FACTORS AFFECTING HEALTH OUTCOMES : CASE STUDY OF LOW AND MIDDLE INCOME COUNTRIES

Kosin Techaniyom

A Dissertation Submitted in Partial
Fulfillment of the Requirements for the Degree of
Doctor of Public Administration
School of Public Administration
National Institute of Development Administration
2017

FACTORS AFFECTING HEALTH OUTCOMES : CASE STUDY OF LOW AND MIDDLE INCOME COUNTRIES

Kosin Techaniyom

School of Public Administration

Associate Professor.....Major Advisor

(Prapon Sahapattana, Ph.D.)

Instructor.....Co-Advisor

(Athkrit Thepmongkol, Ph.D.)

The Examining Committee Approved This Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Public Administration.

Professor.....Committee Chairperson

(Anchana NaRanong, Ph.D.)

Associate Professor.....Committee

(Prapon Sahapattana, Ph.D.)

Assistant Professor.....Committee

(Thanapan Laiprakobsup, Ph.D.)

Instructor.....Committee

(Athkrit Thepmongkol, Ph.D.)

Assistant Professor.....Dean

(Pairote Pathranarakul, Ph.D.)

September 2017

ABSTRACT

Title of Dissertation	Factors Affecting Health Outcomes : Case Study of Low and Middle Income Countries
Author	Mr. Kosin Techaniyom
Degree	Doctor of Public Administration
Year	2017

The thesis entitled "Factors affecting Health Outcomes: Case Study of Low- and Middle-Income Countries" was aimed at investigating the factors influencing health outcomes in two dimensions: 1) Conventional health status, the indicator of which was the under-five morality rate per 1,000 live births and 2) Health equity, the indicator of which was the under-five morality rate per 1,000 live births in the wealthiest class divided by the under-five morality rate per 1,000 live births in the poorest group of the population in the country. Secondary data used in the analysis was collected from 1996 to 2015 from a pool of 139 low- and middle-income countries.

For conventional health status, balance panel data analysis was carried out using four groups of predictive factors. The first group was composed of public health system factors: the rate of improved rural sanitation facilities and the percentage of children aged 12-23 months with DPT immunization. The second group consisted of good governance factors: the government effectiveness index and the corruption control index. The third group consisted of financial factors: health expenditure per capita and the gross national income (GNI) per capita. The fourth group was the effective transition rate from primary to lower secondary general education for both sexes. This study revealed that these variables had panel cointegration (the long-run relationships). The random-effect test of the models produced results which were in line with the theories used in this research – preventive public health, corruption control, and the effective transition rate from primary to lower secondary general

education for both sexes significantly reduced the under-five morality rate per 1,000 live births at a statistical significance level of 0.05.

With regard to health equity, this research employed multiple regression analysis, in which the variables were developed using the means of data from 2002-2014. These variables consisted of the rate of improved rural sanitation facilities, the percentage of children aged 12-23 months with DPT immunization, the gross national income (GNI) per capita, the effective transition rate from primary to lower secondary general education for both sexes, the government effectiveness index, the corruption control index, and health expenditure per capita. Only the corruption control index had an influence on it, with statistical significance at 0.05.

The major findings of this research consisted of: 1) Corruption control was a key predictor of a reduction in the under-five mortality rate and improved health equity, 2) Preventive public health was a key factor affecting in a reduction in the under-five mortality rate, and 3) Health expenditure per capita had no impact on the under-five mortality rate or health equity. In addition, financially, only the gross national income (GNI) per capita resulted in a reduction in the under-five mortality rate.

ACKNOWLEDGEMENTS

The accomplishment of this dissertation was contributed to by many people.

First, I would like to express my sincere thanks to my major advisor, Prapon Sahapattana, for trusting me and giving me valuable advice and the freedom to work on this dissertation.

Also, I have a deep gratitude towards my co-advisor, Athkrit Thepmongkol, who provided me with precious advice and new perspectives.

Lastly, I would like to share the value and goodness of this dissertation with my beloved parents, who supported me financially during my work on this dissertation.

Kosin Techaniyom

September 2017

TABLE OF CONTENTS

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

CHAPTER 1

INTRODUCTION

1.1 Background and Significance of the Problem

"Well-being" is a key principle for fulfilling tasks among modern states. This term has different meanings, which are quite abstract. The meanings assigned vary according to academic perspectives or fields of the persons who provide the meanings. However, one common sense is "a state in the quality of life of people" (Gasper, 2002; Travers & Richardson, 1997). Overall, it refers to happiness in life and a happy mental state (Easterlin, 2001), as well as the development of good living (McGillivray, 2005). Many international organizations have attached great importance to well-being and set clear goals related to it. The United Nations Development Program (UNPD) (1990) set a goal: good quality of life must start from public health services which are accessible to all. All these things reflect the importance of the public health system as a key mechanism for ensuring people's well-being in line with international principles.

In terms of country development to achieve economic growth, a main focus should be on well-being of the local people, which directly results from the public health system. For example, a microeconomic notion about individuals' health is: apart from being able to work at their full capacity, healthy people are able to extend their life time, working hours, and knowledge and technology transfer period (Schultz, 1999). In macroeconomics, there is a considerable amount of evidence about the impacts of the public health system on economic growth; for example, public health investment can result in an increase in national incomes (Gyimah-Brempong & Wilson, 2004). A review of literature as part of this research found that over the past 150 years, there was a leapfrog increase in life expectancy of the worldwide population, from less than 40 years to 78 years, by the end of the 19th century. The main reason for this was proper hygiene and an abundance of food, which resulted in

a decline in mortality and had a strong correlation with income growth, especially in Europe. It can be said that local people's improved health has increased productivity in the manufacturing sector and results in economic development.

In a profound sense, public health success is both a universally-recognized goal and indicator of success in public administration. Public health success significantly contributes to economic growth and development. To measure public health success, it is necessary to identify indexes of what is happening in the public health system – health outcomes. The significance of public health success or health outcomes on country development makes the factors that influence improved health outcomes become an interesting topic to study.

A review of ideas about the need to study factors influencing good health outcomes using available empirical evidence revealed that since 1970, variables used for the measurement of the progress of the government sector have been extended from economic variables, e.g. GDP and GNP, to social variables, e.g. life expectancy, child mortality, access to health services, access to water, access to sanitation, infant mortality, calorie intake, and literacy. The measurement has been improved in terms of the number of informants, which has been increased in order to develop a global database and in terms of methodologies and measurement tools. A key observation is these variables are used for measuring public health success or health outcomes.The data suggested that health outcomes have gained increasing interest and attention at the international level. Thus, factors that influence health outcomes were worth studying using academically-proper methods to generate empirical evidence based on proper findings.

A guiding principle for global public administration is "good governance," which is assigned different meanings by different scholars. In a broad term, it means a decision-making process and policy implementation for country development (The World Bank, 2015). There is a certain amount of evidence which identifies the relationship between the levels of good governance and economic development impacts. This research investigated the levels of good governance in relation to health outcomes, using similar and relevant empirical evidence; for example, the impacts of good governance on individuals' health (Klomp & de Haan, 2008) and the overall health outcomes (Rajkumar & Swaroop, 2008). Corruption is another indicator of

good governance toward health service delivery (Gupta, Davoodi & Tiongson 2000). Modern research has revealed a trend that the relevance of the concepts of health outcomes and good governance has gained greater attention in the academic circle. Many international organizations and scholars have developed tangible good governance indicators through continuous data collection. This has made it possible to test these indicators to identify factors influencing health outcomes in order to develop additional concepts and evidence for the linkages for the academic circle. In addition to identifying factors influencing good health outcomes, the author conducted systematic analysis on good governance-related issues in order to gather empirical data based on research which was conducted using comprehensive methodologies.

Based on the significance of public health success as a determinant of economic growth and country development and as a key goal in public administration, it is necessary to study public health success. The indexes of public health success consist of indexes of results of the overall national public health system – health outcomes, which is an internationally recognized indicator. This research sought to explore the causal factors in health outcomes. Another principle which is recognized as having an impact on the levels of public health success and country development is "good governance." Hence, in this research, "good governance" served as a factor that influences health outcomes.

To identify what factors affect health outcomes, the author reviewed literature on the causal factors and global situations of health outcomes through secondary data recognized by the World Bank. The research found that the levels of health outcomes of low-income and middle-income countries are a concern and fall far behind their high-income counterparts. The author excluded high-income countries and focused on middle-income and low-income countries because the incomes of high-income countries are at a satisfactory level. Development of health outcomes in high-income countries should go in another direction, beyond basic health outcomes, such as under-five mortality, which is a major and pressing problem among low- and middle-income countries. The goal of seeking the answer made it necessary to employ the panel data analysis technique in the data analysis. Clear theoretical concepts were important for developing variables in testing. In addition, it was necessary to conduct

a standardized test of variables and data sets before conducting model analysis. Model analysis had to be done carefully and straightforward to ensure that the analysis results would be complete and could serve as reference at a macro level. Based on the intentions and concrete methods, the objectives of the research were developed.

1.2 Research Objectives

1) To study factors that influence health outcomes.

2) To develop policy proposals based on research findings to improve health outcomes among low-income and middle-income countries around the world.

CHAPTER 2

LITERATURE REVIEW

2.1 Population Health and Development

In general, when it comes to national development, "humans" are considered to be the most crucial resource to make it progress. Governmental core activities for human resource development are usually in the form of educational and public health services. Educational services will improve the quality of the population, while public health services will result in healthiness to ensure improved productivity of people. Both services are important processes for the implementation of national development policies. The physical environment includes factors such as topography and climate. The social environment includes social values, social stability, cultural characteristics, incomes, and community conditions, e.g. urban growth and proportion of the elderly to children. The biological environment includes the occurrence or recurrence of epidemics. The international environment includes factors such as the influx of foreign labor force. Lastly, technological development has resulted in change in lifestyles. All of these factors have impacts at the individual and greater population levels.

The health levels of global populations have dramatically improved, especially in the last 50 years, in terms of mortality rates of populations at different ages and life longevity. Its major contributing factors consist of improved quality of food, advancements in the public health systems, improved educational levels, and increase in public health expenditure across the world. Empirical evidence that supports this phenomenon is, for example, the research by McKeown entitled "Record, and Turner (1962, 1975) on Reasons for the Decline of Mortality in England and Wales during the Nineteenth Century" and "An Interpretation of the Decline of Mortality in England and Wales during the Twentieth Century." Both pieces of research identified that a decrease in the mortality rate of populations in England and Wales mainly resulted

from the advancements in medication and vaccinations and improved hygiene, e.g. improved cleanliness of drinking water and improved quality of food, all of which directly led to the decline in mortality rates. Several research works from the U.S.A. provide consistent findings that advancements in public health, e.g. vaccination, and higher educational levels result in greater longevity and reduced mortality rates in the U.S.A. (Fuchs, 1974; Fogel, 1986; Lleras-Muney, 2005).

In conclusion, to a certain extent, the healthiness of populations results in human resources that are of high quality – the heart of national development. Thus, promoting good health among populations is a crucial mechanism for future national development.

2.1.1 Linkages between Population Health and Population Incomes

The simplest reason used for explaining "why healthier people are more likely to be wealthier than unhealthy ones" is: healthier people are able to work longer hours, work harder, and are less likely to get ill, which provides them with opportunities to generate more income. Healthy children are able to access education more regularly than children with poor health. Regular access to education has a direct impact on the levels of education, knowledge and capability among children. Thus, better health creates more direct and indirect development opportunities at the individual and national levels.

Theoretically, the linkage between population health and national development is often mentioned in terms of the linkage between increased incomes or economic development and population health. The literature review revealed that such linkage was developed in conjunction with significant concepts about technological capital. This led to the development of the Neoclassical School (Solow, 1956; Swan, 1956), which reflects a significant difference between richer countries and poorer countries. Development of wealthier countries is a result of their technological capital which creates production advantages or productivity – these advantages have dynamic consequences. Thus, it can be concluded that technological capital is crucial to national development (Romer, 1991; Lucus, 1988). There is further evidence that technological factors not only contribute to economic development but also the continuity of national development. Technology is defined as a resource that exists

within an individual or a country; therefore, human resources or human capital have become a variable which has gained interest and are referenced continually.

Since the development of the Solow Model, the interest in studying factors contributing to economic development has often been related to human resources, as a contributing factor in sustainable development. There are numerous studies that used educational indexes to represent human resources to verify this idea. Health indicators were first mentioned and substantiated in mid-1990s (Fogel, 1986; Barro, 1996; Barro & Sala-Martin, 2004). Seeking evidence for the linkage between population health and economic development, these studies believed that healthiness is the most important element of well-being and has an impact on the opportunity for human capital development, e.g. less sick leave used, increased chances for education and learning, and increased working time. At the individual level, this will lead to improved productivity, which will result in higher economic growth. On the other hand, when individuals earn better income, their lifestyles will be dynamically conducive to healthiness and enhanced human capital, through educational upgrades and health promotion, thus resulting in a continual growth process. In addition, medical care expenses for healthy individuals are less than those of unhealthy individuals. All of these are factors that affect expenditures of individuals, as well as the whole country in cases when the government has to be responsible for the expenses.

A great deal of evidence confirms that health factors are not only important for generating economic growth but also for ensuring stability of national development. This empirical evidence is witnessed in cross-country studies and national studies, both at the macro and micro levels.

There are many macro studies in this area. The research by Lucas (1988) entitled "On the Mechanics of Economic Development", which has been continually referenced in other studies, demonstrates that the production sector in countries whose populations have good average health levels will enjoy better growth. The research by Bloom, Canning and Sevilla (2004) entitled "The Effect of Health on Economic Growth: A Production Function Approach" confirmed the positive impacts of health on economic levels, especially good health promotes longevity and has a direct impact on the average economic outcomes. In the research, work experiences of the samples were controlled. That is, individuals' greater longevity will result in them having better

economic situations, especially in terms of savings. This is contrary to an old belief that when a society consists of a greater number of elderly people, the government will have to spend more on medical care. However, countries investigated in the studies were developed western countries that have a well-established public health system and a continually implemented health insurance system. The research by Gertler and Van der Gaag (1990) entitled "The Willingness to Pay for Medical Care: Evidence from Two Developing Countries" provides a conclusion that a health status like life expectancy has a positive relationship with economic and income levels. There are studies that proved the relationship between income and health levels, which believed that "The 'better off' are healthier." Their major finding was the relationship between improved health levels and higher income levels among individuals (Pritchett & Summers, 1996; Gallup & Sachs, 2001). Others studies investigated the impacts of advancements in medical technology on national incomes (Acemoglu & Robinson, 2008). In conclusion, the improved health of populations provides an increase in national revenues. However, these studies did not identify the reasons why many countries are unable to develop themselves to attain the same level of other countries despite increasing health factors of their populations.

Micro research in this field focuses on how individuals' health affects their income. An advantage of this kind of research is that it provides high-quality data for analysis; however, its limitation is that its results cannot be inferred in a different environment or in a broad picture of populations. However, another benefit of this kind of research is that it studies actual phenomena. An example is the long-term study of infants through health indicators, e.g. birth weight and vaccination in countries with similar characteristics to compare infant development with their incomes in the future (Thomas & Frankenberg, 2002; Heckman, 2007). Another example is the study on health behaviors, which provide a conclusion that individuals with healthy behaviors are more likely to earn more incomes (Grantham-McGregor et al., 2007; Thomas & Strauss, 1997). Another example is the study on illness which results in lower income. The research by Bleakley (2006) investigated the impacts of malaria on the southern part of the U.S.A. in 1920, as well as in Brazil, Colombia and Mexico in 1955, to identify their consistency. It showed a very interesting result: illness from malaria affects incomes of individuals during the end of life – the more serious their illness

from malaria is, the lower income they will earn in the long run. These results were consistent with phenomena in other regions, e.g. India and Africa (Cutler et al., 2007; Barecca, 2007; Hong, 2007). In conclusion, micro research provides results that confirm that individuals' good health has long-term national and international impacts.

Both micro and macro research identifies that the good health of individuals and the greater population can lead to higher incomes and economic development, which are the most-easily observable indicators and verifiable empirical data. Accordingly, population health is strongly associated with national development to ensure economic growth. This makes the study of contributing factors in population health needs to be supported and implemented by the government sector. The next part is the review of population health concepts and currently-used methods for population health measurement.

2.1.2 Population Health Concepts

The concepts of health population have been developed over a long period of time. "Population health" consists of the term "population" and "health." The term "population" refers to a group of individuals who live within the same territory and such territory may be defined in research or may refer to a country territory or others. "Health" refers to physical or mental health that is free of disease or disturbance (WHO, 2015). The important definition of "population health" which serves as an approach of this thesis is as follows:

"Public health is a conceptual framework that aims to identify why an individual is healthier than another individual. This conceptual framework also involves public health policies, resource allocation, and relevant research (Young, 1998). In addition, it involves health outcomes of a group of individuals within a study area, the distribution of health outcomes in the studied group (Kindig & Stoddart, 2003), population health measured through health status indexes which are determined by society, economy, and physical environment of a territory, and long-term development, such as child health, social capital, and human capital (Dunn & Hayes, 1999)."

It is evident that the definition contains shared senses – a group of individuals within one territory and the assessment of the health status of the group of individuals. This research used the findings provided by Kindig and Stoddart (2003), which

suggests that population health has to be measured in terms of outcomes and outcome distribution. Kindig (2007) provided a conceptual framework for explaining health population-related concepts as a pattern of relations, which is presented below:

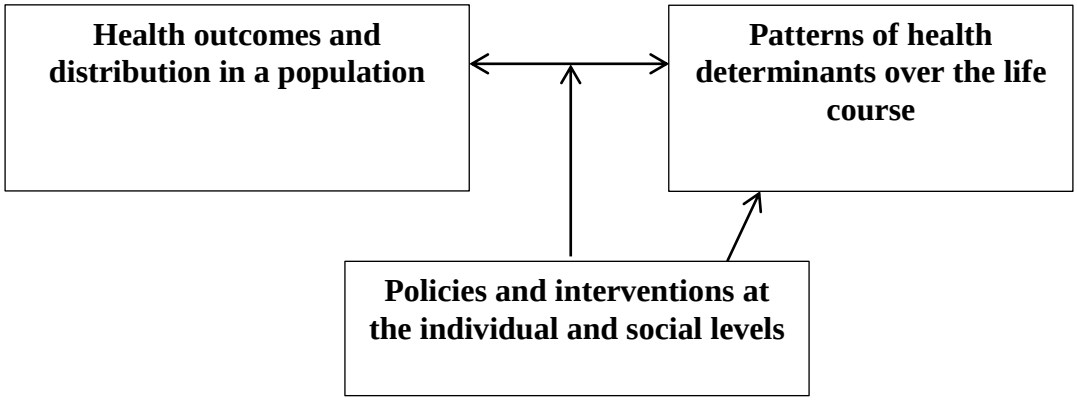


Figure 2.1 Conceptual Framework of Health Population
Source: Adapted from Kindig and Stoddart, 2003.

The conceptual framework reflects the linkage of proposed factors, whereby health outcomes and distribution in a population has a connection with individualistic lifestyles. Living without risk factors (e.g. alcohol, cigarettes, and drug substances) and working without risk factors (e.g. physical environment and stress) have a relationship with some public outcomes, e.g. long lifespan. While other policies and supports, e.g. the public health system, health insurance system, hygiene-related culture, customs and values, and others, can be collectively called institutional factors. Institutional factors, e.g. the preparedness of the public health system, legal provisions, as well as religious rules and beliefs, have a direct effect on lifestyles, e.g. cleanliness and hygiene. Simultaneously, institutional factors play a vital role in changing the relationship between health outcomes and distribution in a population and lifestyles. For example, although individuals have lifestyles that involve risks involving illness and death, e.g. drinking, if the public health system in the country where the individuals are living has comprehensive healthcare services, this can prolong their lifespan for a certain period. The results may also be opposite the presented examples.

Concerning key considerations for the population health concept which illustrates the linkages of factors presented through the aforementioned conceptual framework, only public outcomes and distribution in the population are measurable tangibly, involving no bias, due to objectivity of the concept, e.g. long life span and infant mortality. Some institutional factors are measurable objectively, e.g. the public health system, which can be measured based on the number of beds per a thousand patients. Others are difficult to measure because of their abstractness, e.g. social values. The last factor – lifestyle, is the most difficult to measure. Although data about lifestyles can be collected from individuals, measurement of lifestyles involves high variation because the data consists of attitudes or opinions. In addition, lifestyle measurement needs to be conducted on a continual basis. Thus, this research focused on factors that are tangibly measurable so as to create variables in the research, especially health outcomes and distribution in the population, as well as institutional factors that are measurable.

2.1.3 Population Health Outcomes around the World

A major reason why the study of population health requires the measurement of health outcomes and distribution in a population is the government's ultimate goal to formulate policies that result in improved health of its population at the individual level, equally, regardless of class or social status. The review of literature showed that popular health outcome indexes of global population tend to reflect the development of the health of the global population, for example:

2.1.3.1 Under-five mortality rate – According to the WHO Report (2015), there were 5,900,000 who died under five years of age (16,000 deaths per day on average), with the highest rate in Africa (81 deaths per 1,000 births). The rate was almost eight times as much as that in Europe (11 per 1,000 births). The change in mortality rates is shown in the Figure below.

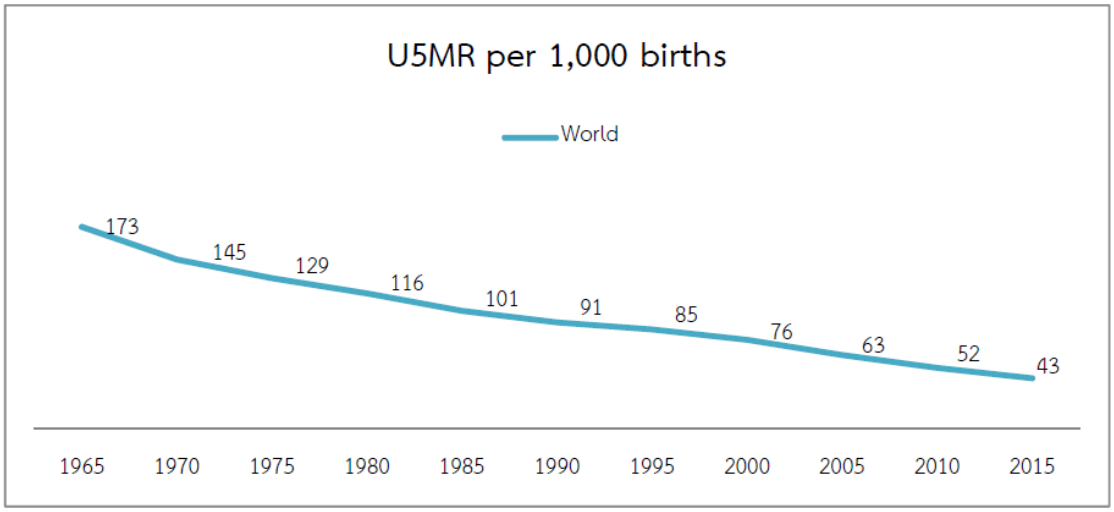


Figure 2.2 Under-five mortality Rate Worldwide from 1965-2015

Source: The World Bank, 2015.

The World Bank's database indicates a downward trend in the under-five mortality rate worldwide. After 1990, the figure decreased from 91 to 43 in 2015, which represented a decrease of 53 percent. The under-five mortality rate by national income levels – high, medium and low-income countries, is as follows:

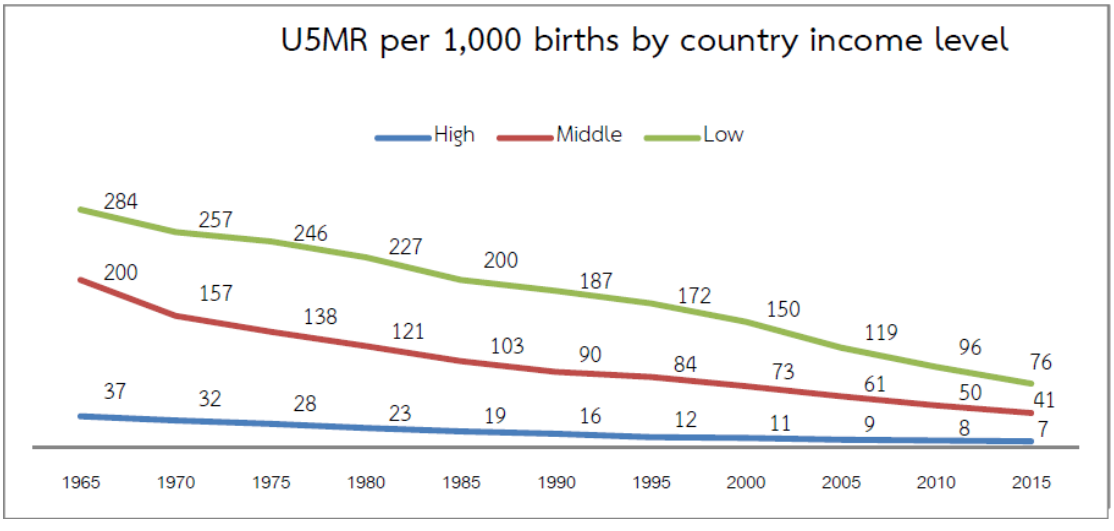


Figure 2.3 Global Under-Five Mortality Rate from 1965-2015, by Country Income Levels

Source: The World Bank, 2015.

The data illustrates inequality of the under-five mortality index values between high-income and low-income countries. In 1965, the reported rate in low-income countries was 284 deaths to 1,000 births, which represented 1.4 times as much as that of middle-income countries (200 deaths per 1,000 births) and 7.7 times as much as that of high-income countries (37 deaths per 1,000 births). It was positive that the under-five mortality rate enjoyed a continual decline in all income-based country groups. In 2015, the rate in low-income countries was only 76 deaths per 1,000 births, which represented a 3.7 percent decrease from 1965, while the rate in the middle-income group dropped five times to 41 deaths per 1,000 births and that of the high-income group also decreased by five times. However, a great concern was the disparity in health outcomes among different groups. The gap between the high-income countries and their low-income counterparts in 1965 was 7.7 times, but in 2015 it was 10.7 times.

In terms of figures, it was gratifying that the under-five mortality rate enjoyed a continual decline across the world. This might be due to medical advancements, a perfect health system or institutional factors, e.g. state expenditures on public health. However, in terms of gaps, it can be said that "Fewer richer children than poorer children die." This manifests the importance of creating equality among the groups by identifying factors that contribute to a decline in such inequality in the future.

2.1.3.2 Infant mortality rate – According to the WHO Report (2015), there were approximately 45,0000 deaths that were infants (aged less than one year old), which represented 75 percent of children who died under five years old in the index presented earlier. The situation was the most serious in Africa, where the infant mortality rate was 55 deaths per 1,000 births. The rate was the lowest in Europe, which was 10 deaths per 1,000 births and the rate enjoyed a continual decrease. In 1990, the figure was 8,900,000 (63 deaths per 1,000 births), which dropped to only 4,500,000 (32 deaths per 1,000 births) in 2015.

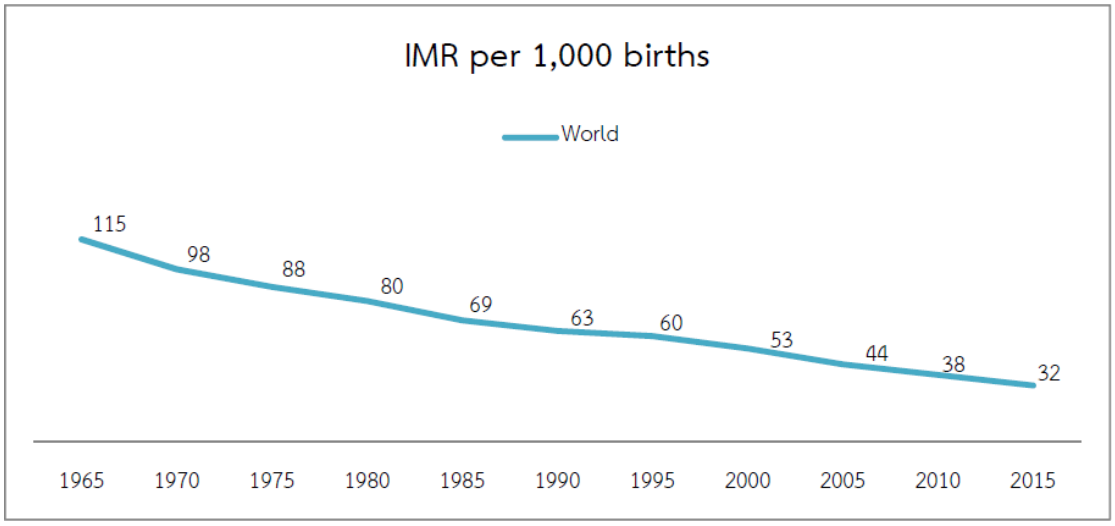


Figure 2.4 Global Infant Mortality Rate from 1965-2015
Source: The World Bank, 2015.

The infant mortality rate experienced a steady decline, from 115 in 1965 to only 32 in 2015. However, the difference in the figures varied from an income-based country group from another group, which is as follows:

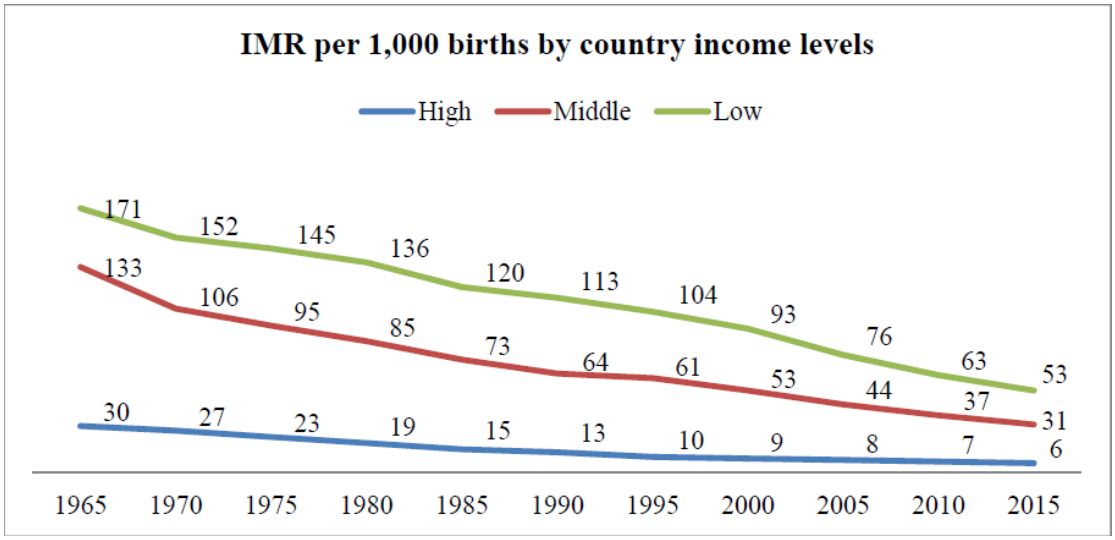


Figure 2.5 Global Infant Mortality Rate from 1965-2015, by Country Income Levels
Source: The World Bank, 2015.

Naturally, infants have death risks due to various factors; however, data showed a steady decline in infant mortality in all income groups. However, the comparison among income groups showed a key finding – the disparity between high-income countries and lower-income countries is apparent, which was consistent with the previously-mentioned indexes. In 2015, the reported infant mortality rate in low-income countries (53 deaths per 1,000 births) was 8.8 times as much as that of high-income countries (six deaths per 1,000 births) and 1.7 times as much as that of middle-income countries (31 deaths per 1,000 births). The comparison between middle-income and high-income groups also showed a disparity. The infant mortality rate in middle-income groups was approximately five times as much as that of their high-income counterparts.

Similarly, the under-five mortality rate enjoyed a steady decline, especially from 1990 to 2015, when all countries were able to reduce the infant mortality rate by two times. However, the disparity in health incomes was identified among country groups, the same as the previous index. It was a great concern that infants in poorer countries may not be able to survive until the end of their first year. This may be due to the levels of preparedness of the government sector or supports by the government sector, such as public expenditure on public health support or modernity of the public health system.

2.1.3.3 Life expectancy is another popularly-used or mentioned index. According to the WHO Report (2015) report, the average life expectancy for the world populations was 71.4 years. The average life expectancy among females was 73.8 years and that of men was 69.1 years. The average life expectancy was the least among populations in Africa, which was 60 years, and that of Europe was the highest, which was 76.8 years. This is presented through the following figure.

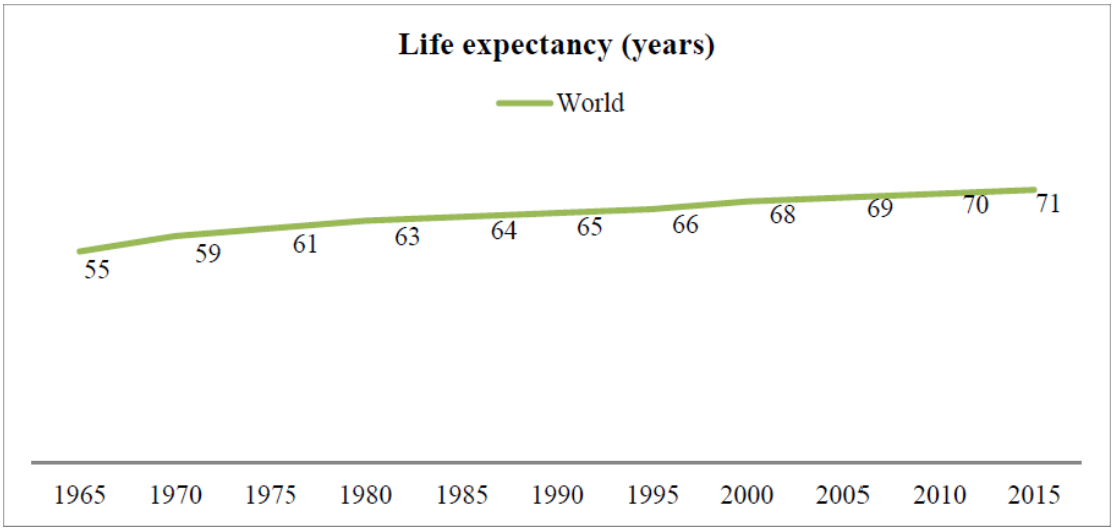


Figure 2.6 Global Life Expectancy from 1965-2015
Source: The World Bank, 2015.

The data showed a rapid change between 1965 and 1970, with a five-year increase in life expectancy. In other time ranges, the average life expectancy of global populations increased by only one or two years. Classified by income groups, the trend was as follows:

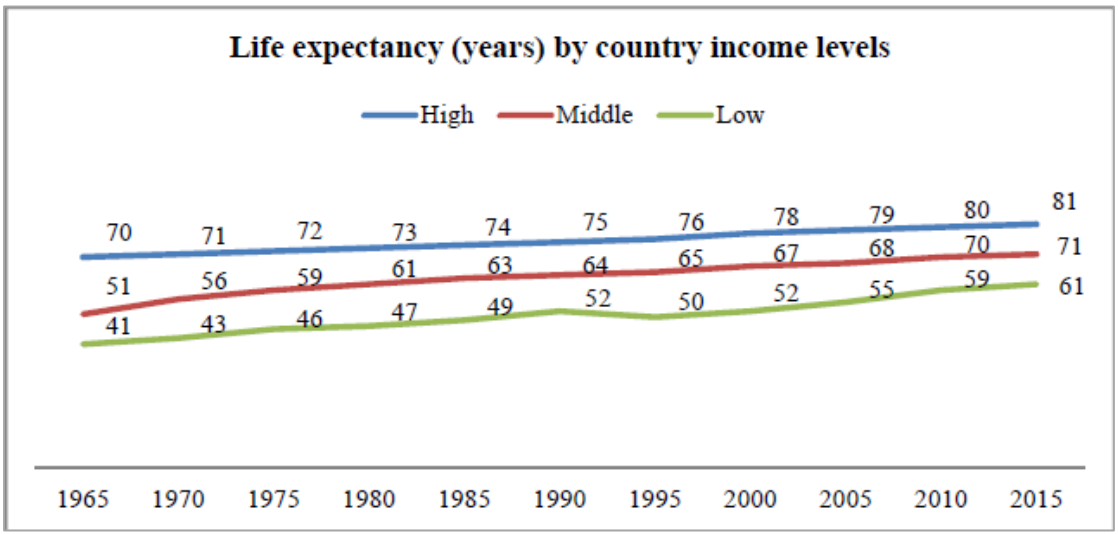


Figure 2.7 Global Life Expectancy from 1965-2015, by Country Income Levels
Source: The World Bank, 2015.

The disparity between income levels in 2015 was 10 years per level, which means: “The poor die earlier than the rich.” However, the development of life expectancy in all income groups was consistent. The world population had a longer life expectancy, and life expectancy would even be longer if they had a better economic status. A key observation was that from 1990 to 1995, the life expectancy of the populations in poor countries declined from 52 to 50 years. The review of literature suggested that the major cause of deaths among adults and children during that time was the AIDS epidemic in Africa, along with the collapse of the Soviet Union. This resulted in a decrease in the index of life expectancy of populations in low-income countries. (WHO, 2015).

The data reflected by the three major indexes point to the development of health outcomes for world populations. That is, the health of world populations from 1965 to 2015 improved, both in terms of the longer life expectancy (from 55 to 71), lower under-five mortality rates (from 173 to 43 deaths per 1,000 deaths), and lower infant mortality rates (from 115 to 32 deaths per 1,000). Despite good health of world populations, a gap or inequality of health indexes, as mentioned, was identified among high-, medium-, and low-income groups. That is, richer countries had healthier populations. Due to this conclusion, studies on health outcomes focused on countries lagging behind in terms of public health. The results of the studies can be used for formulating measurements or policies to achieve the best ways to improve public health with available resources to yield the maximum benefits for countries that are lagging behind using empirical data of those countries.

2.1.4 Poverty and Health

Data presented in the previous section raised two important questions: “Why do populations in richer countries have better health than those in poorer countries?” and “Does poverty lead to poorer health?” An explanation for this phenomenon provided by scholars is the “poverty-health trap.” This is based on the principle that poverty results in poor living, which results in poorer health and this makes economic self-development difficult. This occurs in a cycle, which allows continuity of poor health and poverty. An analysis of the concept with current situations revealed a consistency that in regions with concentrated poverty, like Africa, are characterized

by low health index values. By income levels, low-income countries had populations with lower health levels, and those countries failed to develop themselves or escape poverty in the past.

Poverty affects population health in various ways. For example, poor people and poor countries have insufficient resources, food, or medicine for healthcare before contracting a disease, during treatment, and after recovery or surveillance. This is a common pattern. In terms of resources, this phenomenon is reflected through the public health expenditure index, which showed that rich countries spent far more on public health than poorer countries.

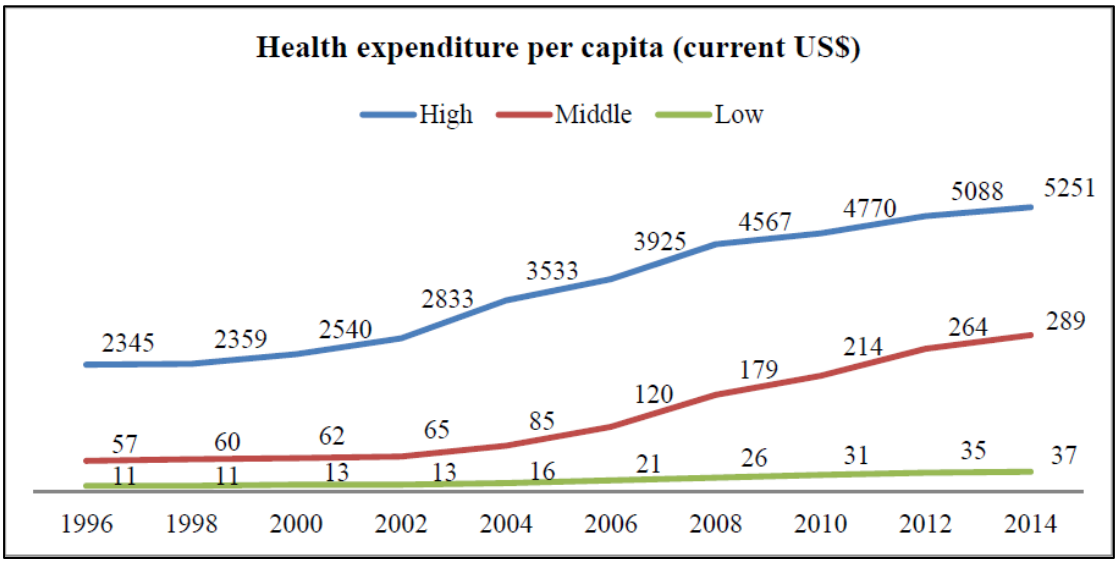


Figure 2.8 Annual Public Health Expenditure per Capita from 1996 to 2014, by Country Income Levels

Source: The World Bank, 2015.

It is not surprising that richer countries have a healthier population than poorer ones. This is because rich countries can promote good health of their populations through public spending. The data revealed that in 2014, the annual per-capita public spending on public health was 140 times as much as that of poorer countries (5,251 U.S. dollars per head in high-income countries and 37 U.S. dollars per head in low-income countries). Although health outcomes are affected by various factors, a

guarantee for good health outcomes is having sufficient resources, which, in this case, refer to comprehensive public spending. Therefore, it is worrying that low-income countries could afford only 37 U.S. dollars per capita on an annual basis. Thus, it is difficult for low-income countries to upgrade the health of their populations to be comparable to developed or high-income countries.

Some facts from the UNICEF Report (2016) were that at least 2,400 million people had poor hygiene and over 633 million could not access clean drinking water. This had a direct impact on their health. Today, at least 800 under-five children die each year due to unclean water-derived diseases. This phenomenon happens in rural areas in low-income to middle-income countries. In addition, low-income countries are more likely to have populations with low education, which results in poorer health conditions. For example, low education of mothers has a direct impact on under-five mortality due to various causes, including a lack of knowledge about hygiene or nutrition (Kiros & Hogan, 2001). In particular, a serious issue in Africa is a lack of hygiene-related knowledge. For example, people cut newborn babies' umbilical cord using a rusty pair of scissors or knife. This matter deals with basic health knowledge. Mothers in some areas, however, do not have such knowledge, which results in mortality of a large number of children as a result of tetanus (Dow, Philipson & Sala-i-Martin, 1999).

According to the poverty-health trap concept, worse health leads to increased poverty. A large number of studies have been carried out using this concept, which has resulted in a great deal of empirical evidence. The findings of most research on this topic often link "good health" with "human resources" or "human capital," which is recognized as a contributing factor in long-term development. Its key notion is good health results in greater productivity. Unhealthy adults are not strong, have a short life, and are unable to work at their full capacity. Unhealthy children have low weight and are unable to learn at their full capacity (Ainsworth, Beegle, & Koda 2002; Alderman, Behrman, Levy & Menon, 2001). In some countries, malnutrition among their populations can result in decreased productivity in the future. These phenomena result in low income and high healthcare expenditures, which leads to an endless cycle of poverty. This is the characteristic of poverty-health traps.

It is evident that population health is crucial to national development in various dimensions. A number of studies demonstrate that population healthiness will have a beneficial impact on country development, the most-easily measurable indicator of which is increased income. In addition, health and income have a close relationship. Many academics have developed frameworks to explain "poverty-health traps," which manifest that if population health is poor, this will impede country development and a failure in national development will endlessly lead to poor population health. This has encouraged the government sector and academic circle to seek ways to improve both population health and country development. An indicator that is easy to study and observe is health outcomes of a population. Thus, focusing on factors in good outcomes is definitely critical to national development and national policy formulation. In addition, inequality in health outcomes is apparent across different groups of countries divided by income. The quality of life and health outcomes of populations in high-income countries are at very high levels, while those in their middle-income and low-income counterparts are a concern. Thus, the author would like to investigate countries that are lagging behind in terms of health outcomes, which are low-income and middle-income countries. The concept and research findings will help to improve the health of populations in countries that are lagging behind. The study will provide more policy-related benefits than the study of countries with good population health outcomes. The following part is dedicated to relevant key concepts and research about health outcomes.

2.2 Health Outcomes

2.2.1 Development of Macro Health Outcome Measurement

The World Health Organization (WHO) has defined the term "health" as a complete physical, mental and social state which is free from disease or disease risks. A government is directly responsible for creating well-being for its citizens. Well-being involves comprehensive components, including the physical environment and socio-economic environment which is conducive to "happiness." Thus, the overall meanings of "health outcomes" encompass not only physical integrity but also human integrity.

A review of literature revealed that the measurement of health outcomes usually falls under three categories: 1) Measurement of overall health outcomes based on the mean values or medians of overall population well-being; 2) Measurement of the access and distribution of health outcomes in specific subgroups from the entire population; and 3) Measurement of the overall progress or well-being of the entire society as a representative of health outcomes of individuals. The third approach has been mostly used as the main approach in the study of health outcomes due to easy measurement and convenient access to data (Parrish, 2010). However, this is often criticized for neglecting social equality, such as equality in opportunities, equality in access to resources, and equality in power.

Usually, the predictability for the remaining life time or death of individuals will be more accurate as they reach their later years. Death at an older age of individuals indicates good well-being while they are alive. In fact, if the average age of the overall population is higher, this reflects their better well-being. Thus, health outcomes definitely have a relationship with the mortality rates of a population. On the other hand, identifying the number of people who are alive within a given age range, such as infancy and age over 65 years, is a way to generate health outcome indicators (Fryback, 1998). The most popular indexes of health outcomes are as follows:

Table 2.1 General Health Outcome Index

Examples of Population Health Outcome Metrics Based on Mortality or Life Expectancy
Mortality
Crude mortality rate
Age-adjusted mortality rates (AAMR)
Age-specific mortality rate
Neonatal (<28 d)
Infant (<1 y) (infant deaths per 1,000 live births)
Under 5 y
Adult (15-60 y)

Table 2.1 (Continued)

Examples of Population Health Outcome Metrics Based on Mortality or Life Expectancy
Other characteristic-specific mortality rates
State- or county-specific
Sex-specific
Race-specific
Condition-specific mortality rates and similar measures
Disease-specific mortality rate
Injury-specific mortality rate
Leading causes of death
Smoking-attributable mortality (number of deaths)
Maternal mortality ratio
Occupational class-specific mortality rate
Life Expectancy
Life expectancy at birth
Life expectancy at age 65 y
Premature Mortality
Years of potential life lost
Premature mortality rate
Summary Measures of Population Health
Health-adjusted life expectancy at birth (y)
Quality-adjusted life expectancy
Years of healthy life
Healthy life years
Disability-adjusted life years
Quality-adjusted life years
Inequality Measures
Geographic variation in AAMR among counties in a state (standard deviation of county AAMR/state AAMR)

Table 2.1 (Continued)

Examples of Population Health Outcome Metrics Based on Mortality or Life Expectancy
Mortality rate stratified by sex, ethnicity, income, education level, social class, or wealth
Life expectancy stratified by sex, ethnicity, income, education level, social class, or wealth

Source: Adapted from Fryback, 1998.

The life or death perspectives cannot answer all questions or indicate all health outcomes. Scholars have suggested that good living conditions or happiness is another important part of health outcome measurement. Thus, the analysis of health outcomes involves both objective indexes and subjective indexes. The most popular subjective indexes are as follows:

Table 2.2 Subjective Health Outcome Indexes

Examples of Population Health Outcome Metrics Based on Subjective (Self-Perceived) Health State, Psychological State, or Ability to Function
Health State
Percentage of adults who report fair or poor health
Percentage of children reported by their parents to be in fair or poor health
Mean number of physically or mentally unhealthy days in the past 30 days (adult self-report)
Mean number of mentally unhealthy days in the past 30 days (adult self-report)
Mean number of physically unhealthy days in the past 30 days (adult self-report)
Experiential and Psychological State
Percentage of adults with serious psychological distress (score ≥13 on the K6 scale)

Table 2.2 (Continued)

Examples of Population Health Outcome Metrics Based on Subjective (Self-Perceived) Health State, Psychological State, or Ability to Function
Percentage of adults who report joint pain during the past 30 days (adult self-report)
Percentage of adults who are satisfied with their lives
Ability to Function
Percentage of adults who report a disability (for example, limitations of vision or hearing, cognitive impairment, lack of mobility)
Mean number of days in the past 30 days with limited activity due to poor mental or physical health (adult self-report)

Source: Adapted from Fryback, 1998.

Additional research found reports on the synthesis of the development of health outcome measurement. These reports indicated that health outcome measurement and indicators were seriously developed in 1960, when "death" and "disease-free" were merged as the same index of health outcomes, by establishing the ratio of healthy age to the period of serious illness or disability (Murray, Salomon, Mathers & Lopez, 2002). The study by Sullivan (1971) proposed a technique for health outcome measurement, which was based on an estimated period of healthy life and an estimated period of illness. The calculation often combined mortality rates with disability. These reports showed that health outcomes can be measured through various aspects and there are many indexes available to represent health outcomes of studied measurement units.

Measurement of health outcomes has gained more interest for different reasons. An important consideration proposed by a large number of academics is the distribution of public health services per all classes within a population.The demographic stratification and analysis of public health service distribution show the

level of equality in the access to public health services. It is believed that if equality exists across all classes, this will lead to the well-being of the entire population, consisting of the rich and the poor (Braveman & Gruskin, 2003; Reidpath & Allotey 2007). "Health inequity" in a population has been assigned different meanings. For example, it is an indicator of the differences in health service patterns and good health of individuals and demographic classes (Kawachi, Subramanian & Almeida-Filho, 2002). The main reason why "health equity" has become a topic of interest is the fact that if individuals or social-class groups have an equal opportunity to achieve healthiness, this can provide them with an equal opportunity for social class advancement without advantages or disadvantages between classes. Equality in this sense is not equal shares but equity. The importance of "health equity" also reflects the government sector's role in formulating policies that lead to social justice in terms of health, which is an aim that indicates legitimacy and good representation of the government.

Another important issue is the linkage of public administration factors that are directly related to the public health system or budget spending, in order to identify if health outcomes occur. The study of the outcomes of public administration factors and other factors is the study of interactions of variables, to identify if they have an impact on an issue of interest, which, here, is health outcomes. This study is crucial because if there is a significant finding that both factors can yield improved health outcomes when they interact with each other, this will have an impact on policy formulation of studied countries. Most importantly, this issue has been hardly empirically confirmed and studied; only theoretical evidence is available. Thus, this research made an effort to pioneer the investigation of the interactions between public administration and other factors.

2.2.2 Research Related to Health Outcomes

The study entitled "Governance and Health Systems Performance: Exploring the Association and Pathways," by Olafsdottir, Reidpath, Subhash and Allotey (2011), aimed to identify the relationship between governance and the public health system. A significant finding was that countries with higher levels of good governance had better health outcomes than those with lower levels of good governance. This led to an important conclusion that the interventions or adoption of macro policies that focus

on creating good public health structures will have a more positive impact than micro or individual policies. A.E. Olafsdottir studied three cases: 1) African countries, most of which are low-income countries, 2) High-income countries in Europe during economic recession, and 3) Middle-income countries in Asia. The focus of the research was the impact of financial reform on the public health system. All these cases identified a linkage between governance and the public health system and health outcomes.

Hilaire (2014) conducted the study entitled "Good Governance of Public Health Expenditures," which investigated the interactions between good governance and public health expenditures in 43 African countries from 1993 to 2012. An empirical finding found a slight interaction between them. H.G. Hilaire argued that this finding might be derived from the fact that variables used in his research did not cover all realities. However, the research found that public health expenditure per capita and the overall expenditure had a positive effect on health outcomes with statistical significance.

The study "Governance and Corruption in Public Health Care Systems," by Lewis (2006), investigated factors that had an impact on public health service delivery in developing countries. It aimed to seek empirical evidence from institutional variables and corruption in the public health system in order to identify if they had an effect on public health service delivery. The research findings confirmed that "corruption," a sub-index of good governance, had an impact on mortality rates, public health service delivery, and investment in public health. He indicated that in the case of service delivery, if the public health system does not have a good administration institution, adverse consequences may follow; for example, healthcare officers do not work at their full capacity, patients have to pay for unnecessary or unlawful expenses, and resources are stolen by healthcare officers, which are collectively called "corruption." If corruption occurs, this will impair the efficiency of the public health system, which will inevitably have an adverse impact on service users. It can also impact investment in public health and affect the general public in a similar way.

The study entitled “Health Expenditures, the Health Outcomes, and the Role of Good Governance,” by Farag et al. (2013) aimed to establish empirical evidence for the relationship between public health expenditures and health outcomes (overall mortality rate and mortality rate in children) influenced by the levels of national good governance. The research studied 113 low- and middle-income countries across the globe. It was found that public health expenditures could reduce the overall mortality rate and the under-five mortality rate with statistical significance (using the fixed effect method). Another important finding was that the effect size of the decrease in mortality rates highly depended on good governance levels. That is, good governance will enhance the effectiveness of public health expenditures.

Pellegrini, Rodriguez-Monguio and Qian (2014) conducted the study entitled “The US Healthcare Workforce and the Labor Market Effect on Healthcare Spending and Health Outcomes.” The purpose of the study was to assess how the labor market of public health organizations had an impact on healthcare spending and health outcomes in the U.S.A. The data collection was conducted in 50 sub-districts in the District of Columbia between 1999 and 2009. The research showed causal relevance that during an economic downturn, public health spending increased while the private spending decreased, which led to less participation of public health unions and adversely affected the overall population health.

The research “Increased Rural Connectivity and its Effects on Health Outcomes, by Majid (2013), attempted to prove the assumption that improved connectivity through, for example, road development and public utility development, yielded improved health outcomes of rural children and awareness of good hygiene among parents. The research employed cross-section time-series of rural Pakistan in the past 16 years. The research findings confirmed that improved connectivity had a positive effect on rural children’s health outcomes.

Lordan and Frijters (2013), in the research entitled “Unplanned Pregnancy and the Impact on Sibling Health Outcomes” argued that unplanned pregnancy had an impact on the health outcomes of elder siblings. The samples consisted of over 1,800 children in Peru whose age ranged from 0-5 years. A significant finding was unplanned pregnancy had an effect on the health outcomes of infants and their siblings. Another key finding was that when general demographic factors served as

indicators of health outcome levels, "family size" and "economic levels" were often used as key demographic variables. However, the research pointed out that family planning could also satisfactorily explain health outcome levels. That is, family planning had a direct relationship with family educational levels.

The research entitled "The Effects of World War II on Economic and Health Outcomes across Europe," by Kesternich, Siflinger, Smith and Winter (2014), explored the long-term impacts of World War II on the health and geo-economic status of European populations. Conducted in 2009, the study involved 20,000 samples from 30 European countries who were children during World War II. The findings show that experiences from the war, including loss, violence, or being in the battlefield resulted in low levels of education, low levels of happiness in life, fewer opportunities for marriage, and low self-care. The same result was found between low-income groups and middle-income groups. The finding demonstrated the importance of demographic characteristics that had an impact on health outcomes.

The study entitled "Health Expenditures and Health Outcomes in Africa," by Anyanwu and Erhijakpor (2007), aimed to find empirical evidence for the relationship between national health expenditures and health outcomes, which were measured based on the overall mortality rate and the under-five mortality rate. The study used data from 47 African countries from 1999-2004. The research found that public health expenditures had a significant impact on both health outcomes – the overall mortality rate and the under-five mortality rate. It also found that ethnic differences in the study areas and the prevalence of AIDS resulted in lower health outcomes and a higher number of physicians and improved knowledge among women also had an impact on health outcomes.

Conclusion:

The measurement of health outcomes has long evolved. Health outcomes are often measured by three major factors: 1. Indexes related to mortality rates, 2. Indexes related to equality in receiving health services, and 3. Report of happiness in life. This research involved the first two indexes to represent health outcomes. However, the amount of research that showed broad or macro empirical evidence was small. The table below presents important research works, along with their findings, measurement of independent variables and dependent variables, and research methodologies.

Table 2.3 Dependent Variables Review

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
A.E. Olafsdottir, (2012): Governance and Health Systems Performance: Exploring the association and pathways**.** A thesis submitted for the degree of Doctor in Public Health, School of Health Sciences and Social Care: Brunel University.	Countries with higher levels of good governance had better health outcomes than those with lower levels of good governance. This led to an important conclusion that the interventions or adoption of macro policies that focus on creating good public health structures will have a more positive impact than micro or individual policies. A.E. Olafsdottir studied three	The measurement was divided into two dimensions – 1. Status: Under-five Mortality Rate and Infant Survival Rate. 2. Health Equity: Under-five Mortality Rate of the Lowest-income Stratum per Under-five Mortality Rate of the Highest-income Class.	These variables were divided into five groups – 1) Health System: Number of Beds per 10,000 People, Percentage of Babies Delivered by Skilled Health Personnel, Percentage of One-year-Olds Immunised with Three Doses of Diphtheria, Tetanus Toxoid and Pertussis, 2) Economy and Finance: Per Capita Health Expenditure and Gross National Income	Panel Data Analysis with 46 countries in Africa (1991-2006).

Table 2.3 (Continued)

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
	cases: 1) African countries, most of which are low-income countries, 2) High-income countries in Europe during economic recession, and 3) Middle-income countries in Asia. The focus of the research was the impact of financial reform on the public health system.		3) Education: Percentage of the Effective Transition Rate from Primary to Lower Secondary General Education, Both Sexes and Percentage of Adult Literacy, 4) Water and Sanitation: Percentage of Population with Access to Clean Water and Percentage of Population with Access to Standard Sanitation, 5) Governance: Legal Role, Transparency and Anti-	

Table 2.3 (Continued)

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
			corruption, Opportunity for Sustainable Economic Development,.	
H.G. Hilaire (2014): Does Good Governance Improve Public Health Expenditure-Health Outcomes Nexus? New Empirical Evidence from Africa, www.ecoasso.org/articles/HOUENINVO_Hilaire1.pdf.	This study investigated the interaction between good governance and public health expenditures, which found a slight interaction between them. H.G. Hilaire argued that this finding might be derived from the fact that variables used in his research did not cover all realities.	Infant Mortality Rate, Child Mortality Rate, Infant Average Life Expectancy, and Total Mortality Rate.	Health Outcomes in the Previous Year, Ratio of Health Expenditure (National Health Expenditure/Gross National Income), Good Governance (Government Effectiveness and Anti-corruption), and Interactions between Good Governance and Health Expenditure Ratio	Panel Data Analysis (Fixed-effects and Generalized Method of Moments) with 43 countries in Africa (1993-2012).

Table 2.3 (Continued)

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
M. Lewis (2006): Governance and Corruption in Public Health Care Systems**.** Center for Global Development**,** Working Paper (78).	The research findings confirmed that good governance had a positive impact on public health service delivery and investment in public health.	Percentage of 12-23 Month-Old Children with Access to Measles Vaccination and Under-five Mortality Rate.	Log of the Gross National Income, Overall Governance, Government Effectiveness, Average Number of Years of Education in Female Adults, Percentage of Basic Education Graduation in Women, Ethnic and Religious Division, and density of main roads.	Panel Data Analysis with 117 developing countries around the world (1999-2008).

Table 2.3 (Continued)

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
M. Farag, A.K. Nandakumr, S. Wallack, D. Hodgkin, G. Gaumer and C. Erbil (2013): Health Expenditures, Health Outcomes and the Role of Good Governance, Health Care Finance Econ, 13:33-52.	It found that public health expenditures could reduce the overall mortality rate and the under-five mortality rate with statistical significance. Another important finding was that the effect size of the decrease in mortality rates highly depended on good governance levels. That is, good governance	Log of Total Mortality Rate and Log of Under-five Mortality Rate.	Log of the Percentage of Health Expenditure per Gross National Income, Log of the Percentage of Personal Health Expenditure per Gross National Income, Gross National Income per Population, Government Effectiveness, Interaction between Health Expenditure and Government Effectiveness,	Panel Data Analysis (Fixed-effects Method) with 133 low- and middle-income countries around the world (1995-2006).

Table 2.3 (Continued)

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
	will enhance the effectiveness of public health expenditures.		Reproduction Rate (Birth Rate per Female Population), Percentage of Female Workers to Total Workers, and Urban Population to Total Population.	
L.C. Pellegrini, R. Rodriguez-Monguio and J. Qian (2014): The US Healthcare Workforce and the Labor Market Effect on Healthcare Spending and Health Outcomes.	The research showed causal relevance that during an economic downturn, public health spending increased while the private spending decreased,	16-64 Year-Old Population Mortality Rate and Health Status (self-report).	Health Worker Market (Health Worker Manpower, Unemployment Rate, and Labor Engagement Rate).	Panel Data Analysis (Fixed-effects Method) with 50 states of Columbia, USA

Table 2.3 (Continued)

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
Health Care Finance Econ, 14:127-141.	which led to less participation of public health unions and adversely affected the overall population health.			(1999-2009).
H. Majid (2013): Increased Rural Connectivity and its Effects on Health Outcomes, The Lahore Journal of Economics, :18 271–282**.**	The findings confirmed the hypothesis that improved connectivity of transport routes had a positive effect on the health outcomes of rural children and parents' perception of	Prenatal Vaccination and Childhood Vaccination.	Completeness of Connected Roads, Main Roads Connected to Cities (two time periods), Completeness of Electrical Power in Districts, Characteristics of Family Samples (Size,	Panel Data Analysis with 900 rural household (1986-1991, 2001-2010).

Table 2.3 (Continued)

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
	good hygiene of their children.		Number, and Education)	
G. Lordan and P.Frijters (2013): Unplanned Pregnancy and the Impact on Sibling Health Outcomes, Health Economics**,** 22: 903-914**.**	The significant finding indicated that unplanned pregnancy had a health impact on infants and their siblings.	Infant Height and Weight and Height and WHO-Based Weight.	Family Planning, Maternal Characteristics (Age, Education, Residence, Income, Social Capital, and Social Pressure), Eldest Child Age, and Age of Other Children.	Panel Data Analysis more than 1,800 baby in Peru (2 times: 2002 and 2006).

Table 2.3 (Continued)

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
I. Kesternich, B. Siflinger, J.P. Smith and J.K. Winter (2014): The Effects of World War II on Economic and Health Outcomes across Europe, The Review of Economics and Statistics, 96(1): 103-118	The findings show that experiences from the war, including loss, violence, or being in the battlefield resulted in low levels of education, low levels of happiness in life, fewer opportunities for marriage, and low self-care. The same result was found between low-income groups and middle-income groups.	Vaccination, Depression (Measured using Euro-D), Diabetes, Marriage, Heart Disease, Height, Happiness, and Self-Health Report.	Father Loss in War, Famine Period, Stay in Battlefield, Period in Warfare, and Foe Killing.	Multiple Regression with 20,000 people (live in WW2) in 30 EU-Countries (2009).

Table 2.3 (Continued)

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
Anyanwu, J.C. & Erhijakpor, A.E.O. (2007): Health Expenditures and Health Outcomes in Africa, Economic Research Working Paper Series, African Development Bank Group, Africa.	Public health expenditures had a significant impact on both health outcomes – the overall mortality rate and the under-five mortality rate. It also found that ethnic differences in the study areas and the prevalence of AIDS resulted in lower health outcomes and a higher number of physicians	Total Mortality Rate and Under-five Mortality Rate.	Per Capita Health Expenditure, Total Health Expenditure, Ethnic Diversity Division, Women Literacy Rate, Urban Population, Gross National Income Per Capita, and Number of Doctors per 100,000 People.	Panel Data Analysis with 47 countries in Africa (1999-2004).

Table 2.3 (Continued)

Health Outcomes				
Research	**Significant Research Findings**	**Variables**		**Methodology**
		Dependent Variables	**Independent Variables**	
	and improved knowledge among women also had an impact on health outcomes.			

2.3 Factors Influencing Health Outcomes

A review of literature found three categories of health outcomes, which were reflected through the following assessments: 1) Health outcomes, which reflect the physical changes of a population, such as mortality, 2) Health outcomes, which reflect the well-being of society, such as equality in healthcare services, and 3) Health outcomes, which reflect the happiness or mental state of a population and individuals. The concept of health outcomes has a strong relationship with other public health concepts, e.g. individual and community health impacts and public health services.

There are many factors that influence health characteristics, e.g. the physical environment, socio-cultural environment, individual characteristics, and individual behaviors. The health of individuals or social groups is determined by the environment, such as pollution and congestion. With regard to social factors, e.g. income or social status, people with higher income and social status have better health. There is considerable evidence that demonstrates that higher education is strongly associated with good health. Genes and risk behaviors of individuals are strongly associated with their health. It addition, convenience of healthcare services and the service access rate have an important impact on health (WHO, 2015). The study entitled "Socioeconomic, Cultural and Behavioral Factors Affecting Hispanic Health Outcomes," by Morales, Lara, Kington, Valdez and Escarce (2002), found socio-economic factors which had statistically significant impacts on health outcomes among Hispanic people. In particular, poverty and low education resulted in difficulties in accessing healthcare services, which had an impact on health outcomes. In addition, Mexican-American people in the U.S.A. had an equal opportunity to, or lower opportunity than, Hispanic people.

Based on the primary principle of the socio-economic impacts on health, as well as empirical evidence, the overview of the process that generates a comprehensive range of health outcomes is presented below.

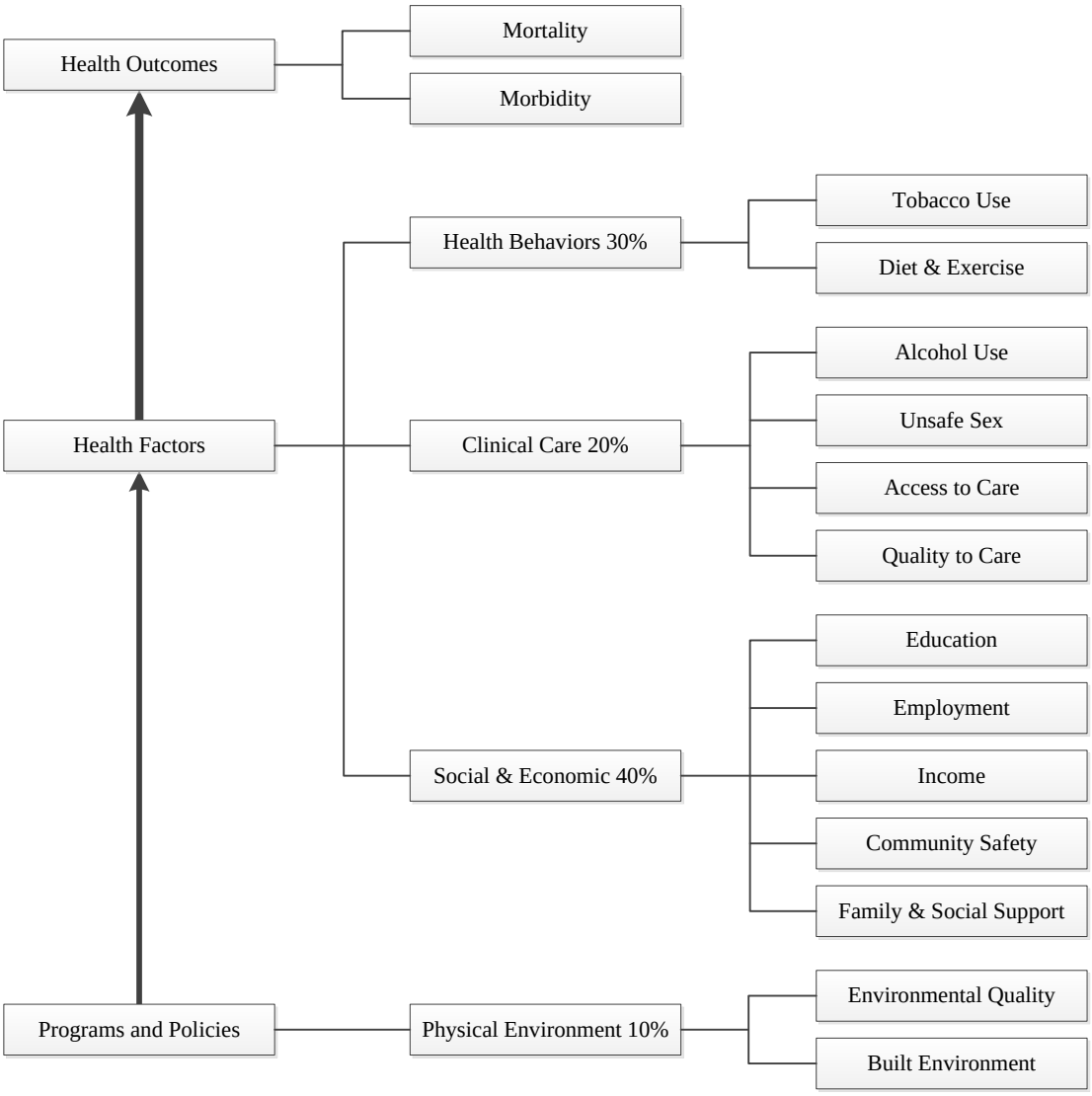


Figure 2.9 Process and Factors Affecting Health Outcomes

Source: Adapted from County Health Rankings & Roadmaps, 2017.

It is evident that socio-economic conditions play a crucial role in determining health outcomes. The aforementioned research also found that apart from being a key determinant, socio-economic factors have a relationship with health behavior. For example, people with lower socio-economic status are more likely to have poorer health behavior or even lower accessibility to health services. Individual behavior is a key determinant of health. These risk behaviors often have a long-term impact on

health and result in death in the future. Another factor that influences health outcomes is the public health system.

2.4 Health System

The public health system is a complex system involving various factors. The factors include macro factors, e.g. the local social environment, the structure of local public health organizations, and pressure from neighboring countries (Roemer, 1991). They also include psycho-social factors, e.g. cultures, social values, and socio-political ideologies. Individual factors are also included, for example, behavior, background, and social capital (Morgan & Swann, 2004). Nonetheless, the primary objectives of the public health system are to provide a population with good health and life (WHO, 2015), to create a system that protects people from illness and cures their illness (Mooney, 2007), and to provide protection of the value of illness, e.g. opportunity cost and medical expenses (McIntyre & Mooney, 2007). The ultimate outcome of positive health outcomes is to lead a country into socio-economic security and strength. The broad picture of the public health system is as follows:

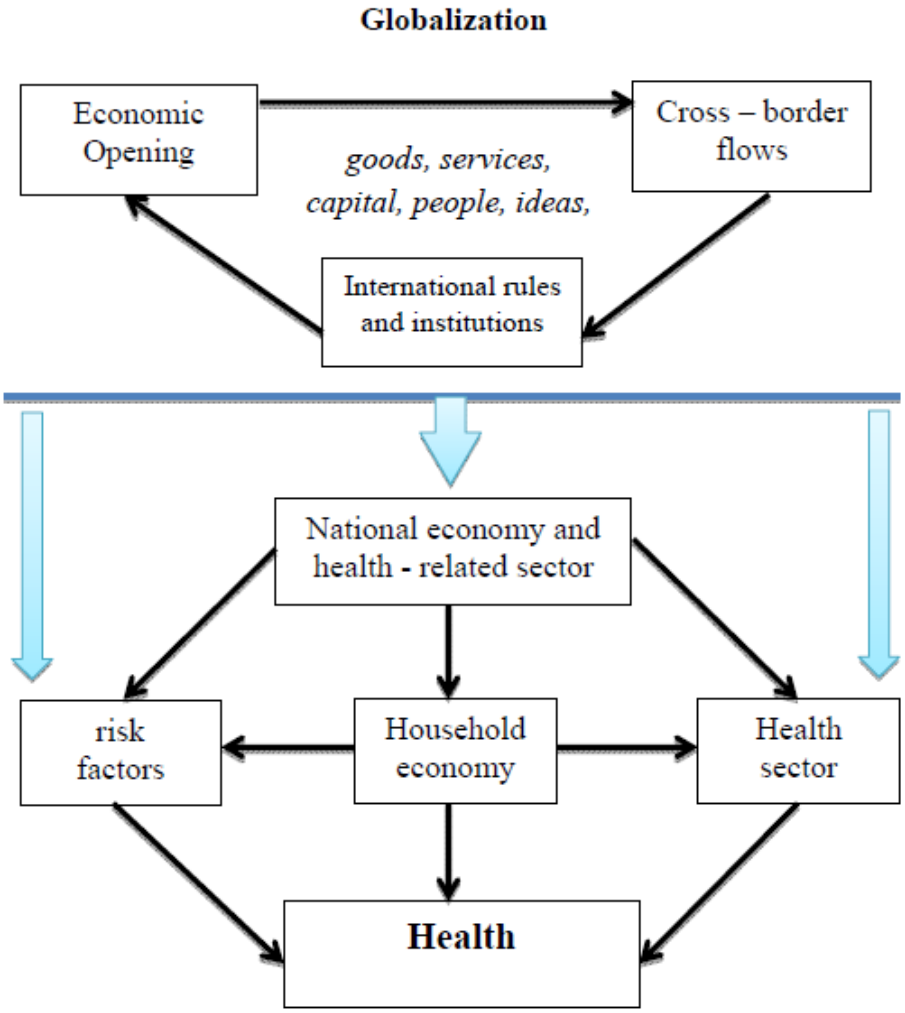


Figure 2.10 Overview of the Public Health System

Source: Adapted from Smith and Hanson, 2011.

The figure above describes the international pressures as result of globalization, which facilitates movement of capital, labor force, goods and services, as well as information and ideas. These things flow from one country to another through key economic characteristics. These key economic characteristics have an impact on the public health sector and the household's economic characteristics and lead to risk factors, all of which have a procedural relationship with the health of individuals.

In a micro picture, health outcomes are the result of continued public health implementation through the public health system. This is reflected through indexes of the World Health Organization (2000, as cited in Duran, Kutzin, Martin-Moreno & Travis,

2011), which demonstrate that health system performance can be measured through these factors: 1) Health outcomes (measured based on life expectancy and the quality of life of children), 2) Responsiveness (measured based on what the government has promised to provide for a population and what is not provided to them), and 3) Financing protection and equity in the financial burden (measured based on the fact that people have no risk to non-affordability to medical expenses or to excessively-high medical expenses). This can be illustrated as follows:

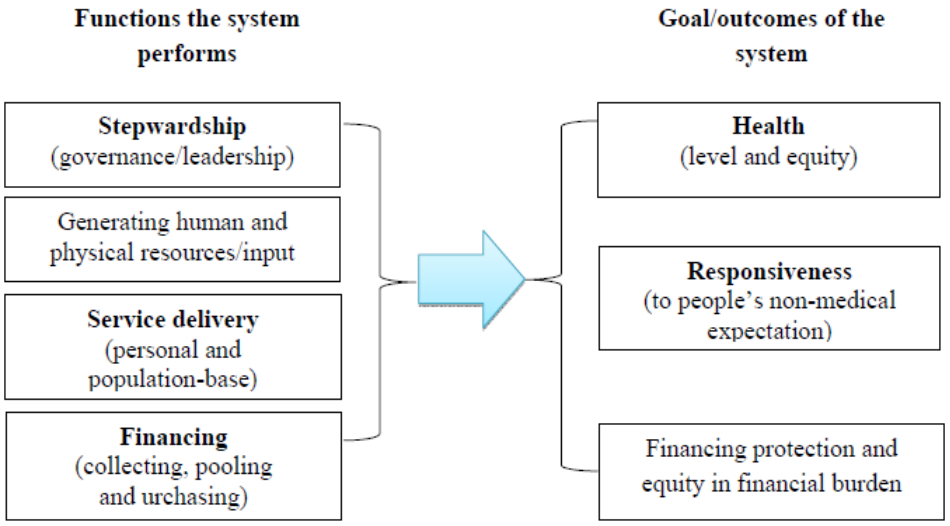


Figure 2.11 WHO Health System Performance Framework
Source: Adapted from Duran, Kutzin, Martin-Moreno and Travis, 2011.

The above figure shows the comprehensiveness of the measurement of health system performance. A review of literature found that "responsiveness" is not a very popular indicator. The indicator first appeared in the study by Darby, Valentine, Murray, and Silva (2000) entitled "Strategy on Measuring Responsiveness." This study was criticized for its low reliability, accuracy, and methodologies for data collection (excessively wide variety of sources of data). The indicator "financing protection and equity in financial burden" was also severely criticized for poor "reliability" and "accuracy" of its measurement tools. Examples of the criticisms consisted of a lack of clarity of missing data for each country and calculation methods that have a risk of breaching agreements on data analysis (Almeida et al., 2001). It

was also criticized for using seriously inappropriate data analysis techniques, which led to unreliable structural and predictive outcomes (Williams, 2000). A number of public health experts stated that the WHO report was not scientific due to bias in data collection (Navarro, 2000).All research methodologies, concepts, data collection, and data analysis used in the report faced technical challenges. Thus, reliability of the report was questioned (Smith, 2002). The arguments resulted in unpopularity of both indexes even after the database and data collection methodologies were improved. Empirical evidence from the study "WHR 2000 to WHR 2010: What Progress in Health Care Financing?," by McIntyre, (2010), concluded that the report and database preparation was improved due to problems with the low levels of participation in integrating their data into the databases among middle-income and low middle income countries. In the 2007 report, the database had better integrity of data and the criticized methodological loopholes were improved.

A profound analysis revealed issues of WHO Health System Performance. The index "responsiveness" had an issue of subjectivity, which resulted in its measurement being complicated and involving many different aspects. The index "financing protection and equity in financial burden" had an issue of continuity of collection of data in the database. On the other hand, health outcomes were tangibly measurable because of the measurement of actual numbers, database continuity (with at least 30 years of data collection), and the central standard for data collection for all countries. However, to ensure accurate measurement and high predictability, none of the indexes should be omitted. Thus, creating a right methodology for this research was challenging.

2.5 Governance and Good Governance

2.5.1 Governance

According to the Oxford Dictionary, "governance" means "the action or manner of governing a state, organization, etc." For the World Bank (2015), "governance" refers to exercising national executive and administrative powers of authority and the process of forming a government, which must be efficient and effective to reach out to people in socio-economic terms. The Organization for Economic Co-operation and

Development (OECD) defined "governance" as "exercising political, economic, and executive powers to manage a country." In addition, "good governance" is "governance characterized by transparency, auditability, efficiency, and effectiveness in drafting laws and undertaking domestic activities." There is a report that showed the trends of change or development of its meanings. In 2000, the term "governance" implied the government's capabilities to develop a country with legitimacy derived from institutional trust by the general public. At that time, a rapid change in technology and social network and media encouraged the government to create transparency and auditability through publicized information and participation of the general public in inspecting corruption, which continued for over 10 years. The report mentioned that after 2015, "governance" would become the major goal of democratic states and the use of powers for national administration. The report also identified that this term would be assigned a more practical meaning, by focusing more on civil rights through pushing the human rights process and on the community-based approach as a key mechanism for national administration. The United Nations Development Program (UNDP) defined the term "governance" as "economic, political, and public administration movement at all levels using mechanisms derived from approval by the general public through laws with non-discrimination and equality."

The Committee on Experts on Public Administration (UN) prepared a report entitled "Definition of Basic Concepts and Terminologies in Governance and Public Administration" (2006) in order to align an understanding about the meaning of "governance." The report presented that in public administration, the term "governance" has experienced a semantic evolution. One definition is "state-driven administration using inter-organizational networks (Frederickson & Kevin, 2003), with the aims to diminish roles, command line, and centralization of the government sector and create its transparency and auditability in line with rapid economic, social and environmental changes."

An academic work that has been referenced in terms of "governance" was an article written by Rhodes (1996) "The New Governance: Governing without Government," which was pioneer work in this area. In his article, "governance" was discussed in six dimensions – reducing the state size, corporate governance, modern public administration, social network system, self-management organization network, and

good governance. Under the section "Hollowing out the State," Rhodes explained that "hollow states" originate from applying ideas of the private sector. Privatization, reduction of responsibilities of central and local governments, as well as reduction of powers of state authorities using the new public management (NPM) approach focusing on managerial accountability and political control, can cause problems, despite smaller and fragmented governments. The problems include implementation supervision-related issues, more difficulty in spending control, and more complexity of checks and monitoring. These show the weaknesses of the NPM approach. For example, the focus on cost-effectiveness result in negligence of coordination among agencies and the absence of establishing a common goal or attaching great importance to network relationships. The focus on outcomes and responsibility of individuals under the NPM approach is not suitable for management that involves networks, which share responsibility for outcomes. In addition, competition diminishes the importance of interdependence among stakeholders within a network, thus resulting in a lack of trust in self-reliance.

Rhodes (1996) pointed out an innovative dimension of public management, which attached great importance to networks that are independent from the government. The community strength-based approach was believed to be more appropriate than "the new public management" (NPM) approach, which focuses on business thinking. The tools used by the business sector which are very different from those of the government sector were heavily used by the government sector, which results in adverse effects. Finally, Rhodes concluded that society was "increasing governance and reducing the government" or "increasing support and reducing control," whereby the government's role shifts form a "controller" or "manager" to only a "supporter."

Bidhya Bowornwathana (2006) presented preferable characteristics for "new democratic governance." The change was derived from the awareness of the failure of past performance of the government, which resulted in a comprehensive movement of administrative reform based on the following principles:

1) A smaller government that does less – The central government should be smaller and have a diminished role. For example, the number of agencies, ministries, and government officers should be reduced and privatization should be adopted. This is because of a lack of efficiency to meet actual needs of the general public and the

belief that the private sector performs better than the government sector in some tasks. Thus, "the government sector should shift its role to be a supporter of the private sector, civil society, and non-profit organizations for solving social problems" rather than being an implementer. In addition, the government should promote full competition of the private sector in the globalized market.

2) A government with a global vision and flexibility – The government should be aware of its role in the global community due to the dominant movement toward globalization and democracy in the world. Government officers should consider seeking necessary international information for the country's benefits. Due to different uncertainties, the government may consider establishing sub-agencies to perform tasks at a small level. This principle is consistent with the civil society empowerment and decentralization principles.

3) Accountable government – Due to the general public's disappointment with their government performance for its serious non-transparency (Hood, 1991), a government needs to be able to provide explanations and clarifications about its actions for the general public and outsiders. Citizens' improved knowledge and awareness of their rights results in high expectation of the government and this leads to pressure from the institutional environment on the government, which is exposed to demands and thorough inspection from the general public.

4) A Government that is fair – The question "who will benefit from public administration reform?" must be answered. It must be remembered that public administration reform is directly related to politics, which has a negative image. Thus, an important function is to prove that implementation will be beneficial to the majority of people, not interest groups. Diverse opinions of people in society are the toughest challenge.

In essence, "governance" is a key principle rather than a management tool. It is comparable to a "finish line" of public administration. This principle achieves an important intent in "public administration within the context of globalization and democracy." This will give rise to this phenomenon: "The real powers lie with the citizens, which results from a strong civil society, whereby state mechanisms serve as supporting and facilitating factors only." Thus, the general public's expectations of

the government will be higher and their knowledge and awareness of their rights will be greater. This results in the government's adaptation to the general public's needs. However, governance is not a magic drug. Instead, it is philosophy that guides public administration in the long run under seriously changing circumstances, as today.

Based on the synthesis of definitions of "governance" provided by international agencies and the review of basic concepts from related theories, the meaning assigned to this term in this research is "the government's ability to issue and enforce laws which result in delivery of public services and national development.' Based on this definition, "governance" is more likely to be fulfillment of government tasks than "abstract quality of a good government." It also reflects the "process" that allow for assessing the government's abilities.

2.5.2 Good Governance

Good governance is a globally-recognized concept. According to literature about the previous section, this concept led to the assessment of the potential or quality of the government – If it is assessed as "good," it has good governance. "Good governance" has been mentioned for a long time. The research under the title "Sub-Saharan: From Crisis to Sustainable Growth" (1989) was pioneer research on this topic. The World Bank proposed country administration which uses sustainable development principles. To date, the World Bank is an international agency that seeks to measure the quality of governance, believing that "good governance" will lead to national development with comprehensive security. There are six relevant criteria:

1) Voice and accountability (VA) – People's eligibility to choose a government and freedom to have exposure to media and participatory expression in the democratic process.

2) Political stability and absence of violence/terrorism (PSAV) – The tendency of overthrowing the government's constitution, unrest, and terrorism.

3) Government effectiveness (GE) – The quality of public services free from political pressure, the quality of the public policy process, and trustworthiness.

4) Regulatory quality (RE) – The perceived ability of the government to push public policies and laws to fairly promote the private sector.

5) Rule of law (RL) – Confidence and perception of legal compliance, especially police officers, frontline officers, and courts in terms of law enforcement.

6) Control of corruption (CC) – Powers of the general public to investigate, and demand actions to combat exploitation by the business sector and national corruption of elites and the government.

The analysis of the World Bank indexes identified that, for good governance, there are two key factors that should be assessed: 1) Governmental institutions and a public service system for implementation of public affairs and delivery of public services (public administration) and 2) Characteristics that are in accordance with the democratic concept, e.g. fundamental democratic rights, elections, and auditing. Therefore, the concept of good governance according to the World Bank is "the state which produces democracy-based development."

The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 2009) defined the term "governance" in line with the regional development context. The meaning assigned by UNESCAP is clear and concise, which is: the process of decision-making and policy implementation for country development. The evaluation model and measurement from the World Bank were applied to identify the goodness and badness of the governance system. The criteria consist of: 1) Accountable, 2) Responsive, 3) Transparent, 4) Participation, 5) Equitable and inclusive, 6) Follows the rule of law, 7) Effective and efficient, and 8) Consensus-oriented. These criteria by the UNESCAP are clear and focus on the decision-making and policy-making of the government sector (Sheng, 2011).

The Asian Development Bank (ADB) defined "good governance" as exercising resource management powers for country administration to ensure socio-economic development, by focusing these key issues: 1) Political stability, e.g. democracy and human rights and 2) Economic development, e.g. the efficient use of public resources. It includes principles that are similar to those provided by the World Bank and the UNESCAP, which consist of: 1) Accountability – The government's ability to answer questions and to be audited, 2) Participation – The government's ability to involve the general public in administration and policy formulation, 3) Predictability – Equal law enforcement, and 4) Transparency – Transparency in terms of access to data and monitoring of public spending. All of these factors must be implemented in a consistent

and continuous basis. The African Development Bank (AFDB), a similar organization, set up a goal that is similar to that of the ADB. However, the AFDB added that development needs to ensure sustainable development for Africa, by focusing on: 1) Accountability, 2) Transparency, 3) Combating corruption, 4) Participation, and 5) Legal and judicial reforms. The intention to combat corruption was raised as a key issue for the AFDB.

The United Nations Development Program (UNDP) defined the term "good governance" as public administration that ensures sustainable human capital development. Its focus is building critical processes, which consist of politico-economic development and public administration mechanisms. With regard to politico-economic development, the UNDP focused on policy formulation and decision-making which are conducive to its development. As for public administration mechanisms, the focal point is policy implementation and networking from all sectors to drive good governance. The UNDP proposed nine key elements for governance: 1) Participation – Citizens of any status can be involved in policy decision-making, 2) Rule of law – Equality of law enforcement, 3) Transparency – Data transparency, 4) Responsiveness – Responsiveness to all related parties, 5) Consensus orientation – Focus on common interest through consensus of all parties, 6) Equity – Creation of equality, 7) Effectiveness and efficiency – Efficient and effective use of resources, 8) Accountability – Auditability, 9) Strategic vision. High – high-ranking leaders and their governments regard human resource development as a national agenda item. It is apparent that the UNDP aimed to create development and define the term "good governance" as strengths derived from local factors which are prominent organizational features.

The term "good governance" in relation to the public health system has been assigned many definitions. The WHO defined that "stewardship" was the key to the existence of "good governance" in the public health system. Its focuses are on transparency and auditability, as well as trust and legitimacy which the general public provides for the system. Its top focus is corruption in the public health system. The WHO considered that corruption is the most important obstacle to the quality of public health and it increases healthcare costs and expenses, the wastefulness of resources, and the useless loss of resources.

A review of literature and synthesis of key principles revealed a key characteristic of good governance, which is a process that contributes to continuous long-term national development. The development process is divided into two levels – 1) National institutional development process, which contributes to international development and 2) Organizational development process, which results in the development and effective use of resources. These two development processes need to respond to fundamental democratic principles. As an organization directly related to the public health system, the WHO has provided a definition for the term "good governance." However, the WHO has not developed indexes for this. Thus, it is essential to utilize the World Bank's full-fledged database as the basis for the analysis of good governance in relation to other things.

2.5.3 Evidence of the Linkage between Governance and the Public Health System

Preliminarily, the principle of governance is vital to national development in various dimensions – economic, social, and political dimensions and the status of a strong state based on democracy. The notion "governance" reflects national mechanisms conducive to democracy-based development. A literature review found linkages between governance and country development. For example, the study by Hall and Jones (1999) investigated how the World Bank's index of "good governance" affected per-capita income, and it found a significant positive result. Some empirical evidence of the connection between governance and the public health system are presented in health outcome-related studies (Olafsdottir et al., 2011; Hilaire, 2014; Lewis, 2006). Concerning the logical linkages between the principles of "governance" and the public health system, when bad governance occurs, such as corruption in the procurement of pharmaceuticals and medical supplies, this will have an adverse impact on the well-being of service users (Menon-Johansson, 2005).

The relevance of governance with respect to the public health system has been manifested in a number of reports. An example is a report by the WHO (2000), which had an aspiration for stewardship, a key factor in good governance. Some other reports pushed for decentralization, transparency, and accountability for issues related to the overall well-being of a country (The World Bank, 1993). In other words, governance

is a mainstream idea spreading into all governmental organizations with a focus on decentralization, the cost-effective use of resources (especially budget monies), and public participation in audits. This concept has been widely adopted in the public health system (Rajkumar & Swaroop, 2008). It has resulted in major changes to the public health system, in terms of empowering local governments, based on the decentralization principle, to take care of population health (Sheaff, 2005). This basic principle has led to a wide range of studies, which have provided different angles of results.

The study entitled "Corruption and the Provision of Health Care and Education Services," by Gupta, Davoodi and Tiongson (2000), aimed to identify evidence that failures in marketing commonly has occurred in the empirical world, which has been distorted and carried out with a wrong objective, were a result of corruption in the system. The research findings proved that corruption in the government sector had a macro impact on the public health sector. Corruption increased the rates of infant mortality and underweight in children. Corruption in the educational sector increased the school dropout rates before graduation in elementary schools. Corruption was one of the indicators of bad governance. Its significant result was that corruption increased the costs of public health and educational administration. The study used a panel data analysis from 126 developed and developing countries. The research by Sheff (2005) entitled "Governance in Gridlock in the Russian Health System: the Case of Sverdlovsk Oblast," studied the public health reform in Russia in 1990. It examined the governance structure in Sverdlovsk, where the source of grants to the health system shifted from federal grants to local government grants, representing one-third of hospital revenue. The new structure involved a problem. That is, if the hospitals reduced their services, the amount of grants offered to them would be reduced, but if they tried to increase services, their main income would be reduced as well. This problem manifested obstacles of collaboration within the government sector and public administration.

These two studies reflect policies that had a negative impact on the public health system. Decision-making of the government sector might lead to unintended consequences, which might be worse than they should be and result in a failure in public administration.

The research “Public Spending and Outcomes: Does Governance Matter?” by Rajkumar and Swaroop (2008) established a linkage among public spending, governance, and health outcomes. It found that a higher level of governance resulted in the increased effectiveness of public spending, which resulted in good health outcomes with statistical significance. This led to a conclusion that governance was important for health outcome improvement. The study entitled “Public Health Governance: Views of Key Stakeholders,” by Marks, Cave and Hunter (2010), studied key stakeholders in public health governance in the United Kingdom. It found that obstacles during the collaborative process, e.g. non-clarity of the scope of powers and failures in monitoring policy implementation, resulted in ineffective monitoring of the public health system. The research entitled “Decentralisation, Governance and Health-System Performance: Where You Stand Depends on Where You Sit,” by Mitchell and Bossert (2010), aimed to identify if the decentralization principle was in line with the governance principle in terms of improvement of auditability, with respect to convenience and accessibility. Carried out in six countries, i.e. Bolivia, Chile, Pakistan, India, the Philippines, and Uganda, the study believed that decentralization could optimize public health services. The study found that if local areas achieved the goal of public health decentralization, this would improve accessibility and auditability and increase the participation of the general public and the public health sector.

The study entitled “Effects of Governance on Health: a Cross-national Analysis of 101 Countries,” by Klomp and De Haan (2008), is another piece of evidence for the connection between governance and personal health. The assumption of the study was that good governance has a direct impact on individuals’ health and has a direct and indirect impact on the public health system. A key finding from the study was that good governance did not have a direct impact, but an indirect impact, on the health of individuals through increased revenue and improved quality of health services. In other words, good governance resulted in better public health services and increased income, which resulted in individuals being healthier.

In short, governance is associated with the public health system in terms of institutional pressure. The governance concept has played a contributory part in the macro structure and the public health system of a country. As presented earlier, this

includes decentralization, reform of the public health system in line with key principles, and improvements made by health service provider organizations, for example, in terms of data transparency, participation in audits, and enhanced quality of public services. The findings, in conjunction with empirical evidence, provided an overview of the relationships between governance and the public health system, through spending, administration, and corruption in the system. Thus, it can be inferred that governance is a key factor in creating a public health system which produces desired health outcomes.

2.6 Public health Expenditure

Public health expenditure is a key factor usually referred to as a key indicator of the government's accountability to its people in terms of health. It is believed that greater public health expenditure usually has a positive impact on the public health system of a country (Anyanwu & Erhijakpor, 2007). However, the proper proportion of public health expenditure varies to the income levels of each country. For example, low-income countries usually perceive that their public health expenditure is excessive, while their middle-income counterparts try to identify a balance in their spending to improve the effectiveness in health outcomes, as much as they can allocate. High-income countries, which are usually financial donors to lower-income countries, often ask how much their funding support has been spent for public health purposes. Thus, an appropriate amount of public health expenditure often varies to the context of each country (Musgrove, 1996).

Although some empirical evidence indicates that public health expenditure has a significant effect on health outcomes, other empirical evidence reports that public health expenditure alone is not adequate to predict health outcomes. Due to the conflicting findings in the empirical evidence, it was necessary to consider how important "public health expenditure" was to be included into the analysis. The following part is dedicated to the two groups of studies.

Supporting studies – There are a number of studies that manifested that public health expenditure had an impact on health outcomes. For example, the study by Heysen and Musgrove (1986) concluded that higher incomes led to greater longevity.

However, it found that increased public health expenditure reduced the mortality rates in low-income countries only. In a study of 35 countries in 1990, by Badani and Ravallion (1997), public health expenditure was identified to have an impact on a health outcome – infant and child mortality rates in poor families in poorer countries. However, this result was not found in wealthier countries. The finding was consistent with that from the study by Burnside and Dollar (1998). Burnside and Dollar found that public health expenditure was associated with infant and child mortality rates in low-income countries. The study by Filmer, Hammer and Pritchett (1997) found a significant impact associated with the overall expenditure by the government on child mortality rates. However, it did not see a robust impact of public health expenditure on health outcomes. The study by Akinkugbe and Afeikhena (2006), which was conducted in 42 African countries, found significant evidence of the effect of the proportion of public health expenditure on GDP and under-five mortality rates. The study by Or (2000), which investigated factors affecting mortality rates in 21 OECD countries from 1970 to 1995, found that per-capita public health expenditure did not have a statistically robust effect on health outcomes. There are other studies that documented a similar result that public health expenditure had a small impact on health outcomes in wealthy or developed countries (Anderson, 1975; Hadley, 1982; Leu, 1986; Babazano & Hillman, 1994; Hitiris & Posnet, 1992, as cited in Or, 2000). A study Gupta, Verhoeven and Tiongson (1999) by showed that public health expenditure, especially primary health expenditure, resulted in a decline in infant and child mortality. Another study by Gupta, Verhoeven and Tiongson (2001) manifested a linkage between public health expenditure on the well-being of low-income populations in poorer countries. The linkage was more obvious in poorer countries than richer countries. However, such linkage had a low level of robustness. The study by Hammer et al. (2003) found that per-capita income, per-capita public health expenditure, and education were good predictors of child mortality in developing countries. The work by Gottret and Schieber (2006), which studied 81 low-income and middle-income countries, showed an interesting finding. They concluded that a 10-percent increase in public health expenditure had a better impact on under-five mortality rates (reduced under-five mortality rates) than a 10-percent increase in educational or infrastructure expenditure. The work by Anyanwu and Erhijakpor (2007), which was carried out across Africa,

found a significant result that public health expenditure directly affected the under-five mortality rate. The work by Novignon, Olakojo and Nonvignon (2012) found a similar result, which led to a conclusion that public expenditure could increase the survival rate and reduce under-five mortality rate. The study also showed that both the public and private sectors had to have cooperative public health spending because public and private expenditure, such as insurance, contributed to improved health outcomes. The results are consistent with many past studies which identified that public health expenditure had a greater impact in poorer countries than in richer countries.

Studies providing opposite findings – The study by Carrin and Politi (1995) found that debts and income had a direct effect on health outcomes. However, it identified no relationship between public health expenditure and health outcomes (cited in Musgrove, 1996). The study by Filmer and Pritchett (1999) provided a clear conclusion that public health expenditure did not result in reduced child mortality. It found that "cultural factors," such as education among women or the ratio of ethnic minorities in society, were good predictors of child mortality. Thus, its policy proposal was that increasing income, reducing inequality, or improving education among women was a better alternative than increasing public health expenditure. The finding of the research by Burnside and Dollar (1998) was consistent with that of previous work in terms of the insignificance of the effect of public health expenditures on health outcomes. Even the report by the World Bank (2004), which involved the study from 1980-1999, showed no effect of public health expenditure on reduced mortality. The work by Issa and Ouattara (2005), which was conducted in 160 countries, stated that apart from the fact that increased public health expenditure did not reduce mortality, it had a negative effect on health outcomes. However, the study used only two groups of countries – high-income and low-income countries, which might result in inaccurate estimation.

Based on the aforementioned empirical evidence, from the group of studies that supported the relationship between public health expenditure and health outcomes and the studies that rejected such relationship, the author synthesized these phenomena and found their common points, as shown below:

1) Public health expenditure had an effect on health outcomes in low-income countries (Heysen & Musgrove, 1986; Babazano & Hillman, 1994, as cited in Or, 2000; Badani & Ravallion, 1997; Burnside & Dollar, 1998; Hammer et al., 2003). However, this finding was not found in high-income countries.

2) Other variables, such as economic factors, e.g. per capita income and gross national income; social factors, e.g. the rate of education among females, public utilities, and the road's proximity; and cultural factors, e.g. the rate of ethnic minorities in the country, had an impact on health impacts (Carrin & Politi, 1995; Filmer & Pritchett, 1997; The World Bank, 2004). However, the levels of these factors in developed or richer countries were much higher. Thus, the conclusion, as mentioned above, was that other variables also had an effect on health outcomes in developed or richer countries.

3) Another important observation was that the analysis results varied to sets of data and the methods of estimation or data analysis (Baldacci, 2002). Different robustness criteria and flexible agreements were used, so diverse conclusions were found.

The synthesis led to these questions: how to apply the methods, how to improve these variables, and how to select variables to produce empirical evidence that is reliable and appropriate for study samples, from the literature review to the development of concepts and variables for the next stage.

2.6.1 Evidence of the Linkages between Governance and Public Health Expenditure

Concerning the major differences in factors affecting health outcomes between richer countries and poorer countries, in addition to economic and socio-cultural factors, the level of governance is an important factor in health outcomes. Its empirical evidence was presented in previous sections (Gupta, Davoodi & Tiongson, 2000; Sheaff, 2005; Lewis, 2006; Rajkumar & Swaroop, 2008; Mitchell & Bossert, 2010; Marks, Cave & Hunter, 2010; Olafsdottir et al., 2011; Hilaire, 2014). This evidence provided indications that could lead to a conclusion that the increase in good governance results in improved health outcomes. Concerning public health expenditure

and good governance, the research by Wagstaff and Cleason (2004) entitled “The Millennium Development Goals for Health Rising to the Challenges,” manifested that good policies and good institutions were the most important factors that allowed public health expenditure to yield good health outcomes. The study used the World Bank’s CPIA indexes as data for the analysis. It found that when the increase in the value of the CPIA for policy and institutional would have a significant impact on the effect of public expenditures on better health outcomes, such as mortality rates, epidemic mortality rates in children, and underweight children. Wagstaff and Cleason indicated that good policies and institutions optimized public spending. The study found that many countries did not fully spend public health funds, if compared with their affordability. The main reason was that the level of institutional development had a significant impact on the government’s full spending on public health. Therefore, institutional and policy development are not less important than other factors. The work by Wolf (2007) demonstrated that “corruption control,” one of the World Bank's governance indexes, was a factor in reduced infant mortality rates. This was consistent with the study by Radin (2008), which was conducted in 26 countries in Central and Eastern Europe between 1980 and 2003. The study found that grants alone did not reduce cancer-related mortality. A statistically significant reduction in cancer-derived mortality needed to involve the interaction effects among the grant index, the corruption index, and the institutional index.

Based on the aforementioned empirical data and evidence, it can be concluded that public health expenditure is a key factor affecting health outcomes. However, the government’s public health spending should be carried out through good policies and institutions. Good policies and institutions will guarantee that public health expenditure will produce the most efficient and effective health outcomes. If a country has bad institutions, it can be compared to a water tank with holes. Although a large amount of water is filled in it (here, it is compared to funds for public health spending), the water cannot fill the tank up. Thus, the amount of water alone cannot yield desired outcomes; a good structure should also be studied. This research aimed to identify the interaction between a good institutional structure and the amount of spending and to study if it can produce good health outcomes – this issue required

data analysis. If the results were statistically significant, this would confirm the idea that a good institutional structure can push for policies in the future.

2.7 Education

A review of literature found that the relationships between education and health outcomes were widely referred to and studied. A great deal of empirical evidence has demonstrated the logical relationships between low education and individuals' health outcomes, such as morbidity and mortality at early ages (Cutler and Lleras-Muney). In addition, education affected health outcomes at the macro level. The study by Kitagawa and Hauser (1973) pioneered the examination of the impact of educational levels on health outcomes in 1960. It found a higher rate of mortality and death at earlier ages among low-educated populations. The study by Rogot, Sorlie and Johnson (1992), carried out from 1960-1980, found a greater difference in population ages. The group of populations with higher education enjoyed a longer life, which was found in both white males and females in the United States. An international study conducted by Von dem Knesebeck, Verde and Dragano (2006), encompassing 22 European countries, reached a conclusion that populations with low education had poor health. In addition, low education was associated with cancer and acute heart attacks (Mackenbach et al., 2004).

In general, higher education results in a better quality of life. For example, an opportunity to earn more income allows one to use money for health purposes. Children from a highly-educated family are more likely to enjoy the same opportunity as their parents. Educational levels provide inequality in income, which is found both at the micro and macro levels (Daniels, Kennedy & Kawachi, 2000). This conclusion can be witnessed in high-income or developed countries, where populations are more likely to have higher education than those in low-income countries. This results in different health outcomes. The report by Lleras-Muney (2005), which involved the study in 1960, found that education had an impact on the mortality rate. It found that one year of education provided 1.7 years of longer life. The aforementioned research provided evidence of the relationship of education with health outcomes (Carrin & Politi, 1995; Filmer & Pritchett, 1999; The World Bank, 2004). Based on a literature review,

this research included education as one factor affecting health outcomes in accordance with the principles outlined above.

2.8 Variables in the Research

Health outcomes – In this study, the health outcome was a dependent variable. It consisted of two dimensions: conventional health status and health equity. In terms of conventional health status, under-five mortality rate was used in several studies as an indicator of health outcomes (Blaxter, 1981; Reidpath & Allotey, 2003; Reidpath, 2009; Gwatkin et al., 2007). As for health equity, it refers to health outcomes on the richest to the poorest on an equal basis. The most common indicator of health equity is health outcomes on the poorest populations (Braveman & Gruskin 2003; Reidpath & Allotey, 2007). This research used the following indicators.

1) Conventional health status – U5M (under-five mortality)
2) Health equity – U5M / Poorest Social Quintile.

Health system – This variable has been widely studied. It can be defined three ways: health personnel's capabilities, sufficiency of sources of services or hospitals, and health security, e.g. vaccination (Kabir, 2008). Relevant indicators used in this research with respect to the health system were as follows:

1) Improved sanitation facilities, rural (% of rural population with access)

2) The percentage of one-year-olds immunized with three doses of diphtheria, tetanus toxoid and pertussis

Governance – This research referred to the World Bank's Governance Index, which was derived from comprehensive data collected across the world. It consists of six indicators, covering positive institutional characteristics that contribute to stable national development. However, only some of these indicators were used in this research. These indicators are related to the general public and the government in terms of public health administration. Relevant indicators used in this research were as follows:

1) Government effectiveness (GE) – It indicates public service quality that is free from political pressure and the quality of the public policy process and its creditability.

2) Control of corruption (CC) – It indicates the public sector's power to audit and file complaints about improper exploitation by the business sector and national corruption by the elite and the government.

Finance/Economy – As mentioned above, public health expenditure is a major factor contributing to health outcomes. Relevant indicators used in this research relating to finance and the economy were as follows:

1) Per capita total expenditure on health
2) Gross national income (GNI) per capita

Education – This is another key factor affecting health outcomes, from the individual to the national levels. Based on the reviewed literature, there are diverse educational indicators. However, if educational inequality in studied countries was to be taken into account, it was necessary to choose proper variables. The indicator used in this research with respect to education was as follows:

1) Effective transition rate from primary to lower secondary education, both sexes (%) or the rate of entry into upper secondary education in both sexes. Based on the variables, a simple equation for the study is as follows:

$$\text{Health Outcomes} = \alpha + \beta\ \text{Health system} + \beta\ \text{Finance and economy} + \beta\ \text{Good Governance} + \beta\ (\text{Health expenditure x Good Governance}) + \beta\ \text{Education} + \tau + \gamma + \varepsilon$$

The variables were arranged in a tabular form so that it is easy to understand and clear about the sources of data. They are provided with descriptions, as follows:

Table 2.4 Variables in this Study and Sources of Data

Variable	Source	Year
Health Outcomes		
Conventional Health Status, using the under-five morality rate per 1,000 live births.	The World Bank WHOSIS	1996 - 2015
Health Equity, using the ratio between the poorest and the richest U5MR quintiles.	UN DESA	

Table 2.4 (Continued)

Variable	Source	Year
Health System		
Water and Sanitation, using improved sanitation facilities, rural (% of rural population with access)	WHO/UNICEF (joint program)	
Primary Health Care, using immunization, DPT (% of children ages 12-23 months)	WHO The World Bank	
Finance/Economy		
Finance, using health expenditure per capita (current US Dollars)	The World Bank	1996 - 2015
Economy, using gross national income, Atlas method (current US dollars)		
Governance		
Control of Corruption index	The World Bank	
Government Effectiveness index	WGI	
Education		
Effective transition rate from primary to lower secondary general education, both sexes (% of students enrolled in the final grade of the lower level of education in the previous year)	UNESCOIS	

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Data used in this Study

This study used annual secondary data which was time series data from 1996-2015. It included: 1) Data on social, economic, political and globalization factors from the World Bank's electronic database, consisting of the World Development Report and Indicators and the Poverty Assessment Report and 2) Statistics from the World Health Organization (WHO). The design of the data analysis is as follows:

3.1.1 Population

A review of literature manifested the necessity to study health outcomes. It was apparent that health outcomes in middle-income and low-income countries were not good, which was very different from those in high-income countries. Thus, for theoretical and policy benefits, 139 middle-income countries and low-income countries across the world classified according to their income levels based on the grouping by the World Bank were selected:

Table 3.1 Groups of Countries by Income Levels by the World Bank

Low-income economies ($1,025 or less): 31 countries	**Lower-middle-income economies ($1,026 to $4,035): 52 countries**	**Upper-middle-income economies ($4,036 to $12,475): 56 countries**
Afghanistan, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros, Congo Dem. Rep, Eritrea, Ethiopia, Gambia, The Guinea, Guinea-Bissau, Haiti, Korea, Dem. People's Rep., Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Niger, Rwanda, Senegal, Sierra Leone, Somalia, South Sudan, Tanzania, Togo, Uganda, Zimbabwe	Armenia, Bangladesh, Bhutan, Bolivia, Cabo Verde, Cambodia, Cameroon, Congo Rep., Côte d'Ivoire, Djibouti, Egypt Arab Rep., El Salvador, Ghana, Guatemala, Honduras, India, Indonesia, Kenya, Kiribati, Kosovo, Kyrgyz Republic, Lao PDR, Lesotho, Mauritania, Micronesia Fed. Sts., Moldova, Mongolia, Morocco, Myanmar, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Philippines, Samoa, São Tomé and Principe, Solomon Islands, Sri Lanka, Sudan, Swaziland, Syrian Arab Republic, Tajikistan, Timor-Leste, Tonga, Tunisia, Ukraine, Uzbekistan, Vanuatu, Vietnam, West Bank and Gaza, Yemen Rep., Zambia	Albania, Algeria, American Samoa, Angola, Argentina, Azerbaijan, Belarus, Belize, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, China, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Equatorial Guinea, Ecuador, Fiji, Gabon, Georgia, Grenada, Guyana, Iran Islamic Rep., Iraq, Jamaica, Jordan, Kazakhstan, Lebanon, Libya, Macedonia FYR, Malaysia, Maldives, Marshall Islands, Mauritius, Mexico, Montenegro, Namibia, Palau, Panama, Paraguay, Peru, Romania, Russian Federation, Serbia, South Africa, St. Lucia, St. Vincent and the Grenadines, Suriname, Thailand, Turkey, Turkmenistan, Tuvalu, Venezuela RB

Source: The World Bank, 2016.

3.2 Data Analysis

Data used for the analysis was panel data, which consisted of time series data and cross-sectional data. In this research, the time series data was data collected between 1990 and 2015 (26 years), while the cross-sectional data was collected from 137 middle-income countries, as classified by the World Bank.

This research involved quantitative analysis. As the data used in this research was panel data which comprised time series data and cross-sectional data, it was necessary to test its stationarity. In general, time series data is non-stationary. Time series data tends to have greater accumulated values over time, which results in non-stationary. The mean the values and variance of the data also changes over time. Therefore, testing variables for a casual relationship or estimating the panel data using the ordinary least square (OLS) method will experience inaccuracy, which will result in spurious regression. Often times, it is found that the coefficients of variables have a statistically significant relationship, with higher R squared values but extraordinarily low Durbin-Watson values. It can be considered that the statistics from the regression equation lack reliability and efficiency. Thus, before an examination is provided for the data, the properties of the data need to pass the unit root test to prevent distortion in the interpretation of statistical results.

The issue of data non-stationarity can be solved by differencing non-stationary variables until stationarity is achieved. However, this has an impact. That is, if the differencing is done, the estimated model will not be able to analyze data about the adjustment of variables in the model to achieve the cointegration effect. This will result in a loss of the long-run relationships of variables, a decrease in the degree of freedom, and the change in the interpretation of variables that have a different value.

The panel unit root tests consist of various tests; for example, the Levin, Lin and Chu (LLC) test, Breitung test, Hadri test, Im, Pesaran and Shin (IPS) test, and Fisher-Type test using Fisher-ADF and Fisher-PP. As for non-stationary data, before its non-stationarity is solved, the cointegration effect can be identified using the Pedroni and Kao tests. If the variables can have a cointegration effect, the model tested can be directly undertaken. If the cointegration effect is not achieved, it is necessary to address the issue of data non-stationarity prior to testing the relationships

of variables in the model using the ordinary least square (OLS) method, through estimation using Pooled OLS, fixed-effect model, and random-effect model.

3.2.1 Panel Unit Root Tests

Due to the issue of data non-stationarity, which is commonly found in time series data, for the model analysis, it is necessary to investigate this issue in all variables. In principle, the panel unit root test identifies the consistency or stability of data. This is done by considering if a set of data in the past can explain the current set of data, which is called a stochastic process. If the process is stable, that is to say, if the mean value, variance, and covariance are close to the constants or if the cointegration is achieved, this indicates that the data is stationary. On the contrary, if the process is not stable or always changes, this means that the set of data is non-stationary (unit root). To test this, the method developed by Dickey and Fuller (1979) is commonly used. Its main hypothesis is that data is non-stationary data and if the calculated value of the data rejects the main hypothesis, this means that the data is stationary and it can be immediately calculated in the model. As previously mentioned, popularly-used unit root tests for panel data-based models consist of the Levin, Lin and Chu (2002) test, which has limitations on the analysis of relationships between cross-section data; the Im, Pesaran and Shin (2003) test, which is able to solve the issue of cross-sectional relationships; the Breitung (2001) test, which can be used with a population group that is smaller than the time period; the Fisher's type test: Maddala and Wu (1999) and Choi (2001), which can be used with statistics that are unbalanced panel data; and the Hadri (2000) test. They can be presented in a tabular form as follows:

Table 3.2 Unit Root Test for Panel Data

Testing method	Main hypothesis	Alternative hypothesis	Statistical test
Tests with common unit root processes			
Levin, Lin and Chu	With unit root	Without unit root	t - statistic
Breitung	With unit root	Without unit root	Breitung t - statistic
Hadri	Without unit root	With unit root	Z - statistic
Tests with individual unit root processes			
IPS	With unit root	Without unit root in some countries	W - statistic
Fisher – ADF	With unit root	Without unit root in some countries	Fisher Chi – Square
Fisher – PP			

To judge whether data is non-stationary or not, various indicators need to be taken into consideration due to the multi-dimensions of panel data. If the data is non-stationary, it will be tested for a long-run relationship of variables.

3.2.2 Panel Cointegration Test

If data are found to be non-stationary time series data, when they are combined, their long-run relationship may be identified. This can be observed through the deviation from the long-run equilibrium relationship. If it is stationary, it has cointegration (Engle & Granger, 1987; Banerjee et al., 1993). Thus, theoretically, testing the cointegration effect is testing the stationarity of the deviation from the estimated long-run equilibrium relationship of non-stationary time series data. If a cointegration relationship is identified, this means that the variables or data have a long-run relationship. Therefore, there is no concern over spurious regression, which may arise in time series data. As for panel data, the following are popular methods used for testing the cointegration relationships:

Method by Pedroni (2004), the main hypothesis of which is there is no cointegration in data. The statistics that need to be considered consist of the Panel v- statistic, Panel ρ-statistic, Panel pp-statistic, and Panel ADF-statistic. These are characterized as group panel statistics. If the test value rejects the main hypothesis, this means there is at least one country where variables have a "cointegration relationship."

Method by Kao and Chiang (1999), with the main hypothesis that there is no cointegration in data. The statistic was the augmented Dickey–Fuller (ADF) statistic. If the test value rejects the main hypothesis, this means the data is characterized as "cointegration"

3.2.3 Estimation Panel Methodology

The estimation of a model with balanced panel data found a diversity of analysis units with continuous data collection. This might allow the specific characteristics of the analysis units, which here were specific characteristics of individual low-income countries and middle-income countries, to show different phenomena. Thus, the unknown difference of the analysis units needed to be included in the model estimation, which is presented as below:

$$\boldsymbol{y_{it} = B_0 + B_1 x_{it1} + \cdots + B_k x_{itk} + a_i + u_{it}, t = 1 \ldots T}$$

When $\boldsymbol{y_{it}}$ = Dependent value of the variable i at the time observation point t.

$\boldsymbol{x_{it1}}$ = Value of the independent value j of the sample i at the time t,

Whereby $\boldsymbol{j = 1 \ldots k}$

$\boldsymbol{a_i}$ = Unobserved fixed effects

$\boldsymbol{u_{it}}$ = error term

To evaluate which is a better choice for the model estimation between the random-effect model and the fixed-effect model, the coefficient and constants need to be considered. Theoretical and empirical suitability may be taken into account. For example, if respective analysis units are totally different or if it is found that a theory should not apply to all analysis units, then the fixed-effect model is the answer for the

estimation or development of specific constants of the analysis units. On the contrary, if specific characteristics of the individual countries definitely have no effect on what to be studied, the random-effect model should be more suitable. Some widely-recognized tests are the tests that aim to identify the optimal estimation methods by means of statistical tools. The ones used in this research are as follows:

Hausman test (1978), which has the hypothesis that the estimated covariance between the fixed effect and the random effect is the same. Thus, if the calculated value accepts the main hypothesis, the suitable estimation method should be the random effect and if the calculated value rejects the main hypothesis, the estimation method should be the fixed effect.

The redundant fixed-effect test, which was developed by Moulton and Randolph (1989) – It suggests that the F-test can be used to identify if data should have the fixed effect, whereby the main hypothesis is that there is no fixed effect in the estimation. Thus, if the calculated value does not reject the main hypothesis, it is necessary to use other estimation methods.

In addition, a health equity model was developed, which included the same variables as those in the earlier model. However, the limitation of data made it impossible to conduct panel data analysis for the model test. The best way was to gather data available during certain time periods. In this research, data from 2002 to 2014 was gathered, based on which the mean values of individual countries for each issue were identified. The model was tested using the multiple regression method. One caution was that the independent variables should not be too related or there should not be multicollinearity. This problem needed to be tested. In addition, in the multiple regression analysis, heteroscedasticity should be a concern, as it could lead to estimation error. Heteroscedasticity was checked using the White's test, with the main hypothesis that the model was characterized as homoscedasticity. After the tests were completed and all values were identified, the test for causal relationships of the variables was carried out.

CHAPTER 4

DATA ANALYSIS RESULTS

The data used in the study is presented into two parts. The first part consists of the factors influencing conventional health status, which is panel data of studied countries. The second part includes factors influencing health equity, which is cross-sectional data.

Part 1: Tests of factors that influence conventional health status

1) General information of country groups and variables used in this study, which include the mean values, standard deviations, and characteristics of the country groups.

2) Panel unit root tests, which consist of the LLC test, Breitung test, Hadri test, IPS test, Fisher-ADF test, and Fisher-PP test, which are presented in a tabular form for better understanding.

3) Panel cointegration tests, which consist of the Pedroni and Kao tests – Due to the limitation of data involved in the analysis, only the Kao test was used.

4) Model tests in relation to factors affecting conventional health status – Before the model test, other tests were conducted to identify which model was more suitable between the random-effect model and the fixed-effect model. After that, the value was estimated in the model test.

Part 2: Model tests for health equity

1) General information of the studied data.

2) Tests for causal relationships using multiple regression.

4.1 Factors Influencing Conventional Health Status

4.1.1 General Information of Factors Influencing Conventional Health Status

Preliminarily, this research aimed to examine 137 middle-income countries and low-income countries across the world through all the variables from 1990-2015, by using 3,562 samples. However, to allow the panel data analysis to produce the best and most accurate results, balanced panel data needed to be used. Balanced panel data consists of data in which variables have continuity and the number of variables in all the countries is the same. Such data was very difficult to obtain; however, an utmost effort was exerted to search for the data and use it with the highest prudence. It was found that there were only 38 countries that have balanced panel data which was collected from 2006 to 2011, so the number of samples was reduced to 228, which was adequate for the model tests. These 228 countries, which are classified by the World Bank by income levels, are presented below:

Table 4.1 Countries in the Study Classified by Income Levels

Low-income economies	Lower-middle income economies	Upper-middle income economies
Ethiopia	Bhutan	Albania,
Madagascar	Bolivia	Azerbaijan
Malawi	Cabo Verde,	Belarus,
Mozambique	Colombia	Belize,
Niger	El Salvador,	Bulgaria,
Senegal	Guatemala	Costa Rica,
	Indonesia	Cuba,
	Kyrgyz Republic	Iran, Islamic Rep
	Lao PDR	Kazakhstan
	Lesotho	Lebanon

Table 4.1 (Continued)

Low-income economies	Lower-middle income economies	Upper-middle income economies
	Moldova	Malaysia
	Morocco	Mauritius
	Pakistan	Mexico
	Tajikistan	Panama
	Ukraine	Peru
		Serbia
		Venezuela, RB
6 countries from 31 countries	15 countries from 52 countries	17 countries from 56 countries

The above table demonstrates the proportion of countries used in the study. According to the World Bank, the proportion of low-income economies, lower-middle income economies, and upper-middle income economies is 31: 52: 56 (altogether 139), representing 22, 37, and 40 percent, respectively. The proportion of the country groups included in this research was 6:15:17, representing 16, 39, and 44 percent, respectively. This proportion was very similar to the proportion assigned by the World Bank and was good in terms of representation.

4.1.2 Results of the Panel Unit Root Tests

The panel unit root tests for conventional health status involved balanced panel data. It consisted of the under-five morality rate per 1,000 live births (U5MR), the effective transition rate from primary to lower secondary general education, both sexes (Ed), the percentage of children aged 12-23 months with DPT immunization (DPT), corruption control index (CC), government effectiveness index (GE), improved rural sanitation facilities (RIMP), health expenditure per capita (HE), and gross national income per capita (GNI). The tests comprised the LLC test, Breitung test, Hadri test, IPS test, Fisher-ADF test, and Fisher-PP test, as described below.

Table 4.2 Results of the Panel Unit Root Tests of the Studied Variables

Variables	At level I (0)					
	LLC	Breitung	Hadri	IPS	Fisher-Type	
					ADF	PP
U5MR	-7.73213	9.45344	34.7302	-15.5936	60.1608	116.068
	(0.000)*	(1.000)	(0.000)*	(0.000)*	(0.8773)	(0.0016)*
Ed	0.7619	1.9386	9.37618	-4.5112	90.3985	56.5139
	(0.7768)	(0.9737)	(0.000)*	(0.3260)	(0.1241)	(0.9540)
DPT	3.24959	2.24307	51.7922	-3.3E+10	46.9414	57.8295
	(0.9994)	(0.9876)	(0.000)*	(0.000)*	(0.9965)	(0.9401)
CC	0.75100	5.63296	48.2150	1.16442	55.7468	92.4606
	(0.7737)	(1.000)	(0.000)*	(0.8779)	(0.9609)	(0.1232)
GE	-1.96359	-0.28811	57.5924	-0.21440	80.7617	100.570
	(0.0248)*	(0.3866)	(0.000)*	(0.4151)	(0.3328)	(0.0298)*
RIMP	-1.34582	-1.97540	53.3480	4.39280	54.7806	39.5033
	(0.9108)	(0.0241)*	(0.000)*	(1.000)	(0.9541)	(0.9968)
HE	8.59763	3.30609	36.3225	-1.20106	14.6507	17.4425
	(1.000)	(0.9985)	(0.000)*	(0.1149)	(1.000)	(1.000)
GNI	20.1432	3.0090	47.8110	1.80493	38.3330	69.7215
	(1.000)	(0.9987)	(0.000)*	(0.9645)	(0.9999)	(0.6805)

From Table 4.2, through the LLC test, only U5MR and GE were stationary variables at level I (0), while other variables were non-stationary. As for the Breitung test, only RIMP was stationary at level I (0). Similarly to the Fisher-ADF test, the Hadri test found that all the variables were non-stationary. The IPS test found that only U5MR and DPT were stationary. As for the Fisher-PP test, stationarity was found in two variables – U5MR and GE. Overall, the panel unit root tests revealed that the data at level I (0) was non-stationary, so it was adjusted by means of the first difference method and then the panel unit root tests were undertaken again, as depicted in Table 4.3 below.

Table 4.3 Results of the Panel Unit Root Tests of Variables in the Study

First difference or I (1)						
Variables	**LLC**	**Breitung**	**Hadri**	**IPS**	**Fisher-Type**	
					ADF	**PP**
U5MR	-15.8155	4.24628	61.2594	-5.3E+12	239.095	285.153
	(0.000)*	(1.000)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
Ed	-17.0076	-1.6340	60.1108	-2.98838	103.789	175.343
	(0.000)*	(0.0510)	(0.000)*	(0.0014)*	(0.0188)*	(0.000)*
DPT	-30.0227	2.32596	58.5377	-2.98838	103.798	175.343
	(0.000)*	(0.9900)	(0.000)*	(0.0014)*	(0.0188)*	(0.000)*
CC	11.8301	0.48126	53.4101	-3.85083	213.917	218.053
	(0.000)*	(0.6848)	(0.000)*	(0.0001)*	(0.000)*	(0.000)*
GE	-15.4348	-0.93715	59.3056	-2.33885	241.534	243.744
	(0.000)*	(0.1743)	(0.000)*	(0.000)*	(0.000)*	(0.000)*
RIMP	0.93248	2.47958	49.2384	4.9E+13	108.244	51.8977
	(0.000)*	(0.9934)	(0.000)*	(0.000)*	(0.0104)*	(0.8977)
HE	-10.7171	1.65469	19.7861	-8.51629	132.233	190.752
	(0.000)*	(0.9510)	(0.000)*	(0.000)*	(0.001)*	(0.000)*
GNI	-3.59803	2.98201	59.8713	-4.5E+13	107.163	157.681
	(0.002)*	(0.9986)	(0.000)*	(0.000)*	(0.0107)*	(0.000)*

Table 4.3 reveals that through the LLC, IPS, and Fisher-ADF tests, all of the variables were stationary at level I (1). The Breitung and Hadri tests confirmed non-stationarity of the data. As for the Fisher-PP test, only RIMP was non-stationary. Overall, most of the tests indicated that the stationarity level of these variables was at I (1), so panel cointegration tests were conducted in the following stage. For better understanding, Table 4.4 was developed to show a comparison of the panel unit root tests.

Table 4.4 Comparison of the Panel Unit Root Tests of the Variables in the Study

Variables	LLC	Breitung	Hadri	IPS	Fisher-Type	
					ADF	PP
At level I (0)						
U5MR	***			***		***
Ed						
DPT				***		
CC						
GE	***					***
RIMP		***				
HE						
GNI						
First difference or I (1)						
U5MR	***			***	***	***
Ed	***			***	***	***
DPT	***			***	***	***
CC	***			***	***	***
GE	***			***	***	***
RIMP	***			***	***	
HE	***			***	***	***
GNI	***			***	***	***

Note: *** Stationary - Non-stationary

The above table demonstrates a major trend – the order of integration of the studied variables was at first difference, or level I (1). This made it possible to analyze the long-run relationships or conduct panel cointegration tests of the non-stationary data.

4.1.3 Panel Cointegration Test

The unit root tests in the earlier stage revealed an important finding that all the studied variables were non-stationary at level I (0). However, at first difference or at level I (1), all these variables were stationary. This important result led to panel cointegration tests, which aimed to identify the long-run relationships amongst all these variables. Based on the characteristics of data included in the analysis, the Pedroni test (2004) was not feasible to identify the long-run relationships, but the Kao and Chiang test (1999) was, which involved the Augmented Dickey-Fuller (ADF) statistics. The findings are shown in Table 4.5 below.

Table 4.5 Results of the Panel Cointegration Test using the Kao Method

	t-statistic	**p-value**
ADF	-3.705987	0.0001

Table4 .5 presents the results of the Kao test, using the ADF statistics. The calculated value had statistical significance at 0.0001, which rejected the main hypothesis. This means the variables of U5MR, Ed, DPT, CC, GE, RIMP, HE, and GNI had a long-run relationship or cointegration.

The panel cointegration of these variables made the estimation in the model in the following stage free from concern over spurious regression, which is a common issue for time series data. In addition, the panel cointegration manifested that although these variables were non-stationary, that is, there were always extraneous f*actors, w*hen all these variables were considered together, they could adjust into the long-run equilibrium – this is a positive impact on the development of policies in the future. The next part is dedicated to testing of the model to identify the influence of these factors.

4.1.4 Testing the Model of Factors Influencing Conventional Health Status

To test the model which consists of balanced panel data, it is crucial to test for a proper estimation method. One popular test is the Hausman test (1978), which was

used in this research to select between the random-effect and fixed-effect methods. Table 4.6 identifies the findings of the test.

Table 4.6 Results of the Hausman Test

Cross-section random	Chi-square	Degree of freedom	p - value
	2.7961	7	0.903

From Table4 .6, the Hausman test found that the calculated value had statistical significance at 0.903. This accepted the main hypothesis specifying that the estimated covariance of the fixed-effect method and random-effect method is the same. Table 4.7 provides the findings of the comparison of the methods.

Table 4.7 Results of the Hausman Test

Variables	Fixed effect	Random effect	p - Value
Ed	-0.619	-0.743	0.229
DPT	-0.124	-0.129	0.918
CC	-3.787	-6.138	0.591
GE	-3.223	-3.242	0.996
RIMP	-1.093	-0.724	0.362
HE	0.001	-0.001	0.643
GNI	-0.000	-0.001	0.418

From Table 4.7, the random-effect or the fixed-effect methods did not produce a different result. Thus, the main hypothesis was accepted, which means the model test required the random-effect method for estimation. The results of the model test using the random-effect method are depicted in Table 4.8.

Table 4.8 Results of the Model Test Using the Random-Effect Methods and Relevant Statistics

Variables	Coefficient	Std. Error	t-Statistic	p - Value
Constant	164.2306	19.01711	8.635938	0.0000
CC	-6.137777	2.650142	-2.316018	0.0215
Ed	-0.743608	0.193404	-3.844842	0.0002
GNI	-0.001016	0.000395	-2.569795	0.0108
GE	-3.240138	3.183722	-1.017720	0.3099
HE	-0.001209	0.002603	-0.464486	0.6428
DPT	-0.129434	0.064030	-2.021449	0.0444
RIMP	-0.724643	0.111807	-6.481174	0.0000
R-squared	0.523564		S.E. of regression	4.555131
Adjusted R-squared	0.508404		Durbin-Watson stat	1.285887

The results of the model test using the random-effect method and other relevant statistics, as shown in Table 4.8 above, are described below.

Factors influencing conventional health status

The test of the model of factors influencing health outcomes using U5MR as the representative revealed that RIMP, DPT, CC, GNI, and Ed had an influence on the reduction of U5MR at a statistical significance level of 0.05, while GE and HE had an influence on the reduction of U5MR at a statistical insignificance level of 0.05, with the model-based predictability level of 0.523. Although the value of Durbin-Watson was 1.285887, which showed the issue of autocorrelation (which causes spurious regression), panel cointegration of the data made it unnecessary to take this issue into account.

With regard to the effect size of factors affecting the reduction in the U5MR, the effect size of RIMP was equal to -0.724 ($t = -6.481174$, $p = 0.0000$). That is, a

one-percent improvement of RIMP resulted in the U5MR being reduced by 0.724 per 1,000 live births. The effect size of DPT was equal to -0.129 (t = -2.021449, p = 0.0444), which means a one-percent increase in the number of children aged 1-2 years old in the country who received DPT immunization resulted in the U5MR being reduced by 0.129 per 1,000 live births. As for GNI per capita, its effect size was -0.001016 (t = -2.569795, p = 0.0108), which means a one-dollar increase in GNI per capita resulted in the U5MR being reduced by 0.001 per 1,000 live births. The effect size of Ed was -0.743608 (t = -3.844842, p = 0.0002), which means that a one-percent increase in the average effective transition rate from primary to lower secondary general education of both sexes of children resulted in the U5MR being reduced by 0.743 per 1,000 live births. The effect size of the CC index was equal to -6.137777 (t = 316018.2-, p = 0.0215), which means a one-unit increase in the corruption control index resulted in a reduction in the U5MR by 6.137 per 1,000 live births.

The variables without statistical significance included HE, with the effect size of -0.001209 (t = -0.464486, p = 0.6428) and GE index, with the effect size of -3.240138 (t = -1.017720, p = 0.3099). Although they had no statistical significance, they had a positive relationship with the theory in the research. That is, they resulted in a reduction in the U5MR or had a negative relationship with the U5MR.

4.2 Testing the Model for Health Equity

4.2.1 General Information of Factors Influencing Health Equity

The factors that had an influence on health equity were variables derived from the U5MR in the wealthiest class divided by the U5MR in the poorest class per 1,000 live births. This ratio was based on the concept that if the equity in health outcomes exists, the ratio should be 1:1 or the U5MR in the wealthiest class and the poorest class should be the same, or very similar. The data was really difficult to gather. Because it had not been consistently collected, it could not be connected to form panel data. The best way to deal with the data was to gather it within particular periods, and the years from 2002 to 2014 were selected. Data from these years were gathered and their mean values were calculated for each topic for individual countries. There were altogether 53 samples obtained, which were sufficient for the model testing. General

values of the data are as follows:

Table 4.9 General Information of Factors Influencing Health Equity

	AVR_U5MR_RATIO	AVR_RIMP	AVR_DPT	AVR_CC	AVR_GE	AVR_ED	AVR_HE1	AVR_GNI
Mean	0.772	38.649	81.521	-0.650	-0.626	84.048	223.783	1565.210
Median	0.713	31.744	84.307	-0.6482	-0.608	86.147	142.504	1029.230
Maximum	1.523	97.7846	98.153	0.238	0.240	99.771	796.604	8146.153
Minimum	0.280	3.784	32.000	-1.350	-1.638	41.26	21.186	177.692
Std. Dev.	0.292	28.445	12.961	0.376	0.440	13.554	202.524	1524.855
Skewness	0.3245	0.5068	-1.355	0.386	-0.273	-0.921	1.334	1.971
Kurtosis	2.555	2.003	5.475	2.762	2.618	3.442	3.871	7.951
Sum	40.9484	2048.400	4320.615	-34.4969	-33.17854	54.570011	860.509	82956.153
Observations	53	53	53	53	53	53	53	53

Table 4.9 shows basic information before an analysis on health equity-related data was carried out. Due to the limitation of data for this analysis, it was necessary to breach some agreements on, for example, skewness and kurtosis. This was because in reality, there are high disparities between the poorest countries and their richest counterparts in various factors. These factors include the average GNI (AVR_GNI), which had a very large gap (177.692-8146.153 US dollars), the improved rural sanitation facilities (3.784-97.7846 percent of population with access), the average health expenditure per capita (AVR_HE), the average percentage of children aged 12-23 months with DPT immunization (AVR_DPT), and the average effective transition rate from primary to lower secondary general education, both sexes (AVR_Ed).

The values of the average government effectiveness index (AVR_GE) and average corruption control index (AVR_CC) ranged from -2.5 to2 .5, which did not create much difference in the data. In short, due to data limitations, certain

requirements needed to be ignored to allow empirical findings to be acceptable in the analysis.

Health equity was a variable that stemmed from the U5MR in the wealthiest class divided by the U5MR in the poorest class per 1,000 live births. This ratio was based on the concept that if the equity in health outcomes exists, the ratio should be 1:1 or the U5MR in the wealthiest class and the poorest class should be equal, or very similar. The factors developed into the model were the same factors included in the earlier model. However, the data limitations made it infeasible to conduct panel data analysis. The best way to deal with the data was to gather it within particular periods, and the years from 2002 to 2014 were selected. Data from these years were gathered and their mean values were calculated for each topic for individual countries. After that, the model was tested using the multiple regression method. It had to be ensured that the independent variables were not too related or multicollinearity would not exist. Thus, before the model testing, the correlation matrix had to be tested. The following table shows the findings:

Table 4.10 Correlation between Independent Variables (Correlation Matrix)

Variables	AVR_RIMP	AVR_HE1	AVR_GNI	AVR_GE	AVR_DPT	AVR_CC	AVR_Ed
AVR_RIMP	-						
AVR_HE1	0.666	-					
AVR_GNI	0.565	0.885	-				
AVR_GE	0.396	0.564	0.552	-			
AVR_DPT	0.627	0.472	0.372	0.531	-		
AVR_CC	0.130	0.435	0.403	0.753	0.448	-	
AVR_Ed	0.594	0.560	0.537	0.334	0.275	0.226	-

From Table 4.10, the relationships between independent variables in this study ranged from 0.885 to 0.226. The pair of variables containing the highest value was HE and GNI, with the estimated correlation coefficient being 0.885, which was not a perfect multicollinearity relationship. Thus, it could be utilized to test this model. The next stage was testing heteroscedasticity using the White method. The results of the

test are as follows:

Table 4.11 Results of the Heteroscedasticity Test Using the White Method

F-statistic	p - Value
1.20146	0.3159

Based on Table 4.11, it can be concluded that heteroscedasticity did not occur in the data used in the analysis since the main hypothesis of White method is "There is no issue with the model or the issue of homoscedasticity." The statistics indicated acceptance of the main hypothesis, so the model test in the next stage could be conducted.

4.2.2 Testing the Model of Factors Influencing Health Equity

A data validity test showed that the data could be statistically analyzed in the model estimation. The results of the test of factors influencing health equity are presented in the table below.

Table 4.12 Results of the Test of the Factors Influencing Health Equity

Variables	Coefficient	Std. Error	t-Statistic	p - Value
Constanct	1.83427	0.53402	3.43470	0.00128
AVR_RIMP	0.00265	0.00262	1.01819	0.31402
AVR_DPT	-0.00623	0.00453	-1.36719	0.17835
AVR_CC	0.43124	0.17807	2.42174	0.01953
AVR_GE	-0.21580	0.15337	-1.40699	0.16629
AVR_ED	-0.00534	0.00382	-1.39859	0.16878
AVR_GNI	-7.80101	5.59424	-1.39447	0.17002
AVR_HE1	0.00027	0.00046	0.57777	0.56629
R-squared	0.22704		S.E. of regression	0.27620
Adjusted R-squared	0.10680			

From Table 4.12, the results of the model test and other relevant statistics can be presented as follows:

Factors influencing health equity

The test of the model of factors influencing health equity using the U5MR in the wealthiest class divided by the U5MR in the poorest class per 1,000 live births (AVR_U5MR) found that the average improved rural sanitation facilities from 2002-2014 (AVR_RIMP), the average percentage of children aged 12-23 months with DPT immunization from 2002-2014 (AVR_DPT), the average gross national income per capita from200 2-2014 (AVR_GNI), the average effective transition rate from primary to lower secondary general education for both sexes from 2002-2014 (AVR_Ed), the average government effectiveness index from 2002-2014 (AVR_GE), and health expenditure per capita from 2002-2014 (AVR_HE) had no influence on the reduction in the U5MR with statistical significance at 0.05. Only the corruption control index from 2002-2014 (AVR_CC) had an influence on it, with statistical significance at 0.05 and a model-based predictability level of 0.22704.

Regarding the influence of factors affecting health equity, the average corruption control index from 2002-2014 (AVR_CC) had the effect size of 0.43124 ($t = 2.42174$, $p = 0.01953$), which means a one-unit increase in the corruption control index resulted in the equity in the U5MR between the wealthiest class and the poorest class at 0.431 units, which was considered to be a large effect size (the best value of equity is 1 unit).

CHAPTER 5

CONCLUSIONS AND SUGGESTIONS

5.1 Overview of the Research

This research explored factors affecting health outcomes of middle-income and low-income countries across the world, which were classified by the World Bank. It used secondary data during the years 1990-2015 from international data sources, e.g. the World Bank and the WHO. The objectives of this research were to 1) Investigate the factors influencing health outcomes, 2) Identify if good governance and health expenditures have an influence on health outcomes, and 3) Develop policy recommendations for low-income and middle-income countries across the world based on the research findings.

To respond to the research objectives, literature was reviewed to develop a conceptual framework for this research, which consisted of factors influencing health outcomes. In this research, health outcomes were investigated in two dimensions: 1) The factors affecting conventional health status, the indicator which was the under-five morality rate per 1,000 live births was the indicator and 2) The factors affecting health equity, the indicator which was the under-five morality rate in the richest group of the sample population per the under-five morality rate in the poorest group of the population in the country. Both factors consisted of the same group of independent variables, i.e. public health factors, financial status factors, good governance factors, and an educational factor. The public health factors comprised the improved rural sanitation facilities and the percentage of children aged 12-23 months with DPT immunization. The financial status factors consisted of health expenditures per capita and gross national income per capita. Its good governance factors consisted of the government effectiveness index and corruption control index. Its educational factor was the effective transition rate from primary to lower secondary general education for both sexes.

Due to the need for balanced panel data to ensure the integrity in the model analysis, the data used in the analysis of factors affecting conventional health status was data collected from 2006-2011 from 38 countries out of a pool of 139 countries (initially, the research planned to obtain data from the years 1990-2015). However, the proportion of countries that were samples was similar to the countries that were populations of this research and the number of years was adequate for the model analysis. Factors influencing health equity faced a similar limitation, but this was more serious. That is, its data was characterized as pool panel data, which had low reliability. Hence, the data from 2002 to 2014 was sought as much as possible. The mean values were calculated for each factor and the data was tested in the model.

5.2 Findings

The findings of the model analysis, which are presented in the previous chapter, can be discussed, in response to the objectives of this research, as follows:

5.2.1 Factors Influencing Conventional Health Status

The data used in the model analysis consisted of panel data, which required a property test before value estimation, which is presented in order as follows:

5.2.1.1 Panel Unit Root and Panel Cointegration Tests

The tests consisted of the LLC test, Breitung test, Hadri test, IPS test, Fisher-ADF test, and Fisher-PP test. Overall, the tests indicated that the aforementioned variables were non-stationary at the normal level but they were stationary at the level I (1), which could be tested via a panel cointegration test. Only the Kao Test (1999) could be used for investigating the long-run relationships of data, while the Pedroni Test (2004) could not. The tests revealed that the under-five morality rate per 1,000 live births (U5MR), the effective transition rate from primary to lower secondary general education for both sexes (Ed), the percentage of children aged 12-23 months with DPT immunization (DPT), the corruption control index (CC), the government effectiveness index (GE), the improved rural sanitation facilities (RIMP), the health expenditure per capita (HE), and the gross national income per capita (GNI), had a

long-run relationship or panel cointegration, which allowed for estimation in the next stage without concern over spurious regression.

5.2.1.2 Results of the Tests of Estimation Methods and Findings From the Model

In the model tests, it was necessary to identify an appropriate estimation method. In this research, the Hausman Test (1978) was used, and it suggested that the random effect method was suitable for the model. This means that the equations and estimation could be used for the whole set of sample countries. The model testing, which was carried out in the following stage, provided the results:

Factors affecting the U5MR consisted of the public health factors and the educational factor. As for the health expenditure factors, only GNI per capita resulted in a reduction of U5MR. As for the good governance factors, only the corruption control index resulted in a reduction of U5MR. The results were in line with relevant theories and studies considered in this research. The findings can be discussed by topics of analysis, as follows:

Improved rural sanitation facilities (RIMP) – The increase in the rural population with access to improved rural sanitation facilities, which resulted in a reduction in U5MR, was calculated. Primary healthcare covers hygiene and cleanliness of water for consumption. In 2015, in low-income and middle-income countries, 5.1 percent of the rural population in Djibouti and 100 percent of the rural population in Uzbekistan was reported to access primary healthcare. That is, in worst-case countries, only five percent of the rural populations had access to proper sanitation, which depict a difficult life and risks of diseases and ailments amongst populations in poorer countries. Theoretically, the relationship between sanitation and sickness has been identified and presented over the course of several hundred years (Chadwick, 1842). Apart from poor sanitation, sickness has a profound relationship with poverty and has a huge impact on children in poorer families. According to the WHO Report (2015), middle-income and low-income economies usually experienced public health issues because of below standard hygiene and unclean water, the main causes of sickness. For example, from 1992-2000, diarrhea was the cause of death of 1.6-2.5 million under-five children across the globe (Kosek, Bern, & Guerrant, 2003). In the Sub-Saharan region, in 2008, approximately 19 percent of under-five children died from

diarrhea (Norman, Pedley & Takkouche, 2010). Despite taking no lives, tropical infectious diseases and parasites result in a poorer quality of life and poorer health conditions. If they occur in children, children will suffer from being underweight and have a weak immune system. Thus, it is not surprising that improved rural sanitation facilities resulted in a reduction in the under-five mortality rate in countries with low-income and middle-income economies. The finding was in line with results of findings in this research.

Percentage of children aged 12-23 months with DPT immunization (DPT) – This was based on the percentage of children aged 12-23 months immunized with three doses of diphtheria, tetanus toxoid and pertussis. Vaccination is the best way to address deadly diseases impacting children. According to the WHO Report (2015), in 2015, 56,694 under-five children were reported to die from pertussis, most of whom lived in low-income countries (20,630) and lower-middle income countries (31,419). From 2000 to 2015, pertussis was the cause of mortality of 961,945 under-five children. Concerning tetanus, in 2015, it was the cause of death of 34,487 children in lower-middle income countries and 9,509 children from low-income countries across the world. From 2000 to 2015, there were 1,258,760 under-five children whose death was caused by tetanus. As for the rate of children with access to DPT vaccination, in 2015, the rate was the lowest in the Republic of Equatorial Guinea, representing 16 percent and the highest rate was reported to reach 99 percent. Vaccination is the most important mechanism for saving children's lives from deadly diseases. This information has led to a conclusion that DPT vaccination has a causal relationship with the reduction of the under-five mortality rate, which was proved by the model in this research.

Effective transition rate from primary to lower secondary general education for both sexes (Ed) – It is widely understood that education is key health factor. Higher education is often associated with a longer life expectancy. In 2013, the effective transition rate from primary to lower secondary general education for both sexes in middle-income and low-income countries ranged from 58.2 (Islamic Republic of Mauritania) to 99.8 percent. However, this outcome was based on the available data. In fact, it can be assumed that the rate in other countries, for which data was not gathered, may be lower. According to the WHO Report (2015), common

characteristics of under-five children at risk of mortality included being born in a rural area, living in a poor family, and having a mother whose education was below basic education. In particular, in developing countries, a one-year increase in a mother's education resulted in a 7-9 percent reduction in the under-five children mortality rate in the Sub-Saharan region (Cleland & Van Ginneken, 1988). This was consistent with the phenomenon in South Asia, where mothers with lower education had more risk of losing under-five children, especially mothers who did not complete their education in primary school. The effect was under the control of the variable 'everyday risk behavior' and relevant social factors (Basu & Stephenson, 2005). It was also found that education resulted in a higher use of contraception and less unplanned pregnancies. This finding was found in people completing secondary education in low-income and middle-income countries (Bongaarts, 2010). It was also found that the rate of vaccination of children against deadly diseases was higher in mothers with a high-school education than those with a primary education or lower (Mason & King, 2001). Empirically, children aged 11-15 years, or early adolescents, are at the reproductive age. In general, sex education or health education is included in the school curriculum for children in this age group, which aims to educate them about their own bodies and having appropriate relationships. If children at these ages are not in the school system, this may result in them lacking and awareness about sexuality and finally an unhealthy pregnancy and inefficient baby care. For all these reasons, it is theoretically and empirically clear that secondary education is one of the key variables in a higher survival rate of children from infancy until five years old. This finding is consistent with this research, which found that the effective transition rate from primary to lower secondary general education for both sexes reduced the under-five morality rate.

Gross national income per capita (GNI) – GNI per capita is a complex factor, which has a dynamic relationship with health and child mortality. For instance, living in a wealthy or high-income family has an impact on child health in terms of complete vaccination and nutrition. All these factors provide children with a potential to earn high income in the future due to their strong health. According to the 2015 WHO Report, the GNI per capita of populations in low-income and middle-income countries ranged between 260 US dollars (Burandi) to 12,820 dollars (Equatorial Guinea). Such disparity was higher when compared with high-income countries.

Theoretically, income has an immense effect on health. Having a low income is often associated with unhealthiness, malnutrition, inadequate medication, and less access to expert physicians, which become barriers to working and result in a failure to earn increased income. When the phenomenon keeps happening like a cycle, it is called a health trap. A health trap results in individuals being unable to increase their income and continuously suffering from poor health. This trap, in conjunction with sexual disparity (which is a global phenomenon regardless of financial status) involves women, especially poor mothers, relative to health risks and death at the great extent. This outcome is directly transferred to under-five children – it results in the group of children having higher risks of unhealthiness and death compared to other groups of children. Many studies have shared similar findings that populations in richer countries are more likely to have better health, and a by-product of economic leapfrog growth is longer life expectancy (Pritchett & Summers, 1996). These studies commonly reasoned that when individuals earn a higher income, they or their family will be likely to spend more on health, which results in increased life expectancy (Preston, 2007). This research found that GNI per capita resulted in a decrease in the U5MR, with a relationship and significance confirmed by the theories, as mentioned above.

Corruption control index (CC) – This research used the World Bank's corruption control index to predict the U5MR. The control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as the "capture" of the state by elites and private interests." Speaking simply, it means it is the general public's power to take an action to call for fairness from corruption from the government and private sectors who use their power in a destructive way. In this research, the corruption control index is comparable to the institutional environment of a country where there are operations and channels for calling for legitimacy of corruptive practices which have an extensive impact on the overall sectors. In 2015, the data gathered about the value of the corruption control index in low-income and middle-income countries ranged from -1.72 to 1.20 (the full value ranged from -2.5 – 2.5). The corruption situation in these groups of countries was at a serious level, based on the World Bank's indicators. Concerning the linkages between corruption and health outcomes, it was found that the corruption control index had an influence on

the U5MR (Gupta, Davoodi & Tiongson, 2000). Furthermore, corruption control resulted in efficient public health budget spending and a reduction in the U5MR (Rajkumar & Swaroop, 2002; Wagstaff & Claeson, 2004). In line with the aforementioned concept, this research found that the corruption control index had an influence on the U5MR with statistical significance.

As for the health expenditure (HE) and the government effectiveness index (GE), they had no significant impact on the U5MR. However, their predictive direction was consistent with various theories which believe that both variables result in a decrease in the U5MR. The next part will discuss the reason for this, which is a key issue of this research.

5.2.2 Factors Influencing Health Equity

The data used in the model analysis was cross-sectional data. Before the model testing, tests were performed for validating properties of this data. This started with the multicollinearity test, which found that the relationship of independent variables ranged from 0.885 to 0.130. Despite high multicollinearity, the issue of perfect multicollinearity did not exist, which would obstruct model estimation, so the data could be used in the model testing in the following stage. Then, the heteroscedasticity test was conducted using the White method, which found that the data contained homoscedasticity – this made the causal relationship test feasible in the next stage.

Based on the model testing, only the average corruption control index from 2002-2014 (AVR_CC) had an effect on the U5MR in the richest class of a population, divided by the U5MR in the poorest class per 1,000 births (AVR_U5MR). However, the average rate of improved rural sanitation facilities from 2002-2014 (AVR_RIMP), the average percentage of children aged 12-23 months with DPT immunization from 2002-2014 (AVR_DPT), the average gross national income per capita from 2002-2014 (AVR_GNI), the average effective transition rate from primary to lower secondary general education for both sexes from 2002-2014 (AVR_Ed), the average government effectiveness index from 2002-2014 (AVR_GE), and the average health expenditure per capita from 2002-2014 (AVR_Ed), had no statistically significant impact on the U5MR, which can be summarized as follows:

Average corruption control from 2002 to 2014 (AVR_CC) – A survey revealed that from 2002-2014, the mean values of the corruption control among the sample countries ranged from -1.350 to 0.238 index units. Theoretically, academics usually explain that the occurrence of corruption in the public health system is an obstacle to service delivery. That is, corruption will result in a lower volume and lower quality of service delivery, and the underprivileged will be impacted the most. This negative impact will expose the underprivileged to a health trap, which is characterized by a continuous lack of income and health deterioration. Several reports mention that there are two major types of corruption in the public health system – "non-theft corruption" and "theft corruption." In terms of theft corruption, for example, the government sector exercises its power to certify a particular drug from a pharmaceutical company probably due to bribes or another form of compensation. A non-transparent cost or illegitimate process may result in low quality drugs. Furthermore, the fact that people have no choices may result in them being prescribed drugs that lack proper certification or research-based confirmation. In a narrower view of the misuse of power, for example, competent officers exercise their power by asking a friend or an acquaintance to jump the queue for a service. Despite having no clear impact, if this phenomenon persists, it will develop to be like a cancerous cell which will eventually have a destructive effect on the normal system. With regard to "theft corruption," one of its examples is the use of national budget funds for personal interest, which include using budget funds for any other purposes that do not benefit the general public, implementing projects that have no achievements, or generating jobs for people in their own group. In developing countries, both types of corruption are a common phenomenon, which results in a lower volume and lower quality of service delivery (Anderson, 1998, 2000; Azfar, & Gurgur, 2001). Corruption in the public health system does not only result in more difficulty in accessing services or lower service quality, but also results in wasteful use of budget funds, inadequate or below standard public health infrastructure, and impacts on other social factors which affect the overall health of the population (Mackey & Liang, 2012). Health service delivery is an important mechanism for the distribution of health equity to the poorer population than the richer population. This is because the richer population has better access to diverse services, e.g. public and private health insurance and costly services from

private hospitals. Thus, if corruption extensively occurs in the public health system, it will undermine the main mechanism for delivering necessary health services to the poor. This will inevitably result in poorer people, who are already more seriously affected than their wealthier counterparts, suffering from poorer living conditions and health. Apart from the poorer people themselves, this will have an impact on their children under their care. Therefore, it is not surprising that the corruption control index can logically reflect health equity in one society or country based on the above-mentioned principles and concepts. This is consistent with the findings of this research, which suggest that the average corruption control index value from 2002-2014 had an influence on health equity in low-income and middle-income economies across the world.

5.3 Key Issues from the Research Results

Based on the aforementioned statistical test results and discussions of the results, key points pertaining to factors affecting health outcomes, i.e. U5MR and health equity, were synthesized. The key points are described below.

5.3.1 Why did Health Expenditure per Capita Have No Impact?

The results of this research indicate that health expenditure per capita (HE) did not reduce the U5MR, but the gross national income per capita (GNI) did. Although public health expenditure had no statistical significance, the direction of its coefficients was in line with the theories involved in this study, which was a negative direction. Anyway, a question that came up was why did this happen, and this led to more research to find the answer. The data in 2014 revealed that health expenditure per capita in low-income and middle-income countries ranged between 25.0 (Central African Republic) and 2,474.6 (Cuba) US dollars, which represented from 17.1 percent (Republic of Sierra Leone) to 99.2 percent (Tuvalu). Such a difference mainly stemmed from the specific environment or factors of individual countries in terms of resources, budgets, and even disasters. Hence, to identify why health expenditure had no effect on low-income and middle-income countries required various perspectives, as discussed below.

Expansion of public expenditure – Since the end of World War II, public expenditure, especially social expenditure, has significantly increased in both developed and developing countries. A possible reason for the expanded public expenditure is the push by interest groups, who want to play a role in health policies that provide them with the most benefits. Another possible reason is economic growth, which results in an increase in government revenues, thus improving the capacity for public expenditures by the government. Another possible reason is national development, which needs to involve social policies for human resource development. Based on different pressures on a country's administration, the sources of increased public expenditure can be summarized as follows: 1) People's needs, due to a failure of the market mechanisms for public goods, 2) Rapid economic growth, and 3) The government's tasks for allocating and distributing resources and wealth in a wide range of dimensions. It was witnessed that health expenditures steadily increased despite during economic downturn.

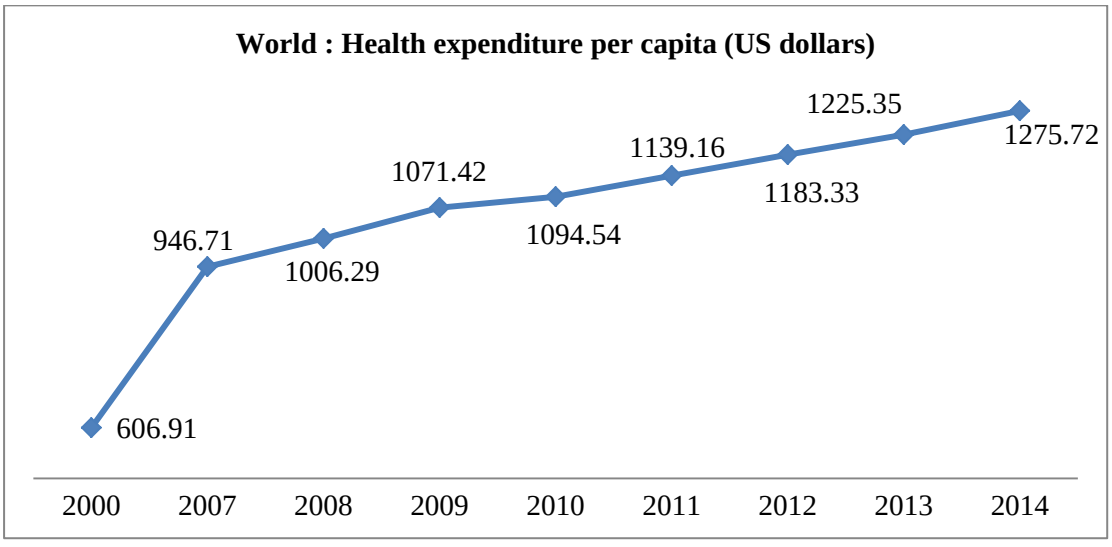


Figure 5.1 Health Expenditure Per Capita of Global Populations
Source: The World Bank, 2015.

It is evident that the overall global health expenditure per capita increased by approximately 50 US dollars annually. The increase in the expenditure responded to the growing public health needs of local people. However, this trend by country

income levels, especially upper-middle and lower-middle income countries, is illustrated below:

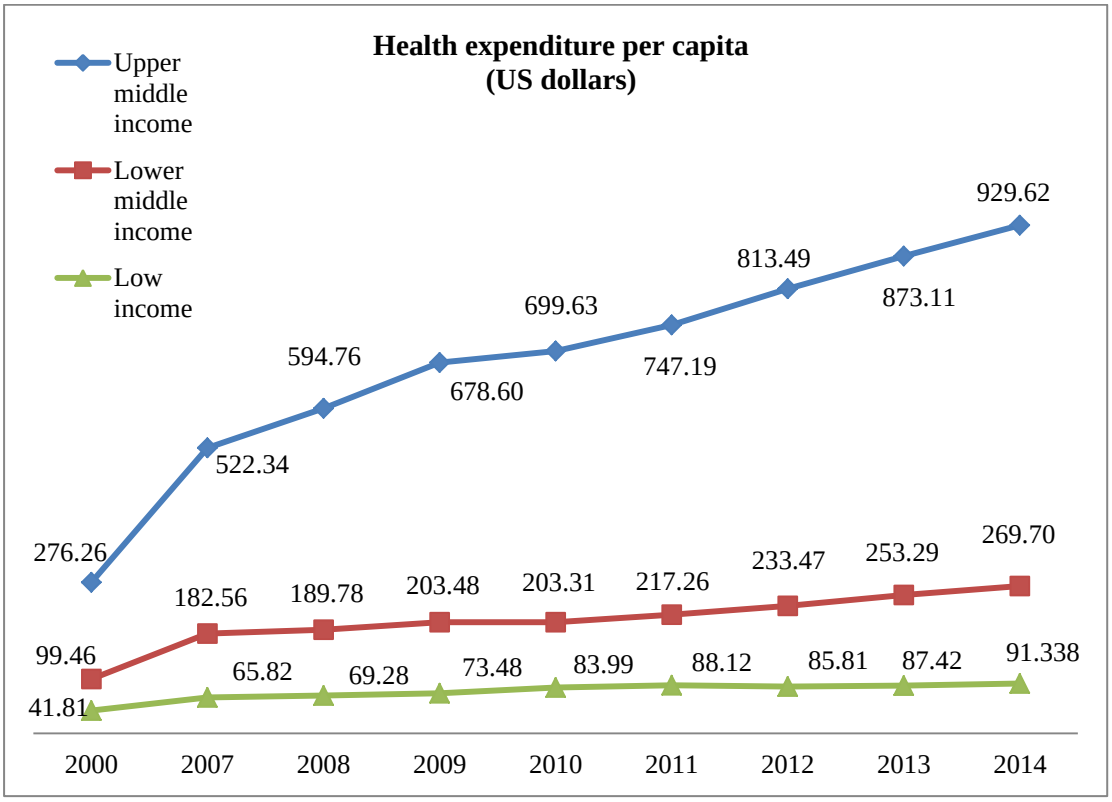


Figure 5.2 Health Expenditure Per Capita in Upper-middle and Lower-middle Income Countries

The data revealed that low-income countries and lower-income countries did not see the trend of expanded health expenditure. However, the trend was seen in upper-middle income countries, which was in line with the global expansion for this expenditure. The number of low-income and lower-middle income countries represented 60 percent of the number of all countries around the world, so their population made up the majority of the world populations. Accordingly, most of the data in the model analysis belonged to these groups of counties. Although the test results were consistent with the theories used in this research, expanded health expenditure did not reduce the U5MR from a statistically significant standpoint.

The most important reason for the non-expansion of health expenditure was probably a limited amount of funds for spending by each of the countries. An implication of the non-expansion of expenditure is that health expenditure was only spent to just maintain the existing health system and could not yield better outcomes. This is called a health trap, as discussed earlier. Investments in enhancing the capacity of the public health system which had a direct impact on health outcomes failed to be made. Thus, health expenditure per capita in low-income and middle-income countries had no relationship with the reduced U5MR.

In terms of health equity, health expenditure per capita was not found to have an effect on health equity. This was because government spending failed to establish a health system that focused on poorer populations in the country. The main mechanisms for improving health equity are increasing health expenditure and focusing on the underprivileged.

Government decision-making and budgeting – Government decision-making is one of the key factors affecting public policies and public expenditures. Based on relevant theories, there are two models for government decision-making: 1) The rational comprehensive model and 2) The incrementalism model. The rational comprehensive model has some limitations and is not easy to be implemented in the real world. Therefore, governments usually use the incrementalism model in their decision-making. These are the main concepts under this model: 1) In a decision-making process, a chosen option or the option that gives the highest return is not necessarily the best choice, but it is often the option which is believed to be the most practical; 2) A chosen option is usually an option that governments are familiar with. A new option that the government is not familiar with will be highly risky; 3) In the case when an old option does not produce satisfactory results, a new option will usually not be totally different from the old one. Thus, the change will usually occur gradually; and 4) A decision is the result of compromises between related interest groups. Thus, if a dramatic change occurs, this may have an impact on the interests of various groups of people and then dissatisfaction or resistance may arise.

Under the incrementalism model, 1) There are marginal alternations in the budget size from the previous year; and 2) If there is change in the budget size, it will be stable incremental growth, which is consistent with the empirical world. In

conjunction with the insufficiency of budgets to achieve desired health outcomes, the decision to change or increase the proportion of budget funds allocated to public health will be more difficult. This behavior also includes borrowing money for investments from other countries, which will result in a large amount of debt.

Policy implementation – One belief that has long continued to affect policy evaluations is that an outcome of a policy results from feeding various input into a process in a particular system. Thus, good input will be followed by a good outcome. This belief has led to the evaluation of feasibility and risks in the empirical world. Based on this research, the belief that an increase in health expenditure per capita will lead to better health incomes may not be practical.

Academics in public policy and policy implementation have suggested that the success of a policy is strongly associated with the success of policy implementation. Based on literature reviewed in this research, the key factors in successful policy implementation consist of the following principles: 1) The goals of policies and projects must be clear and can be systematically measured; 2) Administrative tools used for establishing and implementing projects must be clear and reasonable, 3) Policies with unity or single policies are more likely to be successful. 4) Hierarchical delivery, or a top-down policy chain, should be adopted, 5) The top-level project designers must possess good knowledge and understanding about the environment of policies and problems; and 6) Operational staff must have bonds with projects and polices (Pressman & Wildavsky, 1984; Sabatier, 1986; Van Meter & Van Horn, 1975). The consideration of the environment of public health policies revealed that all these principles include obstacles to policy implementation. The obstacles include ambiguous or multifaceted goals, complex structures, extensive networks of stakeholders, as well as globalized changes, which result in a persistence of problems and changes. Thus, the conclusion about the linkages between health outcomes and inputs, e.g. health expenditure per capita, will definitely be ambiguous when these linkages are considered through the perspective of successful policy implementation.

The various reasons why health expenditure per capita in low-income and middle-income countries resulted in no reduction in the U5MR are a key finding of this research. The findings are consistent with the findings from many studies, which indicated that health expenditure per capita did not reduce the U5MR. The studies

which concluded that health expenditure could reduce the U5MR were studies in which variables were not controlled or the institutional variables, e.g. good governance and health expenditure per GDP, or other variables, were already at a high level (Pritchett & Summers, 1996; Hill, Pande, Mahy, & Jones, 1999; Filmer & Pritchett, 1999). Thus, results from this research are another piece of evidence which confirms that health expenditure per capita does not have a significant effect on the U5MR.

5.3.2 Preventive Public Health Strategies

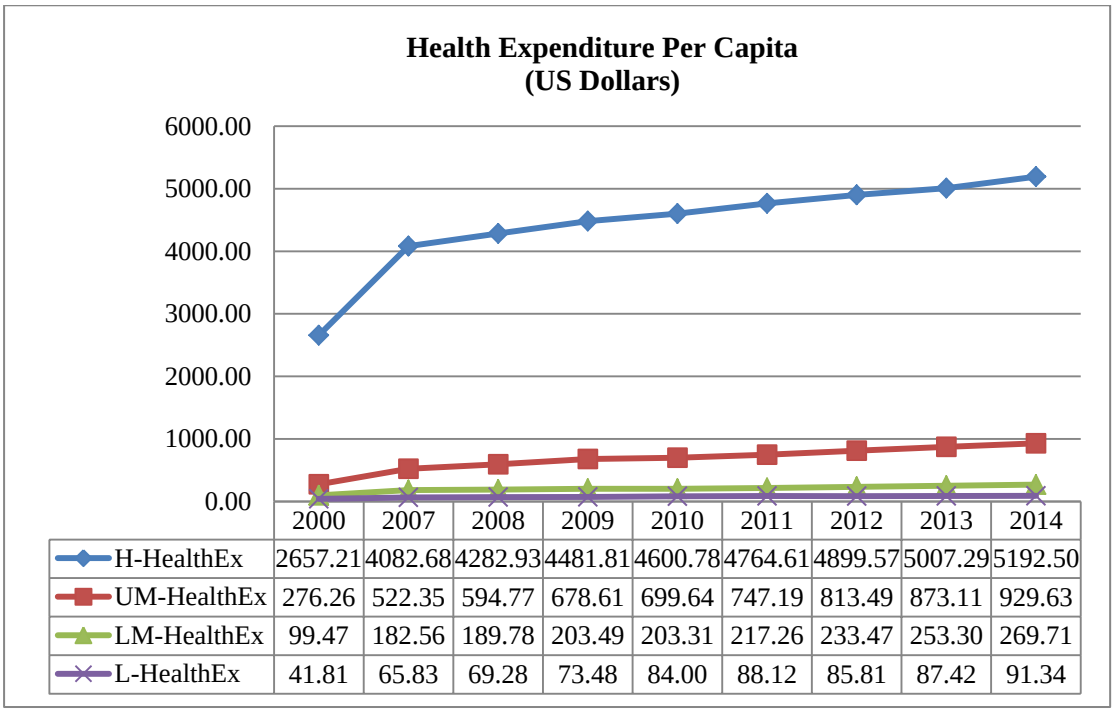
The main function of a public health system is to provide populations with better health conditions, with the main tasks of preventing diseases, providing treatment, and recovering from sickness. Health service delivery is a key principle in driving public health tasks, which can be divided into three levels: 1) Primary healthcare, which consists of preventive services and therapeutic services, 2) Secondary healthcare, and 3) Tertiary healthcare. To ensure efficiency in service delivery to achieve good population health, these three levels of healthcare need to work coherently without duplication. Primary healthcare is often considered to be critical to successful service delivery. As primary healthcare is the first contact point between individuals, communities or families and the national health system, it involves far more than medical services. It includes other elements that will promote population health, which are reflected through preventive factors of primary healthcare.

Serving as one main activity of public health affairs which is related to primary healthcare, disease prevention can be categorized into three levels: 1) Primary prevention, which involves diseases prevention efforts by controlling and eliminating factors leading to the diseases and by promoting other health activities that will contribute to disease reduction, e.g. providing health education, reducing sources of breeding grounds for germs, and sanitation 2) Secondary prevention, which involves diseases prevention efforts after they have occurred with an attempt to reduce the outbreak and severity of the diseases, as well as disease screening and detection, and 3) Tertiary prevention, which involves efforts for preventing diseases after their symptoms are apparent to reduce damage or disability, which also include prevention of potential complications.

The model testing identified that public health variables, consisting of the

RIMP and DPT, resulted in the reduction of the U5MR. This finding manifested a key issue that in order to improve health outcomes, there should be an increase in primary prevention which focuses on reducing disease risk factors. The RIMP consists of two key factors: 1) Proper sanitation and 2) Clean water for domestic use. The access to proper sanitation and clean water are major contributions to reduced risks of outbreaks, as discussed earlier. As for DPT, it deals with the prevention of major diseases, which is the primary task of primary prevention.

The review of data about health expenditure shows very interesting results, which are illustrated in the following figure.

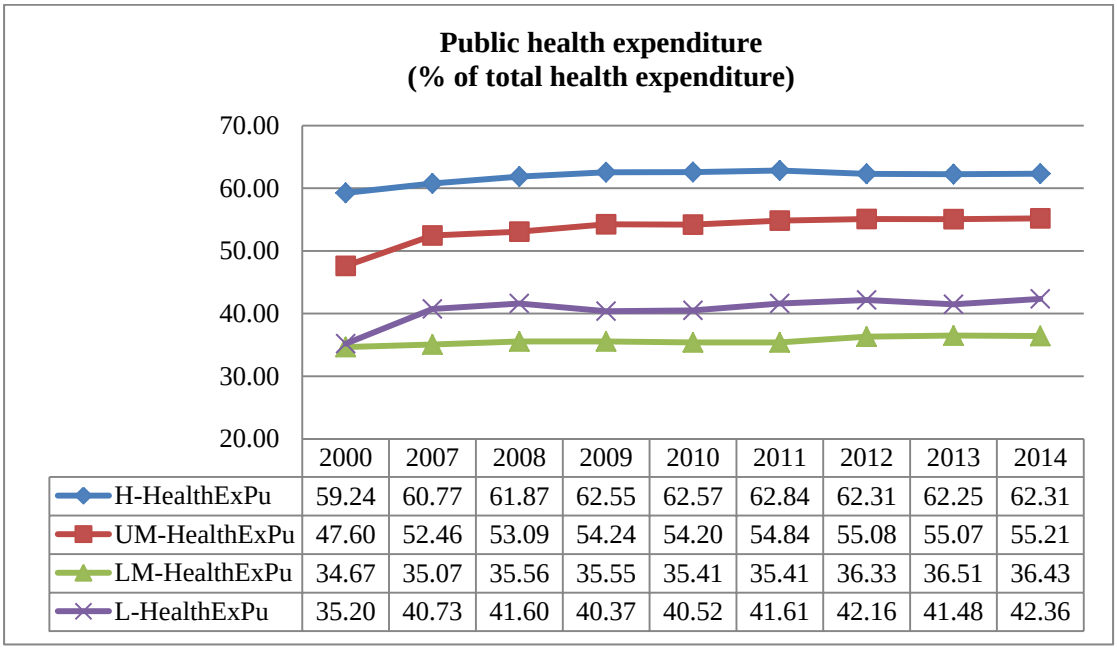


	2000	2007	2008	2009	2010	2011	2012	2013	2014
H-HealthEx	2657.21	4082.68	4282.93	4481.81	4600.78	4764.61	4899.57	5007.29	5192.50
UM-HealthEx	276.26	522.35	594.77	678.61	699.64	747.19	813.49	873.11	929.63
LM-HealthEx	99.47	182.56	189.78	203.49	203.31	217.26	233.47	253.30	269.71
L-HealthEx	41.81	65.83	69.28	73.48	84.00	88.12	85.81	87.42	91.34

Figure 5.3 Health Expenditure per Capita of Global Populations by Income Levels
Source: The World Bank, 2015.

The figure shows a distinction in health expenditure per capita between richer countries and poorer countries. In 2014 alone, the health expenditure per capita in low-income countries was 91.34 US dollars, while that in lower-middle income countries, upper-middle income countries, and high income countries amounted to 269.71, 929.63, and 5,192.50 US dollars, respectively. The data on health expenditure

(% of total health expenditure), which cut the expenditure on providing clean water and proper sanitation, is illustrated below:



	2000	2007	2008	2009	2010	2011	2012	2013	2014
H-HealthExPu	59.24	60.77	61.87	62.55	62.57	62.84	62.31	62.25	62.31
UM-HealthExPu	47.60	52.46	53.09	54.24	54.20	54.84	55.08	55.07	55.21
LM-HealthExPu	34.67	35.07	35.56	35.55	35.41	35.41	36.33	36.51	36.43
L-HealthExPu	35.20	40.73	41.60	40.37	40.52	41.61	42.16	41.48	42.36

Figure 5.4 Public Health Expenditure (% of Total Health Expenditure) by Income Levels

Source: The World Bank, 2015.

From the data on public health expenditure, a very interesting trend was identified. If the expenditure on providing clean water and proper sanitation was cut out, the health expenditure per capita between rich and poor countries would not be very different. In 2014, the richer countries spent 62.31 US dollars per capita, while the poorer countries spent 43.36 US dollars per capita. The difference was only 19.95 US dollars per capita. However, the gap of total expenditure per capita between the two groups was 5,101.16 US dollars. This demonstrated one key issue – the outcomes that arise from health expenditure per capita are actually the outcomes from primary healthcare expenditure. In other words, "the truly important expenditure is disease prevention expenditure." The research manifested that the expenditure for providing improved sanitation and clean water in rural areas contributed to a decline in the U5MR. Although limitations to the public health structure, subsidies, or other factors

(e.g. limited cooperation from other sectors) have an impact on health expenditure, we cannot deny the importance of preventive expenditure for the reduction of the U5MR around the world, which was manifested in the empirical data.

Primary prevention is deeply associated with the provision of knowledge and understanding about health. Higher education is more likely to be accompanied by better health, as witnessed in this research. This research found that Ed significantly reduced the U5MR. In secondary education, sex education and advanced health education provided for children will definitely affect their knowledge about hygiene and the prevention of sexually-transmitted diseases which are directly related to pregnancy and childbirth. Thus, in one sense, the increased rate of higher education can help with primary prevention.

In short, the variables of RIMP, DPT and Ed are consistent with primary prevention, which is a very important matter. Logically, if all diseases were preventable, no illness would exist. Empirically, there are disparities in primary healthcare between different groups of people classified by incomes. Thus, the top-priority approach for middle-income and low-income countries is "preventive methods," which are defined as "preventative public health strategies," which have theoretical positive impacts and were consistent with the research.

5.3.3 Key Predictors of Corruption Control

In the past, the analysis of activities or outcomes of government policies focused on resources that served as inputs, policy processes, and policy outcomes. The results of the analysis were usually far from reality. Later, many academics sought additional methods for the analysis to ensure results that are in line with empirical conditions as much as possible. One of the factors that were proposed to be included in the analysis is "governance." Speaking simply, they suggested adding the institutional environment of a system into the analysis in order to explain outcomes in society. This analysis first appeared in an important study by Oliver Williamson, who was recognized as the initiator of the concept of good governance and cooperative governance, which are important concepts in the today's world. Williamson's important studies consist of Transaction-Cost Economics: The Governance of Contractual Relations (Williamson, 1979), The Economic Institution of Capital (Williamson,

1985) and The Mechanisms of Governance (Williamson, 1996). His studies indicate that the institutional environment is a central, abstract mechanism which functions between the hidden market and the private sector and that the institutional environment varies according to socio-economic conditions of each country. Thus, an analysis of an economic system should incorporate institutional issues to ensure explanations of phenomena are in line with actual situations. Since then, "governance" has been included into analyses more widely, especially by the government sector. This is a major development in policy formulation for country development.

The concept of "governance" originates from a need for good institutions in the long run. In fact, underdeveloped countries often have a backward institutional structure, so they need to shape a proper directional path in the long run to ensure good institutions. It is noticed that in these countries, undesirable institutions become strong institutions and persist despite no legitimacy. This may stem from the fact that the government has the most power and resources, including the power of suppression and allocation of resources to the private sector. Above all, these undesirable institutions can exist by merging with interest groups or establish themselves as a dictatorship or a system that protects its own interest groups. Thus, there should be a 'checks and balances' system to check the powers and ensure that good institutions are established through the participation of the general people.

In this research, apart from reducing the U5MR, corruption control (one of the indicators of good governance) had an impact on health equity, measured based on the U5MR in the wealthiest class divided by the U5MR in the poorest class of a population. This finding was consistent with studies which found that the overall corruption control at the national level needs to be included in the analysis for considering health outcomes. A finding is health expenditure reduced the U5MR only in countries where the institutional environment is favorable, and corruption control is one of the variables (Rajkumar & Swaroop, 2002). Another finding is good governance, which has incorporated corruption control, was found to reduce the U5MR (Kaufmann, Kraay & Zoido-Lobaton, 1999; Kaufmann, Kraay & Mastruzzi, 2004). Or in a straightforward case, countries with higher levels of corruption always experienced a higher U5MR (Gupta et al., 1999).

In public health efforts to achieve health incomes, the overall national

corruption control is an institutional environment which covers the entire public health system. This is comparable to planting a tree in a particular environment with the goal of promoting growth of the tree. If the environment of the public health system is an obstacle to its being a normal system or if corruption occurs in the system, this can be compared to an atmosphere or the climate of the environment which is an obstacle to the growth of the tree. The outcomes from corruption result in all sectors of the public health system being interrupted and become an obstacle to implementation of goals, which is comparable to a tree that stops growing. Eventually, if the environment is not conducive to the life of the tree or if corruption is so immense that it impedes all growth processes, the public health goals will not be achieved or the tree will die. If the results are opposite – if the environment is favorable, the tree will grow and the health outcomes will be good. Based on the significance of the variable "corruption control" in this research, the variable can be incorporated into the public health framework proposed by the WHO, which is illustrated as follows:

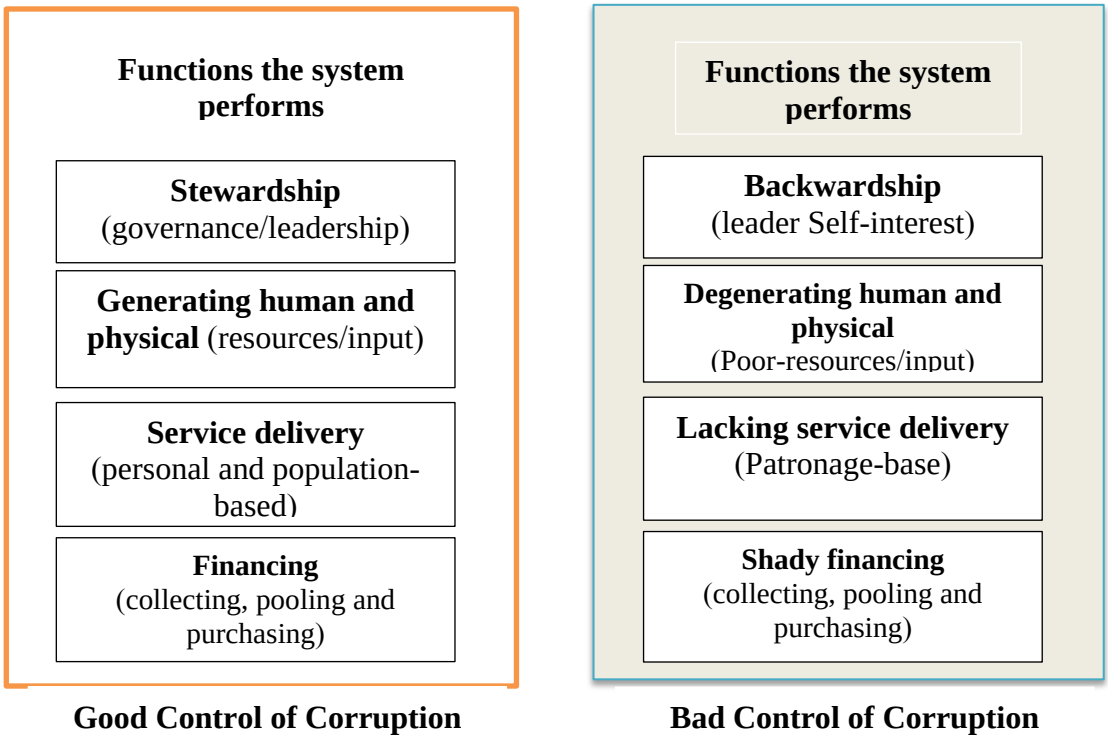


Figure 5.5 Model of the Public Health Framework in Low and High Corruption Situations

Source: Applied from Duran et al., 2011.

The consideration of the WHO's public health performance in conjunction with the institutional environment in terms of corruption control can provide a picture of practices which represent obstacles resulting from corruption, as illustrated in the figure above. At the policy implementation level, there should be practice guidelines which aim to ensure good management and focus on common goals. If corruption occurs, whether it is an action that directly violates laws or an action within a grey area, the goals of policies will deviate from action for public interest and can relate to personal need of policy implementers. In the next level, which deals with alternative development and resource allocation, if corruption occurs at this level, the resources allocated will be more likely to be incomplete in terms of quality and quantity. When the resources are input into the service delivery process, this will lead to inefficiency in the service delivery. In addition, corruption in the service delivery results in a system available for clients being diverted to clients within the network of authorities. In financial perspectives, if corruption happens, this will lead to financial non-transparency. These explanations are broad explanations. The in-depth details about the impacts of corruption on health outcomes should be presented in other studies in the future. A key conclusion from this research with regard to corruption control is that when providing an explanation of health outcomes in future studies, the institutional environment should not include only corruption control but also other institutional variables into the analysis. Or, the institutional environment should be considered to serve as a predictor in the model because empirical results from this research point out the power of its explanation for both health outcomes and health equity, which is clear, straightforward, and highly beneficial to the study.

5.3.4 Key Predictors of Corruption Control

The model estimation found long-run relationships or panel cointegration of the variables included in this study. Theoretically, the variables used in a model should have a theoretical long-run relationship or consistency. Sometimes, however, some variables deviate from the relationships, and finally they have to return to the long-run relationships. Based on the results of this research, this made all the variables stronger in predicting phenomena because the statistical results had long-run relationships.

In addition to the long-term results, the random effect method suited the model estimation. This means the low-income and middle-income countries used in this research could provide a prediction using the same equations and the same slopes at the intersection on the same axes. This is considered to be the most efficient estimation method for panel data, which shows the appropriateness of data and classification. Therefore, when these two findings were combined, it can be said that this research found robust prediction results.

5.4 Policy Proposals

From the research findings and key points from this research, the guidelines for the development of the levels of overall national health outcomes can be developed, which can be applied to low-income and middle-income countries. They consist of 5i – 1) Increase income, 2) Increase educational opportunities, 3) Invest in rural sanitation and water, 4) Invest in immunization, and 5) Institute the control of corruption. To implement the policy, all of these components need to be pushed simultaneously. As this research pointed out the long-run relationships of the variables used in the study, an effort should be made to increase all of these factors at the same time, as illustrated in the figure below:

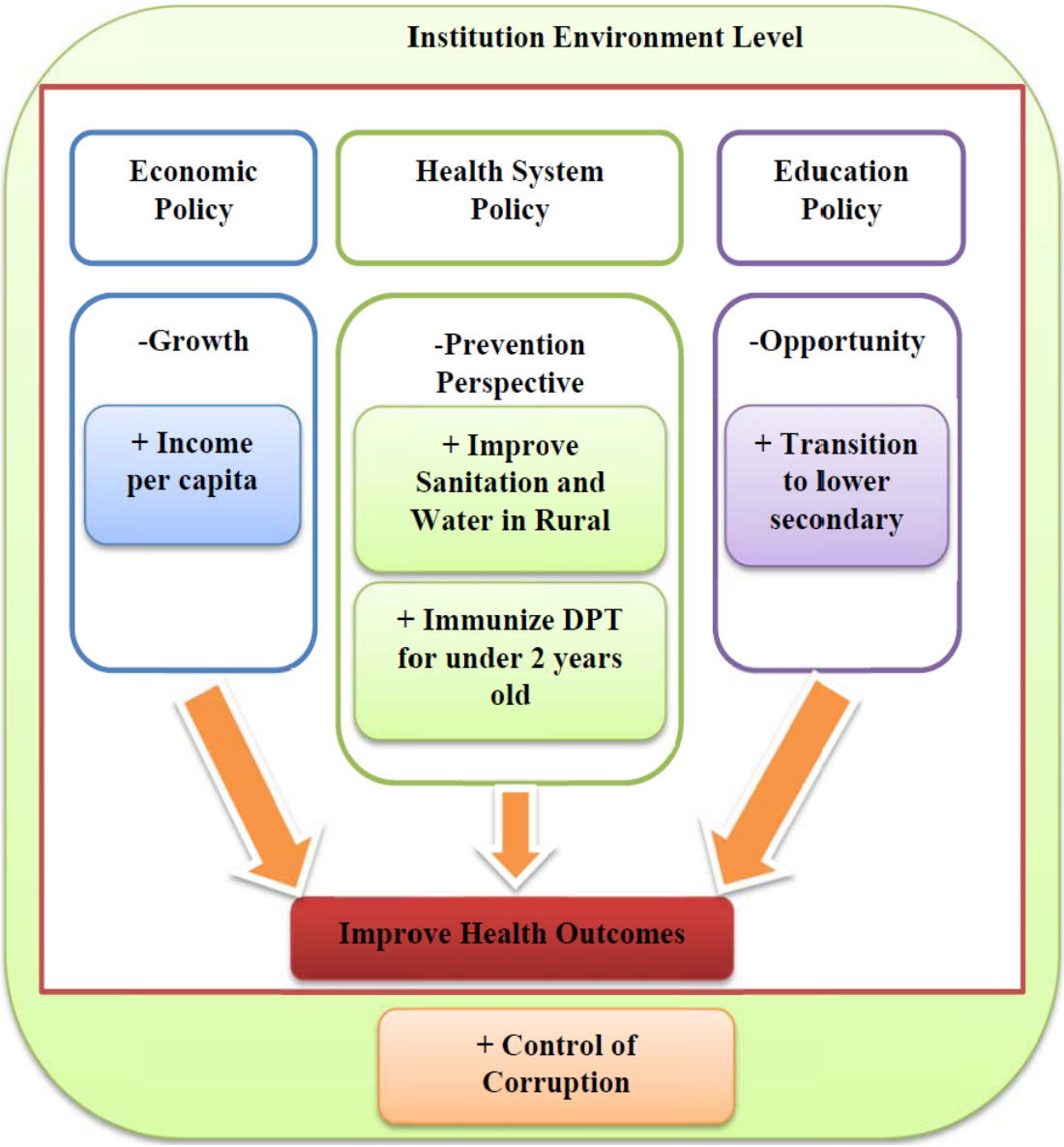


Figure 5.6 Guidelines for Policy Implementation to Increase Health Outcomes 5i

The figure illustrates the policy guidelines that are consistent with the research results. The objectives of the 5i policy are to upgrade health outcomes, that is to say, to reduce the U5MR and to result in the 5MR in the poorest class and that of the wealthiest class being close or equal to each other.

The details of the policy guidelines are provides below:

Economic policy – increase income

Economic policies are a key principle for country administration, which are complex and involve a large number of stakeholders. This research indicates that health expenditure per capita had no effect on health outcomes. The research suggests that the absence of the health outcomes resulted from the non-expansion of health expenditures in low-income and middle-income countries. This research further indicates the main reason for the non-expansion of health expenditures – "The increase in health expenditure is derived from the increase in revenue." That is to say, the government's decision to increase health expenditures happens when the country earns more revenue.

Revenue was the paramount factor in the expansion of public expenditures, which was the weakest point for the countries studied in this research. Thus, an economic policy which places a focus on "economic growth" is essential for the improvement in health outcomes. The relationship between income and health is evident in both theories and relevant studies. Accordingly, increasing income to populations is a factor that contributes to the improved levels of health outcomes and should serve as a guideline for policy implementation.

The question of how to increase GNI per capita is a highly-complex question, and individual countries have different limitations with respect to this matter. A key principle proposed by this research is that increasing income is a good way of reducing the U5MR, that is to say, economic growth is an important agenda item.

Education policy – increase the rate of transition to lower secondary education

Educational policies are similar to economic policies in terms of complexity and the engagement of many stakeholders. Improving the rate of transition to lower secondary education requires profound understanding and a great deal of resources. This research only proposed one key concept – "educational opportunities contribute to the improvement in health outcomes." The relationship between education and health has been confirmed by various theories and research with the following conclusion: higher education contributes to better health and has a relationship with a higher income. This finding was also identified in this research.

The reason why lower secondary education is a key contribution to a reduction in the U5MR is that children in lower secondary education are at the reproductive age. Sex education and health education courses often include knowledge about sexuality and sexual well-being, which are linked to giving birth to babies in every culture. The acquisition of such knowledge during this age is important for self-care and baby care. This is consistent with a large number of studies, which found a relationship between the U5MR and education, especially education of mothers. Thus, an educational policy guideline proposed by this research is "the government has to boost the transition to lower secondary education," using specific approaches in line with the context of the country.

Health system policy – Invest in sanitation, water and immunization

The public health system is directly related to health outcomes. The results of this research highlighted a key point – the improvement of public health through the provision of sanitation, clean water, and vaccination against key diseases resulted in the reduction of U5MR in low-income and middle-income countries. This factor is characterized by "preventive public health," which involves the prevention of the occurrence and outbreaks of diseases, which is a key factor in disease control. A review of literature as part of this research found that the budget funds allocated to providing clean water and sanitation was enormous in richer countries, and if the expenditure on clean water and sanitation was cut off, the health expenditure per capita among high-income, middle-income and low-income countries was almost the same. Thus, it can be concluded that disease prevention and control are an important mechanism affecting the reduction of the U5MR. As for vaccination against diphtheria, tetanus toxoid and pertussis, it had a direct linkage to a reduction in the U5MR from these three diseases. The research results also verified such relationship with statistical significance, too.

A major obstacle to investment in primary healthcare and vaccination for key deadly diseases for children aged under-two in middle-income and low-income countries is the source of the funds for the investment. The author studied data about the improvement of primary healthcare in middle-income and low-income countries around the world to identify which countries performed well under financial constraints. The data showed that these countries included Azerbaijan, Ecuador, Pakistan, and Lao

PDR, with the RIMP from 2002 to 2014 representing 57.9- 84.4%, 58.6-80.7%, 23.7-49%, and 22.7-56%, respectively.

Case study of Azerbaijan – As an upper-middle-income country population, Azerbaijan has a population of 9.31 million, with approximately 5.01 million living in urban areas and 4.3 million in rural areas. According to the 2012 WHO Report, in Azerbaijan, the infant mortality rate was 30.8 per 1,000 live births and the U5MR was 35.8 per 1,000 live births. In 2012, the RIMP of the country represented 57.9 percent, and this dramatically increased to 84.8 percent in 2014, which saw the highest growth of the RIMP in the world. The Azerbaijani government aimed to improve the quality of life for its people through a project for enhancing the access to infrastructure, which was called "The Second National Water Supply and Sanitation Project", with a focus on rural towns. This project was supported by a 150-million loan borrowed from the World Bank in 2014.

Azerbaijan enjoyed a steady economic growth rate, which resulted in urban-rural disparities, especially in the provision of clean water and proper sanitation, which were concentrated in urban area. Thus, the Azerbaijani government set up a goal to develop a water pipeline system to reduce such disparities. A review of literature as part of this research found that nearly half its rural population experienced a shortage of drinking water sources and had no access to sufficient water. As a result, the Azerbaijani government exerted great efforts to build a water distribution system throughout the rural areas. In its first development plan, the government spent approximately 230 million US dollars to implement this project, which commenced in 2008. However, the economic slowdown due to the oil crisis resulted in the contraction of the economic growth in Azerbaijan in 2009. Thus, the government had to formulate a backup plan and borrow funds from funding sources outside of the country, including the European Union and other international organizations, to carry out the projects.

A benefit analysis revealed that approximately 120,000 Azerbaijanis, representing 10 percent of the total Azerbaijani population, accessed this improved-quality water immediately upon the delivery of piped water from the project. This reduced the cost of managing or supplying clean water from anywhere between10 to 95 percent, which varied according to different residential areas. Furthermore, this project improved the quality of water by around 10 liters, on average, per capita. For areas with water

storage tanks, in which local people kept water for boiling for household use, this amount would increase to 20 liters per capita. It was expected that this project would increase the life expectancy of the Azerbaijani population by up to 20 years. Furthermore, this project allowed rural areas to significantly reduce the costs of supplying water and maintaining water reservoir maintenance, due to the fact that the water pipeline network was now connected to over 11,000 households. In summary, the total benefit of the project amounted to 22.9 million US dollars, with seven-percent energy savings and 22.4-million US dollar NPV. The total investment was valued at 1,950 US dollars per capita, which represented deficit spending. However, the government sought funding support from the international community since a long-term benefit of this project is a significant improvement of the quality of life of its population.

It is evident that the development of Azerbaijani started with economic growth and its will to develop a water distribution system and sanitation facilities. The priority of this project pushed the government to implement this project despite having inadequate budget monies. The importance of the project justified borrowing money, and this received good support from international organizations, which allowed Azerbaijani to develop a clean water system in rural areas.

Develop an institutional environment – enforce control of corruption

The institutional environment covers the entire system of a country and has an effect on activities of the country. Developing countries often have a backward institutional structure, so they need to shape a proper directional path in the long run to ensure good institutions. This research discovered that the control of corruption resulted in a reduction of the U5MR and improved the health equity. The guidelines for developing a policy towards an increase in corruption control is a complex matter and are too difficult to be pinpointed. However, when the principles like transparency and accountability, which facilitate the investigation or detection of corruption, are taken into account, this can help developing policy choices.

Access to citizen’s information – A key principle pertaining to corruption control is citizens’ awareness of their citizenship or ownership of their resources. Thus, the perceived delivery of resources to service units, whether by the central or local governments, helps the citizens to identify if the level of services they receive is appropriate, in terms of quantity and quality. As for service quality, there should be

“standard service delivery systems,” which are designed for pharmaceutics, knowledge of service providers, and so on, which are in line with the specific context of each area.

Complaint channels – In addition to the awareness of the suitability or non-suitability of the services received, complaints or complaint channels are critical in controlling corruption. The suitability of complaint channels in different contexts should be a matter of concern. The complaints may be filed to regulatory agencies, independent organizations, or even the country leaders.

Establishing a monitoring network – Forming groups and linking them together as civic networks id a good idea for balancing the government powers to ensure that the needs of a population are responded to properly. The gathering of monitoring networks often produces positive side effects, such as learning how to conduct monitoring or group management. The transfer of such knowledge will serve as an important mechanism for robust corruption control in the future. The networks may also include international networks or international organizations which are equipped with more expertise.

5.5 Conclusions on Issues and Academic Merits

The under-five morality rate (U5RM) is a critical, common issue among low-income and middle-income countries, compared to high-income countries, most of which are developed countries. The disparity in the issue of U5RM is a big concern and attention should be devoted to the improvement of health outcomes. This author strongly hopes that this research will play a role in creating evidence that is consistent with different theories, in line with specific contexts of groups of countries investigated in this research, through valid statistical tests. This aims to serve as a guideline for other studies. The main factors that were found to result in the reduction of the U5RM were public health variables, which include the perspective of “preventive primary healthcare.” An additional finding shows that the health expenditure of high-income countries was dedicated to the provision of clean water and proper sanitation, not medical care. This finding highlights the importance of the preventive public health approach, which results in the improvement in health outcomes, which are consistent with theories and the empirical world. However, a major obstacle for poor countries is

the expenditure required for improving the preventive public health system. The author made a great effort to find examples of countries that had good health outcomes. The main method for sourcing funds among low-income countries was "securing a loan from a funding source outside of the country," which might be alliance countries or international aid organizations, by means of reliable benefit analysis to identify the cost-effectiveness of projects.

A key point that is a highlight and merit of this research is creating theoretical evidence for the linkage between corruption control, which is part of good governance, and a significant reduction in the U5MR. Moreover, corruption control affected the health equity between the rich and the poor. Therefore, the variable "corruption control" deserves to be a key factor in studies that are concerned with health outcomes of middle-income and low-income countries in the future. Corruption control is a major issue for low-income and middle-income countries around the world, which is in accordance with past theories and empirical data. Thus, other studies in the future should take into account an approach to institutionalize the control of corruption.

The most important obstacle experienced by studies that require secondary data analysis is data integrity. In particular, this research aimed to achieve data integrity by means of panel data analysis, which required balanced panel data. This requirement resulted in a significant amount of complete data being omitted from this research. It is not surprising that other studies which employed the same methodology as this research were criticized for the reliability of their findings. However, it was fortunate that the remaining data in this research was valid and existed in a sufficient amount for the different tests. Apart from that, the test results were really satisfying in theoretical and methodological terms. The results also confirmed that the model could be suitably applied to the countries investigated in this research. The luck was derived from a long-standing accumulation of international public health databases. Thus, the findings manifest the importance of correct data collection and well-organized classification systems, which is another major weakness of low-income countries. Although pushing for the improvement in this area is beyond the author's ability, the test results are a key piece of evidence which demonstrates that if there is sufficient data, creating evidence for country development in other dimensions will be feasible, while receiving theoretical support.

Finally, the author strongly hopes that this research will be part of the advancement of the academic circle, based on valid findings from clear research methodologies and appropriate supporting theories, with constructed evidence that deserves reference in the near future.

BIBLIOGRAPHY

Acemoglu, D. & Robinson, J. A. (2008). Persistence of power, elites and institutions. *American Economic Review, 98*(1), 267-291.

Ainsworth, M., Beegle, K. & Koda,G. (2002). The impact of adult mortality and parental deaths on primary school enrollment in Northwestern Tanzania. *Journal of Development Studies, 41*(3), 412-439.

Akinkugbe, O. & Afeikhena, J. (2006). Public health care spending as a determinant of health status: A panel data analysis for SSA and MENA. In Adenikinju A, Olaniyan O, (Eds.) *Applied macroeconomics and economic development.* Ibadan: Ibadan University Press.

Alderman, H., Behrman, J. R., Levy, V. & Menon, R. (2001). Child health and school enrollment: A longitudinal analysis. *The Journal of Human Resources, 36*(1), 185-205.

Almeida, C. et al. (2001). Methodological concerns and recommendations on policy consequences of the World Health Report 2000. *The Lancet, 357*(9268), 1692-1697.

Anderson, J. (1998). *Corruption in Latvia: Survey evidence.* Washington, DC: World Bank.

Anderson, J. (2000). *Corruption in Slovakia: Results of diagnostic surveys.* Washington, DC: World Bank.

Anyanwu, J. C. & Erhijakpor, A. E. O. (2007). *Health expenditures and health outcomes in Africa.* Africa: African Development Bank Group.

Azfar, O. & Gurgur, T. (2001). *Does corruption affect health and education outcomes in the Philippines?.* College Park, MD: IRIS Center, University of Maryland.

Badani, B. & Ravallion, M. (1997). Decomposing social indicators using distributional data. *Journal of Econometrics, 77*(1), 125-139.

Baldacci, E., Guin-Siu, M. T. & De Mello, L. (2002). *More on the effectiveness of public spending on health care and education: A covariance structure model.* Washington, DC: International Monetary Fund.

Banerjee, A., Dolado J. J., Galbraith, J. W. & Hendry, D. (1993). *Co-integration, error correction, and econometri analysis of non-stationary data.* Oxford: Oxford University Press.

Barreca, A. I. (2007). The long-term economic impact of In Utero and postnatal exposure to malaria. *The Journal of Human Resources, 45*(4), 865-892.

Barro, R. J. (1996). Democracy and Growth. *Journal of Economic Growth. 1*(1), 1-27.

Barro, R. J. & Sala-i Martin, X. (2004). *Economic growth.* Camebridge, MA: The MIT Press.

Basu, A. M. & Stephenson, R. (2005). Low levels of maternal education and the proximate determinants of childhood mortality: A little learning is not a dangerous thing. *Social Science and Medicine, 60*(9), 2011-2023.

Bidhya Bowornwathana. (2006). Transforming bureaucracies for the 21st century: The new democratic governance paradigm, In Eric E. Otenyo, Nancy S. Lind (Eds.) *Comparative public administration (Research in Public Policy Analysis and Management, Volume 15)*. (pp.667-679). Bingley, UK: Emerald Group Publishing.

Blaxter, M. (1981). *The health of the children. Review of research on the place of health in cycles of disadvantage.* London: Heinemann Educational Books.

Bleakley, H. (2006). *Malaria in the Americas: A retrospective analysis of childhood exposure.* Bethesda, MD: National Center for Biotechnology Information, National Library Medicine.

Bloom, D. E., Canning, D. & Sevilla, J. (2004). The effect of health on economic growth: A production function approach. *World Development, 32*(1), 1-13.

Bongaarts, J. (2010). The causes of educational differences in fertility in Sub-Saharan Africa. *Vienna Yearbook of Population Research, 8*, 31-50.

Braveman, P. & Gruskin, S. (2003a). Defining equity in health. *Journal of Epidemiology and Community Health, 57*(4), 254-258.

Braveman, P. & Gruskin, S. (2003b). Poverty, equity, human rights and health. *Bulletin of World Health Organization, 81*(7), 539-545.

Breitung, J. (2001). The local power of some unit root tests for panel data. In T. B. F. Badi H. Baltagi, R. Carter Hill (Eds.), *Nonstationary panels, panel cointegration, and dynamic panels (Advances in Econometrics)* (pp. 161-117). Bingley, UK: Emerald Group Publishing.

Burnside, C. & Dollar, D. (1998). *Aid, the incentive regime and poverty reduction.* Washington, DC: The World Bank.

Carrin, G. & Politi, C. (1995). Exploring the health impact of economic growth, poverty reduction, and public expenditure. *Tijdschrift voor Economie en Management, 40*(3-4), 227-247.

Chadwick, E. (1842). *Report on an inquiry into the sanitary condition of the labouring population of Great Britain.* London: Her Majesty's Stationery Office.

Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance, 20*(2), 249-272.

Cleland, J. G. & Van Ginneken, J. K. (1988). Maternal education and child survival in developing countries: the search for pathways of influence. *Social Science Medicine, 27*(12), 1357-1368.

County Health Rankings & Roadmaps. (2017). *Our approach.* Retrieved from http//:www.countyhealthrankings.org/our-approach

Cutler, D., Fung, W., Kremer, M. & Singhal, M. (2007). *Mosquitoes: The long-term effects of malaria eradication in India.* Cambridge, MA: Harvard University.

Cutler, D. M., Lleras-Muney, A. (2010). Understanding differences in health behaviors by education. *Journal of Health Economic, 29*(1), 1-28.

Daniels, N., Kennedy, B. & Kawachi, I. (2000). *Justice is good for our health.* Boston, MA: Boston Review.

Daniels, N., Kennedy, B. & Kawachi, I., Cohen, J. & Rogers, J. (2000). *Is inequality bad for our health?.* Boston: Beacon Press.

Darby, C., Valentine, N., Murray, C. & Silva, A. (2000). *Strategy on measuring responsiveness.* Geneva: World Health Organization.

Dickey, D. A. & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal American Statistical Association, 74*(366), 427-431.

Dow, W. H., Philipson, T. J. & Xavier Sala-i-Martin. (1999). Longevity complementarities under competing risks. *American Economic Review, 89*(5), 1358-1371.

Dunn, J. R. & Hayes, M. V. (1999). Toward a lexicon of population health. *Canadian Journal of Public Health, 90*(1), 7-10.

Duran, A., Kutzin, J., Martin-Moreno, J. M. & Travis, P. (2011). Understanding health systems: scope, functions and objectives. In Figueras J. & McKee, M. (Eds.), *Health systems, health, wealth and societal well-being: assessing the case for investing in health systems* (pp. 19-36). Berkshire: Open University Press.

Easterlin, R. A. (2001). Income and happiness: Towards a unified theory. *Economic Journal, 111*(473), 465-484.

Engle, R. F. & Granger, C. W. J. (1987). Co-Integration and error correction: representation, estimation, and testing. *Econometrica, 55*(2), 251-227.

Farag, M., Nandakumar, A.K., Wallack, S, Hodgkin, D. Gaumer G. & Erbil C. (2013). Health expenditures, health outcomes and the role of good governance. *International Journal of Health Care Finance and Economics, 13*(1), 33-52.

Filmer, D. & Pritchett, L. (1999). The impact of public spending on health: Does money matter?. *Social Science and Medicine, 49*(10), 1309-1323.

Filmer, D., Hammer, J. & Pritchett, L. (1997). *Health policy in poor countries: Weak links in the chain.* Washington, DC: The World Bank.

Fogel, R. W. (1986). *Nutrition and the decline in mortality since 1700: Some additional preliminary findings.* Boston, MA: National Bureau of Economic Research.

Frederickson, H. G. & Kevin, B. S. (2003). *The public administration theory primer.* Boulder, CO: Westview Press,

Fryback, D. G. (1998). Methodological issues in measuring health status and health-relates quality of life for population health measures. In *Summarizing population health: Directions for the development and application of population metrics.* (pp. 39-57), Washington DC: National Academy Press.

Fuchs, V. R. (1974). *Who shall live? health, economics, and social choice.* New York: Basic Books.

Gallup, J. L. & Sachs, J. (2001). The economic burden of malaria. *American Journal of Tropical Medical Hygiene, 64*(1-2), S1-S11.

Gasper, D. (2002). Is sen's capability approach an adequate basis for considering human development?. *Review of Political Economy, 14*(4), 435-461.

Gertler, P. & Van Der Gaag, J. (1990). *The willingness to pay for medical care: Evidence from two developing countries.* Baltimore, MA: The Johns Hopkins University Press.

Gottret, P. & Schieber, G. (2006). *Health financing revisited : A practitioner's guide.* Washington, DC: World Bank.

Grantham-McGregor, M., Cheung, Y. B., Cueto, S., Glewwe, P., Richter, L. & Strupp, B. (2007). Development potential in the first five years for children in developing countries. *The Lancet, 369*(9555), 60-70.

Gupta, S., Davoodi, H. & Tiongson, E. (2000). *June-last update, Corruption and the Provision of Health Care and Education Services*. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=879858

Gupta, S., Davoodi, H. &Tiongson, E. (2000). *Corruption and the provision of health care and education services.* Washington, DC: International Monetary Fund.

Gupta, S., Verhoeven, M. & Tiongson, T. (1999). *Does higher government spending buy better results in education and health care?.* Washington, DC: International Monetary Fund.

Gupta, S., Verhoeven, M. & Tiogson, E. (2001). Public spending on healthcare and the poor. *Health Economic, 12*(8), 685-696.

Gyimah-Brempong, K. & Wilson, M. (2004). Health human capital and economic growth in Sub-Saharan African and OECD Countries. *The Quarterly Review of Economics and Finance, 44*(2), 296-320.

Gwatkin D. R., Rutstein, S., Johnson, K., Suliman, E., Wagstaff, A. & Amouzou, A. (2007). *Socio-economic differences in health, nutrition, and population within developing countries.* Washington, DC: World Bank.

Hadri, K. (2000). Testing for stationarity in heterogeneous panel data. *Econometric Journal, 3*, 148-161.

Hall, R. E. & Jones, C. I. (1999). Why do some countries produce so much more output per worker than others?. *The Quarterly Journal of Economics, 114*(1), 83-116.

Hamner, L., Lensink, R. & White, H. (2003). Infant and child mortality in developing countries: Analyzing the data for robust determinants. *Journal of Development Studies, 40*(1), 101-118.

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica, 46*(6), 1251-1271.

Heckman, J. (2007). *Investing in disadvantaged young children is good economics and good public policy.* Washington, DC: New York University.

Heysen, S. & Musgrove, P. (1986). Interdepartmental differences in life expectancy at birth in Peru as it relates to income, household drinking-water, and provision of medical consultations. *Bulletin of the Pan American Health Organization, 20*(1), 31-44.

Hill, K., Pande, R., Mahy, M., & Jones, C. (1999). *Trends in child mortality in the developing world: 1960–1996.* New York: UNICEF.

Hilaire, H. G. (2014). Does good governance improve public health expenditure-health outcomes nexus? New empirical evidence from Africa. *Revue d'Economie Thorique et Applique, 4*(1), 21-42. Retrieved from http://www.who.int/hia/evidence/doh/en

Hong, S. C. (2007). The burden of early exposure to malaria in the United States, 1850-1860: malnutrition and immune disorders. *Journal of Economic History, 67*(4), 1001-1035

Hood, C. (1991). A public management for all seasons?. *Public Administration, 69*(1), 3-19.

Im, K. S., Pesaran, M. H. & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics, 115*(1), 53-74.

Issa, H. & Ouattara, B. (2005). *The effect of private and public health on infant mortality rates: Does the Level of development matters?*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.63.9133&rep=rep1&type=pdf

Kabir, M. (2008). Determinants of life expectancy in developing countries. *The Journal of Developing Areas, 41*(2), 185-204.

Kao, C. & Chiang, M.-H. (1999). On the estimation and inference of a cointegrated regression in panel data. In Badi H. Baltagi,Thomas B. Fomby, R. Carter Hill (Eds.). *Nonstationary panels, panel cointegration, and dynamic panels (Advances in Econometrics, Volume 15)* (pp.179-222). Bingley, UK: Emerald Group Publishing.

Kaufman, D., Kraay, A. & Mastruzzi, M. (2004). Governance matters III: Governance indicators for 1996, 1998, 2000, and 2002. *World Bank Economic Review, 18*(2), 253-287.

Kaufman, D., Kraay, A. & Zoido-Lobaton, P. (1999). *Governance matters.* Washington, DC: Development Economics Research Group, World Bank.

Kawachi, I., Subramanian, S. V. & Almeida-Filho, N. (2002). A glossary for health inequalities. *Journal of Epidemiology and Community Health, 56*(9), 647-52.

Kesternich, I., Siáinger, B., Smith, J. P. & Winter, J. K. (2014). The effects of world war ii on economic and health outcomes across Europe. *Review of Economics and Statistics, 96*(1), 103-118.

Kindig, D. A. (2007). Understanding population health terminology. *The Milbank Quartely, 85*(1), 139-161.

Kindig, D. A. & Stoddart G., (2003). What is population health?. *American Journal of Public Health, 93*(3), 380-383.

Kiros, G. E. & Hogan, D. P. (2001). War, famine and excess child mortality in Africa: The role of parental education. *International Journal of Epidemiology, 30*(3), 447-455.

Kitagawa, E. M. & Hauser, P. M. (1973). *Differential mortality in the United States: A study in socio-economic epidemiology.* Cambridge: Harvard University Press.

Klomp, J. & De Haan, J. (2008). Effects of governance on health: A cross-national analysis of 101 countries. *Kyklos, 61*(4), 599-614.

Kosek, M., Bern, C. & Guerrant, R. L. (2003). The global burden of diarrhoeal disease, as estimated from studies published between 1992 and 2000. *Bulletin of World Health Organization, 81*(3), 197-204.

Levin, A., Lin, C.-F. & Chu, J. C.-S. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics, 108*(1), 1-24.

Lewis, M. A. (2006). *Governance and corruption in public health care systems.* Washington, DC: Center for Global Development.

Lleras-Muney, A. (2005). The relationship between education and adult mortality in the United States. *Review of Economic Studies, 72*(1), 189-221.

Lordan, G. & Frijters, P. (2013). Unplanned pregnancy and the impact on sibling health. *Health Economics, 22*(8), 903-914.

Lucas, R. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1): 3-42.

Mackenbach, J. P. et al. (2004). Inequalities in lung cancer mortality by the educational level in 10 European populations. *European Journal of Cancer, 40*(1), 126-135.

Mackey, T. K. & Liang, B. A. (2012). Combating healthcare corruption and fraud with improved global health governance. *BMC International Health and Human Rights, 12*(1), 23.

Maddala, G. S. & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics, 61* (November), 631-652.

Majid, H. (2013). Increased rural connectivity and its effects on health outcomes. *The Lahore Journal of Economics, 18*(September), 271-282.

Marks, L., Cave, S. & Hunter, D. J. (2010). Public health governance: Views of key stakeholders. *Public Health, 124* (1), 55-59.

Mason, A. D. & King, E. M. (2001). *Engendering development through gender equality in rights resources and voice.* Washington DC: The World Bank.

McGillivray, M. (2005). Measuring non-economic well-being achievement. *Review of Income and Wealth, 51*(2), 337-364.

McIntyre, D. (2010). WHR 2000 to WHR 2010: What progress in health care financing?. *Health Policy and Planning, 25*(5), 349-351.

McIntyre, D. & Mooney, G. (2007). *The economics of health equity.* Cambridge: Cambridge University Press.

McKeown, T., Record, R. G. & Turner, R. D. (1962). Reasons for the decline of mortality in England and Wales during the nineteenth century. *Population Studies, 16*(2), 94-122.

McKeown, T., Record, R. G. & Turner, R. D. (1975). An interpretation of the decline of mortality in England and Wales during the twentieth century. *Population Studies, 29*(3), 391-421.

Menon-Johansson, A. S. (2005). Good governance and good health: The role of societal structures in the human immunodeficiency virus pandemic. BMC International *Health and Human Rights, 25*(5), 4.

Mitchell, A. & Bossert, T. J. (2010). Decentralisation, governance and health-system performance: Where You Stand Depends on Where You Sit. *Development Policy Review, 28*(6), 669-691.

Mooney, G. (2003). *Economics, medicine and health care* (3rd ed.). Harlow: Financial Times Prentice Hall.

Mooney, G. (2007). How can public health deal with the problems of neo-liberalism? A response to The scope, mission and method of contemporary public health. *Australian and New Zealand Journal of Public Health, 31*(6), 509-510.

Mooney, G. (2009). *Challenging Health Economics.* Oxford: Oxford University Press.

Morales, L. S., Lara, M., Kington, R.S., Valdez, R. O. & Escarce, J. J. (2002). Socioeconomic, cultural, and behavioral factors affecting Hispanic health outcomes. *Journal of Health Care for the Poor and Underserved, 13*(4), 477-503.

Morgan, A. & Swann, C. (2004). *Social capital for health: Issues of definition, measurement and links to health.* London: Health Development Agency.

Moulton, B. R. & Randolph, W. C. (1989). Alternative tests of the error components model. *Econometrica, 57*(3), 685-693.

Murray, C. J. L., Salomon, J. A., Mathers, C. D., Lopez, A. D. (Eds.). (2002). *Summary measures of population health: Concepts, ethics, measurement and applications.* Geneva: World Health Organization.

Musgrove, P. (1996). *Public and private roles in health.* Washington, DC: World Bank.

Navarro, V. (2000). Assessment of the world health report 2000. *The Lancet, 356*(9241), 1598-1601.

Norman G, Pedley S. & Takkouche B. (2010). Effects of sewerage on diarrhoea and enteric infections: A systematic review and meta-analysis. *Lancet Infectious Diseases, 10*(8), 536-544.

Novignon, J., Olakojo, S. & Nonvignon, J. (2012). The effects of public and private health care expenditure and health status in Sub-Sahara Africa: New evidence from panel data analysis. *Health Economics Review, 2*(December), 22, 1-8.

Olafsdottir, A. E., Reidpath, D. D., Subhash, P., Allotey, P. (2011). Health systems performance in sub-Saharan Africa: Governance, outcome and equity. *BMC Public Health, 11*(April), 237-244.

Or, Z. (2000). *Determinants of health outcomes in industrialized countries: A pooled, cross-country, time series analysis.* Paris: Organization for Economic Cooperation and Development.

Parrish, R. G. (2010). Measuring population health outcomes. *Preventin Chronic Disease, 74*(4), A71.

Pedroni, P. (2004). Panel cointegration: Asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Econometric Theory, 20*(3), 597-625.

Pellegrini, L. C., Rodriguez-Monguio, R. & Qian, J. (2014). The US healthcare workforce and the labor market effect on healthcare spending and health outcomes. *International Journal of Health Care Finance and Economics, 14*(2), 127-141.

Pesaran, M. H. & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics, 115*(1), 53-74.

Pressman, J. L. & Wildavsky, A. (1984). *Implementation*. (3rd ed.). Berkeley: University of California Press.

Preston, S. H. (2007). The changing relation between mortality and level of economic development. *International Journal of Epidemiology, 36*(3), 484-490.

Pritchett, L. & Summers, L. H. (1996). Wealthier is healthier. *Journal of Human Resources, 31*(4), 841-868.

Radin, D. (2008). World Bank funding and health care sector performance in central and Eastern. *International Political Science Review, 29*(3), 325-347.

Rajkumar, A. S. & Swaroop, V. (2002). *Public spending and outcomes: Does governance matter?*. Washington DC: The World Bank.

Rajkumar, A. S. & Swaroop, V. (2008). Public spending and outcomes: Does governance matter?. *Journal of Development Economics, 86*(1), 96111.

Reidpath, D. D. (2005). Population health. More than the sum of the parts?. *Journal of Epidemiology and Community Health, 59*(10), 877-880.

Reidpath, D. D. & Allotey, P. (2003). Infant mortality rate as an indicator of population health. *Journal of Epidemiology & Community Health, 57*(5), 344-346.

Reidpath, D. D. & Allotey, P. (2007). Measuring global health inequity. *International Journal for Equity in Health, 6*(October), 16.

Rhodes, R. A. W. (1996).The new governance: Governing without government. *Political Studies*, 44(4), 652-667.

Roemer, M. I. (1991). *National health systems of the world.* Oxford: Oxford University Press.

Rogot, E, Sorlie, P. D. & Johnson, N. J. (1992). Life expectancy by employment status, income and education in the national longitudinal mortality study. *Public Health Reports, 107*(4), 457-461.

Ruger, J. P. (2007). Global health governance and the World Bank. *The Lancet, 370*(9597), 1471-1474.

Sabatier, P. A. (1986). Top-down and bottom up approaches to implementation research: A critical analysis and suggested synthesis. *Journal of Public Policy, 6*(1), 21-48.

Schultz, T. P. (1999). Health and Schooling Investments in Africa. *Journal of Economic Perspectives, 13*(3), 67-88.

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values?'. *Journal of Social Issues, 50*(4), 19-45.

Sheaff, R. 2005. Governance in gridlock in the Russian health system; the case of Sverdlovsk oblast. *Social Science & Medicine, 60*(10), 2359-2369.

Sheng, Y. K. (2011). *What is good governance?*. Retrieved from http://www.unescap.org/pdd/prs/Project

Siddiqi, S., Masud, T., Nishtar, S., Peters, D., Sabri, B., Bile, K. M. & Jama, M. (2009). Framework for assessing governance of the health system in developing countries: Gateway to good governance. *Health Policy, 90*(1), 3-25.

Smith, R. & Hanson, K. (2011a). *Health systems in low-and middle-income countries: an economic and policy perspective.* Oxford: Oxford University Press.

Smith, R. & Hanson, K. (2011b). What is a health system. In Smith, R. & Hanson, K. (Eds.). *Health systems in low-and middle-income countries: An economic and policy perspective.* Oxford: Oxford University Press.

Smith, P. C. (2002). Measuring health system performance. *The European Journal of Health Economics, 3*(3), 145-148.

Solow, R. M. A. (1956). Contribution to the theory of economic growth. *Quarterly Journal of Economics, 70*(1), 65-94.

Stuckler, D., Feigl, A. B., Basu, S. & McKee, M. (2010). *The political economy of universal health coverage. Background paper for the First Global Symposium on Health Systems Research.* Geneva: World Bank Organization.

Sullivan, D. F. (1971). A single index of mortality and morbid-ity. *HSMHA Health Report, 86*(4), 347-354.

Swan, T. W. (1956). Economic growth and capital accumulation. *Economic Record Wiley, 32*(2), 334-361.

Thomas, D. & Frankenberg, E. (2002). Health nutrition and economic prosperity: A microeconomic perspective. *Bulletin of World Health Organization, 80*(2), 106-113.

Thomas, D. & Strauss, J. (1997). Health and wages: Evidence on men and women in urban Brazil. *Journal of Econometrics, 77*(1), 159-186.

Travers, P. & Richardson, S. (1997). Material well-being and human well-being. In F. Ackerman, D. Kiron, N. R. Goodwin, J. M. Harris and K. Gallagher (Eds.), *Human well-being and economic goals.* Washington DC: Island Press.

Van Meter, D. & Van Horn, C. (1975). The policy implementation process. *Administration and Society, 6*(4), 445-488.

Von Dem Knesebeck, O., Verde, P. E. & Dragano, N. (2006). Education and health in 22 European countries. *Social Science and Medicine, 63*(5), 1344-1351.

Wagstaff, A. & Claeson, M. (2004). *Rising to the challenge: The millennium development goals for health.* Washington, DC: World Bank.

WHO. (2015). *Water sanitation and hygiene in health care facilities: status in low and middle income countries and way forward.* Retrieved from http://apps. who.int/iris/bitstream/10665/154588/1/9789241508476_eng.pdf?ua

Williams, A. (2000). Science of marketing at WHO? A commentary on world heatlh 2000. *Health Economics, 10*(2), 93-100.

Williamson, O. E. (1979). Transaction-cost economics: The governance of contractual relations. *Journal of Law and Economics, 22*(2), 233-261.

Williamson, O. E. (1985). *The economic institutions of capitalism.* New York: Free Press.

Williamson, O. E. (1996). *The mechanisms of governance.* New York: Oxford University Press.

Young T. K. (1998). *Population health: Concepts and methods.* New York, NY: Oxford University Press.

Wolf, S. (2007). Does aid improve public service delivery?. *Review of World Economics, 143*(4), 650-672.

The World Bank. (1993). *World development report 1993: Investing in health.* New York, NY: Oxford University Press.

The World Bank. (2004). *Attaining the millennium development unit, South Asia Region.* Washington DC: The World Bank.

The World Bank. (2015). *Mortality rate, under-5 (per 1,000 live births).* Retrieved from http://data.worldbank.org/indicator/SH.DYN.MORT

BIOGRAPHY

NAME	Kosin Techaniyom
ACADEMIC BACKGROUND	Bachelor of Political Science, Ramkhamhaeng University, Bangkok, Thailand, 2007 Master of Public and Private Management, National Institute Of Development Administration, Bangkok, Thailand, 2011