributions. One aim of expanding this system was to encourage independent and informal workers, who make up a substantial fraction of the workforce, to file their taxes. SIS provides services through the public network: national, regional, and local government hospitals, as well as primary care through MINSA's network.
2. EsSalud – Seguro Social de Salud – is a contributive service that provides healthcare as well as pension and welfare coverage, it gives coverage through employment and is financed through payroll discounts. EsSalud is dependent on the Ministry of Labor, it is the Peruvian equivalent of social security and is directed towards all the salaried formal sector workers and their families. EsSalud provides healthcare through its hospitals, specialized institutions, and health centers.
3. The Police (PNP) is covered by the Sanidad de la Policía Nacional.
4. The Armed Forces (FFAA) similarly are covered by the Sanidad de las Fuerzas Armadas.

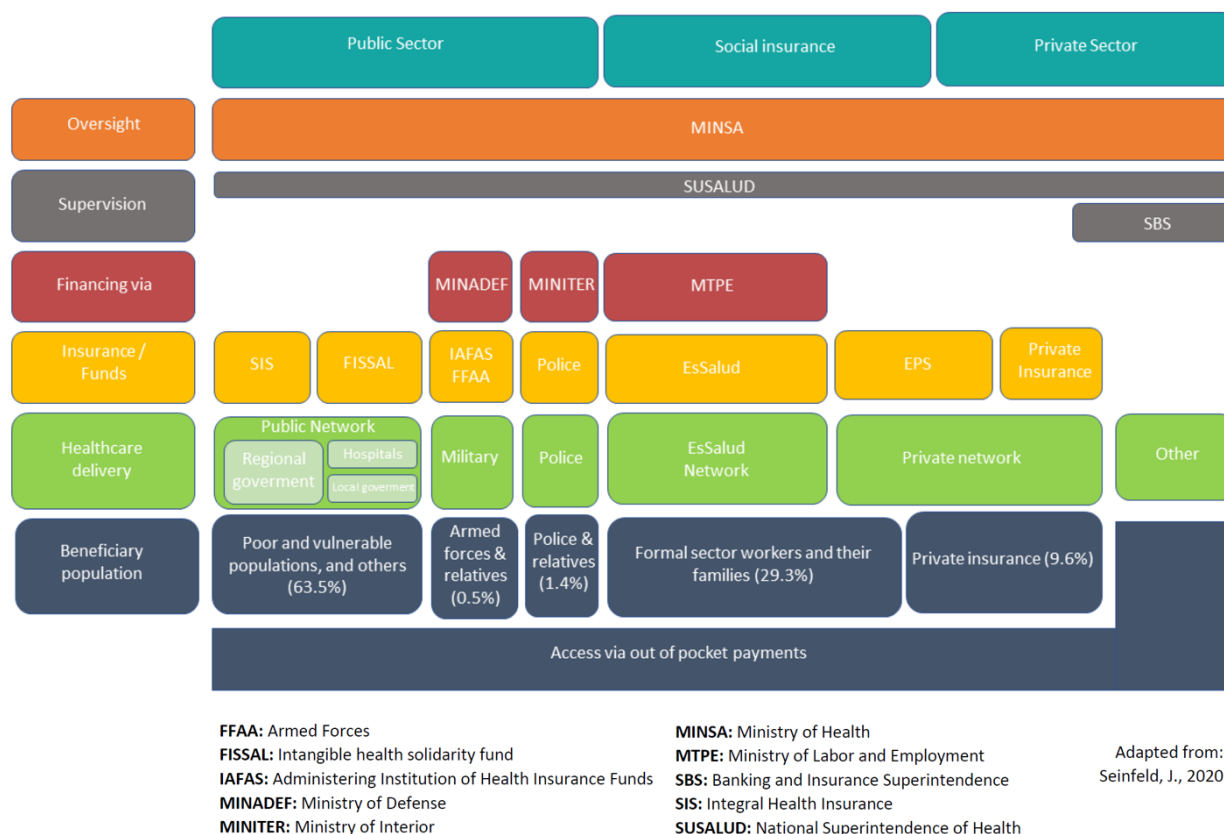
Similar to EsSalud, the Police and Armed Forces operate their own hospitals and clinics and offer services to their consumers through their own network. In case of emergencies care can be provided to patients at different institutions' facilities until the point of medical stabilization, when the patient will be transferred to their own provider's facility

(OECD, 2017). The private sector covers a small percentage of the population, it offers social security and health insurance to workers who are affiliated with it.

As mentioned above these different providers should cover the whole population, however, a category of individuals, usually not poor enough to qualify for Integral SIS and unable to afford the other more expensive plans falls between the gaps of the system and remains uninsured. More importantly there are disparities between these affiliation schemes, reinforcing socio-economics and geographic inequalities (OECD, 2017).

The different institutions compete with the leadership role of the Ministry of Health, making it difficult to articulate health policy. In addition, since 2016 MINSA is in charge of managing public hospitals in Metropolitan Lima, representing the only case in which central government has direct responsibility (OECD, 2017), but also limiting MINSA ability to appropriately intervene in issues happening outside of Lima. Furthermore, governance and steering of the system from the center is weak, and even weaker because of a decentralization of key competencies to regions before they were fully equipped to deliver them (OECD, 2017). These two types of decentralization, administrative and of geographical, create communication issues, which can be very costly, therefore centralizing the system could reduce the uncertainty and increase efficiency (Long, 2020). This does not take away from the decentralization of hospitals, and public clinics to the areas of the country that are farther away from the capital, this policy had good reasons to be implemented because of the disparities in health services in rural areas, however, a strong and centralized core of the health system is necessary to administer and provide appropriate resources in these regions. As of today, there has been little to no progress in unifying the funding sources and insurance providers, causing major problems, especially in managing care during the Covid-19 pandemic: for example, significant delays to transfer patients from public to EsSalud hospitals, where they had better resources and intensive care facilities (Carrillo-Larco et al., 2022).

Figure 8: The Peruvian health system (Videnza Consultores, 2021)



Peru’s healthcare spending in 2019 was 5.2% of GDP, one of the lowest percentages in South America. The OECD average is around 10%, with the United States at the top (almost 20%). Even though the budget has increased greatly over the years, current resources cover only 25% of the variable cost of providing basic health benefits (i.e. the cost of PEAS) (Prieto Toledo et al., 2014). Government health spending is an important value because most of the increase in health coverage that has happened has been through SIS. Evidence however showed that the expansion of health coverage through SIS, which is completely free for the poorest population, had positive effects on health care usage, and suggests that this increased access to health care centers leads to increased awareness about health problems, even generating a willingness to pay for services that are in low supply through a supplier-induced demand (Bernal et al., 2017). This is very important for Peru because introits from this additional demand could help with the funding of SIS and PEAS. This government funded health insurance system does not have a clear evolution path for the future, which poses a challenge for its political and financial sustainability. As mentioned above the people who remain uninsured are often unformal workers or self-employed, they’re less poor than those currently affiliated with SIS, but poorer than those covered by EsSalud, thus falling between two stools (Figure 9: total household expenditures per capita and population covered by type of insurance and poverty status, 2014 (Authors based on ENAHO, 2014, as cited by OECD, 2017)).

Figure 9: total household expenditures per capita and population covered by type of insurance and poverty status, 2014 (Authors based on ENAHO, 2014, as cited by OECD, 2017)

	Extreme poor	Poor	Non poor	Subtotal
Uninsured	1,331.75 0.80%	2,894.93 4.80%	7,690.83 25.50%	6,784.25 31.10%
Only EsSalud	1,424.95 0.00%	3,316.85 1.70%	9,706.77 22.80%	9,262.18 24.50%
Only private	0 0.00%	3,898.18 0.00%	18,449.99 0.90%	18,366.63 0.90%
Only SIS	1,346.24 3.40%	2,567.01 11.90%	5,622.21 23.70%	4,320.37 39.00%
Only other type	1,367.49 0.00%	3,453.92 0.10%	12,305.31 2.40%	12,050.99 2.50%
More than one	927.07 0.00%	2,905.01 0.00%	18,278.24 2.00%	18,185.08 2.00%
Total	1,343.97 4.30%	2,723.75 18.40%	8,194.25 77.40%	6,896.72 100.00%

This complicated structure, together with the great socioeconomic disparities that are present in Peru, explain the numerous barriers to healthcare that were analyzed in the first chapter. The goal of the next section will be to highlight whether the progress in health insurance coverage that has been achieved since the early 2000s has had any positive effects on child health, and whether this is represented equally across the regions.

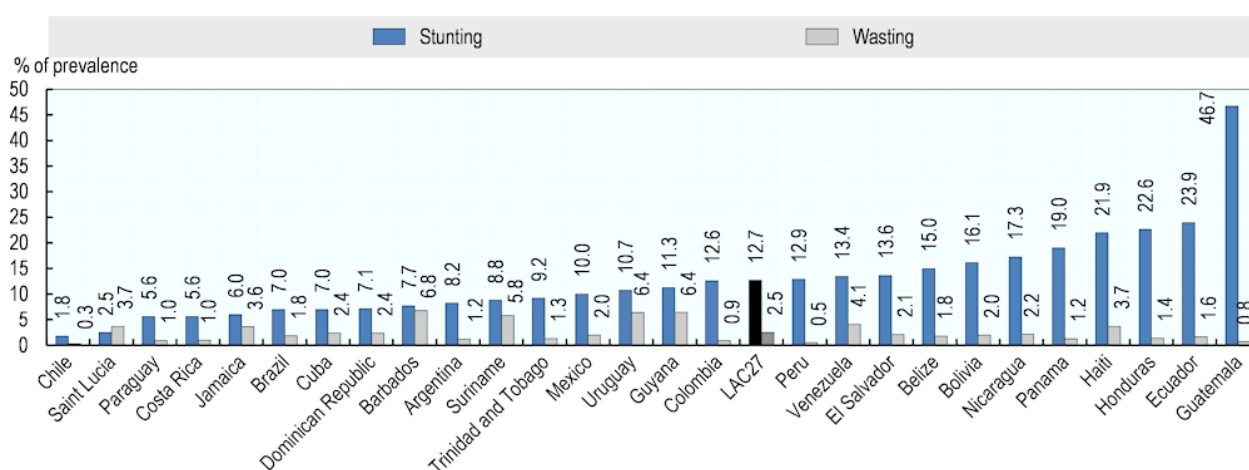
4. Data analysis

The goal was to investigate the situation in different regions of Peru to test whether the advancements in insurance coverage have had positive health effects that can be seen in the data collected by Young Lives between 2002 and 2016. Young Lives is a longitudinal study in poverty and equality, that, since 2001, has documented the lives of 12000 children in Ethiopia, India (Andhra, Pradesh, and Telangana), Vietnam, and Peru. The dataset contains information on 3000 Peruvian children from a younger and an older cohort, born 7 years apart, and interviewed in 5 rounds (Young Lives, 2022).

4.1 Methodology:

Following the example of Urke et al. (2011) I studied the effects of socioeconomic status on children's health and nutritional status, summarized by the notion of stunting. A child is considered stunted when their height is below average by more than three times the standard deviation. Tables by the WHO show the computed averages for different ages of the children. Young lives collected weight and height of the children, then calculated z-scores using tables and software provided by WHO (available at <http://www.who.int/childgrowth/en>). Below a table from "Health at Glance: Latin America and the Caribbean 2020" (Figure 10: Prevalence of stunting and wasting among children under 5, latest year available (OECD and The World Bank, 2020), shows that Peru falls just above average on the prevalence of stunting in children under 5.

Figure 10: Prevalence of stunting and wasting among children under 5, latest year available (OECD and The World Bank, 2020)



To be able to compare the health status of these children before and after the expansion of health insurance coverage in Peru, I decided to use the data from round 1, collected in 2002, for the older cohort, which was eight years old at the time, and data from round 3, collected in 2009,

for the younger cohort, also aged eight at the time of interview. This choice made possible a comparison between children of the same age, even though the size of the two samples was different.

Using stunted as the dependent variable, the main independent variable considered was the child's household's wealth, serving as a value for the socioeconomic status of the child's family. This was estimated using the wealth index calculated by Young Lives. This index was constructed from three indices: housing quality, access to services, and ownership of consumer durables, a detailed description on how these indices were computed can be found in Briones (2017). For the purpose of this analysis, I initially divided the wealth index into quintiles, from poorest to richest households, fixing richest as the reference point, and ran a logistic regression to estimate the difference in probability of being stunted in the different wealth groups; the first results showed similar coefficients for the two poorest fractions of the population, so after running a F test for the difference in coefficients, I only split the sample into three categories, poor, middle, and rich.

As control variables I considered factors that were listed as possible barriers to healthcare in the first chapter: for example, the parents' education level, distance from services, whether the child has insurance (only available in round 1), the number of siblings that the child has, and the gender of the child.

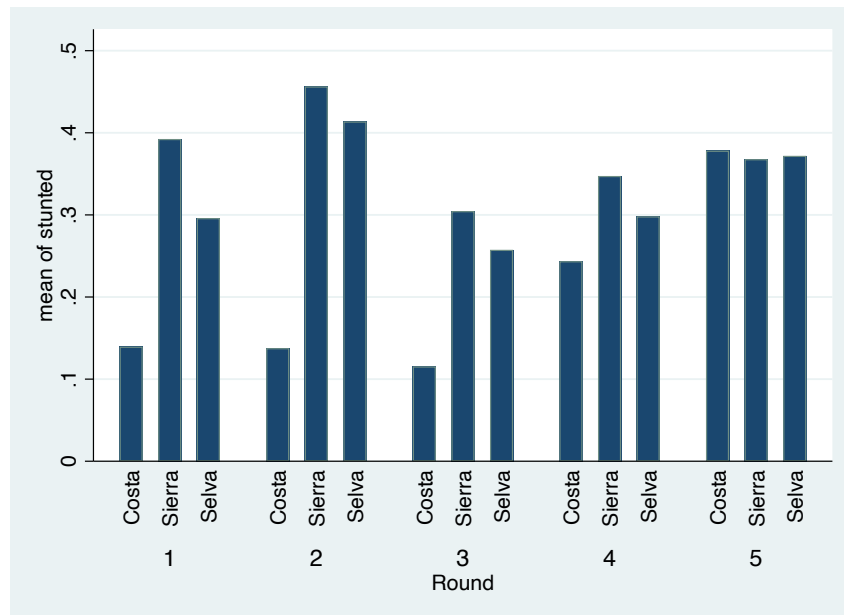
For the variables that were not directly available I tried to approximate the value by using, in the case of distance from services, the variable indicating urban or rural residency, and for the number of siblings, I used the number of people in the household aged between zero and seventeen years. Round 1 questionnaires also offered information on the birth order of the child, which I decided to include as an additional control variable. Mother and father education was given as the last grade completed by the respondent, I then created four groups depending on whether the parent had no formal education, did not complete primary school (6th grade in Peru), did not complete secondary school (11th grade, for a total of 5 years of secondary school), and lastly whether they finished secondary school or attended further education, in university or technical schools (Clark, 2015).

To analyze potential differences in the effect of wealth between boys and girls, we ran the logistic regression again in the two separate groups and estimated new coefficients. The same process was used to estimate the coefficients for the three different regions of Peru: the coast

Costa, the forest Selva, and the mountains Sierra (or Andes as it had been referred to previously by Urke et al.).

4.2 Results:

Figure 11: Summary statistics of the variable Stunted by round and region



Summary statistics for the variable stunting in round 1 (Figure 11: Summary statistics of the variable Stunted by round and region) show great inequalities in the frequency of stunting in different regions of Peru, the starkest being the gap between the coast and the

Andes (Costa and Sierra), however this gap greatly decreases over time. It must be noted that one of the reasons why it decreases could be the fact that the children age more than ten years over the course of the five rounds (rounds go from 2002 to 2016) and therefore make the variable stunting a less reliable value for their health status. Nevertheless, looking at the first two rounds should give us an idea on the geographical inequalities that are present in Peru.

The regressions for 2002 (Logistic regression results for 2002) show a positive but insignificant correlation between socioeconomic status and child stunting, the children in the poor group are 60% more likely to be stunted than those in the richer group. In 2009 (Table 2: Logistic regression results for 2009) this correlation is much stronger and significant, 2.95 times higher probability of being stunted for the poor group compared to the rich one, and 2.15 in the middle wealth group as well. More importantly there is a stark difference in coefficients once we split the sample into female and male: the relationship between socioeconomic status and stunting much stronger in the female group than in the male, 3.80 vs 2.47 times higher probability of stunting for children in poor households. For the male group there is no significant difference in the middle wealth category, while girls in the same category still experience a higher risk of stunting. These results are consistent with the evidence mentioned in the first chapter, which showed a tendency of parents to gain more utility from boys and therefore invest less in the health of their children when they are girls (Qian, 2008).

Looking at the control variables, first of all the coefficients of the variable Typesite are significant in the national sample, after controlling for wealth, which shows that rural households might suffer from lack of services and resources compared to urban areas, but not

in the regional sample; we can see that father education, specifically the group that had completed primary school, was consistently significant in all regressions, meaning that this group had a smaller risk of being stunted than the group where the father had no education – 43% less risk in 2002 and 33% less risk of stunting in 2009. The mother’s education was only significant in the 2009 sample, which had many more participants, but across all levels of education, up to 77% less risk of stunting when the mother had completed secondary school and/or enrolled into higher education. As previous evidence by Ruel et al. (1999, as cited by Urke et al., 2011) had shown, maternal education can have massive impacts on the health status of the children, especially in the Andes region (Sierra), which in our regression showed the highest and most significant odd ratios among all the groups for mother education variables. Another interesting control was the number of siblings, approximated by the number of children in the household: this variable was significantly correlated with stunting in almost every regression – averaging 20% higher risk of stunting for an increase of one child in the household –, following the utilitarian hypothesis of decreasing marginal utility, where parents derive utility from the children.

Results reported in Table 1 also show a negative but insignificant correlation between having insurance and risk of stunting, with similar results in all groups. This is not too surprising since appropriate nutrition is what prevents stunting, and it should not need health insurance to be provided. However, insurance could prevent child mortality by increasing the number of families who reach for treatment for ill children (this however goes beyond the scope of this paper).

More importantly, there was no evidence that the correlation between socioeconomic status and child stunting decreased over the years, even though the health coverage for poorer population increased; although there is no data for health insurance in 2009, from round 4 data we can see that only 24.2% of children was not covered by insurance in 2013, compared to 41.3% in 2002. These results are therefore counterintuitive, as one would expect that after covering the poorest fractions of the population with health insurance, there would be less correlation between socioeconomic status and health status. This however is consistent with the fact that the insurance variable in 2002 was insignificant, meaning that there are many more important factors to consider together with the expansion of health insurance coverage.

Contrary to the findings of Urke et al., these regressions did not show a greater relationship between socioeconomic status and child stunting in the Andes region (for 2002) and are instead consistent with the opposite hypothesis. However, Urke et al. recalculated the wealth quintiles

in the Andes sample, while we decided to keep using the national quantiles to be able to compare the different regions. Looking at regional results, the ones from 2002 are not significantly different, most likely also due to the sample size, while the results from 2009 show some interesting differences: on the Coast wealth is highly correlated with stunting, while in the Andes the type-site is what stands out the most. This is reasonable considering that the mountainous region makes it harder for rural communities to reach services, compared to other areas.

Table 1: Logistic regression results for 2002, the table reports odds ratios

Stunted	(1) National	(2) female	(3) male	(4) Costa	(5) Selva	(6) Sierra
Wealth Index (rich)	1	1	1	1	1	1
Poor	1.602 (.47)	1.761 (.775)	1.314 (.545)	1.013 (.545)	3.664 (3.768)	1.283 (.609)
Middle	1.066 (.271)	1.503 (.57)	.658 (.238)	1.269 (.493)	1.427 (1.271)	.77 (.321)
Typesite (urban)	.641* (.15)	.917 (.324)	.515** (.17)	1.082 (1.26)	1.414 (.924)	.699 (.223)
Father's education (no education)	1	1	1	1	1	1
Incomplete primary	.837 (.23)	.636 (.267)	1 (.392)	.477 (.307)	.79 (.665)	.905 (.348)
Incomplete secondary	.569** (.146)	.513* (.198)	.473** (.174)	.603 (.273)	.919 (.634)	.479* (.185)
Secondary/University	.749 (.2)	.772 (.307)	.55 (.21)	.908 (.401)	1.414 (1.032)	.45** (.181)
Mother's education (no education)	1	1	1	1	1	1
Incomplete primary	1.035 (.277)	1.765 (.712)	.67 (.253)	1.172 (.718)	.175** (.144)	1.705 (.613)
Incomplete secondary	1.333 (.362)	.751 (.307)	2.824*** (1.132)	1.771 (.973)	.255* (.204)	2.217** (.872)
Secondary/University	.641 (.216)	.676 (.349)	.717 (.332)	.802 (.482)	.211 (.225)	.802 (.406)
No. of household members under 18	1.17** (.08)	1.268** (.127)	1.172 (.119)	1.293** (.162)	.88 (.158)	1.206* (.127)
Birth order	1.078* (.046)	1.053 (.065)	1.126* (.072)	.96 (.105)	1.298** (.155)	1.052 (.061)
Child has insurance	.894 (.167)	.954 (.271)	.937 (.245)	.819 (.28)	.852 (.472)	.889 (.242)
Gender (male)	1.195 (.214)			1.348 (.456)	1.214 (.628)	1.183 (.302)
Constant	.323*** (.129)	.205*** (.123)	.468 (.244)	.11* (.142)	.453 (.606)	.419 (.236)
Observations	703	325	378	281	103	319

Standard errors are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Logistic regression results for 2009, the table reports odds ratios

Stunted:	(1) National	(2) Female	(3) Male	(4) Costa	(5) Selva	(6) Sierra
Wealth Index (rich)	1	1	1	1	1	1
Poor	2.947*** (.652)	3.806*** (1.318)	2.487*** (.736)	5.493*** (2.12)	8.643*** (6.917)	1.418 (.473)
Middle	2.146*** (.427)	3.131*** (1.002)	1.601* (.415)	1.51 (.483)	4.893** (3.83)	1.727* (.53)
Typesite (urban)	.643*** (.097)	.689* (.149)	.593** (.126)	2.63 (2.144)	.87 (.297)	.589*** (.113)
Father's education (no education)	1	1	1	1	1	1
Incomplete primary	.946 (.161)	.738 (.181)	1.218 (.293)	1.071 (.467)	.707 (.292)	.957 (.207)
Incomplete secondary	.67** (.119)	.556** (.139)	.791 (.201)	.668 (.264)	.454* (.201)	.707 (.163)
Secondary/University	.766 (.144)	.62* (.174)	.937 (.241)	.712 (.245)	.512 (.276)	.818 (.212)
Mother's education (no education)	1	1	1	1	1	1
Incomplete primary	.664** (.111)	.712 (.173)	.606** (.14)	.655 (.356)	.577 (.242)	.665** (.132)
Incomplete secondary	.564*** (.103)	.751 (.197)	.415*** (.106)	.671 (.31)	.455* (.21)	.609** (.142)
Secondary/University	.331*** (.075)	.353*** (.12)	.297*** (.091)	.655 (.3)	.182** (.134)	.234*** (.076)
No. of household members under 18	1.234*** (.055)	1.33*** (.085)	1.142** (.071)	1.252** (.141)	1.295** (.15)	1.217*** (.067)
Gender (male)	1.243* (.152)			1.765** (.491)	1.318 (.415)	1.118 (.175)
Constant	.2*** (.055)	.129*** (.053)	.361*** (.13)	.023*** (.023)	.085*** (.077)	.424** (.161)
Observations	1935	961	974	718	300	917

Standard errors are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The difference in sample sizes compared to table one is due to the fact that table 1 contains data from the older cohort and table 2 contains data from the younger cohort.

5. Conclusions and Policy Implications

The goal of this study was to investigate the barriers and determinants of health, and to highlight the importance of the different factors that affect health outcomes together with health insurance. Previous studies showed us how healthcare access is influenced by many different aspects that include wealth, education, gender, ethnicity, cultural background, family size et cetera. The results from the Young Lives data also indicate that a child's health status is correlated with socioeconomic status, as well as the parents' educational level, the number of children in the family, the gender of the child, and the geographic location of the household. A comparison between different regions allowed us to see how wealth inequality is not always the main obstacle, and how different areas of the same country need to be addressed in different ways to include the various elements that set apart their healthcare barriers, specifically how health in rural areas like the Andes is more affected by educational gaps than wealth gaps compared to the urbanized region Costa. These results together with previous evidence, show that, even though there have been advancements in health in Peru, these have not erased the gap created by inequality. Peru has made great progress in its journey to achieve universal health coverage, but there are still many hurdles to overcome.

Focusing on Peru's healthcare system in chapter two allowed us to understand which other factors can be an obstacle to achieve better health in the country: the separation of healthcare providers is certainly one of the reasons why the rural areas of Peru struggle to receive good care: it creates inefficiencies in the administrations of funds, hospitals, and patients, which in turn generate higher costs; lack of organization and low quality of services that derives from it generates indirect costs for households, who have to consider these extra tolls when deciding whether to seek treatments or not. In a country like Peru where the healthcare budget is very low compared to the average, higher cost can cause great damage and should therefore be eliminated as much as possible. In its journey to achieve universal health coverage, Peru has shown incredible efforts and advancements in the expansion of health services to the populations in need, while also being a good example of the things that could be improved.

From these findings we can draw some suggestions about the health policies that Peru and similar countries should implement to better target their goal to achieve universal health coverage: together with policies revolved around providing insurance to the poorest populations, they should also invest in decentralizing services to more rural areas, where access to basic needs can still be difficult, while providing them with the appropriate training, resources, and information systems. Developing countries that are trying to increase their

coverage should follow the example of Peru with SIS, while trying to avoid the issue of decentralization that Peru has so far not been able to fix. They should also focus on developing the education system, particularly maternal education, as it can have significant effects on child development in regions like the Andes. They should provide subsidies to bigger households, first of all benefiting children in these families, who could receive appropriate care and be less at risk of malnutrition, but also as an incentive to prevent the population pyramid reversion that Peru, like many other countries is heading towards, and that will challenge its healthcare system. This phenomenon will test Peru's capabilities to sustain the publicly funded health system (SIS) that has become the most prevalent one, while also not currently receiving the appropriate amount of funding to cover for the basic health needs that are guaranteed by law.

The analysis of the Peruvian context, both through the development economics lens and the health economics lens, showed us how goals to achieve better health in a country should not only focus on expanding one's healthcare system, but most of all address the factors that influence the development of humans through all periods of their life: their mother's health and education, their own education, the cultural attitudes of the family or the community they live in. This study gave evidence on the successes achieved by the Peru in the past decades, and important suggestions for future policies.

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