The Road Into the Future of Health Care: The Importance of Addressing Access to Health Facilities in Transportation Infrastructure Investment Decisions

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The Road Into the Future of Health Care:
The Importance of Addressing Access to Health Facilities in Transportation Infrastructure Investment Decisions

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Fall, 2016

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Abstract

Background
One school of thought argues that transportation infrastructure is not an ultimate end goal of development and therefore shouldn’t be addressed within development funding decisions while the other argues that transportation infrastructure is the crucial foundation from which all development efforts are based and therefore needs to be addressed within development funding decisions. Within this framework, there is a lack of academic and other research addressing how physical access to health care for pregnant women can better be addressed when making decisions regarding funding of transportation infrastructure projects.

Purpose
To demonstrate the importance of considering access to health care facilities when making infrastructure funding decisions by providing evidence of the impacts such decisions have on pregnant women in sub-Saharan Africa. We also hope to provide tangible suggestions for how to make changes, from a policy standpoint in order to implement these suggestions. Finally, we hope to open a dialogue regarding what factors, apart from economic revenue, should and can be better considered when making funding decisions regarding infrastructure investments.

Method
Primary research, collected in the form of interviews with experts in the fields of health, transportation and policy and the collection of secondary research in the form of peer reviewed journal articles and reports from major development and humanitarian organizations were all used to help support this investigation. Ethical considerations were abided by throughout.

Results
We find that considering physical access to health care at the start of projects, for example in the case of PPIs, will likely help to ensure that transportation infrastructure projects do address concerns regarding health, without much extra required effort or money. We also find that by increase the amount of communication between ministers in SSA, there is likely to better consideration of health within transport decisions and vice versa. Furthermore, we see that there are many other benefits that come from improved transportation infrastructure in rural areas such as improved potential for economic growth and increased access to hubs of ingenuity.

Conclusions
We demonstrate the importance of physical access to health care for pregnant women and how vital the consideration of this topic is within transportation infrastructure funding decisions.

Key Words (alphabetically): Civil Engineering, Economics, Health Care Management, Human Development, Management, Obstetrics & Gynecology (including Midwifery), Public Administration, Public Health, Transportation

Other works by the author:
Preface

I am interested in understanding how political decisions can be made in more effective and efficient ways so as to ensure vulnerable groups receive the support they deserve as a fundamental human right. I am passionate about ensuring everyone has an equal opportunity to pursue the life they wish to live and I do not believe that poor health care or any other reasons resultant from where an individual was born, should impact their potential or hamper their ability to achieve. For this reason, I have conducted academic research for the past 4 years into the idea of infrastructure criticality. It is this idea of criticality that sparked my interest in how important transportation infrastructure is in accessing health care services. Once I started reading into the topic, I realized that there was very little literature advocating for politically addressing the issue of physical access to health care facilities. This is why I chose to contribute my thesis research towards ensuring political actors and players take into account access to health care when they are making decisions regarding what pieces of infrastructure they will fund or support. It is my hope that I have fully detailed the reasons for why this field should be considered in funding decisions and that I have provided potential options for how this can be done effectively. I also hope that ultimately I will be able to implement solutions such as I have proposed here, so as to better ensure that vulnerable groups of people have the support they need in order to receive their fundamental human right of access to necessities such as primary health care facilities.

Acknowledgments

Before beginning this investigation, I would like to take a moment to thank the advisors I have been so fortunate to have had with me throughout this process, without whom I would not have been able to complete this work. I would like to thank Dr. Alexandre Lambert and Dr. Anne Golaz for helping me to formulate the approach I took to this paper, for helping guide me to come up with strong aspects of my analysis, for helping me to find contacts and for teaching insightful and interesting classes on policy and health aspects of humanitarian aid and development. I would also like to thank Dr. Paul Chinowsky, my long-standing research advisor, whom I have worked with for nearly four years. Without his introduction to this field of research, his guidance and constant support in my exploration of it and his provision of resources, insight and leadership throughout my experience in it, I would never have been able to make the progress I have made in this work thus far. I would also like to thank the other staff of the SIT program, Françoise Flourens and Christine Cornes, for making our semester possible and successful. I would like to thank the Boettcher Foundation for making my attendance of CU and this study abroad program in addition to my engagement in all other academic activities possible through financial, intellectual and community support. I would also like to thank the experts I met with for their valuable time and insight into my topic of investigation. These experts include Dr. Chinowsky, Dr. Evans, Mr. Garcia, Dr. Kacyira, Mr. Ritsch, Dr. Weiss, an expert from a development bank whom wished to remain anonymous and a government official who also wished to remain anonymous. Finally, I would like to thank my parents and my significant other for their unconditional provision of emotional, intellectual and physical support throughout all of my endeavors. Without them, I would not be where I am today. Thank you so much to all of those who made this paper possible.
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List of Acronyms:

CSF: Critical Success Factor
GDP: Gross Domestic Product
MDGs: Millennium Development Goals
NEPAD: New Partnership for Africa’s Development
PPI: Private Participation in Infrastructure
PPP: Private Public Partnership
SDGs: Sustainable Development Goals
SSA: Sub-Saharan Africa
UN: United Nations
UNFPA: United Nations Fund for Population Activities
UNPD: United Nations Population Division
WHO: World Health Organization
WBG: World Bank Group
Introduction

The continent of Africa has a “pronounced infrastructure deficit” when compared to all other global regions, with the weakest and least addressed sectors being transportation and energy infrastructure\(^1\). When limiting the scope of analysis to solely developing regions, Sub-Saharan Africa (SSA) (recognized by the World Bank Group to be the poorest region of the world\(^2\)) remains the cluster of countries with the least amount of transportation facilities, having a generally lower overall infrastructure density than Latin America, Asia\(^3\) and other comparable low-income regions\(^4\). A map visually demonstrating this can be found Appendix A. This lack of transportation infrastructure within SSA is often considered a determinant of poverty\(^5\) and unfortunately has far reaching negative consequences on many critical factors. These include the potential for economic growth through trading\(^6\), agriculture\(^7\) and tourism, the lack of access to markets and hubs of ingenuity\(^8\) and, as will be the focus of this paper, access to and utilization of health care services\(^9\). Given these negative impacts, recent developments within the political approach to what infrastructure should be invested in and where it should be located have started to take elements such as those listed above into consideration\(^10\). However, a critical element that

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2 World Bank Group and Poverty Reduction and Equity Management (2015) The State of the Poor: Where are the Poor and where are they Poorest?
8 Porter, G. (2014)
seems to have been unaddressed by these recent policies has been the impact that transportation infrastructure has on giving access to health care facilities within SSA\textsuperscript{11}.

Physical or “spatial” access, one of the two forms of access to health care facilities (the other being “aspatial” access)\textsuperscript{12}, is a necessary component for people’s ability to effectively reach, use and benefit from health care facilities, especially within the rural spread of many SSA countries\textsuperscript{13}. Because of the wide range of conditions and considerations required, from a medical perspective, for people coming from different age groups, gender backgrounds and people with different abilities, we will narrow the scope of our investigation to just pregnant women and mothers with infants. In doing this, we will be addressing the needs of the demographic group often deemed among the most vulnerable, in terms of medical needs and potential health risks/outcomes, within SSA\textsuperscript{14}. We will also then be able to make use of the three stages of delay model which details and explains the three barriers pregnant women face when accessing health services with the three steps including; delay in deciding to seek medical care, delay in reaching the health facility and delay in receiving adequate care once at the health facility\textsuperscript{15}. It is within this context that the existing limited research has been done regarding how transportation infrastructure impacts pregnant women’s access to health care services. However, as was noted above, these observations have not yet been translated into policy considerations regarding infrastructure development and investment, which is one of the primary focuses and objectives of this paper.

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Before continuing, there are several key points to note. The first and most crucial is that although this paper advocates for increased consideration of transportation infrastructure in ensuring access to primary health care facilities for pregnant women within SSA and highlights the benefits that could potentially result from such implemented changes, the author realizes that there are many different components that are required in order to ensure adequate access to health care facilities for pregnant women in SSA. While transportation infrastructure is simply one of the pieces of the puzzle, the author hopes to demonstrate how crucial it is as a building block for the health care “machine” and how it has yet to be fully addressed within policy-making procedures. Secondly, the author also recognizes that there are many social, economic and cultural influencing factors regarding access to health care facilities. However, these will not be addressed by the scope of this paper due to space constraints. Finally, the paper will be addressing the policy and decision making process of just the governments of SSA, rather than any external development banks or humanitarian aid agencies due to time limitations and practicality of implementation suggestions.

Definitions

In order to avoid confusion stemming from differences in definitions, we will start by defining some of the potentially controversial terms crucial to the exploration of this subject matter in an alphabetical order here.

Access (specifically in reference to health care): Access is a very broad term frequently used by politicians, and it is often not properly defined which can cause confusion and differences in understanding regarding expected outcomes and implementation of policies\(^\text{16}\). Because there is such a wide range of opinions on the matter, we will provide here several different perspectives,

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but will ultimately select one to use for the purpose of this paper. At the most basic level, access can be broken down into two components; spatial access and aspatial access to health care facilities. Spatial access includes consideration of factors such as physical distance, time of travel, duration of travel and geographic factors while aspatial access includes social, cultural, economic or political components that must be taken into consideration with regards to accessing health care services\textsuperscript{17,18}. On a more sophisticated level however, Gulliford et al argue that there are many more factors to take into consideration when discussing access including but not limited to adequate supply of services, financial and organizational barriers, acceptability, consideration of different perspectives and backgrounds and availability, utilization or outcome of a service\textsuperscript{19}. Penchasky and Thomas, the founding fathers of the definition of access, include the five influencing factors to be availability, accessibility, accommodation, affordability and acceptability\textsuperscript{20} while the WHO defines access as having three components including physical accessibility, financial affordability and acceptability\textsuperscript{21}. As one can see, the range of the definition is immense and for the purposes of this paper, we will adhere to the two-component definition of access for simplicity and to reduce confusion.

**Distance:** For the purposes of this paper and many other papers addressing similar topics of physical access to health care facilities, distance does not only include physical mileage of travel, but it also includes travel time, amount of effort required to travel, etc. “Delay in this context

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\textsuperscript{17} Combs Thorsen, V., Sundby, J. and Malata, A. (2012)
[rural areas] is influenced more by the nature of the road and availability of transportation and not the physical distance to health facility\textsuperscript{22}.

**Primary Health Care:** We will use the globally accepted definition of primary health care, provided to us by the WHO in the Alma Ata. In a condensed version the Alma Ata states that primary health care is the essential, basic level of health care that should be universally accessible to everyone and is based on “practical, scientifically sound and socially acceptable methods and technologies”\textsuperscript{23}.

**Transportation Infrastructure:** Within the field of medicine, there are so many different forms of infrastructure that it is essential to note that we are only dealing solely with transportation infrastructure here, focused specifically on roads and programs that accompany road usage. Within the consideration of transportation infrastructure, we take into account not only the distance of road infrastructure, but we also include into this the time it takes to travel along the road and forms of vehicles available to travel in or with.

With the establishment of these key terms, we are ready to explore the details of this topic, its implications and potential policy solutions which if implemented may save the lives of many mothers and children. An explanation of the Three Delays Model can also be found in Appendix B.

**Background**

**Literature Review**

Although the importance of road infrastructure in giving physical access to health care services has been fairly well documented within academic journals and research\textsuperscript{24,25,26,27}, very

\textsuperscript{22} Atuoye et al (2015)
\textsuperscript{23} International Conference on Primary Health Care (1978) *Declaration of Alma-Ata*
\textsuperscript{24} Thaddeus, S. and Maine, D. (1994)
little to no work has been done in order to ensure this factor is methodically taken into consideration within policy decisions regarding investments into infrastructure. There are two different schools of thought with regards to the role that infrastructure plays in humanitarian development efforts. The argument that is more commonly assumed by academics and policy makers within the realm of development aid is that infrastructure and transportation, although key to the ultimate goals and focuses of humanitarian development, are “not ends in themselves” and therefore they should not be a priority of consideration among policy makers within this realm of work. However, on the opposite side of this argument is the idea that “lack of infrastructure serves as one of the most significant obstacles to sustaining and distributing the trajectory of growth and poverty alleviation” and therefore plays a critical role to ensuring development efforts are successful and should be considered as a key factor within policy investment decisions.

In addition to the disagreement about the importance of infrastructure in the ultimate outcomes of development and its consideration within policy goals, there is also discrepancy present regarding the role that private participation in infrastructure (PPIs) can play in the outcome of development within sub-Saharan Africa (SSA). As one of the globally recognized leaders of humanitarian aid and effort, the UN established in its SDGs that it is in support of the involvement of the private sector in the achievement of humanitarian development aid. Along with the UN, many other experts point to the potential benefits PPIs could have on humanitarian

30 Sustainable Development Goals: 17 Goals to Transform Our World 2015a, c.
development initiatives\textsuperscript{31}. However, there are some experts who suggest that involvement of the private sector and privatization of systems that are related to transport and health ultimately don’t serve the public good and allow economic persuasion to excessively influence decisions and actions of public actors\textsuperscript{32}. Finally, most of the literature that is available on how transportation infrastructure relates to the health section focuses the potential harms to health that result from the infrastructure industry including the harms to health from pollution, road accidents and the health effects that are associated with easier access to modes of transport like reduction of physical activity\textsuperscript{33}. The literature background for this topic is lacking in areas and in the areas that it is present, the research is unclear or has substantial disagreement occurring within it.

**Objectives and Research Question**

This paper aims to explore how the concept of giving physical access to primary health care services can be better and more methodically considered within policy decisions regarding infrastructure investment. We will briefly address the importance transportation infrastructure has in ensuring physical access to health care facilities for pregnant women and the larger negative implications the lack of this service has on pregnant women and their children. We will also detail other potential beneficial outcomes associated with improved transportation infrastructure development. We will detail why this issue may not be receiving the appropriate attention it should be and why it should be given more emphasis within political decisions. We will also propose potential policy solutions that may help to better integrate this topic into political discussions and decisions. Finally, the SSA country of Ghana will be used as a case

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study and flagship example of how such policies and partnerships could potentially be adopted and implemented. It is our hope to show here why the element of providing access to health care systems should be better considered when making decisions regarding what infrastructure projects to invest in. We also hope to provide tangible policy suggestions for how this ultimate goal could potentially be achieved. Finally, it is our hope to start a larger dialogue surrounding the topic of how infrastructure investment decisions are made. We would like to encourage the consideration of social, health and cultural impacts infrastructure projects have, in addition to the potential economic revenue they may bring, when making funding decisions. These elements are not currently methodically considered in all infrastructure funding processes.

**Research Methodology**

Because the field of work the author is focusing on is a relatively new field of thought, a combination of both primary sources and secondary sources were used to form the background research for this paper and to provide supporting evidence for the policy proposals. With regards to primary sources, the author was fortunate to be able to meet with and interview a wide variety of experts that had insight into this topic, from the health, transportation or policy perspective. Provided in alphabetical order, the author was able to meet with the following experts; Dr. Paul Chinowsky, an expert advisor within infrastructure criticality and policy making decisions regarding infrastructure investment at the University of Colorado, Dr. David Evans, a lead economist within health facilities for the WBG, Mr. Daniel Martinez Garcia, the pediatric and vaccination advisor for MSF, Dr. Aisa Kacyira, the previous mayor of Kigali, Rwanda and the current director of UN-Habitat, Mr. Markus Ritsch, an engineer with experience in both public

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34 Chinowsky, P. (2016) ‘Professor at University of Colorado, CliCs’. Interview 18 November.
and private infrastructure investment schemes, Dr. Thomas Weiss\textsuperscript{39}, an expert analyst on the UN policies and their impacts on development, an expert from a development bank\textsuperscript{40} with specialties in health financing who wished to remain anonymous and a government official who manages development projects and investments into infrastructure projects\textsuperscript{41} that wished to remain anonymous as well. A table displaying the demographic characteristics of these individuals can be found in Appendix C. All of these experts were selected for their specialties in health, transportation or policy. The author did initially have a difficult time finding experts who would be willing to lend their insight to this subject of study because the topic tends to fall between the areas of expertise most people specialize in and therefore many people didn’t feel comfortable to comment on the subject matter. All of these interviews shed great light onto the topic of study for the author in addition to helping shape and mold the direction of the final analysis and argument. In addition to the use of primary data, secondary data was also used for guidance and theoretical support of arguments made. Databases of search included Google Scholar, the UN library database, CrossMark, ScienceDirect, and JStore. Key search words included: maternal health, road infrastructure investment, infrastructure policy, road infrastructure SSA, second delay, physical access to primary health care facilities, road infrastructure in Ghana, and methods of improved communication within policy settings. The articles found through this search were first read and reviewed and then categorized as directly applicable, tangentially applicable or not applicable. Quotes, notes and summaries were then collected from all the applicable and tangentially applicable articles. The process of snowballing from the collected articles was also used to find other applicable articles. Finally, all protocols for ethical writing were adhered to.

\textsuperscript{40} Development bank expert. Interview, 18 November.
\textsuperscript{41} Government official managing investment decisions. Interview, 17 November.
All interviewers were asked for their consent to share their information and comments and all information learned from external sources have been sited.

**Critical Analysis: Why, How and What Can be Done?**

**Why focus on rural Sub-Saharan Africa?**  
According to the World Bank, SSA is the poorest region in the world, and this trend is not projected to change as the number of impoverished people continues to grow within the SSA region at a faster rate than in relation to the rest of the globe\(^{42}\). Appendix D shows a map demonstrating this visually. SSA is also ranked as the poorest region in terms of infrastructure density, a common measurement of infrastructure presence and quality, of all other global regions with an average of 137 km per 100 square km whereas on average, all other low-income areas have 211 km per 100 square km\(^{43}\). This can be visually seen in Appendix E, a picture of the globe at night showing what areas have electricity and thus forms of infrastructure. It is clear that SSA is lacking in infrastructure. This lack of infrastructure network is one of the most significant deterrents to facilitating and implementing growth and poverty reduction for SSA\(^{44}\). It is more apparent and severe in the rural areas of SSA\(^{45}\) because there is less incentive to invest in these areas and therefore the impacts on access to health care services are even more extreme in the rural areas. In addition to the poor state of infrastructural development, the health condition of the region is also in critical condition. In terms of overall health status, SSA is again ranked as

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\(^{42}\) World Bank Group and Poverty Reduction and Equity Management (no date) *The State of the Poor: Where are the Poor and where are they Poorest?*


\(^{44}\) NEPAD (2014) ‘New partnership for Africa’s development: twelfth consolidated progress report on implementation and international support’, United Nations General Assembly

the region with the poorest standing\textsuperscript{46}. According to data released by the WHO for 2015, out of the 830 women that die every day due to complications associated with child birth, 550 of these deaths occur in SSA with the remaining 280 deaths occurring else where in the world\textsuperscript{47}. Given the lack of adequate infrastructure and health status, in addition to the growing size of the population, the rural regions of SSA were selected as the region most in need of addressing. It is our hope that the concrete policy suggestions provided here can help address the lack of infrastructure and health development within the SSA region.

**The 6 Building Blocks of Health Care**

According the WHO, there are six primary building blocks required in order to ensure the development, implementation and maintenance of a sustainable health care system. The six building blocks include: health service delivery, health workforce, health information systems, access to essential medicines, health systems financing and leadership/governance. If implemented to their full capacity, then WHO suggests that there will be four primary, beneficial outcomes including improved health (in both level and equity), improved responsiveness, improved social and financial protection and improved efficiency\textsuperscript{48}. There are many parts and components that are required to create a functioning and effective health care machine and the topic of our study, increased physical access to primary health care facilities provided by the use of transportation infrastructure, is apart of this machine and fits into the first block of health service delivery. This block of infrastructure addresses a wide range of infrastructures with the main constituents including physical health care facilities, water systems, health care providers themselves and medical supplies and equipment. However, the only mention of transportation

\textsuperscript{46} International Finance Corporation (IFC) (no date) *Health and Education in Africa*. Available at: (Accessed: 12 November 2016)

\textsuperscript{47} WHO, UNICEF, UNFPA, WBG and UN (2015) *Global Health Observatory (GHO) data: Maternal Mortality*. Online: World Health Organization

\textsuperscript{48} World Health Organization (2010)
infrastructure in the handbook produced by the WHO addressing the six building blocks is statement that “indicators of service availability cannot, of course, accurately reflect access to services”\(^{49}\). The handbook then goes on to briefly explain that physical access to health care facilities and the establishment of catchment areas are often measured and gauged solely on a physical distance (kilometers or miles) to the health care facilities rather than also taking into consideration the time it takes for the patient to get to the health care facility and the capacity of the facility itself. We would also include here that the cost of this transportation, the regular availability of transportation able to take the patient to the health facility and the variety of ways the patient can reach the health care center should also be considered in these decisions. The handbook explains that only a limited number of countries currently use these key indicators for analysis. However, as we will show in a later section, these indicators are crucial in being able to successfully determine where to place health care facilities, what rural transportation infrastructure to invest in and how to better support individuals living in rural areas to access such health care services, thus better increasing their ability to improve their health status overall. It is from this foundation and the need for better addressing transportation infrastructure and its relation to people’s access to health care facilities and therefore ultimately health outcomes, that our argument and analysis stems.

**How does lack of transportation infrastructure impact access to primary health care facilities?**

Good road infrastructure and vehicles in which to utilize such road infrastructure are seen as a “key link between potential accessibility and actual utilization of maternal health services”\(^{50}\). Regardless of how well equipped health care facilities are, how well trained the staff in a given facility is or how much equipment a primary care facility has, in order for mothers in rural SSA

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\(^{49}\) World Health Organization (2010), pg 24

\(^{50}\) Fiagbe, P., Asamoah, D. and Oduro, F.T. (2012), pg 256
to be able to utilize any of these health services, they must first be able to physically connect
with them. Whether this manifests as the woman going into the primary health care facility or if
the health care physician comes to her, the physical transportation network, which allows for the
connection of the person in need of aid and the person giving aid, must be strong enough for the
connection to occur. We have seen from the statistics already presented, that this transportation
infrastructure is the weakest in SSA region than in anywhere else in the world. We suggest that it
is for this reason, among many other social, cultural and economic factors, that the maternal
health of pregnant women and young mothers in SSA suffers. It is for this very fundamental
reason that it is crucial that the funding and selection of infrastructure projects take into better
account giving access to health care services.51

“Poor road network(s) and absence of regular means of suitable transport leaves rural
areas inaccessible”52, making it difficult for women who are pregnant, and especially those who
are close to labor, living in rural areas that lack adequate transportation infrastructure to access
the health care services they require in order to care for themselves and their baby(ies). We
would like to note here that it is during times that the women most need access to health care
services in order for her or her babies survival and when they are most vulnerable to the potential
health impacts from not being treated53, that they are also most likely not able to physically
access health care services due to their own physical state. For example, in Ethiopia, the top four
reasons for maternal death in the past decade were obstructed labor (with or without uterine
rupture), hemorrhage, hypertensive disorders and sepsis, all of which need immediate attention54,
all also impact a women’s ability to physically walk and/or handle systems of transportation that

51 The International Bank for Reconstruction and Development and World Bank Group (2009)
52 Atuoye et al (2015)
54 Berhan, Y. and Berhan, A. (2014)
are rough or require high levels of physical exertion. Even in cases where severe health complications don’t arise, women are often physically weak during and after giving birth\textsuperscript{55}, making walking, riding on the back of a moto or in an overly crowded public transport system difficult if not impossible.

The case of SSA is further impacted by a lack of adequate transportation facilities in terms of giving access to healthcare because some of the newest policy implementations to address the lack of health care access has been through a system of referrals\textsuperscript{56}. However, this system of referrals is highly dependent on the women being able to get from the primary health care facility to the referred service, which again depends on their ability to utilize available forms of transport systems in order to get to their desired location. If these systems are weak or non-existent, this system of referrals increases the amount of travel that must be done, which can result in women not receiving the care they need because they can’t physically access the next health care facility\textsuperscript{57}. Furthermore, in the case that women and their families are able to facilitate some form of transportation along some road, the cost of this endeavor is typically so high that it can leave a family in economic ruin\textsuperscript{58}. In the case of referral health care services, it was found that as much as 70\% of the women that receive referrals opt to not follow them due to the “high cost and unavailability of regular transportation” in order to get to their next health care facility\textsuperscript{59}.

As a result of the inability, both physically and economically (in addition to the cultural and social barriers that also remain an issue in physical access) to reach health care facilities, there can be substantial consequences for mothers and their babies.

\textsuperscript{57} Combs Thorsen, V., Sundby, J. and Malata, A. (2012)
\textsuperscript{58} Atuoye et al (2015)
\textsuperscript{59} Atuoye et al (2015)
Impacts on pregnant women of lack of physical access to health care facilities

There are many consequences that could potentially result from a lack of accessing medical services for pregnant women within SSA. Decreased access to services before becoming pregnant is the first impacting factor that occurs for mothers or potential mothers. With reduced access to family planning services, it is more likely for women to fall pregnant due to unprotected sex. If this pregnancy is unwanted, because abortion is illegal in many places within SSA, then it is more likely that an unsafe abortion will be practiced than under other circumstances. During the stages of pregnancy, if mothers are unable to go in for regular check-ups then it is more likely that conditions and abnormalities not be caught in time to be adequately managed. Thirdly, without adequate paths and facilities of transportation, women are more likely to have a home birth or to give birth on their way to the hospital. If women are unable to go into a health care facility while giving birth, unless they have made other prior arrangements or an ambulance is able to meet them, they are most likely unable to receive treatment from a skilled birth attendant for any complications that may arise during the process in addition to receiving medical suggestions for care during and after the birth. This lack of medical care during the birth has the biggest potential for negative impacts on both the mother and child. Without the attendance of a skilled birthing professional at the site of a birth, it is much less likely that serious medical concerns will be addressed. These primary medical concerns include bleeding, obstructed labor, eclampsia and infections within SSA and all of factors could be addressed with the aid of a skilled birth attendant. A lack of medical attention during the birth can also have substantial impacts on the infant. A lack of medical attention to a

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Womens Health Care Office (2012)
Pearson, L., Larsson, M., Fauveau, V. and Standley, J. (no date) *Childbirth Care*. The Partnership for Maternal, Newborn and Child Health
neonate can have both short term and long term lasting health impacts on the infant due to their increased state of fragility immediately following birth, including but not limited to addressing issues with asphyxia, hypothermia, hypoglycemia and infections. Finally, if the woman is able to reach a birthing facility, in many cases the cost of organizing transportation required to get there is so high that it threatens financial ruin of the family. Furthermore, the use of these health care facilities is not only important during the times when a pregnant woman is giving birth. Consistent, professional health care attention is an important component of ensuring improved public health care. By ensuring that infrastructure investments take into account providing access to health care facilities, they are not only impacting the short term provision of medical care to pregnant mothers, but they are also ensuring that pregnant women, and all other demographic groups, have improved, life long access to medical facilities and sites of care.

**What are the benefits of ensuring women have access to health care facilities?**

According to the WHO, pregnant women living in rural areas are recognized to be among the most vulnerable groups of people because of the potential ill that may come to them during times of disaster, their susceptibility to disease and their often correlated level of poverty. The number of deaths that result from poor access to maternal health care is higher than what it should be considering the current progression and state of modern medicine. Not only does addressing maternal mortality reduce the number of deaths associated with poor provision of care, but the impact mothers have on a global scale in terms of provision for the family’s care, health and safety reach far beyond just impacting her own health. The role mothers play,

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66 Pearson, L., Larsson, M., Fauveau, V. and Standley, J. (no date)
68 World Health Organization (2010)
69 World Health Organization (2010)
especially within rural areas, is a crucial building block for the children within those societies to be productive, successful, contributing members of society.

**What are the other benefits that come from improving transportation infrastructure access within rural SSA?**

Transportation infrastructure clearly doesn’t only give access to health care services and facilities, because if it did then it would be taken into higher consideration within political funding decisions. Roads and transportation infrastructure also contribute to many critical factors of development including, but not limited to the potential for economic growth through trading\(^70\), agriculture\(^71\) and tourism and building access to markets and hubs of ingenuity\(^72\), access to education, employment opportunities, services and goods and leisure activities\(^73\). The implementation of road networks not only helps improve the potential for access to health care, but it also improves the potential of economic growth within a country. This is especially critical within the rural areas of SSA. SSA is known for having an abundance of natural resources, but is lacking in the infrastructure required to be able to effectively export and benefit from such natural resources.

Furthermore, addressing the factors which are taken into consideration when funding infrastructure projects not only helps to ensure that transportation infrastructure is funded with the people it is impacting in mind, but it addresses several issues touched upon by the newly implemented Sustainable Development Goals (SDGs). The MDGs were criticized for a variety of different weaknesses, in spite of their successes in motivating global development by establishing set goals. One of these specific criticisms includes the fact that the MDGs didn’t adequately address or consider how to better involve “enablers of development such as

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\(^70\) Porter, G. (2014)  
\(^72\) Porter, G. (2014)  
infrastructure” into the conversation and ensure their buy-in into movements. Our policy proposals here help to address that. An additional criticism of the MDGs is that they are pointed more towards times of crises rather than towards prolonged strategies for development. It is our hope that with the implementation of a plan that better helps to address how infrastructure investments are made, that we also start to address the long-term view of development by ensure that infrastructures are put in place in order to ensure access to necessary facilities, such as primary health care services. Weiss, an expert analyst of the MDGs and SDGs, suggested that new UN realities include the fact that development resources are now less important than development management is in order to achieve benchmark goals within development. With the implementation of the new SDGs, there has been an effort made to address these above weaknesses through the implementation of goal number seventeen, which is to revitalize the global partnership for sustainable development. One of the focuses of this goal is better ensure that partnerships between private and public industries are utilized in order to ensure sustainable development does occur and one of the tangible suggestions the UN provides for doing this is for “long-term investments” in “critical sectors including…transport and infrastructure.” Therefore, we see that our policy suggestions and proposals are helping to directly achieve goal 17 of the SDGs in ensuring partnership between governments and private industries help to ensure investments into the fabric of our society such as transportation, is designed and invested in with those who most need it in mind. It is our hope that better political considerations of how transportation infrastructure gives access to health care services, especially in the cases of pregnant mothers, will help to address and fix a long-term issue. This proposed solution not only

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75 Loewe, M. (2014)
77 Sustainable Development Goals: Goal 17; Revitalize the global partnership for sustainable development 2015b, c
78 Sustainable Development Goals: 17 Goals to Transform Our World 2015a, c.
helps to fix a lack of access in the short term, but it helps to ensure that a sustainable system is put in place in order to ensure long-term access to health care facilities and of health care providers to those in need of aid.

**Why has this not been more methodically considered in infrastructure decisions before?**

From extensive literature review and interacting with experts in the field, there seem to be several potential causes for this lack of full integration between health services and health systems. Unfortunately, public health care is often not considered a top priority by many developing nations and it is therefore not a priority to address a subsector of that, access to primary health care facilities. According to Kiamani, 2008 on average within the SSA context, SSA governments only spend $2/person on provision of public health care services when experts agree it should be more than $8/person. However, this is exactly why we are proposing that the transportation industry takes the aspect of health that they do have influence over, into consideration when making investments into projects. Within rural and developing areas, an individual’s lifestyles and low prioritization of health contribute to not addressing the issue of a lack on transportation infrastructure. It is our hope that by ensuring rural areas have better connection with health facilities that there may be room for these priorities to adjust and for more emphasis to be placed on the importance of good health care. Furthermore, there are other areas for larger economic return regarding infrastructure investment such as port to port connections, connection of business hubs, giving access to areas with abundant natural resources as well as many others lucrative industries that are more appealing for businesses in terms of financial

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81 Atuoye et al (2015), pg 7
revenue. This however, is why we suggest that this issue needs to be tackled from a governmental level and at the scale of PPIs so as to ensure that businesses with private interests are financially incentivized, through other methods, to also take access to health care facilities as a consideration within their funding decisions. Additionally, in spite of the frequently recognized lack of physical access to the health care facilities, there are often other areas of weaknesses within health care systems which receive more consideration than physical access to rural areas does. However, as we originally argue, without being able to connect the individual requiring medical aid and the facility that is able to give aid, the impact of improved health care is not realized. Additionally, in order to effectively be able to assess the tangible impact infrastructure has on components such as social and cultural factors, this requires increased access to monitoring and measuring indicators. We suggest that this could be integrated into the responsibilities of the private institutions that take on projects such as these, as will be detailed later in the paper in the policy proposal section. Finally to further complicate the situation, the management of transport addressing access to health facilities falls between the jurisdiction of the ministers of health and transport within almost all SSA countries, which makes political coordination and facilitation highly inefficient and difficult. Because this topic of improved communication between ministers of transport and health has not been addressed in an academic paper before, to the best of our knowledge, we will spend the remainder of this paper detailing political approaches and changes that can be implemented so as to increase the communication and implemented solutions to improving the consideration of giving access to health care facilities when investing in infrastructure projects. We will first provide tangible and feasible suggestions applicable to all SSA governments and will then provide an in-depth application of

the policy suggestions within the setting of Ghana. We believe these suggested policy reforms are not only feasible and realistic, but we believe them to have the potential to substantially increase the access to health care facilities of pregnant women, while not requiring substantial economic or time investments.

**Proposed Policy Solutions**

After extensive literature review, two themes seem to emerge for potential solutions, from a policy level, that address this lack of consideration for access to health within infrastructure financing. The first is a restructuring of how ministers within SSA communicate and coordinate their efforts while the second is the involvement of the private sector into the endeavor through the use of private participation in infrastructure (PPI) and privatized industry.

Before proceeding, it is important to note that while the overarching arguments and many of the underlying theories are applicable to many of the countries within the SSA region, the specific details of the implemented plan may need adjustment and revision in the case specific country application, because the social, economic, and political factors at play in each country may require different approaches and solutions to resolve them. Furthermore, the challenges facing each countries and region may not necessarily be in physical access to health care services, requiring the consideration of other causal issues.

**Background on SSA Transport Investment Decisions**

The most frequent form of government within SSA is a Presidential Republic (a list of all SSA countries with their corresponding governmental assignments can be found in Appendix F and G). Because 30 of the 46 SSA countries adhering to a Presidential Republican

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83 Martinez, D. (2016) 'MSF Chief of Vaccinations and Neonatal Expert'. Interview with 14 November
85 CIA World Fact Book (no date) Field Listing: Government Type: Available at: (Accessed: 14 November 2016)
form of government, this is the form of administration we will address our policy reformations to\textsuperscript{86}. A presidential republic operates in a mixed system of “English common law and customary law”\textsuperscript{87}. There are multiple parties that vie for the presidential spot, and the ultimate power of the country is then distributed between the legislative, executive and judicial branches in a system of checks and balances\textsuperscript{88}. When it comes to making decisions regarding daily operations however, the operating system is highly decentralized\textsuperscript{89}, operating at both central and local governmental levels\textsuperscript{90}.

Within the political context of a presidential republic, there are individual sets of ministers who manage a wide variety of topics within the country, with the topics of management varying depending on the country. Unfortunately, these ministers seem to follow the trend of working within their own governmental silos\textsuperscript{91} that Dr. Golaz of the University of Geneva, explained\textsuperscript{92}. Each minister operates within a specific area of focus and in order to be reelected, they often must demonstrate that they have been successful in their position of power. Because of the amount of time a politician spends in office is relatively short, in comparison to the lifetime of a piece of infrastructure, politicians are usually more likely to support quickly implementable solutions that look impressive and reflect well on their time in office as opposed to addressing the long-term needs or root causes of an issue\textsuperscript{93}. As a result of this, SSA countries tend to invest in large infrastructure projects that are highly visible\textsuperscript{94} rather than taking into consideration data-based evidence reflecting the real needs of the populations the piece of

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\textsuperscript{86} CIA World Fact Book (no date) Field Listing: Government Type. Available at: (Accessed: 14 November 2016)
\textsuperscript{89} Atuoye et al (2015)
\textsuperscript{90} Bafo-Arthur (2007)
\textsuperscript{91} Center for Global Development and The African Population and Health Research Center (2014) Delivering on the data revolution in sub-Saharan Africa. African Development Working Group
\textsuperscript{92} Lecture with Dr. Anne Golaz, 2016.
\end{flushleft}
infrastructure will serve\textsuperscript{95}. Furthermore, there is little motivation or incentive to ensure communication happens effectively between ministries when it is not required by some external rule or shared goal. An expert from a development bank reflected on the difficulty of getting SSA ministers to work together when the working together would pull funding away from their own ministry and give it to a different ministry\textsuperscript{96}. According to Foster and Briceno-Garmendia\textsuperscript{97}, it is this lack of communication and coordination that leads to weaknesses within the existing transportation infrastructure, which then do not support individuals in accessing health care services. The anonymous development bank expert noted, “this topic [of increased cooperation between ministers of health and transport] is given a lot of lip service, but is rarely, if ever acted upon”\textsuperscript{98}. The solutions to this issue may manifest in different forms for various SSA countries, and it will likely manifest in a multitude of ways in a global setting, but some specific and tangible suggestions are briefly proposed here for consideration and the potential manifestation of these approaches within a country context are provided for Ghana in a following section.

**Increasing Communication Between Ministers**

Increased communication and coordination are crucial factors for insuring access to health care is better considered within a political decision making framework\textsuperscript{99}. In order to achieve this end, it is the communication and coordination that occurs between governmental actors that directly deal with either health or transport that needs to be addressed. In doing this, a more “comprehensive framework that takes onboard structural and agency factors” may be able to better address the explained gap of policy consideration\textsuperscript{100}. The World Bank Report of 2009 advocates for improved communication between government actors by stating that sectoral

\textsuperscript{95} Gutman, J., Sy, A. and Chattopadhyay, S. (2015)
\textsuperscript{96} Development bank expert. Interview. November 18.
\textsuperscript{97} The International Bank for Reconstruction and Development and World Bank Group (2009)
\textsuperscript{98} Development bank expert. Interview. November 18.
\textsuperscript{99} Bampoe, V. (no date) *The State of Healthcare Delivery in Ghana*.
\textsuperscript{100} Atuoye et al (2015)
governance is a major key issue that needs to be addressed in terms of infrastructure
development and investment\textsuperscript{101}. Previous governor of Rwanda, Dr. Aisa Kirabo Kacyira, agreed
when she stated in a keynote speech to the Graduate Institute of Geneva that an important key in
the future of policy, regarding successful development, will be increased communication
between sectors of different governments\textsuperscript{102}. For SSA, the best level at which to integrate these
changes is the ministerial level because that is where most of the tangible decisions are made.

Although we haven’t seen strong examples of cooperation and coordination occurring
between ministries in health and transport in SSA in the past, we have seen this approach to be
very effective in addressing this communication gap in areas of India and South Africa\textsuperscript{103}. In
these cases, by establishing a relationship with the other ministry and having set meeting times,
both the Indian region of Rajasthan and parts of South African infrastructure development
managers were more effectively able to communicate their needs to each other and make action
plans\textsuperscript{104}. By establishing pre-set meeting times between the ministers of transport and health,
these assemblies force conversation and communication to occur, which, under productive
settings, result in exchange of ideas. Having an established meeting time during which to discuss
issues in need of consideration will ensure that each ministry is aware of the pertinent problems
that need addressing within the other ministry. In order to make these meetings more impactful,
we suggest that during the course of them, there should be time set aside to specifically address
any upcoming infrastructure projects underway and any emerging or outstanding health issues
that can be addressed through improvement of physical access to health care facilities. As the
result of these discussions, tangible agreements and goals should be established and agreed upon
by both ministries. These goals should be adequately documented and assigned a firm, set

\textsuperscript{102} Kacyira, A. (2016) ‘Chief of UN-Habitat’, Interview with 15 November.
\textsuperscript{103} Development bank expert. Interview, 18 November
\textsuperscript{104} Development bank expert. Interview, 18 November
schedule for achievement. Furthermore, monitoring indicators should be established in conjunction with these goals so as to ensure that the goals are achieved from both perspective sides. These changes are an inexpensive way to address the given gap of communication, as meetings do not require high capital to organize or follow through on. Furthermore, the establishment of tangible, implementable goals would help to ensure that political discussions start the transformation from policy into reality. However, according to Dr. Evans, it is not likely that concrete actions will be taken unless data and evidence is used to demonstrate the impacts a potential problem may have, how the given problem will be solved and the approaches that can be used in doing so.\(^{105}\)

In order to address this, it is our suggestion that an expert advisor, with access to the statistical data and information and with high credibility, be permanently placed from the health ministry on the transport committee and vice versa. By ensuring that an expert is present from each of the other sectors during all key decisions, this allows for the ideas and positions of the other group to be represented and taken into consideration during the decision making process. Dr. Paul Chinowsky notes, trends pertaining to what elements are taken into consideration usually start in the transportation sector, and then typically tend to migrate in the form of policy rules towards the health-financing sector.\(^{106}\) It is our hope that with the implementation of expert advisors, that the migration of ideas from health policy to infrastructure financing would be enhanced and strengthened as well. By achieving this, all of the above concerns would be better addressed. This solution also has very few requirements for resources or substantial extra time as these meetings held with advisors already occur on frequent basis, and nothing substantial, in terms of resource allocations or time, would be required in order to implement this solution. The

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\(^{106}\) Chinowsky, P. (2016)
hiring of an additional expert within each field may be necessary, depending on if the expert can continue to work for their home ministry still while being employed by the other ministry as well. Even in the case that these above suggested policies are implemented fully and are effective, there are non-governmental, private sector stakeholders and actors that have a large influence in transportation infrastructure financing as well. We have provided a policy solution for these actors here as well.

**The Influence of Private Participation in Infrastructure (PPIs)**

Although private investments tend to be frowned upon within the health sector due to potential manipulation and political persuasion that is often associated with Private-Public Partnerships (PPPs) in the world of big pharma\(^\text{107}\), the reality is that many infrastructural development projects are funded by private industries\(^\text{108}\) and without these investments, some rural areas would never receive infrastructure investments. Because the use of Private Participation in Infrastructure (PPIs) are on the rise within SSA\(^\text{109}\), we felt it necessary to address these newly forming partnerships and from the beginning address how they can better ensure access to health care facilities is considered as a critical factor when making infrastructure investments.

The implementation of transportation infrastructure through the use of PPI’s or PPPs in infrastructure, if specifically geared towards addressing the gap of transportation infrastructure giving access to health care facilities for pregnant women, has several potentially positive impacts otherwise unavailable to this sector of work. Through the use of PPIs, maintenance and monitoring post project implementation is more feasible to do from a private level because there

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is usually more technical and personnel capability to completely follow through on this than at the governmental level\textsuperscript{110}. Furthermore, there is typically larger incentive to do adequate monitoring and maintenance within the private sector so as to keep profits high and customers happy. By collecting monitoring data and information, the private institution would be able to report back to the public institution and in the case of any weaknesses, the public sector would then be able to bring their skills as a large, national organization to address the challenges at hand. It is our suggestion that regulations be put in place so as to mandate that the private partner does monitor for potential social and cultural issues, in addition to any technical issues that may arise with the piece of infrastructure and that they report any issues that arise to their public partner. In doing this, it is likely that any issues associated with the implementation be more quickly identified and then can be better addressed with the tools available to the public sector. Furthermore, by establishing measureable indicators prior to the start of the project this may also result in a higher quality piece of infrastructure being built originally in order to be able to meet the pre-established indicator goals. Another benefit of PPIs over other tradition forms of solely privatized or public investments into infrastructure development is that through the partnership of PPIs, the trend of privatized companies only investing in infrastructure in areas that area already resource rich could be controlled and monitored by the public sector\textsuperscript{111}. It would be our suggestion that the private sector releases special bids for projects to focus primarily on ensuring, in our case, better physical access for rural villages to primary health care clinics. By creating the need for this infrastructure project, the public sector would be able to directly ensure that that infrastructure is put in place in order to address this topics consideration in other funding decisions. Finally, one

\textsuperscript{110} Public Private Partnership in Infrastructure Resource Center (PPPIRC) (2016)

\textsuperscript{111} Public Private Partnership in Infrastructure Resource Center (PPPIRC) (2016)
of the most frequent concerns regarding a partnership between a private and public sector is the influences the private sector will then have over the public sector\textsuperscript{112}. However, the solution to this problem has actually already been implemented. There is a database that is organized by region, specifically for PPI’s\textsuperscript{113}. If this maintained in the high quality manner it has been up to this point, then the concern with how private industries are influencing public governance should be substantially reduced because all of the information regarding who is working with who on what will be openly available for all to see and judge for themselves.

Through the combined implementation of adjustments within the political approach to infrastructure and health investments as well as the increased use of PPIs to help address the topic of access to health care facilities from a more privatized stance, it is our hope that this topic which has for so long gone unaddressed due to lack of resources or other issues being placed ahead of it, receives the political and physical attention it requires in order to be addressed properly.

**Why Address This Issue Over Other Pressing Issues?**

The author is aware that many factors and issues need to be taken into consideration when making policy proposals at regional and country levels. However, there are several key reasons why this particular initiative has been selected as needing addressing over other potential issues. The most compelling reason is that first steps to addressing this issue are inexpensive, and in the grand scheme of policy, are relatively easy to implement. By simply ensuring physical access to health facilities is better considered within infrastructure investment decisions, we have seen that the potential improvement made within maternal health could be substantial.

Furthermore, addressing this particular issue simultaneously addresses a multitude of other issues

\textsuperscript{112} Lecturer, Judith Ritcher. October 2016.

ranging from economic development to distribution of humanitarian aid to ensuring that public health initiatives continue to increase in their effectiveness. Finally, with the rapidly growing popularity of PPIs or PPPs within SSA already, by addressing and emphasizing the importance of this topic from the start of this process, it is possible that we can work to avoid the potential failures that a lack of this consideration results in.

**Policy Proposal: Several Potential Solutions to Ghana’s Access to Healthcare Issues**

With the above justification of the importance of addressing physical access to health care services when making transportation infrastructure investments, in addition to the broad policy proposals presented, we will now suggest a more tangible example of how these policy implementations may manifest. For conservation of space, brief summaries of “Why Ghana”, “Background on Health Care and Road Infrastructure in Ghana” and “Understanding Ghana’s Current Political Operations” have been provided within the paper. The full text of these sections can be found in Appendix H.

**Why Ghana?**

Ghana is a visible country within the SSA region making it a flagship example for other countries of what policy reforms could be successful in addressing these proposed issues. It is also feasible that the suggestions of this policy proposal may be of immediate, tangible use for Ghanaian government. This policy proposal hopes to make a pointed and applicable policy recommendation for the specific situation of the Ghanaian people, addressing issues mentioned but not addressed by previous reports on the topic.
Background on Health Care and Road Infrastructure in Ghana

Although Ghana has a strong economic standing within SSA, the countries health status is suffering comparatively on the global scale. Furthermore, providing reliable and quality transportation infrastructure is crucial for ensuring people have access to health care facilities, especially those living in rural regions, which are deprived of health care facilities. To see further demographic information, please refer to Appendix I. Meara et al note that reduction of death in Ghana hinges on access to services. Unfortunately the status of road infrastructure within Ghana is not strong either with a road density of 25 km per 1000 square km. However, the Ghanaian government has shown commitment in the past to implementing programs that bridge the gap between poor infrastructure resources and giving access to health care services by trying to facilitate and encourage the support of transportation to health care facilities at local levels.

Understanding Ghana’s Current Political Operations

Ghana’s political organization fits into the majority of SSA governmental organization explained above because it is defined to be a Presidential Republic. Although ideally a goal to work towards, there seems to be little consistent communication between the Minister for Transport, Mr. Fifi Fiavi Franklin Kwetey, and the Minister for Health, Mr Alex Segbefia in terms of coordinating their efforts, financial investments and ultimate goals. Ironically however, the long-term goals established by each ministry suggest the need for partnership between the

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117 Nation Master (2015) Transport > Road density > Km of road per 100 sq. Km of land area: Countries Compared. Available at: (Accessed: 10 November 2016)
118 Interview with anonymous source
two government sectors\textsuperscript{119}. We see that although the goals established by each ministry require the support and commitment of the other ministry, there is little to no infrastructure in place to ensure this communication actually happens which results in little progress being made in the field that they are both responsible for. This point is further confirmed by Atuoye et al when they note that the lack of transportation infrastructure harms the progress that the Health Planning and Service Compounds (CHPS), the providers of the most basic health care within Ghana\textsuperscript{120}, are able to make\textsuperscript{121}.

**Proposed Approach**

In a recent conference held on the challenges facing the health system within Ghana, the minister of health stated that it was the responsibility of the financing ministry to determine what kind of ambulances the country should invest in\textsuperscript{122}. This is an example of how decisions that are influenced by and within multiple sectors of government are often cast to another sector to address. In an effort to increase the amount of communication that occurs between Mr. Fifi Fiavi Franklin Kwetey, Mr Alex Segbefia, we suggest the establishment of a bi-monthly meeting between the two ministers. Other cabinet members would of course be welcome to the meeting, but the formal establishment of a meeting time would help to ensure that their conversations are more than just passing elevator updates\textsuperscript{123}. Within these meetings, tangible goals should address the needs of each ministry at the time of the given meeting. For example, the health system within Ghana is currently struggling to address how to increase the rate of people, especially pregnant women, following referrals given to them by their doctors as currently, 70% of


\textsuperscript{121} Atuoye et al (2015)

\textsuperscript{122} Association of Chartered Certified Accountants (ACCA) (2013) *Key Health Challenges in Ghanas*. ACCA

Ghanaian people do not follow these medical referrals\textsuperscript{124}. This is an issue that the transport minister should be aware of, because most of these declines are due to weaknesses with transportation infrastructure. If this were the topic of discussion, then the two ministers should establish tangible goals for addressing this concern. For example, they could potentially work to ensure that referrals are given to the closest primary health care facility, while simultaneously putting a transport service in place in order to help reduce the cost and difficulty of this transport. Specific and tangible goals should then be established regarding when these goals will be achieved, and monitoring indicators, such as the number of referrals made with distance in mind and the number of rides given, should be tracked in order to ensure the established goals are being met.

In terms of the second political operation adjustment, each ministry does establish a list of advisors that must sit in on all of their key decisions. The Ghana Health Service Council, the operating arm of the Health Ministry does have requirements regarding what cross-sector advisors it has on its board and a transportation minister is not included in this list\textsuperscript{125}. Similarly, a health minister doesn’t seem to be required to be a member of the Transportation Ministry list either\textsuperscript{126}. That being said, we would encourage each ministry to consider adding an advisor from the other ministry to their board of advisors, or at least adding a temporary position for the advisor so that they may be called during times of question or emergency. Potential expert advisors that could fill these positions for Ghana include Siisi Essuman – Ocran, the director of the Policy and Planning sector of the transport department\textsuperscript{127} and Emmanuel Owusu Ansah, the director of the Policy and Planning sector of the health department\textsuperscript{128}.

\textsuperscript{124} Atuoye et al (2015)
\textsuperscript{126} Government of Ghana (2016)
\textsuperscript{127} Government of Ghana (2016)
\textsuperscript{128} Government of Ghana (2016)
With respect to the third element of our policy proposal, PPIs are on the rise in SSA\textsuperscript{129} and in Ghana they are being implemented with great success up to this point\textsuperscript{130}. It is our suggestion that at the onset of a given PPI road infrastructural project, such as the two that are currently in progress in Ghana, “Upgrading Accra-Tema Motorway and Accra-Takoradi Highway Rehabilitation and Dualization”\textsuperscript{131}, the private and public institutions establish clear outcomes regarding improved access to health care facilities. Goals could include increasing the number of rural health care facilities each project gives access to, monitoring the use of the infrastructure to see if there is a demographic group who has a disadvantage in using the piece of infrastructure and identifying key geographic areas that currently lack infrastructure but do have existing health facilities. In this way, the project can be better geared towards providing adequate access to health facilities as well as having a tangible way of following up on the progress made. All of these components would help to ensure that infrastructure that is ultimately invested in does actually address the issue of accessing health care services by pregnant women living in rural areas. We also see with the implementation of these two road projects described above, that there are other benefits that come from PPIs. In this case, we see that improving the connections between two major cities within Ghana requires passing through rural areas that would have otherwise not received infrastructure investment. It would be our suggestion that in future projects such as these, that provision of physical access to health care facilities in those areas be a requirement on the construction bid that the private partner would then be required to meet.

It is our hope that the above policy proposals have helped to shed light on what such policy changes would manifest as in a SSA country, like Ghana.

\textsuperscript{131} Osei-Kyei, R. and Chan, A.P.C. (2016)
Conclusion

We have seen throughout the course of this paper the beneficial outcomes that could potentially result if access to health care is considered when making funding decisions regarding transportation infrastructure. We have seen that a lack of physical access, as is address in the second delay theory of maternal health care, has potentially many negative impacts on the health of pregnant women and that the establishment of road infrastructure in rural regions not only helps to address this issue, but it has the capacity to improve the aptitude for development through other avenues such as economic and social development as well. We have seen that transportation infrastructure has been identified by the UN and other leading development agencies as a critical component for ensuring all other development is effective and impactful and that the above proposed solutions helps to address, specifically, goal number seventeen of the SDGs. We have suggested reasons for why in the past this crucial topic has not been methodically and effectively analyzed in policy decisions regarding infrastructure development including the fact that this topic seems to fall between the jurisdiction of the transport and health sectors. It is this key factor that we focused on addressing by suggesting policy adjustments to increase the communication and coordination that occurs between the ministers of health and transport and ensuring experts are placed on the opposite board of advisors to ensure decisions are made with all appropriate considerations taken into account. We note the importance of establishing adequate monitoring practices in order to ensure impact is high and that the infrastructure stays well maintained. We note that both of these potential policies are low cost and require low work, so they should, in theory, be easy to implement and upkeep. We also detail and suggest the potential PPIs offer to this proposed field and the unique impact and
approach they bring in their solutions of privatizing infrastructure projects that give access to health care facilities. Finally, we look at how these policies might be put into action within the SSA country of Ghana. It is our hope that we have demonstrated with this paper the importance of taking the provision of physical access to primary health care facilities for women into higher consideration when making decisions regarding what transportation infrastructure to invest in.

Because this is only the start of investigation within this field of ensuring investment into infrastructure takes into account more than solely financial and planning components, there are many potential future avenues of research to explore. These include but are not limited to how the use of road infrastructure impacts social and cultural components of society and what of these components should be considered when making infrastructure funding decisions in addition to how to better make infrastructure funding decisions data-based, on a global scale.
Bibliography


Bampoe, V. (no date) *The State of Healthcare Delivery in Ghana*.


International Conference on Primary Health Care (1978) *Declaration of Alma-Ata*.


Nation Master (2015) *Transport > Road density > Km of road per 100 sq. Km of land area: Countries Compared*. Available at: (Accessed: 10 November 2016).


Sustainable Development Goals: 17 Goals to Transform Our World 2015a, c. .

Sustainable Development Goals: Goal 17; Revitalize the global partnership for sustainable development 2015b, c. .


Appendices

Appendix A: Infrastructure density globally

![World Map of Infrastructure Density]

Appendix B: Key Theory of The 3 Delays within Maternal Health Care

Although a relatively old theory within public health, the 3 delays model has held historically true and is currently gaining traction and recognition within the world of policy as a theory that holds substantial truth and simplicity for the region of SSA. The three delays are identified by Thadieus and Maine to be the delay in deciding to seek medical care, the delay in reaching a health facility and the delay in receiving adequate care once at the health facility of pregnant mothers. While the first and third delay have received a majority of political attention in terms of research and funding in the past, this paper and investigation aims to explore and emphasize the importance of the second delay in the context of SSA for maternal health improvements.

132 Nation Master (2015)
Appendix C: Table of details about interviews

<table>
<thead>
<tr>
<th>Organization</th>
<th>Key contacts</th>
<th>Date(s) &amp; time</th>
<th>Formal/informal interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN-Habitat, past Mayor of Rwanda</td>
<td>Dr. Aisa Kacyira</td>
<td>15.11.2016 18:30 – 20:00</td>
<td>Informal interview</td>
</tr>
<tr>
<td>MSF</td>
<td>Mr. Daniel Martinez Garcia</td>
<td>14.11.2016 10:00 – 10:45</td>
<td>Formal Interview</td>
</tr>
<tr>
<td>WBG and WHO</td>
<td>Dr. David Evans</td>
<td>8.11.2016 10:30 – 11:30</td>
<td>Formal Interview</td>
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<tr>
<td>Water &amp; Earth Technologies, Inc.</td>
<td>Mr. Markus Ritsch</td>
<td>15.11.2016 22:00 – 23:00</td>
<td>Informal Interview</td>
</tr>
<tr>
<td>Development Bank</td>
<td>Anonymous</td>
<td>18.11.2016 9:00 – 10:00</td>
<td>Formal Interview</td>
</tr>
<tr>
<td>CliCs</td>
<td>Dr. Paul Chinowsky</td>
<td>18.11.2016 17:00 – 17:30</td>
<td>Informal Interview</td>
</tr>
<tr>
<td>Government official</td>
<td>Anonymous</td>
<td>17.11.2016</td>
<td>Informal Interview</td>
</tr>
<tr>
<td>United Nations</td>
<td>Dr. Thomas Weiss</td>
<td>25.10.2016 12:30 – 14:00</td>
<td>Informal Interview</td>
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Appendix D\textsuperscript{136}: Map showing predicted population growth on global scale

Figure 2.2: Forecasted Urban Population Growth 2010-2050

Urban Population in 2050 compared with 2010:

- Smaller
- Larger but less than double
- Double or more, but less than fivefold
- Fivefold or more


Appendix E\textsuperscript{137}: Map showing the globe at night

Appendix F\textsuperscript{138,139}: SSA countries and their respective forms of government

<table>
<thead>
<tr>
<th>Country Name</th>
<th>Government Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angola</td>
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<td>Burkina Faso</td>
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<tr>
<td>Burundi</td>
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<tr>
<td>Cameroon</td>
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<td>Cape Verde</td>
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<tr>
<td>Central African Republic</td>
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</tr>
<tr>
<td>Chad</td>
<td>Presidential Republic</td>
</tr>
<tr>
<td>Comoros</td>
<td>Federal Presidential Republic</td>
</tr>
<tr>
<td>Cote d'Ivoire</td>
<td>Presidential Republic</td>
</tr>
<tr>
<td>Democratic Republic of the Congo</td>
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<td>Equatorial Guinea</td>
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<tr>
<td>Ethiopia</td>
<td>Federal Parliamentary Republic</td>
</tr>
<tr>
<td>Gabon</td>
<td>Presidential Republic</td>
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</table>

\textsuperscript{137} NASA (2014) The World at Night from Space.
\textsuperscript{138} UNDP in Africa (2012) About Sub-Saharan Africa. Online: UNDP
\textsuperscript{139} CIA World Fact Book (no date) Field Listing: Government Type. Available at: (Accessed: 14 November 2016)
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<thead>
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<th>Country</th>
<th>System of Government</th>
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</tr>
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<td>Guinea</td>
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<td>Guinea-Bissau</td>
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<td>Kenya</td>
<td>Presidential Republic</td>
</tr>
<tr>
<td>Lesotho</td>
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<td>Liberia</td>
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<td>Semi-Presidential Republic</td>
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<td>Republic of Congo</td>
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<td>Rwanda</td>
<td>Presidential Republic</td>
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<td>Senegal</td>
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<tr>
<td>Soa Tome and Principe</td>
<td>Semi-Presidential Republic</td>
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<td>South Africa</td>
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<tr>
<td>Zimbabwe</td>
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Appendix G\textsuperscript{140,141}: Numerical breakdown of the government types in SSA

<table>
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<th>Type of Government</th>
<th>Number of Countries with Given Government</th>
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<td>Absolute Monarchy</td>
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<tr>
<td>Federal Parliamentary Republic</td>
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<tr>
<td>Federal Presidential Republic</td>
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<td>Parliamentary Constitutional Monarchy</td>
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<td>Parliamentary Republic</td>
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<td>Presidential Republic</td>
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<td>Semi-Presidential Republic</td>
<td>7</td>
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Appendix H: Expanded sections for the Ghana policy proposal

**Why Ghana?**

With the eighth largest GDP in SSA\textsuperscript{142} and its standing as one of the more stable countries in Western Africa\textsuperscript{143}, Ghana is a visible country within the SSA region making it a flagship example for other countries of what policy reforms could be successful in addressing these proposed issues. Furthermore, the Ghanaian government has for the past decade shown interest in addressing the weaknesses of its road infrastructure system\textsuperscript{144} and declared maternal mortality to be a national emergency in 2008\textsuperscript{145}, so it is feasible that the suggestions of this policy proposal may be of immediate, tangible use for Ghanaian government. There have also been several studies conducted recently\textsuperscript{146,147,148} exploring the physical access of Ghanaian people to health care facilities and the limiting factors that inhibit their ability to do so. These reports provide crucial background details and information regarding what factors of

\textsuperscript{140} UNDP in Africa (2012) About Sub-Saharan Africa. Online: UNDP
\textsuperscript{141} CIA World Fact Book (no date) Field Listing: Government Type. Available at: (Accessed: 14 November 2016)
\textsuperscript{142} World Bank, 2015 (GDP data)
\textsuperscript{144} Oxford Business Group (2016) Transport infrastructure upgrades take shape in Ghana. Available at: (Accessed: 7 November 2016)
\textsuperscript{145} http://www.commonwealthhealth.org/africa/ghana/current_health_issues_and_progress_in_ghana/
\textsuperscript{146} Atuoye et al (2015)
\textsuperscript{147} Fiagbe, P., Asamoah, D. and Oduro, F.T. (2012)
\textsuperscript{148} Meara, J., Leather, A. and Hagander, L. (2015)
transportation infrastructure within Ghana impact access to health care but they make no policy recommendations for what can be done to address these issues. This policy proposal hopes to make a pointed and applicable policy recommendation for the specific situation of the Ghanaian people, addressing issues mentioned but not addressed by previous reports.

Background on Health Care and Road Infrastructure in Ghana

Although Ghana has a strong economic standing within SSA, the countries health status is suffering comparatively on the global scale. With a population of nearly 27 million\textsuperscript{149}, 46\% of whom live in rural areas\textsuperscript{150}, providing reliable and quality transportation infrastructure is crucial for ensuring people have access to health care facilities, especially those living in rural regions, which are deprived of health care facilities\textsuperscript{151}. In 2015 alone, the collective population saw 25,000 neonatal deaths and had a maternal mortality ratio of 319 per 100,000 live births\textsuperscript{152}, ranking as the 37\textsuperscript{th} highest maternal mortality rate globally\textsuperscript{153}. To see further demographic information, please refer to Appendix I\textsuperscript{154}. “A disturbingly large percentage of emergency and critically ill patients are young women who are pregnant” within Ghana according to Drislane et al, 2014\textsuperscript{155}. Meara et al note that reduction of death in Ghana hinges on access to services\textsuperscript{156}. Unfortunately the status of road infrastructure within Ghana is not strong either with a road density of 25 km per 1000 square km\textsuperscript{157}. Furthermore, the existence of political infrastructure to be able to address the weaknesses in communication and facilitation between the two sectors of

\textsuperscript{149} The world Factbook — central intelligence agency (2001)
\textsuperscript{150} World Bank Group (2015) ‘Rural population (% of total population)’.
\textsuperscript{153} WHO, UNICEF, UNFPA, WBG and UNPD (2015) Maternal mortality ratio (modeled estimate, per 100,000 live births). World Health Organization
\textsuperscript{156} Meara, J., Leather, A. and Hagander, L. (2015)
\textsuperscript{157} Nation Master (2015) Transport > Road density > Km of road per 100 sq. Km of land area: Countries Compared. Available at: (Accessed: 10 November 2016)
health and transportation is not currently present or operating\(^ {158}\). However, the Ghanaian government has shown commitment in the past to implementing programs that bridge the gap between poor infrastructure resources and giving access to health care services by trying to facilitate and encourage the support of transportation to health care facilities at local levels. An example of such a program was a fund put in place to help reimburse truck drivers who were able to transport trauma victims to a hospital when other forms of transportation weren’t available. In exchange for their involvement, they would receive compensation for gas and their time\(^ {159}\). Although not widely adopted nor highly effective, the implementation of a program such as this shows the commitment of the Ghanaian government to improving the communication occurring between transportation facilities and health care services.

**Understanding Ghana’s Current Political Operations**

In order to address this crucial issue, which seems to fall between the two sectors of transportation and health, we first need to understand the current political operations of Ghana. Ghana’s political organization fits into the majority of SSA governmental organization explained above because it is defined to be a Presidential Republic. Within this context, there are individual sets of ministers who manage a wide variety of topics within the country, and in the case of Ghana, these range from the Ministry of Defense to the Ministry of Youth and Sports\(^ {160}\). Although ideally a goal to work towards, there seems to be little consistent communication between the Minister for Transport, Mr. Fifi Fiavi Franklin Kwetey, and the Minister for Health, Mr Alex Segbefia\(^ {161}\) in terms of coordinating their efforts, financial investments and ultimate goals. Ironically however, the long-term goals established by each ministry suggest the need for

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\(^{159}\) Meara, J., Leather, A. and Hagander, L. (2015)


\(^{161}\) Interview with anonymous source
partnership between the two government sectors. The health ministry identifies their goals and focuses to be “to improve the health status of all people living in Ghana through effective and efficient policy formulation, resource mobilization, monitoring and regulation of delivery of health care by different health agencies”. The goal of improved delivery of health care would require, in order to address the physical component of access, cooperation and coordination with the transport ministry. Similarly, the transport ministry of Ghana defines among its multiple goals and focuses the goal of “creating an accessible, affordable, reliable, effective and efficient transport system that meets user needs”. Although this goal is broad, the ministry would need to understand what the health “needs” of the users are in order to be able to adequately address them. So we see here that although the goals established by each ministry require the support and commitment of the other ministry, there is little to no infrastructure in place to ensure this communication actually happens which results in little progress being made in the field that they are both responsible for. This point is further confirmed by Atuoye et al when they note that the lack of transportation infrastructure harms the progress that the Health Planning and Service Compounds (CHPS), the providers of the most basic health care within Ghana, are able to make.

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Appendix 1: Demographic values for Ghana

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
<th>Year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>25,366,500</td>
<td>2012</td>
<td>Census</td>
</tr>
<tr>
<td>Population under 18 years</td>
<td>11,423,500 (45% of total)</td>
<td>2012</td>
<td>Census</td>
</tr>
<tr>
<td>Population annual growth rate</td>
<td>2.50%</td>
<td>2012</td>
<td>UNICEF</td>
</tr>
<tr>
<td>Life expectancy at birth</td>
<td>61 years</td>
<td>2012</td>
<td>UNICEF</td>
</tr>
<tr>
<td>Under-5 mortality rate</td>
<td>82 deaths/1,000 live births</td>
<td>2011</td>
<td>MICS</td>
</tr>
<tr>
<td>Maternal mortality rate</td>
<td>378 deaths/100,000 live births</td>
<td>2011</td>
<td>UNICEF</td>
</tr>
<tr>
<td>Primary school net attendance</td>
<td>73%</td>
<td>2011</td>
<td>MICS</td>
</tr>
<tr>
<td>Literacy rate (total)</td>
<td>82%</td>
<td>2012</td>
<td>UNICEF</td>
</tr>
<tr>
<td>Population below international poverty line (USD 1.25 per day)</td>
<td>28.60%</td>
<td>2011</td>
<td>World Bank</td>
</tr>
<tr>
<td>Gross national income per capita</td>
<td>USD 1,594</td>
<td>2011</td>
<td>World Bank</td>
</tr>
<tr>
<td>DGP</td>
<td>47.93 billion</td>
<td>2013</td>
<td>World Bank</td>
</tr>
<tr>
<td>GDP growth</td>
<td>7.10%</td>
<td>2013</td>
<td>World Bank</td>
</tr>
<tr>
<td>Human development index and rank</td>
<td>0.573 Rank 138th (out of 187)</td>
<td>2014</td>
<td>UNDP HDI/R</td>
</tr>
</tbody>
</table>