The Relationship between Access to Healthcare and Civil Conflict

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The Relationship between Access to Healthcare and Civil Conflict:

An Exploratory Study

This paper explores the role of health in explaining the onset and severity of civil conflict. Whereas most research in this field focuses primarily on the impact that conflict has on health, or that disease and overall population health has on state stability and growth, I propose a new variable for consideration in this discussion: access to healthcare. This paper is the first in this field to explore the relationship between access to healthcare and the associated number and intensity of conflict events within states. I examine correlations between several healthcare and conflict indicators from ninety-four administrative regions within African states, spanning a period from 1997 to 2013. I find that results are mixed, but there are statistically significant relationships between accessibility, acceptability, accommodation, and social access elements of “access to healthcare” and the number and intensity of civil conflicts.
I am immensely grateful for the many professors, peers, friends, and family members who have supported me during this experience. The long hours and late nights I spent working through this idea with them are what kept me enthusiastic about this project and helped me constantly during the completion of this thesis. I owe a special thank you to my thesis advisor, Professor Susan Peterson, for taking a chance on this project last March after we had only met briefly. Her patience and guidance have been critical for helping me understand not only this topic, but what it truly means to conduct research. This has been one of the most challenging and rewarding experiences I have had at the College of William & Mary, and it has helped me understand my interests and professional ambitions much more in the process. I would also like to thank Professors Phillip Roessler and Alison Scott for offering to aid me in this endeavor. Beyond serving on my thesis panel, the advice I received from each of them helped me narrow the scope of this question and grab hold of the concepts and data in a manageable way. I am also very thankful for the guidance I was given by Dr. Steve Shellman, and Professors Paul Manna and Scott Ickes. They took time to sit and help me work through my project even though they did not need to. It means a lot to students when faculty are willing to take time out of their busy schedules and help fellow members of the Tribe. Lastly, I would like to thank the Roy R. Charles Center and all donors who helped fund honors theses projects such as my own, and those of other students taking this challenge on this year. I would not have been able to conduct this project without their support.
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Introduction

For over a decade, health issues have gained recognition and importance within security discourse. “In 2000, the United Nations Security Council discussed implications of the AIDS epidemic for global security, marking the first time in history that the body addressed a health issue.” Around this time, the United States National Intelligence Estimate on the security implications of global infectious diseases expressed that “these diseases will endanger U.S. citizenry at home and abroad, threaten U.S. armed forces deployed overseas, and exacerbate social and political instability in key countries and regions in which the United States has significant interests.” In the years since, scholars across the epidemiologic and political science disciplines have articulated a need for “a fundamental reconceptualization of standard definitions of national and international security,” and “more work on access to [health]care and equity...financing mechanisms, resource allocation, regulation, public financial management...and incentives for health workers regarding health systems in conflict-ridden states.” As recently as August 2013, tens of thousands of Spanish citizens and residents took to the streets in protest after the government revoked its National Health System the year before. The demand for greater investigation into the relationship between health and security is growing and must be addressed. Nevertheless, research on health systems in conflict-affected states tends to be piecemeal and small scale, and there is a dearth of policy-relevant insights and analyses.
This thesis has three goals. The first is to examine the growing body of literature linking health and conflict. Most research in this arena focuses on the impact of conflict on health provision; I am turning this question on its head to see whether health provision influences conflict, and if so, how. I do so in response to the calls from scholars, journalists, and policymakers over the past decade which increasingly draw attention to the impact that public health provision has on national security. The second is to propose that access to healthcare is an important yet overlooked variable in this discussion. The original contribution of this thesis is its critical focus on access to healthcare, not just the prevalence of certain diseases or overall population health statistics. While the burden of disease can be a destabilizing factor which exacerbates conflict, not all nations rife with infection are as prone to civil conflict as others. Some nations have the capacity to offer health services to prevent disease and treat illness once it develops, while others do not. Yet, even in nations with developed health systems, not all individuals have equal access to potentially lifesaving medicine and medical care. This points to the third goal of this study: to test for empirical relationships between access to healthcare and the onset of civil conflict.

I propose that there is an inverse relationship between access to healthcare and the onset and intensity of domestic conflict. Scholars of civil conflict postulate that social grievances derived from feelings of relative deprivation of resources between distinct groups can incite civil conflict. As protection of health is a fundamental human right and an aspect of the human experience that must be preserved for individuals to lead full, quality lives, the lack of access to healthcare may be a strong enough motive for people to fight. I hypothesize that when access to healthcare is limited, social grievances arise in populations experiencing poor levels of health
resulting from unequal resource distribution. The relative deprivation in health and quality of life resulting from poor access to healthcare can create tension between those in poor health and those in good health, such that propensity for civil conflict increases. Another approach to the cause of civil conflict postulates that weak states who lack the capacity to fulfill their end of the social contract with their citizenry are more prone to civil conflict. If states cannot offer protection to their constituents from the threat to life posed by illness and infirmity through adequate healthcare services, they are not fulfilling their end of the social contract. Thus, individuals may engage in civil conflict to institute a new government which can successfully offer these services. These hypotheses follow the logic of relative deprivation and weak state theories to explore how varying levels of access to health and health care may be contributory causes for the onset of civil conflict.

Using data collected through the USAID Demographic Health Surveys (DHS) from the years 1997-2013, I identify indicators that proxy the level of access to healthcare within states at the administrative-regional level. These indicators allow me to focus on the “5 A’s of Access to Healthcare”: affordability, availability, accessibility, accommodation, and acceptability. Additionally, I examine indicators for social access that proxy levels of social customs and practices that may influence access to healthcare. I compare this health data with regional conflict data presented in the Armed Conflict Location & Event Dataset (ACLED). ACLED offers data both on the number of events occurring within administrative regions, coded by event type, as well as the number of fatalities associated with each conflict event. Because both DHS and ACLED data are coded at the subnational level, I am able to examine the impact of healthcare on both the number and intensity of civil conflicts that take place in the same region—
a finer level of analysis than many studies that focus at the country-level. Due to the availability of data, I focus my final analysis on ten countries in Africa, which comprise a dataset containing a total number of observations representing 1598 region-years.

Initial matched-pairs correlations of each group of access indicators and variables representing the total number of conflicts, number of conflicts events by type, and number of fatalities suggest that access to healthcare is correlated with civil conflict at a statistically significant level. However, as I will show, these results are mixed. For some indicators of access to healthcare, lower levels of access are inversely correlated with the number of conflict events, whereas other are positively correlated. Further, the predictive ability that statistics for levels of access to healthcare have on the number of conflict events and related fatalities is also mixed. As we will see, attempts to model this relationship using pooled ordinary least squared (OLS), poisson, and negative binomial regression models produce inconclusive results regarding the empirical relationship between these two variables. I offer insights as to why these various models produce these varying results, as well as the merits and shortcomings of each approach. I then offer suggestions for future research into this question, before drawing overall conclusions about the contribution this study makes to the literature on health and civil conflict.
Chapter 1: Literature Review

This complex discussion requires bridging insight and analysis from two distinct fields of study: public health and national security. Thus, I divide this literature review into three sections. Section 1.1 describes the current state of health literature. I examine different facets of health—health systems, population health and health service delivery—and draw insights about the role health plays in development and security. Section 1.2 shifts our focus to the large body of literature on the causes of domestic conflict and civil war. I examine the prominent hypotheses for the causes of conflict in this field and choose to situate my argument among the crop which offer macro-level explanations for the cause of civil conflict. I focus attention here because health and health care are operationalized and provided for primarily through state-level action; individual and non-governmental actions do not dictate national health policy, even if they can influence access to healthcare in other ways. Section 1.3 discusses the eminent arguments linking health to civil conflict. Finally, I draw upon insights from these bodies of literature to formulate and propose my hypotheses briefly, before a more thorough discussion of them in the next chapter.
History is rife with instances in which health, and the lack thereof, has shaped and altered human and military history. As noted by Peterson, disease burden during the Peloponnesian Wars demoralized the Athenian people, undermined political leadership, weakened the army and prevented it from achieving key military objectives. Additionally, waves of influenza epidemics have ravaged human populations, as they did in 1918 when it killed 25 million people, including 500,000 Americans. In Spain, the same pandemic attacked nearly 300,000 allied troops, killing nearly 23,000 and causing significant problems on both allied and German sides during World War I. Furthermore, “the spread of global HIV/AIDS continues to undermine state growth and stability as it robs countries and their citizenries of their most productive years of life.” Faced with the challenges to both life and security caused by the growth and spread of epidemic disease, nations construct elaborate health systems to protect their populations.

In the sections which follow, I briefly discuss the political role of health systems as they have developed over time, and highlight some of the ways in which different systems produce different health and social outcomes. Next, I examine the impact that population health, as a product of health systems and other policies, has on state and economic growth. As state growth and stability have been shown to be important elements in explaining the causes of civil conflict, this link is extremely important to make. However, national level growth does not account for finer grain variation of socioeconomic factors and circumstances within states. Thus, I tighten my focus around the newly-emerging literature that examines intrastate variation regarding provision of health services. Settling here, I am able to highlight some of the potential sources
for social grievance that may predispose nations to more conflict, before moving on to the body of literature that seeks to explain the causes of conflict in the next portion of this literature review.

First, let us begin by discussing health systems. To date, scholars have focused extensively on the role of health systems as social institutions. A health system refers to “all of the activities whose primary purpose is to promote, restore and maintain health.” These activities may be entirely publicly (state) operated, privately organized, or a mixture of both. However, at their core, health systems “combine resources, organizations, and financing and management arrangements that ultimately culminate in the delivery of health services to a population.” Such arrangements were first developed in Germany in 1883 when Otto von Bismarck, the founder and first chancellor of the Wilhelmine Empire, instituted the world’s first compulsory system of national health insurance. In addition to being the first time in modern history that governing institutions organized and assisted in health provision for their citizens, the Bismarckian health system highlights the conceptualization of health provision as a politicized state service. In practice, this system was intended “to construct a social insurance system to forge a bond of loyalty between the worker and the authoritarian state, and to take the wind out of the rising socialist labor movement’s sails.” Over the decades, models for health systems have adapted and altered the Bismarckian model, but they all rely upon four principle functions: financing, purchasing (or resource allocation), service provision, and stewardship.

Health systems are important starting points for the discussion of health’s role in conflict because different health systems place different burdens on individuals and governments in securing health. For instance, Guatemala’s health system receives very little funding from its
national government—only 1.9% of GDP is spent on health. As a result, roughly 40% of Guatemalans do not have ‘access’ to health care services or pensions, and most of these fall into the category of the poor or extreme poor. As recently as 2006, 17.9% of the population was faced with catastrophic spending on health care, meaning that out-of-pocket payment for health expenditures can push them below the poverty line. A radically different health system in Taiwan, universal coverage, has shown that the introduction of social health insurance (government sponsored) can substantially reduce the uncertainty surrounding out-of-pocket health expenditure, reduce the motives for precautionary saving, and even encourage consumption that contributes to economic growth. This comes at a cost of approximately 6.6% of GDP for the Taiwanese government. This rather crude comparison attempts to highlight the different outcomes that can arise from prioritization of different health systems, as well as indicate the potential benefits that can arise from national investment in health care. When populations are healthy, it follows that workers’ sustained and absolute productivity will be greater, thus contributing to greater economic growth. Additionally, stable populations are important for preserving national stability and the order upon which states rely to prevent civil disorder. These claims are validated by the growing research on health and economic growth.

For decades, economists have developed and refined models to capture the effects of different inputs on economic growth. Factors including education, infrastructure, governance, level of foreign investment, work experience of labor the force, and health, among others, have been examined using various quantitative methodologies. Both relative and absolute improvements in health indicators, typically measured in terms of life expectancy gains, or reductions in infant or overall mortality, have a strong, significant, and positive impact on
economic growth, especially in the short run and in low- and middle-income countries.\textsuperscript{23} It has even been asserted that health is the most important determinant of economic growth.\textsuperscript{24}

An examination of the impact of health on economic growth in Sub-Saharan Africa and OECD countries revealed that, even controlling for the endogeneity of investment in health as a byproduct of economic growth, the growth rate of per capita income (GDP/capita) is strongly and positively influenced by the stock of investment in health human capital. Gyimah-Brempong and Wilson, the authors of this study, demonstrate that 22 to 30 percent of annual income growth in Sub-Saharan Africa can be attributed to health, though the same cannot be said for OECD countries. GDP growth increases alongside gains in population-level health statistics, but at a decreasing rate in Sub-Saharan Africa. The authors suggest that a potential cause for this discrepancy in health-related economic growth may only exist in the short run, when investment in health is a relatively new venture for states. These results are echoed by case studies examining increased investment in population health in China,\textsuperscript{25} India, Indonesia, Nepal, Sri Lanka, Thailand,\textsuperscript{26} and Sweden. The latter case study supports the postulations of Gyimah-Brempong and Wilson, revealing that health expenditure increases and associated population health improvements impact economic growth positively in the short run, but that growth tapers, levels off, and even becomes negative in the long run.\textsuperscript{27} Nevertheless, some scholars still argue that investment in human development, focusing especially on improving health, must remain a priority for states at all levels of development.
Even countries initially successful in both human development (HD) and economic growth (EG) will need to change their policies as development proceeds in order to sustain their success. In an early phase, priority should be given to primary education and some comprehensive health interventions, both from the perspective of improving HD and that of increasing EG. At a later stage, the roles of science and technology institutions and higher education become more important and hospitals assume a greater role than before.  

After a certain stage of development, provision of care deals more with promoting, protecting, and preserving well being, not just treating illness and infection. No longer is health conceptualized solely in terms of the absence of illness and disease. This shift in thought is exemplified in regions such as the Middle East and North Africa (MENA), where impressive gains achieved in health status, but only modest gains in economic growth, due to improvements in technology, health service delivery, public health programs and socioeconomic development have catalyzed epidemiological and demographic transitions that challenge traditional views of health. The MENA region is facing a dual burden of disease where rates of communicable disease (e.g. malaria, TB, HIV/AIDS) are decreasing, but remain higher than those in highly developed countries, and rates of non-communicable diseases (e.g. diabetes, heart disease, cancer) are increasing. Demographically, trends of high birth and high death rates across the MENA region are shifting to reflect changing social norms and health gains: both fertility and mortality rates are declining. However, as fertility rates are decreasing less rapidly than death rates, the MENA region is faced with a rapidly expanding youth population and a smaller growth rate in the aging population. In fact, over the past half-century, the MENA region has had the highest population growth in the world, second only to Sub-Saharan Africa.
The epidemiological and demographic transitions taking place in the MENA region are not unique. This region is a “latecomer” to the demographic transition as compared to nations of similar developmental status in east Asia and Latin America. Nations experiencing shifts in the eminent health challenges of their populations are forced to alter traditional health policies, divert public resources to reevaluate and revise the existing health system, and respond to increasing demand from their constituencies regarding “strong upward pressure on health spending—in terms of spending per head and total spending due to populations growth—that may well outpace economic growth rates.” Such demand for more health services creates opportunities for inefficient spending on health that may have negative impacts on economic growth and human capital development, “acting as a drag on labour productivity, adding fiscal pressure on limited government budgets, and reducing government’s ability to target public resources for vulnerable groups.” These concerns echo the results of the studies by Gyimah-Brempong and Wilson, Li and Huang, Narayan, and Granados that long term impact of health investment may yield negative results. Yet research conducted by Alsan et al in 2005 seconds the assertions published in the 2001 WHO Report on the Commission of Macroeconomics and Health that a health workforce is important when attracting foreign direct investment (FDI). In examining FDI inflows to 74 low- and middle-income countries from 1980 to 2000, Alsan et al find that inflows are strongly and positively associated with population health, such that raising life expectancy by one year increases FDI by 9 percent in some instances, even when controlling for other factors such as education, infrastructure, income per capita, and quality of governance. While FDI is not synonymous with economic growth, increased FDI inflows to developing states imply that the recipient nation is growing into a lucrative business environment.
that offers a productive and prosperous labor force.\textsuperscript{37} The takeaway from the situation in the MENA region and nations in similar developmental circumstances is that after a certain initial amount of investment in population health, health service delivery will need to be reconfigured to integrate the provision of preventative and promotion services.

According to World Bank analysts, many governments remain focused on expanding the infrastructure to meet the growing population without adequate attention to improving the efficiency or evaluating the appropriateness of investment in the current stock of technology.\textsuperscript{38} It is one thing to target public health challenges by “throwing money at the problem.” While pure financial investment in health and human capital has been shown to improve economic growth, and by extension state stability in low- and middle-income countries, the utility of this practice is often short-lived. Thus, scholars of public health have increased the attention paid to evaluating methods of service delivery and the challenges nations and health promoters face in trying to extend health resources and investments to the populations they are intended to aid most.

Inequalities in healthcare delivery have been studied extensively in developed countries, especially OECD nations,\textsuperscript{39} but not until the last five to ten years have scholars focused attention on equity of healthcare access in developing and conflict-affected states. Research indicates that heavy socioeconomic variables influence the accessibility of care in nations at all levels of development and security. A case study of access to healthcare in Palestine reveals that “the worse off do have a disproportionately greater need for all levels of care, but with the exception of primary level services, utilization of care appears to be significantly higher for the well off.”\textsuperscript{40} In Afghanistan, attempts to reduce inequalities in healthcare support this conclusion. Though the nationally organized Basic Package of Health Services (BPHS) focuses on seven key areas of
health—maternal and newborn, child health and immunization, public nutrition, communicable
diseases (especially TB and malaria), mental health disability, and essential drugs—Trani et al
express that promoting health in Afghanistan means combating discrimination in the delivery of
care and giving priority to populations with the greatest need: women, children, persons with
disabilities, and those in most severe poverty, even though out-of-pocket expenditures are
especially high for these vulnerable groups. Similar outcomes are true even in conflict-free,
developed nations such as Japan. Since 1961, the government has provided universal health
coverage through a national health insurance package offering many healthcare services, reduced
copay and other welfare programs for the elderly. However, empirical analysis of actual
healthcare use compared to healthcare need reveals that horizontal inequalities that favor the rich
gradually increased with a widening health gap among the poor over the period of 1986-2007.
Further, Watanabe et al suggest that income and health status are big contributors to this gap.

The organization of health service delivery and the overall provision of healthcare is by
no means standardized across countries, and can best be described as complicated. Developing
and developed nations alike experience difficulty offering equitable delivery of healthcare
services to their citizenries. Though scholars and policymakers have drawn attention to the
importance of health for national growth and stability, different national capacities and policy
priorities alter the ways in which health services are provided. These differences ultimately
define and shape the ways in which nations organize their health systems and offer health
services to fulfill a portion of the social contract they have with their constituencies.
Nevertheless, provision of these state services may not always be equal, fair, or acceptable to
individuals. As we will see in the next section, the capacity of states to provide for their
populations, as well as the frustrations that individuals may have resulting from poor provision of state services or undesirable social outcomes can be powerful motivations for people to engage in civil conflict.

1.2 The Causes of Civil Conflict

The prevalence of civil conflict in many low- and middle-income countries remains one of the most pressing security challenges of the modern age. Since 1945, three-quarters of all wars have been within countries rather than between them, and well over 40 million people have died as a result of violent civil conflict. Additionally, about one third of the world’s population lives in countries affected by significant political violence. Rampant civil strife has dampened and even derailed economic growth for many developing countries, and has the potential to undermine the stability of states at all levels of development. Fortunately, episodes of violent civil conflict have dropped in magnitude since the early 1990s. Nevertheless, the global presence of civil conflict remains quite high.

Research into the various causes of civil conflict has given rise to many theories that complement and challenge one another’s explanatory power. Some scholars focus their study on the individual-level motivations that lead people to engage in or abstain from civil conflict. Variables measuring economic deprivation (proxied by lack of education or income), forced participation, payment for allegiance, or social pressures to join a side indicate that elements of opportunity and social grievances contribute to individual actors’ decision to fight. However, these variables do not indicate which side an actor is likely to join if he or she chooses to engage
in civil conflict. Research into the case of the civil war in Sierra Leone helps clarify this ambiguity, at least in this specific case, by demonstrating that an individual’s relative economic or social status, the potential gains and losses to joining a military faction, and the strength of communal ties to a particular warring party each contribute understanding to why soldiers join the overall fight.\textsuperscript{45}

Examinations of individuals’ motivations to engage in civil conflict, while an important piece of this puzzle, are not the best theories to explain how access to healthcare contribute to civil conflict. Because access to health and healthcare are measured at the population level, statistical data will not reflect individual motivations and preferences with fine enough detail to build upon existing micro-level hypotheses for the causes of conflict. Instead, I intend to situate this study among the existing macro-level\textsuperscript{46} theories of civil conflict. Prevailing macro-level research in to the causes of civil conflict which are most salient for examining the relationship between health and conflict approach the issue from two major paradigms: grievance explanations, and the weak state hypothesis.

\textbf{Grievance Explanations}

Political science research offers an account of conflict that focuses on motivations, rather than opportunities, for individuals to engage in civil conflict. At its core, the grievance argument proposes that individuals will engage in violent protest when frustrations escalate to such an acute degree that the status quo becomes unacceptable.\textsuperscript{47}
The first wide-ranging, empirical attempt to identify the causal relationship between grievances and civil strife was conducted by Ted Gurr. His argument centered around a psychological variable—*relative deprivation*—asserting that it is the basic precondition for civil strife of any kind. Relative deprivation refers to actors’ perceptions of discrepancy between the goods and conditions of life to which they believe they are justly entitled, and the amounts of those goods and conditions they think they are able to get and keep. While grievances produced by relative deprivation can be influenced by a number of intervening social variables such as the degree of political repression, institutionalization of formal complaint mechanisms within the bureaucracy, high social, economic, and/or educational inequality, past history of civil conflict (and related cultures of violence), and ethnic or religious cleavages, their potential to incite conflict remains. Kahl notes that

...as deprived individuals and social groups engage in increasingly fierce competition for dwindling resources, the deprivation hypothesis suggests that intergroup violence becomes more likely. Deprivation also increases the risk of rebellion against the state by encouraging individuals to support insurgents and other challenger groups seeking to overthrow the status quo.

Simply put, “greater deprivation may increase the probability of social violence and political chaos.” Early attempts to model grievance-based causes of conflict revealed that state legitimacy has a causal relationship with civil strife independent of persisting or short-term episodes of deprivation or other intervening variables. However, when compounded with the effects of state legitimacy, “states of mind” conditions produced by short-term or persisting deprivation were seen to contribute significantly to the magnitude of civil strife. Later attempts

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to understand the role of grievances in yielding civil conflict suggest the idea that objective and subjective well-being were not similarly related. Crosby introduced the concept of blame into the relative deprivation-conflict literature by arguing that resentment arises from an actor’s failure to possess something that another actor, all other things equal, possessed. Working through feelings of envy over the missing possession, developing a feeling of entitlement to that possession, determining it is feasible to acquire the possession and deferring blame for not having the possession to something outside the self can produce frustrations and discontent strong enough to result in conflict.\textsuperscript{54}

Most recently, Collier and Hoeffler juxtapose grievance-based approaches to civil conflict with another crop of “greed-based”\textsuperscript{55} arguments in their article “Greed and Grievance in Civil War”. Specifically, they study the impact that atypical opportunities for profit brought about by extortion of natural resources, donations from diasporas, and subventions from hostile governments have on inciting civil conflict. They also examine the effect that grievances derived from ethnic or religious hatred, political repression, political exclusion and ethnic dominance, and economic inequality have on predicting the onset of 79 large scale civil conflicts between 1960 and 1999.\textsuperscript{56} They conclude that economic indicators contributing to the greed-based theory of civil conflict have statistically significant causal relationships in predicting civil conflict, whereas examined indicators for grievances are too common among both those countries rife with civil conflict and those without any at all to wield much explanatory power. Nevertheless, they note that just because those aspects of heterogeneity they tested do not predict conflict, it does not mean that grievances are irrelevant in explaining civil strife. In fact, scholars such as Luis Medina assert that previous attempts to model grievances’ impact on civil conflict to date
have been based on the wrong assumptions, and that arguments that grievances are not associated with conflict are incorrect; rather, the relationship is inconclusive.

**Weak State Hypothesis**

The crux of the weak state hypothesis is that strong and capable states are able to prevent grievances and social turmoil within their borders from coalescing into organized violence. Traditional means through which states pacify civil strife include, inter alia, “offering a mix of relief for aggrieved individuals, co-optation of opposition leaders, and outright coercion”\(^57\) as well as state provision of public goods like law enforcement, health services and protection of rights and liberties. The ability of nations to successfully repress dissident movements, or to redistribute resources to aggrieved groups reflect the administrative capacity of the state. “In the civil conflict literature, interest in state capacity has coincided with a turn away from debate over motive”\(^58\)—greed and grievance hypotheses—to put states at the center of the discussion regarding causes of civil conflict. Attempts to operationalize state capacity, however, have taken different turns and emphasized different elements of this rather nebulous concept.

State capacity, defined as one country’s ability to maximize its prosperity and stability, to exert *de facto* and legislative control over its territory, to protect its population from predation, and to adapt to diverse crises relates well to the weak state explanation of civil conflict,\(^59\) is often evaluated in terms of “military capacity, bureaucratic and administrative capacity, and political/institutional coherence and quality.”\(^60\) Military capacity refers to a state’s ability to deter or combat challenges to its authority through the use of force. The unit of analysis here tends to
be the national military and related indicators of its strength and power (e.g. military personnel per capita). Empirical examinations of military capacity and civil conflict find that “greater military capacity is associated with lower likelihood of onset, higher likelihood of termination, and shorter duration of war.”\textsuperscript{61} Alternatively, greater spending on military affairs as part of GDP has been argued to present opportunities for corruption and favoritism of military communities, which can lead to the evolution of social grievances.\textsuperscript{62}

Bureaucratic and administrative capacity refers to the state’s ability to extend its authority and resources into the far reaches of its territory to collect and manage information. Scholars focus their study of administrative capacity on bureaucratic quality--the evaluation of a state’s regular, meritocratic recruitment and advancement processes, or lack thereof.\textsuperscript{63} Another approach to bureaucratic and administrative capacity focuses on the ability of states to extract resources from their citizenries. This operationalization derives from the dearth of literature observing links between economic development in strong states and strong market economies. It identifies weak states as “hopelessly poor” and “unable to maintain basic economic functions and raise the revenue required to deliver basic services to their citizens.”\textsuperscript{64} The extant research on state capacity and conflict shows that “political instability and high risk of conflict are clustered in the data with weak states and low levels of economic development.”\textsuperscript{65} States weakened by poor bureaucratic and administrative capacities are likely to experience conflict because they cannot organize government resources to put down rebellion\textsuperscript{66} or because insurgents face a lower opportunity cost to fighting when the state’s ability to respond is impotent.\textsuperscript{67}

Political/institutional coherence and quality refers to the degree to which democratic and non-democratic features are intermingled in the political system. The Polity index is typically
used to operationalize this concept. The assertion that institutional coherence matters for state
stability is supported by empirical evidence that “mixed regimes, or ‘anocracies’ which are
neither fully democratic or authoritarian are most likely to experience internal conflicts.” States
in between egalitarian and repressive regimes on a spectrum often have less ability to repress or
accommodate dissidents to stave off conflict from erupting.

The weak state hypothesis offers a nice alternative approach to civil conflict insofar as it
offers a more tangible way to operationalize the “state” as a unit whose actions can influence the
probability of conflict onset and its duration. Thus, recommendations for improving state
strength based on national-level policies become relatively easier to deliver and express than
recommendations to address individual grievances or economic motivations. However, these two
explanations for civil conflict are closely related in practice. It is logical that states with low
capacity to govern their constituencies will not be able to offer the state services (e.g. education,
opportunities for stable employment, law enforcement and protection, health services, etc.) that
will keep people happy. Thus, poor state capacity is closely linked with high levels of social
grievance, and vice versa.

1.3 Health & Civil Conflict

To date, empirical studies examining the effect of health related variables on the onset and
duration of civil conflict are few and far between. Within this small, but growing body of
literature, attention has been paid primarily to the impact that burden of disease has on inter- and
intra-state conflict. One of the early investigations into the impact of infectious disease on civil conflict was conducted by Andrew Price-Smith.

In his book, *The Health of Nations*, Price-Smith argues that proliferation of infectious disease poses a quantifiable and serious threat to national and inter-state security. In examining the socio-economic effects that disease outbreaks have wrought on states of varying stability throughout history, he demonstrates how incidences of increased disease prevalence can contribute to reduced economic prosperity, decreased latent power of states, and ultimately increased state fragility. He employs both statistical analysis and process tracing to define the relationships that exist between disease and indicators of state capacity.  

He hypothesizes that “increasing levels of infectious disease exert a negative effect on state capacity, such that increases in disease prevalence result in correspondingly diminishing values of state capacity.” Because state capacity is an abstract concept, Price-Smith chooses five indicators to serve as proxies for overall state capacity based on their ability to address certain attributes of the dependent variable which reflect the “primacy of fungible economic power,” and thus, the importance of human capital for ensuring security. These are gross national product (per capita), government expenditure, school enrollment ratio (secondary), net long-term capital inflow and military spending per soldier (per capita). Measures for evaluating the prevalence of infectious disease burden are infant mortality (IM, per 1000 children) and life expectancy (LX, in years at birth).

Looking at data from 1950 through 1990, Price-Smith examines 20 randomly selected countries across six continents at various levels of socio-economic development and illustrates quantitatively how there is a consistent and strongly negative correlation between infant
mortality and state capacity, and that there is a positive association between life expectancy and state capacity at state, regional and global levels. He concludes that as prevalence of disease increases (demonstrated by rising IM) state capacity declines while an increase in life expectancy indicates a rise in state capacity.

Another crucial study in the literature on disease and conflict examines the impact of HIV/AIDS prevalence on inter- and intra-state conflict. Peterson and Shellman recognize arguments that “AIDS may create direct incentives and opportunities for civil and international conflict in the hardest hit countries,” but suggest “it is more likely to create disincentives for conflict by depleting morale and military capability.” They focus their study on the impact that HIV/AIDS has on states’ political institutions and economic health as essential elements of national security. Through empirical analysis, Peterson and Shellman find that increased HIV/AIDS prevalence is negatively associated with prevalence of violent conflict within states, and that this effect is even more pronounced in international conflicts.

Taking a rather innovative approach to the cause of civil war, Baten and Mumme published a quantitative study examining absolute and relative economic deprivation’s impact on the onset of civil wars between 1816 and 1999 by operationalization deprivation through unique indicators—nutritional well being and median male height. Largely influenced by the health literature and anthropometric methods, they decided to use these measures to examine the grievance hypothesis of civil war. They find that relative deprivation and related inequalities within populations exert a strong and consistent propensity to start civil wars during this time period. They also find that economic deprivation has a negative impact on the probability of civil war onset, but their results do not remain significant when tested for high levels of robustness.
Drawing insights from these three bodies of literature, it seems that there are plausible pathways through which access to healthcare can contribute to greater national stability. Namely, improved population health can reduce social grievances as burdens of disease and illness decrease, and as gains in national economic growth trickle down to the household level. Investment in health and subsequent gains in population health—measured through health outcomes such as life expectancy and infant mortality—have also been shown to produce gains in economic growth even after controlling for the endogeniety of investment in health as a product of state growth. Additionally, delivery of healthcare services reflects a state’s ability to protect its citizenry from the threat to life posed by illness and infirmity; poor healthcare reflects the weakness of a state’s administrative capacity. Thus, states with poor capacity are associated with a higher propensity for civil conflict because they cannot organize resources to pacify dissenting populations through oppression or distribution of appropriate resources (e.g. healthcare).

Building on these arguments, I propose that there is an inverse relationship between access to healthcare and civil conflict. As states provide more services in the form of healthcare delivery, this may improve per capita income, educational and employment opportunities, and even social equality. As a result, populations would likely experience less intra-group tension and frustrations which may, if intense enough, erupt into conflict. Further, if poor access to healthcare depletes population health and stability, we may expect to see a rise in conflict as institutions and social order begin to dissipate. Thus, I anticipate that states experiencing higher levels of access to healthcare should experience lower levels of conflict, while states with poor healthcare access
should experience the opposite. Before diving into my argument, however, I would like to call attention to a few vignettes which illustrate the relationship between healthcare and conflict.
Chapter 2: Preliminary Support?
Observing social tensions surrounding healthcare in three countries

Proposing a new argument for discussion within a growing body of literature is an exiting process. That said, there is always the small concern when conducting exploratory research that the question being posed only addresses a niche issue. However, if recent events regarding healthcare access and civil conflict as recently as 2012 in China and Spain, and 2014 in the Dominican Republic are any indication, the conversation started in this paper may have significant implications for policymakers and state officials in the future. Together, these three vignettes exemplify the consequences that provision of poor healthcare services and the restriction of access to healthcare can have on populations in terms of civil conflict. They offer additional observational support for some of the arguments discussed in the literature linking healthcare to conflict via through weak state and grievance hypotheses, and further inform the argument that I propose in the following section.
In 2012, citizens of China’s Henan province stormed government buildings in the regional capital demanding compensation and medical packages after a botched blood-transfusion scheme came to light. Improper handling of biological materials collected in blood-selling clinics, common operations in many rural Chinese villages such as those in Henan province, are the ultimate source of this conflict. Through these clinics, Chinese health officials would collect blood from willing patients, extract the plasma from it for use in transfusions or other procedures, and put the remaining fluid in common collection tanks before replenishing the blood in donors. In an effort to expedite this process, blood was not tested for communicable diseases such as HIV/AIDS or other transmissible illnesses, and thousands of participants in this program were infected as a result.

In August of 2012, “about 300 Chinese AIDS patients and their relatives stormed and tore down the main gate of the Henan provincial government, prompting a baton attack by local police.” This eruption of civil violence came as a direct response to the revelation that an estimated 100,000 people in Henan province alone had been infected with HIV through spread of contaminated blood collected through botched blood-selling schemes. Of the nearly 100,000 infected individuals known to be infected by this scheme, at least 40,000 were reported to have died as a result of the HIV/AIDS they contracted through bad administration of blood transfusions and improper handling of blood at health clinics.

Activists told reporters that they tried to file lawsuits against the Chinese government, demanding compensation, as well as medical and welfare packages for those families whose
members became infected with HIV or who died as a result of the disease, but that the “Henan government [would not] let them.” Frustrated by the lack of accountability of the government, the unfulfilled promises of aid packages for HIV treatments for children infected through mother to child transmissions of the disease, and the revelation that an estimated 10,000 clinics operating this same, unsafe scheme were still in operation, the Chinese people were moved to demonstrate. The government did little to respond to these protesters’ demands. Children who lost parents to HIV as a result of this scheme are receiving a stipend of only $95 a month, and activists who rallied protesters and petitioned the government for compensation in 2012 have been banned from Henan province, if not arrested for being there, as recently as November of 2013.

The efforts of the Chinese government to quash investigations into this scandal have only exacerbated the social and political problems begun by a provision of bad healthcare services. Though this issue is clearly related to other issues of corruption and ethical misconduct, it exemplifies the political nature of health service delivery, as well as the potential that poor management of health programs and limited access to treatment can have for inciting civil conflict through protest and violent demonstration.

2.2 Revocation of the National Health System, Spain 2012

On April 20, 2012, the Spanish government approved the transition from a National Health Care system (NHS) to an insurance model through a Royal Decree-Law, bypassing the need for parliamentary discussion. Overnight, universal healthcare access, an immensely popular right with social and political impacts guaranteed by NHS, vanished. This single decision stripped
hundreds of thousands of non-citizen residents of their right to healthcare. Though policymakers asserted that the shift was intended to lessen the burden of rampant medical tourism borne by the state, the consequences have proven dire for certain vulnerable groups. Namely, immigrants and migrant workers in Spain find themselves without basic access to preventative or primary healthcare. Except for emergency services and maternal care, residents in Spain without national citizenship now lack access to the reliable, quality guarantee of health services they were accustomed to for years under the NHS.

This new reality is proving to be costly, in both financial and human terms, as demonstrated by the case of one laborer who died of tuberculosis (TB) after multiple denials of care, less than one month after the policy change. In investigating this case, it came to light that the same hospital that had previously cared for this man also diagnosed and subsequently denied care to eight additional patients with TB because they no longer qualified for medical care outside of the NHS. This new health system is failing many of Spain’s residents who were perviously covered under NHS because the new eligibility criteria for access to care are extremely exclusive.

Beyond the social and personal costs induced by the health system change, the Spanish government faced the growing frustrations and opposition of the policy change by the public. In December of 2012, thousands of Spanish medical workers and residents, angered by the budget cuts and plans to privatize health care, took to the streets in protest. The “white tide,” nearly 25,000 protestors dressed in white scrubs, represented a growing conflict between thousands of Spaniards whose desire for universal access to health care conflicts with national policy. These protests continued to receive international attention, making splashes in U.S. media outlets as Rohde 28
recently as February of 2013.\textsuperscript{86} Reporters covering the protests convey the concern felt by numerous Spanish residents that the change in policy away from NHS reflects motivations within the government that are not aligned with the best interests of those people living and working in Spain. As, all other things equal, the drop in access to healthcare has moved tens of thousands of individuals to pressure the government to revert to their former status quo of healthcare, this instance again suggests that access to healthcare is a significant enough motive to prompt civil conflict.

2.3 Restrictions on Citizenship and Related Social Services, Dominican Republic 2013

This extremely recent development in the Dominican Republic concerns changes in citizenship rights for Dominicans of Haitian descent. A ruling in October of 2013 by the Dominican Republic’s Constitutional Court revokes citizenship rights for thousands of former citizens of the island nation, many of whom are of Haitian descent. This ruling has incensed an international response by many Dominican and Haitian emigrants who are outraged by the ongoing tension between Dominicans and Haitians living and working in the Dominican Republic. This ruling, applies to any citizen born after 1929, rendering nearly 210,000 former citizens stateless.\textsuperscript{87}

In the immediate term, many residents of the Dominican Republic are now ineligible to access social programs and services that were available to them before the ruling—namely, public education, healthcare services, even getting a passport to travel.\textsuperscript{88} Outrage over this ruling even incited protests in Miami, Florida and New York City, New York where large Dominican and Haitian diasporas have gathered over the years. In October, protesters gathered in the states
to support their fellow Haitians in the Dominican Republic in protesting the court's decision and the resulting exclusion of social services that comes with it. As this situation continues to unfold and tensions rise, it will be interesting to see how the change in access to publicly provided programs aggravates existing tensions between Haitians migrants, Dominicans of Haitian descent, and non-Haitian Dominican citizens. Again, this example presents an opportunity to examine how changes in access to social programs, including healthcare, influence civil unrest.
In this section, I assert for the first time in the literature that access to healthcare is an important variable in the conversation concerning the causes of civil conflict. If the situations previously discussed offer even the slightest indication, healthcare can play a powerful role in prompting civil strife. Again, I argue that there is an inverse relationship between access to healthcare and the onset and severity of civil conflict within states. The causal mechanisms through which access to healthcare can lead to conflict are social grievances and/or diminished state capacity. In its simplest form, my argument takes the following form, as illustrated in Figure 1. In order to investigate the relationship between access to healthcare and civil conflict empirically, I must define and operationalize access to healthcare and civil conflict, and discuss the merits and shortcomings of this approach within the context of the current literature.

FIGURE 1: ACCESS TO HEALTHCARE & CIVIL CONFLICT
3.1 Access to Healthcare

When we typically think of access to healthcare, we immediately think of access to the doctors, facilities and treatments necessary to protect, preserve, and regain health. These are the elements of health systems that people interact with directly when concerns about their health arise.

However, access to healthcare extends beyond these infrastructural units. Following the methodology employed by the US Agency for International Development, access to healthcare can be dissected into and measured through six areas—the five “A’s of Access,” and social access. In Table 1, I define and describe each element of access to healthcare, as well as offer indicators I can use to measure each facet of access.

<table>
<thead>
<tr>
<th>Element of Access</th>
<th>Definition</th>
<th>Indicators</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFFORDABILITY</td>
<td>The ability and willingness of patients to pay for services provided</td>
<td>Cost as a Perceived Barrier*</td>
<td>costbarr</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percent of Population with Insurance Coverage</td>
<td>inscover</td>
</tr>
<tr>
<td>AVAILABILITY</td>
<td>Do healthcare providers possess the technology and personnel to meet the needs of patients</td>
<td>Concern about there not a provider at the facility*</td>
<td>crnoprov</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concern about there not being medication at the facility*</td>
<td>crnomeds</td>
</tr>
<tr>
<td>ACCESSIBILITY</td>
<td>Geographic accessibility</td>
<td>Distance to a facility*</td>
<td>dist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Needing to seek transport to get to a facility*</td>
<td>trans</td>
</tr>
<tr>
<td>ACCOMMODATION</td>
<td>The extent to which healthcare providers meet the constraints and preferences of patients</td>
<td>Number of physicians per 1,000 population</td>
<td>phys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of hospital beds per 10,000 population</td>
<td>beds</td>
</tr>
<tr>
<td>ACCEPTABILITY</td>
<td>The degree to which patients are comfortable or uncomfortable with healthcare providers</td>
<td>Concern about there not being a female medical provider at a facility*</td>
<td>crnofem</td>
</tr>
</tbody>
</table>
3.2 Civil Conflict

Civil war, the most widely examined facet of civil conflict in the extant literature, is concerned primarily with the number of direct battle deaths resulting from a violent conflict episode within a state. While civil wars often attract the most international attention, other variations of civil conflict have been addressed in the literature. Kahl investigates civil strife—large-scale, sustained and organized violent conflict within a country. Per this definition, civil strife includes instances of revolution, rebellion, insurgency, civil and ethnic war, and sustained campaigns of terrorism. An even broader definition of civil conflict includes instances of internal violence, riots, protests, crime and large scale international violent conflict. Although civil war is the most intensely studied variant of civil conflict, it is important to identify measures of civil conflict beyond battle deaths caused by civil war. As scholars understand better the causal factors for the onset and duration of civil wars, it will become increasingly important for researchers to identify methods to curb and remedy smaller-scale civil conflicts as well.
I draw from the Armed Conflict Location & Event Dataset (ACLED) and adopt their definition and coding of conflict events for this study. Quoted from the dataset codebook, “ACLED definitions mainly concern actors and events. ACLED collects and codes reported information on political violence from the developing world on civil and communal conflicts, violence against civilians, rioting and protesting. ACLED covers activity that occurs within the context of a civil war, and violent activity that occurs outside of civil wars, particularly violence against civilians, militia interactions, communal conflict and rioting…ACLED recognizes a range of actors including governments, rebels, militias, ethnic groups, active political organizations, and civilians.”

Thus, I operationalize conflict by including events short of and including civil war. This data allows me to examine the number of conflict events, coded by event type (e.g. non-violent event, riot/protest, battle), as well as the number of fatalities associated with each event. These two statistics offer me the ability to examine the impact that access to healthcare has on both the number and intensity of conflict events in countries observed in this paper. In Table 2, I present the elements of conflict I focus on in my study, their working definition, and the indicator computed from ACLED for use during my quantitative analysis.

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>ACLED INDICATORS: CIVIL CONFLICT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Element of Conflict</strong></td>
<td><strong>Definition</strong></td>
</tr>
<tr>
<td>NUMBER OF CONFLICTS</td>
<td>Aggregate number of conflict events, per region, per year</td>
</tr>
<tr>
<td>NUMBER OF NON-VIOLENT CONFLICT EVENTS</td>
<td>Aggregate number of non-violent conflict events, per region, per year</td>
</tr>
</tbody>
</table>
3.3 Controls

Obviously when creating models to explain the causes of civil conflict, there are certain factors that must be controlled for. The literature suggests that low levels of health and healthcare access may be a contributory cause for civil conflict, but they are in no way the only factors that have been studied and shown to have a statistically significant impact in predicting this social phenomenon. In the post-Cold War literature, explorations into the causes of civil war rely heavily on cross-national statistical analyses of civil conflict events to identify characteristics of countries most affected by civil conflict. In an exhaustive survey of the empirical work done in this field, James Fearon reviews the statistically significant predictors for conflict that have been established in the literature. Namely variations in youth bulge as a percentage of national adult population, equitable income distribution, ethnic fractionalization, presence of ethnically excluded political groups, poor human rights performance, mountainous terrain, primary
commodity exporting practices (e.g. oil, conflict minerals) and perhaps greater gender inequality contribute to the likelihood for violent civil conflict to begin or endure for longer periods in many low- and middle-income states.  

92 Other indicators such as highest level of education have been used to proxy economic deprivation and level of absolute welfare, as level of education can indicate prospects for future employment or economic successes.  

93 For this investigation, I select the controls outlined in Table 3. The control variable, definition, indicator and rationale are outlined below.
<table>
<thead>
<tr>
<th>Control</th>
<th>Definition</th>
<th>Indicator</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of Population Living in Rural Areas</td>
<td>National estimate of citizens living in rural areas, percent</td>
<td>UN Data. Population, Percent Rural (%)</td>
<td>prural</td>
</tr>
<tr>
<td>Percentage of Households with Access to Electricity</td>
<td>Average estimate of households with access to electricity, percent, by region</td>
<td>USAID survey data, access to electricity. Self-computed statistic.*</td>
<td>electric</td>
</tr>
<tr>
<td>Highest Level of Educational Achievement</td>
<td>Average estimate of the highest level of education attained, by region</td>
<td>USAID survey data, highest level of educational achievement. Self-computed statistic.*</td>
<td>edu</td>
</tr>
<tr>
<td>Level of Ethnic Fractionalization</td>
<td>National estimate, the probability that two randomly drawn individuals are from different ethnolinguistic</td>
<td>Replication data from Fearon &amp; Laitin, 2003, “Ethnic and Cultural Diversity by Country”</td>
<td>efrac</td>
</tr>
<tr>
<td>Level of Democracy</td>
<td>National score for measure of regime type and level of democracy</td>
<td>Polity IV Project. Ranges from -10 (full autocracy) to +10 (full democracy).</td>
<td>polity</td>
</tr>
<tr>
<td>Income per capita</td>
<td>Level of national gross domestic per person in the population, by yearproduct</td>
<td>UN Data. GDP/capita, current $U.S. prices</td>
<td>gdpcap</td>
</tr>
<tr>
<td>Level of Equality of Resource Distribution</td>
<td>National statistic measuring equality of resource distribution within the population</td>
<td>UN Data. GINI coefficient</td>
<td>gini</td>
</tr>
</tbody>
</table>

* Coded such that a higher score means higher regional average (e.g. higher access to electricity, higher level of schooling)
3.4 Causal Mechanism

I propose that the elements of access to healthcare will influence the number of and intensity of civil conflicts as depicted below in Figure 2. I intend to isolate each element of access in order to identify which portion, if any, presents a statistically significant relationship to the level of civil conflict occurring in that area.

FIGURE 2: CAUSAL MECHANISM

Again, the channels through which access to healthcare impacts civil conflict are by exacerbating social grievances such that conflict erupts and/or undermining the stability of the state, its institutions, and its ability to maintain order within its territory. The extant literature on health and conflict suggests that social grievances due to loss of loved ones from chronic illness can be
extremely taxing psychologically and financially for many families. This is especially true when
the families impacted by illness are lower-income, as suggested by Price-Smith. In these
instances, the frustration and anger associated with losing a loved one, especially if it is due to
diseases for which there are good medication and treatments can provoke people to challenge the
status quo. Alternatively, if population health is chronically at low levels due to high levels of
disease or poor state growth, this can diminish the ability of the state to raise revenue and
provide the services such as infrastructural development, rule of law, and welfare programming
its citizens demand. In these instances, groups may be compelled to replace the regime in power
in favor of a more competent one.

While a dearth of research has been done that examines population-level health statistics
(e.g. life expectancy, infant mortality) and civil conflict, the critical element of this study focuses
on access to healthcare. Population health metrics are important units of analysis; they are often
more readily available data, and reach further back in time than healthcare metrics. However,
much of the variation in access to healthcare within states could potentially explain why
population health metrics are as high, or low, as they are in some nations. Understanding the
impact that this variation can have on conflict in localized region may help guide policymakers
in their decision-making processes when it comes to planning health interventions or choosing
whether or not to support health campaigns. If, through this analysis, a statistically significant
link can be established between access to healthcare and civil conflict, it will add an additional
element to the literature on causes of conflict and help direct future research in this direction.

This research question is not without flaws, however. Understandably, access healthcare
will be impacted by conflict going on in the regions where data is collected. This complicates the
validity and reliability of the statistics I will use. Further, healthcare is closely linked to population health—why depart from the norm and focus on an even smaller element of overall national health? In practice, I believe that focusing on healthcare will prove a much more tangible and practical way to offer recommendations to policymakers. Health is a nebulous concept, with varying definitions. In some circles, health means medical health, where in others it is more of a holistic concept. Moreover, others conceptualize health in terms of well-being or in terms of adjustment to the environment. It is often something that journalists and policymakers can refer to, but when it comes time to operationalize it, it is much less clear how to do so. Focusing on access to healthcare can help mitigate this challenge. Healthcare is concerned with the tangible elements of health systems. It is concerned with the units patients interact with. Understanding better the role these components play in causing (or dampening) civil conflict will improve the ability of scholars and government officials to target the causes of conflict and prevent future disturbances from occurring.
Chapter 4: Hypotheses and Data

I propose the following hypotheses to test:

\( H1a: \text{There is no statistical relationship between access to healthcare within an administrative region and the total number of conflicts witnessed in that unit.} \)

This defines the null hypotheses that all regressions for this response variable will test against.

\( H1b: \text{The higher the level of access to healthcare within an administrative region, the lower the total number of conflicts witnessed in that unit of analysis will be.} \)

Higher levels of healthcare access should, following the logic of the grievance argument, resolve frustrations that individuals have about provision of health services. Following the state capacity theory, better access to healthcare can contribute to better population health which is important for economic growth and long term national stability.

\( H2a: \text{There is no statistical relationship between access to healthcare within a unit of analysis and the total number of fatalities due to conflict events witnessed in that administrative region.} \)

This defines the null hypotheses that all regressions for this response variable will test against.
H2b: The higher the level of access to healthcare within a unit of analysis, the lower the total number of fatalities due to conflict events witnessed in that administrative region will be.

Higher levels of access to healthcare should decrease the number of deaths resulting from conflict events within the same unit of analysis. On one hand, better access should make it easier to seek and receive medical care in the event someone falls ill. On another hand, areas where there are better access to healthcare may see less conflict because citizens are happy with the status quo, and thus, do not engage in fighting as much as low access areas.

For my explanatory variables, the elements of access to healthcare, I use USAID’s Demographic Health Surveys (DHS).\(^95\) DHS data are nationally-representative and provide a wealth of indicators for issues related to population demographics, health and nutrition. They are conducted approximately every five years within states, and each sample size contains roughly 5,000 to 30,000 household interviews. All of the interviews, regardless of country or region of origin, are coded using a standardized methodology to allow for cross-country comparisons and comparisons over time. An important element of the DHS data is that individual surveys are coded at the administrative-regional level. This aligns well with the coding of the ACLED data insofar as I can compare access to healthcare indicators to conflict events at the subnational level.

The questions that target access to healthcare were initially asked in DHS surveys beginning in 1997 and continue to the present day. As such, I have to limit the initial pool of countries from which I can draw observations to only those African nations which have two surveys conducted from 1997 to 2013. The reason I limit the region to Africa alone is that
ACLED data is only collected for African countries. While I could use other datasets, ACLED provides the most compatibility of conflict data with health data without having to employ GIS or other spatial modeling methods. I use the individual recode files to populate health statistics in my panel of data. For the two accommodation indicators (number of physicians and number of hospital beds), DHS does not collect data on these at the subnational level. Instead, I collected statistics from the World Health Organization’s Global Health Observatory Data Repository to populate statistics for those indicators in my data panel.

For the response variables, conflict data, I use the Armed Conflict Location & Event Dataset.\textsuperscript{96} Again, this data provides information on the number of specific conflict events by type, regional location, and the associated number of fatalities that corresponds to the conflict. This allows me to examine the number and intensity of civil conflicts at the subnational level over time. Because DHS surveys only asked questions about access to healthcare indicators from 1997-2013, I truncated the ACLED data to include events from within that time period. Obviously, there are limitations to this data. As it is collected in conflict-affected states, there may not always be the most precise recording of the number of fatalities resulting from a conflict event, and the exact location or timing of the event may be off by a bit. However, I do not need that precise information at least for this exploratory study. The one drawback is that riot and protest events are aggregated into one event type. Riots are typically characterized by violent demonstration, whereas protests are peaceful, per the ACLED codebook.\textsuperscript{97} While I computed grouped statistics for the number of conflict events by type (e.g. non-violent; violent, non battle; battle) this inflates the number of violent-non battle events because protests/riots included in this category. In fact, there may be a majority of peaceful protests in that category, but without
intensely scrubbing the data and recoding thousands of events, it would be impossible to separate that original coding successfully. Therefore, I populated my data panel using the number of fatalities per administrative region (Admin_1) per year, alongside the aggregate number of conflict events (sum of all; sum by type) which I self-computed.

Many of the questions asked in the DHS survey were presented in the following way: *Would you describe needing money to get medical care as 0) not a problem, 1) a big problem, or 2) a small problem?* Coding of responses in this way is not particularly useful for me to analyze. Therefore, I recoded responses for each question following this format on a scale of 0-10, 0 being “no problem”, 5 being a “small problem” and 10 being a “big problem.” Then, I averaged the responses to each question for each administrative region where data was collected by DHS to generate a mean score for each indicator for the year the survey was conducted. DHS also offered information regarding level of education and access to electricity at the subnational level, which I averaged in a similar way to the health indicator data. However, I note that electricity scores fall on a range from zero to one (zero meaning zero percent of the region has access to electricity, one means one-hundred percent has access), and that educational level takes a score of zero to three (zero is no education, one is primary education, two is secondary education and three is higher than secondary education). I populated these regional averages alongside the conflict data I pulled from ACLED.

The next important issue to note regarding this data is that some values were missing between years. As DHS does not collect and publish surveys for every year, not all countries had good data to use for a quantitative study. Therefore, I narrowed my selection of countries and administrative regions down to ten nations: Benin, Burkina Faso, Ethiopia, Ghana, Lesotho,
Madagascar, Malawi, Mali, Mozambique, and Zimbabwe. These nations all had DHS surveys collected at two or more time points within the 1997-2013 window, and also had recorded values for the majority of the questions which address access to healthcare indicators. Because not all countries in Africa where DHS had available data for my explanatory variables, I was not able to leave selection of countries for study up to random assignment. That said, the vast number of administrative regions in this sample and the varying degrees of development and conflict among the ten nations make for a mixed sample population. I ultimately compile a dataset containing a total number of observations representing 1598 region-years.

For control variables, I pulled information from the United Nations Data Repository for statistics such as GDP/capita (available per year per country), Percentage of Population Living in Rural Areas (% available in five year estimates), and GINI coefficients for resource distribution equality (available in five year increments). I also incorporated national statistics for ethnic fractionalization using data replicated from a study composed by Fearon and Laitin in 2003. These statistics range from zero to one, such that a higher number indicates a higher probability that two individuals drawn at random are from different ethnolinguistic groups (i.e., higher level of ethnic fractionalization).

Though I was able to find reliable and standardized data for all of my variables and controls of interest, there are limitations of these statistics. First, as not all variables are coded at the subnational level, the accuracy of any model I run to predict the onset or intensity of civil conflict will not reflect the true nature of that region completely. Some of the variation across regions gets lost when you use aggregate statistics. However, as my main explanatory variables (healthcare indicators) response variables (conflict events), and some control variables are coded...
at the subnational level, this suggests that the loss of accuracy from using national statistics will be minimized. Second, as there are years where data were not collected during the time span of 1997-2013, I had to choose between dropping values for missing years and carrying the most recent statistic for my indicators through to the next survey iteration. In choosing the latter, I was able to create a more full data panel, and thus, one which is more “strongly balanced;” however, this stability is inflated by the fact that many observations are repeated across multiple years. I take this into account when running regressions and interpreting results in the next chapter.
Chapter 5: Methods, Regressions and Analysis

Using the long panel I created using the DHS, ACLED, UN and WHO data, I focus primarily on three models to test for a relationship between access to healthcare and the number and intensity of civil conflicts at the subnational level using STATA 13. After discussing descriptive statistics for the data and implications of matched pairs correlations between the explanatory and response variables, I discuss the three models I could use to test this relationship—pooled ordinary least squares (OLS) regression, poisson regression, and negative binomial regressions. I ultimately settle on using negative binomial regressions, clustered by administrative region to yield robust standard errors. In the sections that follow, I discuss the logic behind using each model and interpret the outputs from each.

5.1 Descriptive Statistics & Initial Correlations

In total, the panel contains observations for 1598 region-years, spanning 94 distinct administrative regions in ten countries in Africa. Observations are recorded for years from 1997 to 2013, the entire range in the case of some administrative regions, but not all 94 of them, as the
DHS surveys were not all conducted in 1997 for each country studied. Table 4 offers the descriptive statistics for all variables observed in the panel.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable Name</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>YEAR</td>
<td>1598</td>
<td>2005</td>
<td>4.900513</td>
<td>1997</td>
<td>2013</td>
</tr>
<tr>
<td>Country</td>
<td>NATION</td>
<td>1598</td>
<td>5.106383</td>
<td>3.044845</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Administrative Region</td>
<td>ADMIN</td>
<td>1598</td>
<td>47.5</td>
<td>27.14242</td>
<td>1</td>
<td>94</td>
</tr>
<tr>
<td>Number of Conflicts</td>
<td>NUMCONF</td>
<td>1598</td>
<td>5.813517</td>
<td>17.89149</td>
<td>0</td>
<td>213</td>
</tr>
<tr>
<td>Number of Non-violent Conflict Events</td>
<td>CTYPE11</td>
<td>1598</td>
<td>.3904881</td>
<td>1.840261</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>Number of Violent, Non-battle Conflict Events</td>
<td>CTYPE12</td>
<td>1598</td>
<td>4.251564</td>
<td>15.58797</td>
<td>0</td>
<td>208</td>
</tr>
<tr>
<td>Number of Battle Conflict Events</td>
<td>CTYPE13</td>
<td>1598</td>
<td>1.183354</td>
<td>5.823176</td>
<td>0</td>
<td>85</td>
</tr>
<tr>
<td>Number of Fatalities (per region per year)</td>
<td>FATALITIES</td>
<td>1598</td>
<td>18.3204</td>
<td>129.5981</td>
<td>0</td>
<td>2742</td>
</tr>
<tr>
<td>Needing Permission seek Healthcare</td>
<td>PERMISSION</td>
<td>1079</td>
<td>4.797908</td>
<td>2.061149</td>
<td>.3268945</td>
<td>7.977431</td>
</tr>
<tr>
<td>Is cost a barrier to healthcare</td>
<td>COSTBARR</td>
<td>1079</td>
<td>7.235118</td>
<td>1.558454</td>
<td>2.817355</td>
<td>9.769965</td>
</tr>
<tr>
<td>Distance to a health facility</td>
<td>DIST</td>
<td>1079</td>
<td>6.652097</td>
<td>1.673087</td>
<td>.9259259</td>
<td>9.275037</td>
</tr>
<tr>
<td>Do you need transportation to get to a health facility</td>
<td>TRANS</td>
<td>921</td>
<td>6.479716</td>
<td>1.834034</td>
<td>.8024691</td>
<td>9.245142</td>
</tr>
<tr>
<td>Concern about going alone</td>
<td>CRGOALONE</td>
<td>1079</td>
<td>5.544096</td>
<td>1.969778</td>
<td>.7760331</td>
<td>8.730493</td>
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<tr>
<td>Concern about there being no female provider</td>
<td>CRNOFEM</td>
<td>871</td>
<td>5.40731</td>
<td>2.187806</td>
<td>.6038961</td>
<td>9.206037</td>
</tr>
<tr>
<td>Concern about there being no provider at all</td>
<td>CRNOPROV</td>
<td>279</td>
<td>7.441532</td>
<td>.961655</td>
<td>5.315688</td>
<td>8.909735</td>
</tr>
<tr>
<td>Concern about there being no medication</td>
<td>CRNOMEDS</td>
<td>329</td>
<td>7.4629</td>
<td>1.268164</td>
<td>1.739521</td>
<td>9.073451</td>
</tr>
<tr>
<td>Who has final say in healthcare decisions</td>
<td>DECISION</td>
<td>1145</td>
<td>13.93678</td>
<td>1.713329</td>
<td>10.42126</td>
<td>17.14568</td>
</tr>
<tr>
<td>Insurance Coverage</td>
<td>INSCOVER</td>
<td>475</td>
<td>.0879909</td>
<td>.1503091</td>
<td>0</td>
<td>.5958084</td>
</tr>
<tr>
<td>Percentage of Population living in Rural areas</td>
<td>PRURAL</td>
<td>1394</td>
<td>71.40344</td>
<td>9.068377</td>
<td>56.6</td>
<td>86.9</td>
</tr>
</tbody>
</table>

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In order to get a better sense of how the variables of interest, namely access to healthcare variables, correlate to the response variables, I conducted matched pairs correlations, selecting options for STATA to produce the significance levels of each correlation and the number of observations used to compute it. Matched pairs correlations differ from regular correlations in that matched pairs correlations only compute the correlation for observations where there are populated values for each variable being compared. Since not all regions have data for all variables in all time periods, a regular correlation would reduce the number of observations included in the computation to 30 out of a potential 1598. Table 5 presents this output.
<table>
<thead>
<tr>
<th>Element of Access</th>
<th>Indicator</th>
<th>Number of Conflicts</th>
<th>Number of Non-Violent Conflict Events</th>
<th>Number of Violent, Non-Battle Conflict Events</th>
<th>Number of Battle Events</th>
<th>Number of Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AFFORDABILITY</strong></td>
<td>Cost as a Perceived Barrier</td>
<td>-0.0618</td>
<td>0.0487</td>
<td>-0.1436</td>
<td>0.1801</td>
<td>0.1521</td>
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<tr>
<td></td>
<td></td>
<td>0.0423*</td>
<td>0.1102</td>
<td>0.0000†</td>
<td>0.0000†</td>
<td>0.0000†</td>
</tr>
<tr>
<td></td>
<td>Insurance Coverage</td>
<td>-0.0330</td>
<td>-0.0713</td>
<td>0.0150</td>
<td>-0.1074</td>
<td>-0.1100</td>
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<tr>
<td></td>
<td></td>
<td>0.4726</td>
<td>0.1206</td>
<td>0.7445</td>
<td>0.0193*</td>
<td>0.0165*</td>
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<tr>
<td></td>
<td></td>
<td>475</td>
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<td>475</td>
<td>475</td>
</tr>
<tr>
<td><strong>AVAILABILITY</strong></td>
<td>Concern about there not being a provider at the facility</td>
<td>-0.2411</td>
<td>-0.0819</td>
<td>-0.3923</td>
<td>0.2836</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>0.0000†</td>
<td>0.1724</td>
<td>0.0000†</td>
<td>0.0000†</td>
<td>0.0000†</td>
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<td>279</td>
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<td></td>
<td>Concern about there not being medication at the facility</td>
<td>0.0478</td>
<td>0.0444</td>
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<td>0.2119</td>
<td>0.1933</td>
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<td></td>
<td></td>
<td>0.3874</td>
<td>0.4221</td>
<td>0.4469</td>
<td>0.0001†</td>
<td>0.0004†</td>
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<td>329</td>
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<tr>
<td></td>
<td>Distance to a facility</td>
<td>-0.0777</td>
<td>0.0378</td>
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<td>0.0107*</td>
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<tr>
<td><strong>ACCESSIBILITY</strong></td>
<td>Needing to seek transport to get to a facility</td>
<td>-0.0396</td>
<td>0.0595</td>
<td>-0.1396</td>
<td>0.2345</td>
<td>0.9843</td>
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<tr>
<td></td>
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<td>0.2296</td>
<td>0.0709</td>
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<tr>
<td></td>
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<td>921</td>
<td>921</td>
<td>921</td>
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</tr>
<tr>
<td></td>
<td>Number of physicians per 1,000 population</td>
<td>0.1432</td>
<td>-0.0037</td>
<td>0.1868</td>
<td>-0.0783</td>
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<td></td>
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<td>0.0000</td>
<td>0.9046</td>
<td>0.0000</td>
<td>0.0119*</td>
<td>0.0032**</td>
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<td>1031</td>
<td>1031</td>
<td>1031</td>
</tr>
<tr>
<td><strong>ACCOMMODATION</strong></td>
<td>Number of hospital beds per 10,000 population</td>
<td>0.1787</td>
<td>0.0842</td>
<td>0.1768</td>
<td>0.0780</td>
<td>0.0534</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0000</td>
<td>0.0304*</td>
<td>0.0000</td>
<td>0.0451*</td>
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<tr>
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<td>661</td>
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<td>661</td>
<td>661</td>
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<tr>
<td><strong>ACCEPTABILITY</strong></td>
<td>Concern about there not being a female medical provider at a facility</td>
<td>-0.0739</td>
<td>0.0543</td>
<td>-0.1894</td>
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<td>0.2321</td>
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<tr>
<td></td>
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<td>0.0293*</td>
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<td>871</td>
<td>871</td>
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<tr>
<td></td>
<td>Needing Permission to Seek Healthcare</td>
<td>-0.0643</td>
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</tr>
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<td></td>
<td></td>
<td>0.0346*</td>
<td>0.0205*</td>
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<td>0.0000†</td>
<td>0.0000†</td>
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<tr>
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<td>1079</td>
<td>1079</td>
<td>1079</td>
<td>1079</td>
</tr>
<tr>
<td><strong>SOCIAL ACCESS</strong></td>
<td>Who has final say over health decisions</td>
<td>0.1326</td>
<td>0.0520</td>
<td>0.1635</td>
<td>-0.0530</td>
<td>-0.0123</td>
</tr>
<tr>
<td></td>
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<td>0.0000†</td>
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<td>1145</td>
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<td>1145</td>
</tr>
<tr>
<td></td>
<td>Concern about going alone to healthcare facility</td>
<td>-0.0534</td>
<td>0.0505</td>
<td>-0.1495</td>
<td>0.2230</td>
<td>0.1966</td>
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<td>0.0974</td>
<td>0.0000†</td>
<td>0.0000†</td>
<td>0.0000†</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1079</td>
<td>1079</td>
<td>1079</td>
<td>1079</td>
<td>1079</td>
</tr>
</tbody>
</table>

* significant at p = 0.05  
** significant at p = 0.01  
† significant at p = 0.001
Statistically Significant Positive Correlations

The matched pairs correlations indicate that there are statistically significant positive corrections between the number of battle events and the number of fatalities for at least one indicator of each element of access. All of these, with the exception of the correlations for accommodation indicators and the conflict response variables, make logical sense. For affordability indicators, as cost to go to a health facility becomes more of a problem the number of battle events and fatalities is also expected to increase. For availability indicators, the greater the concern that there will be no provider or medication at the facility, the greater the number of battle events and fatalities is expected to be. This same expectation can be said as distance to a facility, needing to seek transport to get to a facility, concern about there not being a female medical provider at the facility, needing permission to seek healthcare and concern about going to a facility alone all become more problematic for patients. The correlation between needing transport to seek healthcare and the number of fatalities is extremely strong \( r = 0.9843 \) suggesting that there is an extremely strong, positive relationship between these variables. These correlations are all statistically significant at the \( p<0.001 \) level, suggesting there is greater than a 99.9% chance these correlations are not random. These provide initial support for hypothesis 2b.

There also appears to be statistically positive correlations between the accommodation indicators and conflict response variables, as well as the decision-making indicator of social access and conflict responses, which at first may not appear to make sense. For accommodation, the greater the number of physicians per 1,000 population, the greater the expected number of conflict events (any type) and violent, non-battle conflict events should be. This correlation is the
same for the number of hospital beds per 10,000 population for all conflict response variables except for number of fatalities, and both are significant at the p<0.05 level. Upon reflection, these patterns are reasonable. Because these are correlations, not predictive values, it is logical that in areas where number of conflicts is greater, and where more violent conflict occurs, there will likely be more doctors and more beds for patients. This could reflect the responsiveness of states to concentrate infrastructure and public services in areas of highest need, or could reflect the presence of outside actors offering services in conflict affected areas. The accommodation statistics I used from the WHO Global Health Observatory do not discriminate where the physicians or the beds come from.

Other positive correlations which may not immediately make sense include that between needing permission to seek healthcare and the number of non-violent conflict events (significant at p<0.05), and that between level of autonomy in decision-making about health, the total number of conflicts, and the number of violent, non-battle conflict events (both significant at p<0.001). The correlation concerning permission has a weak coefficient (r = 0.0705) suggesting it is very close to zero in actuality. Nevertheless, it could reflect issues of social grievance—as social norms require patients to obtain permission before they seek healthcare, they may be inclined to express their discontent through non-violent means. Permission may not be a significant factor to incite violent civil conflict. Further, the relationship between autonomy in decision-making and total conflict and number of violent, non-battle events may imply that when conflict is high and violence is prevalent, the relative importance of who has the final on health matters is less of an issue for respondents to DHS surveys. Alternatively, it could suggest that as people have more control over their access to healthcare, they may demand more from service
providers and could even engage in protests or riots to convey these demands. Lastly, because the number of violent, non-battle conflict events comprise a large portion of the total number of conflicts, it makes sense why these two response variables correlate in similar ways to these healthcare indicators.

**Statistically Significant Negative Correlations**

The initial correlations reveal some statistically significant negative relationships between access indicators and conflict as well. Namely, for the number of violent, non-battle conflict events and the total number of conflict events, the data suggest that these conflict responses will go down as access to healthcare becomes more problematic in terms of cost barriers, concern about there not being a provider, distance to a facility, concern about there being no female provider, and needing permission to seek healthcare. These results, all significant at the p < 0.05 level, seem contrary to hypothesis 1b. However, upon reflection, these too make sense. As numbers of violent conflict are greater, relatively speaking barriers to healthcare may be seen as less of a problem as other more tangible threats to safety and security. While they do not support the direction of my argument, these correlations may capture the interaction effect that conflict has on access to healthcare.

One negative correlation does support hypothesis 2b, however. As insurance coverage increases, the number of battle events and the number of fatalities is expected to decrease (significant at p < 0.05). As more people are covered by insurance, they are more likely to get medical care and treatment they may need if hurt during conflict. Alternatively, if access to
services is low, they may be less inclined to join forces and overthrow the current regime through battle events.

5.2 Regression Models

Surveying the descriptive statistics of the data, I settle on three potential regression models I could use to explore this relationship: pooled ordinary least squares (OLS), poisson, and negative binomial regressions. A simple OLS model is one of the easiest models to compose to test for any linearity in the relationship between these explanatory and response variables. Because the panel of data used contains observations of many cross-sectional units (administrative regions) at different points in time (time series), it is appropriate to use a pooled OLS model. A regular OLS model looks at the relationship between explanatory and response variables which are static; pooled OLS accounts for the influence of time on the regression results. Investigating the appropriateness of this model for the conflict outcome variables, however, reveals that this relationship may not be modeled best through a linear model.

For example, below is the residuals plot for the response variable, number of battle events, given explanatory variables \textit{costbarr} and \textit{inscover}, as well as all controls. Residuals are the difference between the predicted value of the response variable given the regression being modeled and the observed statistic. Large residuals reflect a difference between the suggested relationship of the model between the variables and the actual observations used in the dataset. If an OLS model was appropriate, the plot of residuals would be randomly distributed and have no discernible pattern.
Clearly this is not the case. The residuals plot for battle events has an observable positive, linear pattern. This suggests that the pooled OLS model attempting to explain the influence of explanatory variables *costbarr* and *inscover* and the control on predicting the number of battle events does not capture all the key influences that produce conflict. Insofar as the predictive ability and statistical significances of the coefficients produced by the model are concerned, the pooled OLS model again is ineffective in modeling this relationship. The table below, Results 1, presents an output from a pooled OLS testing this relationship, incorporating robust standard errors clustered by administrative region. OLS models treat observations as if each is independent from the next, and therefore not correlated with others in the sample. This is certainly not the case for this data, as new battles are not always independent of past battles, and
regions affected by conflict may likely experience more conflict. Clustering around variables helps models account for and minimize intra-group correlation of observations. I cluster by administrative region because this is the unit of analysis where I look for variation in access to healthcare on the resulting level of battle events (in this regression). Controlling for the influence that one conflict event will have on subsequent conflict events in each administrative region is an important element of any model that seeks to identify the impact that healthcare indicators have on explaining conflict.

\textbf{xtreg} ctype13 costbarr inscover electric prural edu efrac polity gdpcap gini, cluster (admin)

Random-effects GLS regression
Group variable: admin

<p>| | | | | | |</p>
<table>
<thead>
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<tbody>
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<td></td>
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<td>60</td>
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R-sq: within = 0.0111
between = 0.1570
overall = 0.1239

<p>| | | | | | |</p>
<table>
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<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Obs per group</td>
<td>Obs per group</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td>3</td>
<td>5.8</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

corr(u_i, X) = 0 (assumed)
(Std. Err. adjusted for 60 clusters in admin)

\textbf{RESULTS 1}

\textbf{POOLED OLS: AFFORDABILITY INDICATORS ON BATTLE EVENTS}

| CTYPE13 | COEFFICIENT | ROBUST STANDARD ERROR | Z-SCORE | P>|Z| | 95% CONFIDENCE INTERVAL |
|---------|-------------|-----------------------|---------|---|-----------------|
| COSTBARR | .084318     | .604093               | 0.14    | 0.889 | -1.099683 to 1.268319 |
| INSCOVER | -2.944667   | 2.630049              | -1.12   | 0.263 | -8.099468 to 2.210134 |
| ELECTRIC | -5.644067   | 5.05695               | -1.12   | 0.264 | -15.55551 to 4.267374 |

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Though I employ clustering effects on this model, I find that none of the explanatory variables are statistically significant, even though the initial correlations suggested otherwise. Further, a post-estimation test was conducted to see if the results are biased due to missing variables. The results indicated that in fact this model is skewed due to missing variables (Appendix, Ramsey Reset Test for Results 1). Though I was able to populate data into the panel using the most recent statistics for each indicator for many cases, it appears there is still insufficient data to make use of a pooled OLS model.

Given the shortcomings of the pooled OLS model, I turn towards two other models which may be more appropriate for modeling these relationships: poisson and negative binomial
regressions. These two models are specifically useful for response variables that are “counts.” Count variables indicate how many times something has happened, such as the number of violent, non-battle events that occur in an administrative region, or the number of fatalities that take place in a region. Linear models such as the OLS have been used to estimate count variables, but as we have seen there are problems trying to offer predictive values for outcome variables that are unbiased and reasonable. Thus, poisson and negative binomial regressions may offer a better alternative to OLS. Poisson models examine the relationship between the expected count of an outcome variable, and the probability of observing any expected count. This is potentially a better model for the relationship I am testing because outputs can help us predict what the count of the outcome variable (e.g. number of conflicts) will be given explanatory variables like healthcare indicators.

A related count regression model, the negative binomial regression, takes the poisson model a bit further and accounts for observed heterogeneity among sample members. This is useful because this model accounts for differences in the administrative regions being analyzed while it tries to predict the number of conflict events we should see given healthcare access and control variables. When regressing outcome and explanatory variables using poisson and negative binomial regressions, I conduct post estimation tests to see which model is more appropriate for modeling the dataset I have created. An example of this process follows, as I use both poisson and negative binomial regressions to predict the number of battle events (ctype13) given concern that there is not a provider at a health facility (crnprov) and concern about there being no medication at a facility (crnomeds).
Poisson regression

Number of obs = 229
Wald chi2(9) = 164.21
Prob > chi2 = 0.0000
Log pseudolikelihood = -932.53538
Pseudo R2 = 0.4702
(Std. Err. adjusted for 30 clusters in admin)

 RESULTS 2
POISSON: AVAILABILITY INDICATORS ON BATTLE EVENTS

| CTYPE13     | COEFFICIENT | ROBUST STANDARD ERROR | Z-SCORE | P>|Z| | 95% CONFIDENCE INTERVAL |
|-------------|-------------|------------------------|---------|-----|----------------------------|
| CRNPROV     | 1.255858    | .4915037               | 2.56    | 0.011 | .2925289 - 2.2191888      |
| CRNOMEDS    | -.9029587   | .3019407               | -2.99   | 0.003 | -1.494752 - -.3111659     |
| ELECTRIC    | 1.378662    | 2.340452               | 0.59    | 0.556 | -3.20854 - 5.965865       |
| PRURAL      | -.2220856   | .0852661               | -2.60   | 0.009 | -.389204 - -.0549671      |
| EDU         | -4.466397   | 1.79073                | -2.49   | 0.013 | -7.976163 - -.9566309     |
| EFRAC       | 320.1333    | 112.9652               | 2.83    | 0.005 | 98.72561 - 541.5409       |
| POLITY      | .1091256    | .0619456               | 1.76    | 0.078 | -.0122855 - .2305366      |
| GDPCAP      | -.0015996   | .0007702               | -2.08   | 0.038 | -.0031091 - .0000901      |
| GINI        | -2.683727   | .8798359               | -3.05   | 0.002 | -4.408174 - -.9592805     |
| _CONS       | -140.5069   | 58.02409               | -2.42   | 0.015 | -254.232 - 26.78178       |

poisgof

Deviance goodness-of-fit = 1551.453
Pearson goodness-of-fit = 3987.765

Prob > chi2(219) = 0.0000
Prob > chi2(219) = 0.0000

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The results of the poisson regression seem promising. There are seven statistically significant explanatory variables captured by the model. However, the large value of the chi-squared
statistic produced by the poisson goodness-of-fit (poisgof) post-estimation command indicates that the poisson model is not appropriate for this data. A large chi-squared value that is statistically significant well below the p < 0.05 level, as we see here, suggests that there is a degree of over dispersion in the data that the poisson model is not picking up.

Turning to the results of the negative binomial regression, we see that there are less statistically significant variables produced by the model. However, when checking for the goodness-of-fit of this model for the data being regressed, it is important to see an alpha score that is not zero. As this is the case, I must take this model to be the more appropriate count regression model than the poisson regression. Additionally, I plotted the predicted values for count of battle events per the negative binomial regression along with the observed count of battle events in the dataset. As the two curves are nearly identical, this affirms my decision that the negative binomial regression is a good fit for modeling this dataset.

![Predicted vs. Observed Pr(y=k) from nbreg](image)
Seeing as the negative binomial regression, clustered by administrative regions, is a model with a good fit for the data, I use this formula to test for a relationship between each of the elements of access to healthcare and the various conflict outcomes controlling for the variables I discuss previously. The results of these regressions are in the tables in the Appendix. Overall, the results are mixed. Hypothesis 1a was largely supported; with the exception of accessibility and acceptability indicators, and one social access indicator, there were no statistically significant predictive effects of access to healthcare variables on the number of conflicts that take place in subnational administrative regions in this sample.

Those indicators that are statistically significant per this model only partially support hypothesis 1b. As the distance to get to a healthcare facility becomes more of a problem by one unit, it is predicted by the model that the log of the number of conflicts will decrease by a value of 1.071. This supports the initial correlation between these variables. This may suggest that as individuals are further from health facilities, they are less likely to engage in conflict because they are also faced with shortage of other public services/infrastructure. This lack of access may just be the status quo, and thus not something worth fighting about. The regression output for this situation also shows that as the percentage of the population living in rural areas rises, there is a statistically significant decrease in conflict. These two variables may go hand-in-hand, suggesting that the number of conflict events is lower in largely rural areas, and that these areas may have less healthcare facilities close-by.

Another statistically significant indicator, role in decision-making, matches the initial correlation. As the regional average score for autonomy in decision-making increases, the log of the number of conflicts is predicted to increase by .3457. Again, this may reflect that as more
people feel empowered to seek healthcare and take health into their own hands, they may be inclined to speak or act out if the services provided are inadequate. Lastly, two indicators were found to be statistically significant in this model that were not initially correlated with this conflict response variable—needing transport to seek healthcare and concern about there not being a female provider. As both needing transport and concerns that there will not be a female provider at a health facility become more problematic, the log of the number of conflicts is predicted to increase. These indicators for the accessibility and acceptability of healthcare may indicate that if healthcare services offered do not meet the needs of the patients, individuals may be incensed enough to voice their grievances.

I personally have seen this in the work that I conduct with a marginalized community outside of Santo Domingo, Dominican Republic. This particular community is located on the fringes of the capital district, in an area where basic infrastructure exists but public healthcare facilities are over miles away from the community and hard to access without private transportation. As many of the people who need healthcare most in this community are elderly individuals, it is hard for them to walk to the facility or to leave young children for long periods of time to make the journey if they can get a ride. This is a point of tension for many community members, and has been an especially hot topic of discussion at community meetings I have witnessed when local government officials are present.

As for hypothesis 2b, we again see mixed results. As I stratified the number of conflicts into three groups of varying intensities (non-violent, violent but non-battle, and battle events), we would expect to see more violent and battle events as access to healthcare goes down. For predicting the number of non-violent conflict event, only the number of physicians
(accommodation) and needing permission (social access) were found to influence conflict at statistically significant levels. As the number of physicians increases, the log of the count of non-violent conflict events is predicted to decrease by 17.7873. This supports the initial hypothesis. As the number of accessible doctors increases, we expect to see less conflict. There may be less concern or grievance about the status of healthcare that would be intense enough to prompt collective, non-violent action. Further, as needing permission to seek care becomes more of a problem (a 1 point increase on the coded scale), the log of the number of non-violent conflict events is predicted to increase by 1.1268. This too seems to support the logic of the grievance argument. As the barriers to access to healthcare increase—here a social access barrier gets bigger—individuals may become frustrated enough to express their concerns publicly through non-violent action.

The next level of conflict intensity is the count of violent, non-battle events (e.g. riots/protests, violence against civilians). Again, needing permission to seek healthcare has a positive and statistically significant relationship when predicting the log of the count of these events. As needing permission becomes more problematic, the log of the predicted number of counts of violent, non-battle conflicts increases by .4842. This may reflect that if social access barriers are intense enough, individuals who may have initially expressed grievances in non-violent ways may escalate to violence. Protests could become violent riots, as was the case in China when frustrations about the government’s response to the AIDS scandal was minimal and evasive. Another social access indicator, role in decision-making, was found to be statistically significant. As individuals have more autonomy in their health decisions, we expect to see an increase in the log of violent, non-battle conflicts. This supports the initial theory that patients who have more
control over their healthcare decisions may grow to vocalize more of their demands from service providers, even through protests or riots if their expectations are not met.

Other indicators which were found to have statistically significant inverse relationships to the log of the count of violent, non-battle conflicts are distance to a facility, needing transport to get to a facility (accessibility), and the number of physicians (accommodation). As for the accessibility indicators, when issues related to travel to healthcare services become more problematic, the model suggests we will see fewer violent, non-battle conflicts. This may reflect that travel issues are not enough of problems to incite violent riots or protests. It may be the case that travel issues, in tandem with other access issues, may provoke violent action by dissatisfied patients, but that alone these issues are not sufficient to cause increased conflict. Lastly, the greater the number of physicians, the less likely we are to see violent, non-battle conflicts. This seems logical and may support the state capacity argument for civil conflict. As the capacity of the state to accommodate its patients increases, we see less riots and protests as a result.

The third level of intensity for conflict events is battle events. These events all occur within the context of civil war. The negative binominal models indicate that as concerns about there not being a female provider at a facility become more problematic, and patients’ level of autonomy in healthcare decision-making increase, the log of the count of battle events should rise. As concern about there being a female provider at a facility proxies the acceptability of healthcare services, this positive relationship may suggest that individuals may seek to replace regimes that offer unacceptable healthcare services. The state may not have the capacity to employ properly acceptable health professionals, or it may not prioritize making healthcare (and other services for that matter) acceptable for the majority of its constituency. In cases like these,
it may be enough that citizens band together and work to overthrow that government which is failing them. Furthermore, if individuals have more autonomy in healthcare decision-making, it may reflect a degree of social flexibility and freedom of expression. If people have stronger opinions about and desires for their healthcare system, but that system is not proving acceptable, more social freedoms may give citizens the room to collect and organize to challenge the government and install one that will meet their needs.

The last measure of conflict intensity investigated in this study is the number of conflict related fatalities. The model produced indicates that as the number of beds increases the log of the number of fatalities will decrease. This is a good conclusion to see, as we would hope that the more spaces and infrastructural units there are to care for patients, less people will die in conflict affected states. Additionally, we see that the more autonomy people share in decision-making, the greater the log of the count of fatalities should be. This may not seem logical at first, but it can extend the conclusion about the positive relationship between this variable and the number of battle events. If autonomy in decision-making leads to more battle events, it may well follow that more people will die as a result of larger, war-type conflicts.
In sum, the results produced by the negative binomial regression comparing access to healthcare indicators, control variables, and measures of civil conflict are mixed. Accessibility, Acceptability, Accommodation, and Social Access elements of “access to healthcare” seem to matter for predicting the number of and intensity of conflict events, though these relationships do not always move in the same direction. Issues with accessibility of healthcare, at least for this population of regions sampled, do not incite more conflict. Social access elements of access to healthcare, however, are positively associated with conflict. This conclusion supports the grievance argument that frustrations about healthcare access and the social norms which influence access to healthcare may be enough to prompt civil conflict increasing in sheer magnitude and intensity. Last, we see the good sign that better capacity for states to accommodate patients, a reflection of greater state capacity, should dampen conflict. This, too, supports the idea that stronger and more capable states will see less violence.

While this initial research suggests that there is a statistically significant relationship between access to healthcare and civil conflict, this is only the first step of many that can be taken to define this interaction further. Given my capabilities with statistical modeling, I was able to employ an appropriate negative binomial regression to this dataset, using clustering by
administrative regions to produce robust standard errors and correct for any intraregional correlation of conflict events within this dataset. However, this model can be improved by conducting a time-series negative binomial model. The model I use only looks at each observation at a static point in time, therefore not accounting for the influence that unique, fixed effects within the administrative regions have on conflict outcomes across the entire span of 17 years for which I have data. A time series negative binomial regression will take this missing factor into account, and may provide more accurate statistic relationship between these variables.

Other researchers\textsuperscript{100} have employed logit models and time-series logit models to measure the impact of explanatory variables on conflict outcomes. These models may be appropriate to test out in the future, but given the time and data constraints of an undergraduate thesis, I was unable to complete these. A recent study examining the impact of economic deprivation using indicators from DHS surveys relied upon GIS methodologies to examine the spatial element of DHS data and conflict outcomes.\textsuperscript{101} This method could also be employed, and would perhaps improve the estimation of relationships between accessibility indicators and conflicts. Lastly, future research into this question will have to examine the interaction and reverse causality effects that conflict has on access to healthcare.

Overall, this thesis begins the discussion of the role that access to healthcare plays in predicting civil conflict. Though results are mixed, it is exciting to see that there are statistically significant relationships between healthcare access indicators and measures for civil conflict, at least in conflict affected states in Africa from 1997-2013. The logic of these relationships also tracks along major paradigms in the conflict literature. Hopefully the conclusions of this study will spark greater exchange of insights across the public health and political science disciplines.
Healthcare, something that is largely influenced by the needs and particularities of individual nations, is not standardized across the globe. Beyond that, the normative rhetoric about the importance of health for security or national stability too often falls short of action. If this thesis can prompt further study into the impact that access to healthcare has on something which many policymakers are concerned with—preventing civil conflict—we may just find that the two are linked. If so, this link may encourage future leaders to make access to healthcare a top priority on their agendas, improving social welfare, population health and civil peace in the process.
Appendix

Results: Ramsey Reset Test for Results 1

Ramsey RESET test using powers of the fitted values of ctype13

Ho: model has no omitted variables
F(3, 336) = 26.88
Prob > F = 0.0000

The Prob > F value of 0.0000 indicates there is greater than a 99.99% chance that this model has omitted values. The pooled OLS model is not a good fit for the data.
## OVERALL RESULTS

### HYPOTHESIS 1B

**NEGATIVE BINOMIAL: ACCESS TO HEALTHCARE ON TOTAL NUMBER OF CONFLICTS**

<table>
<thead>
<tr>
<th>Element of Access</th>
<th>Definition</th>
<th>Coefficient</th>
<th>P Value</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AFFORDABILITY</strong></td>
<td>Cost as a Perceived Barrier*</td>
<td>0.1712</td>
<td>0.623</td>
<td>349</td>
</tr>
<tr>
<td></td>
<td>Percent of Population with Insurance Coverage</td>
<td>-1.555</td>
<td>0.417</td>
<td>349</td>
</tr>
<tr>
<td><strong>AVAILABILITY</strong></td>
<td>Concern about there not a provider at the facility*</td>
<td>-0.1221</td>
<td>0.789</td>
<td>229</td>
</tr>
<tr>
<td></td>
<td>Concern about there not being medication at the facility*</td>
<td>0.1001</td>
<td>0.745</td>
<td>229</td>
</tr>
<tr>
<td><strong>ACCESSIBILITY</strong></td>
<td>Distance to a facility*</td>
<td>-1.071</td>
<td><strong>0.024</strong></td>
<td>631</td>
</tr>
<tr>
<td></td>
<td>Needing to seek transport to get to a facility*</td>
<td>0.9276</td>
<td><strong>0.043</strong></td>
<td>631</td>
</tr>
<tr>
<td><strong>ACCOMMODATION</strong></td>
<td>Number of physicians per 1,000 population</td>
<td>-3.834</td>
<td>0.120</td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>Number of hospital beds per 10,000 population</td>
<td>-0.0032</td>
<td>0.280</td>
<td>419</td>
</tr>
<tr>
<td><strong>ACCEPTABILITY</strong></td>
<td>Concern about there not being a female medical provider at a facility*</td>
<td>0.1918</td>
<td><strong>0.018</strong></td>
<td>581</td>
</tr>
<tr>
<td></td>
<td>Needing Permission to Seek Healthcare*</td>
<td>0.4769</td>
<td>0.092</td>
<td>776</td>
</tr>
<tr>
<td><strong>SOCIAL ACCESS</strong></td>
<td>Who has final say over health decisions**</td>
<td>0.3457</td>
<td><strong>0.000</strong></td>
<td>776</td>
</tr>
<tr>
<td></td>
<td>Concern about going alone to healthcare facility*</td>
<td>-0.3568</td>
<td>0.239</td>
<td>776</td>
</tr>
</tbody>
</table>

* *Coded such that a higher score indicates that this is more of a problem when seeking healthcare*

**Coded such that a higher score indicates more autonomy in decision-making about healthcare needs**

**Significant at the p < .05 level**

Code in STATA 13: `nbreg [numconf] [indicators for each element of access] [all controls], vce (cl admin)`

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## OVERALL RESULTS
### HYPOTHESIS 2Bi
#### NEGATIVE BINOMIAL: ACCESS TO HEALTHCARE ON NON-VIOLENT CONFLICTS

<table>
<thead>
<tr>
<th>Element of Access</th>
<th>Definition</th>
<th>Coefficient</th>
<th>P Value</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFFORDABILITY</td>
<td>Cost as a Perceived Barrier*</td>
<td>0.1257</td>
<td>0.692</td>
<td>349</td>
</tr>
<tr>
<td></td>
<td>Percent of Population with Insurance Coverage</td>
<td>-2.4537</td>
<td>0.366</td>
<td>349</td>
</tr>
<tr>
<td>AVAILABILITY</td>
<td>Concern about there not a provider at the facility*</td>
<td>-0.2039</td>
<td>0.741</td>
<td>229</td>
</tr>
<tr>
<td></td>
<td>Concern about there not being medication at the facility*</td>
<td>0.7082</td>
<td>0.851</td>
<td>229</td>
</tr>
<tr>
<td>ACCESSIBILITY</td>
<td>Distance to a facility*</td>
<td>-1.0501</td>
<td>0.378</td>
<td>631</td>
</tr>
<tr>
<td></td>
<td>Needing to seek transport to get to a facility*</td>
<td>1.3778</td>
<td>0.232</td>
<td>631</td>
</tr>
<tr>
<td>ACCOMMODATION</td>
<td>Number of physicians per 1,000 population</td>
<td>-17.7873</td>
<td>0.006</td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>Number of hospital beds per 10,000 population</td>
<td>0.0105</td>
<td>0.103</td>
<td>419</td>
</tr>
<tr>
<td>ACCEPTABILITY</td>
<td>Concern about there not being a female medical provider at a facility*</td>
<td>0.2809</td>
<td>0.212</td>
<td>581</td>
</tr>
<tr>
<td>SOCIAL ACCESS</td>
<td>Needing Permission to Seek Healthcare*</td>
<td>1.1268</td>
<td>0.034</td>
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</tr>
<tr>
<td></td>
<td>Who has final say over health decisions**</td>
<td>0.2690</td>
<td>0.079</td>
<td>776</td>
</tr>
<tr>
<td></td>
<td>Concern about going alone to healthcare facility*</td>
<td>-0.7321</td>
<td>0.201</td>
<td>776</td>
</tr>
</tbody>
</table>

*Coded such that a higher score indicates that this is more of a problem when seeking healthcare

**Coded such that a higher score indicates more autonomy in decision-making about healthcare needs

Significant at the p < .05 level

Code in STATA 13: `nbreg` [ctype11] [indicators for each element of access] [all controls], vce (cl admin)
## OVERALL RESULTS

**HYPOTHESIS 2Bii**

**NEGATIVE BINOMIAL: ACCESS TO HEALTHCARE ON VIOLENT, NON-BATTLE CONFLICTS**

<table>
<thead>
<tr>
<th>Element of Access</th>
<th>Definition</th>
<th>Coefficient</th>
<th>P Value</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AFFORDABILITY</strong></td>
<td>Cost as a Perceived Barrier*</td>
<td>0.2958</td>
<td>0.162</td>
<td>349</td>
</tr>
<tr>
<td></td>
<td>Percent of Population with Insurance Coverage</td>
<td>-0.6857</td>
<td>0.701</td>
<td>349</td>
</tr>
<tr>
<td><strong>AVAILABILITY</strong></td>
<td>Concern about there not a provider at the facility*</td>
<td>-0.3719</td>
<td>0.406</td>
<td>229</td>
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<td></td>
<td>Concern about there not being medication at the facility*</td>
<td>0.2774</td>
<td>0.377</td>
<td>229</td>
</tr>
<tr>
<td><strong>ACCESSIBILITY</strong></td>
<td>Distance to a facility*</td>
<td>-1.6554</td>
<td><strong>0.000</strong></td>
<td>631</td>
</tr>
<tr>
<td></td>
<td>Needing to seek transport to get to a facility*</td>
<td>1.5146</td>
<td><strong>0.001</strong></td>
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<tr>
<td><strong>ACCOMMODATION</strong></td>
<td>Number of physicians per 1,000 population</td>
<td>-5.9698</td>
<td><strong>0.000</strong></td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>Number of hospital beds per 10,000 population</td>
<td>0.0010</td>
<td>0.866</td>
<td>419</td>
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<tr>
<td><strong>ACCEPTABILITY</strong></td>
<td>Concern about there not being a female medical provider at a facility*</td>
<td>0.1220</td>
<td>0.095</td>
<td>581</td>
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<tr>
<td><strong>SOCIAL ACCESS</strong></td>
<td>Needing Permission to Seek Healthcare*</td>
<td>0.4842</td>
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<td></td>
<td>Who has final say over health decisions**</td>
<td>0.2260</td>
<td><strong>0.005</strong></td>
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<td></td>
<td>Concern about going alone to healthcare facility*</td>
<td>-0.4365</td>
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<td>776</td>
</tr>
</tbody>
</table>

*Coded such that a higher score indicates that this is more of a problem when seeking healthcare*

**Coded such that a higher score indicates more autonomy in decision-making about healthcare needs**

Significant at the p < .05 level

Code in STATA 13: `nbreg [ctype12] [indicators for each element of access] [all controls], vce (cl admin)`
### OVERALL RESULTS
#### HYPOTHESIS 2Biii
#### NEGATIVE BINOMIAL: ACCESS TO HEALTHCARE ON BATTLE CONFLICTS

<table>
<thead>
<tr>
<th>Element of Access</th>
<th>Definition</th>
<th>Coefficient</th>
<th>P Value</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AFFORDABILITY</strong></td>
<td>Cost as a Perceived Barrier*</td>
<td>0.5214</td>
<td>0.423</td>
<td>349</td>
</tr>
<tr>
<td></td>
<td>Percent of Population with Insurance Coverage</td>
<td>-3.3889</td>
<td>0.185</td>
<td>349</td>
</tr>
<tr>
<td><strong>AVAILABILITY</strong></td>
<td>Concern about there not a provider at the facility*</td>
<td>-0.0218</td>
<td>0.972</td>
<td>229</td>
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<td></td>
<td>Concern about there not being medication at the facility*</td>
<td>-0.2000</td>
<td>0.520</td>
<td>229</td>
</tr>
<tr>
<td><strong>ACCESSIBILITY</strong></td>
<td>Distance to a facility*</td>
<td>0.5436</td>
<td>0.418</td>
<td>631</td>
</tr>
<tr>
<td></td>
<td>Needing to seek transport to get to a facility*</td>
<td>-0.5393</td>
<td>0.397</td>
<td>631</td>
</tr>
<tr>
<td><strong>ACCOMMODATION</strong></td>
<td>Number of physicians per 1,000 population</td>
<td>7.320</td>
<td>0.182</td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>Number of hospital beds per 10,000 population</td>
<td>-0.0070</td>
<td>0.094</td>
<td>419</td>
</tr>
<tr>
<td><strong>ACCEPTABILITY</strong></td>
<td>Concern about there not being a female medical provider at a facility*</td>
<td>0.4597</td>
<td><strong>0.027</strong></td>
<td>581</td>
</tr>
<tr>
<td><strong>SOCIAL ACCESS</strong></td>
<td>Needing Permission to Seek Healthcare*</td>
<td>0.5010</td>
<td>0.234</td>
<td>776</td>
</tr>
<tr>
<td></td>
<td>Who has final say over health decisions**</td>
<td>0.4207</td>
<td><strong>0.024</strong></td>
<td>776</td>
</tr>
<tr>
<td></td>
<td>Concern about going alone to healthcare facility*</td>
<td>0.0982</td>
<td>0.818</td>
<td>776</td>
</tr>
</tbody>
</table>

* Coded such that a higher score indicates that this is more of a problem when seeking healthcare
** Coded such that a higher score indicates more autonomy in decision-making about healthcare needs

Significant at the p < .05 level

Code in STATA 13: `nbreg [ctype13] [indicators for each element of access] [all controls], vce (cl admin)`
## OVERALL RESULTS
### HYPOTHESIS 2Biv
### NEGATIVE BINOMIAL: ACCESS TO HEALTHCARE ON FATALITIES

<table>
<thead>
<tr>
<th>Element of Access</th>
<th>Definition</th>
<th>Coefficient</th>
<th>P Value</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AFFORDABILITY</strong></td>
<td>Cost as a Perceived Barrier*</td>
<td>-0.4047</td>
<td>0.436</td>
<td>349</td>
</tr>
<tr>
<td></td>
<td>Percent of Population with Insurance Coverage</td>
<td>-0.7016</td>
<td>0.789</td>
<td>349</td>
</tr>
<tr>
<td><strong>AVAILABILITY</strong></td>
<td>Concern about there not a provider at the facility*</td>
<td>-0.3108</td>
<td>0.602</td>
<td>229</td>
</tr>
<tr>
<td></td>
<td>Concern about there not being medication at the facility*</td>
<td>0.0803</td>
<td>0.812</td>
<td>229</td>
</tr>
<tr>
<td><strong>ACCESSIBILITY</strong></td>
<td>Distance to a facility*</td>
<td>-0.8917</td>
<td>0.181</td>
<td>631</td>
</tr>
<tr>
<td></td>
<td>Needing to seek transport to get to a facility*</td>
<td>0.4902</td>
<td>0.480</td>
<td>631</td>
</tr>
<tr>
<td><strong>ACCOMMODATION</strong></td>
<td>Number of physicians per 1,000 population</td>
<td>8.339</td>
<td>0.215</td>
<td>419</td>
</tr>
<tr>
<td></td>
<td>Number of hospital beds per 10,000 population</td>
<td>-0.0109</td>
<td><strong>0.003</strong></td>
<td>419</td>
</tr>
<tr>
<td><strong>ACCEPTABILITY</strong></td>
<td>Concern about there not being a female medical provider at a facility*</td>
<td>0.2343</td>
<td>0.094</td>
<td>581</td>
</tr>
<tr>
<td><strong>SOCIAL ACCESS</strong></td>
<td>Needing Permission to Seek Healthcare*</td>
<td>0.0723</td>
<td>0.830</td>
<td>776</td>
</tr>
<tr>
<td></td>
<td>Concern about going alone to healthcare facility*</td>
<td>0.1945</td>
<td>0.596</td>
<td>776</td>
</tr>
<tr>
<td></td>
<td>Who has final say over health decisions**</td>
<td>0.7117</td>
<td><strong>0.000</strong></td>
<td>776</td>
</tr>
</tbody>
</table>

*Coded such that a higher score indicates that this is more of a problem when seeking healthcare

**Coded such that a higher score indicates more autonomy in decision-making about healthcare needs

Significant at the p < .05 level

Code in STATA 13: `nbreg [fatalities] [indicators for each element of access] [all controls], vce (cl admin)`
7 For example, Murray et al, 2002 discuss armed conflict as a public health problem. They describe armed conflict as one of the major health challenges of the new millennium as the spread of conflict contributes to the spread of disease, increase the number of years of lost life in national life expectancies and disability-adjusted life years, and undermine the health of national populations. Murray, Christopher JL, Gary King, Alan D. Lopez, Niels Tomijima, and Etienne G. Krug, "Armed conflict as a public health problem," *BMJ* 324, no. 7333 (2002): 346-349.


Most are panel type comparisons, OLS models and one Quantile panel type model.


Ibid.


There is an emerging body of literature which examines meso-level theories of civil conflict. Roessler, for example, proposes a political networks hypothesis of civil war which examines the effect of the inclusivity of a regime’s patronage network on risk of armed rebellion. Roessler, In the Shadow of the Coup d’Etat, April 2013, pp. 48. This level of analysis, like the micro-level, is not the most appropriate level of examination for an investigation of access to health and healthcare as existing indicators for health variables are not fine enough to reflect cleavages at the political network level.

Ibid, 564.


Price-Smith, Health of Nations.

Legitimate regimes tend to have large and oftentimes loyal military and police establishments capable of carrying out political repression and/or coercive activities. Gurr, “A Model of Civil Strife,” pp. 1121.


Derived from a smaller section of economics literature, the essence of greed-based hypotheses for the cause of civil conflict is that rebellion is explained by the atypical circumstances that generate profitable opportunities for participants. Collier and Hoeffler, “Greed & Grievance in Civil War,” pp. 564.

Collier and Hoeffler, “Greed & Grievance in Civil War,” pp. 565; 570; 563.

Kahl, States, Scarcity and Civil Strife, pp. 10


Price-Smith, Health of Nations, pp. 25.


Besley and Persson, "State Capacity”


Collier and Hoeffler, “Greed & Grievance in Civil War,” pp. 568


Price-Smith, *The Health of Nations*, pp. 80


The attributes of state capacity are Fiscal Resources, Human Capital, Reach and Responsiveness, Resilience, Legitimacy, Autonomy, Coherence, Instrumental Rationality. These are adopted from the Project on Environmental Scarcities, State Capacity and Civil Violence.

Price-Smith, *The Health of Nations*, pp. 27.

This measures the effect of infectious disease on the first tail of the population demographic, children under age 5. If disease is more prevalent and/or disease prevention is lacking, this number rises. (Does not reflect long-term illness, however, such as HIV/AIDS).

This measures the total burden of disease on a specified population. Not necessarily sensitive only to infectious disease since it reflects other causes of mortality (e.g. accidents, suicides and violence).

Price-Smith, *The Health of Nations*, pp. 70.

Peterson and Shellman, “HIV/AIDS and Violent Conflict”

Peterson and Shellman, “HIV/AIDS and Violent Conflict”


Yuan, “AIDS Patients Protest in Henan”

Yuan, “AIDS Patients Protest in Henan”


86No author, “Thousands Protest in Spain”


90Kahl, *States, Scarcity and Civil Strife*,


97ACLED codebook


100E.g. Peterson & Shellman, ØStby et al.

101ØStby et al, “Regional Inequalities and Civil Conflict in Sub-Saharan Africa,” np.