Effective Resource Management toward Controlling Malaria

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By: Bijan Mansoury

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ABSTRACT

In the year 2016, the World Health Organization (WHO) reported an estimated 216 million cases of malaria around the world, mostly concentrated in Sub-Saharan Africa. In the same year, the WHO reported that the global community spent around 2.7 billion US dollars to tackle and control this disease. In contrast, the WHO reported a budget of 100 million US dollars in the year 2000 and reported 262 million cases of malaria in the same year. Over these 16 years, the budget for malaria increased by over 2600% with malaria cases showing a minor improvement of around 20% when comparing it with the resources that have been devoted to fight this disease. This disproportionality of spending relative to outcomes suggests that resources allocated to eradicate/control malaria are not being used efficiently and effectively. Consequently, this thesis explores the process of resource management within the fight against malaria, with a focus within my organization, a public health research and development institution (PHRDI)[1]. The main interests of this study are identified as follows: 1) The analysis and evaluation of processes regarding resource planning and management with regards to malaria within PHRDI; 2) Identification of areas that require improvement to ensure that the resources allocation process becomes more efficient; and 3) Propose and implement changes in this process through action research to ensure that my department becomes more efficient.

A qualitative research study was conducted, and the data was collected through interviews and focus group discussions from participants, both internal and external to my organization, who are directly involved in the management of resources allocated to malaria. This research approach

[1] This is not the name of my organization. The actual name is being replaced with this generic name to ensure their identity is protected.

led to the identification of three key issues regarding resource management practices within my organization, including: 1) continuous focus on the status quo, which fails to foster creativity and innovation in the fight against malaria; 2) lack of effective communication amongst internal and external stakeholders; 3) complexity of the contracting process which discourages many small and local organizations from responding to our solicitations.

The implications of these key issues were carefully analysed through the literature review and discussions with research participants in a focus group setting. As a result, a number of remedies and recommendations have been proposed and implemented through the application of action research cycles. The first one is the development of an agile project timeline that is result-driven in an effort to ensure that we actively reflect on the impact of the work and improve as we go. The second is the use of SharePoint toolkit to improve communication. The final change is the formation of a sound organizational structure that is in line with the organization's up to date workload and resources. Although these changes are being implemented, there has not been enough time to observe their overall long-term impact. However, the preliminary results of the proposed changed within my organization are positive, and a number of pilot projects have been completed within a shorter timeline and at a lower cost compared to previous years.

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LIST OF ABBREVIATIONS

ACT - Artemisinin-based combination therapies

CDC – Centers for Disease Control

CO – Contracting Official

DBA – Doctor of Business Administration

DDT – dichlorodiphenyltrichloroethane

FAR – Federal Acquisition Regulations

GDP – Gross Domestic Product

GMAP - Global Malaria Action Plan

IATI - International Aid Transparency Initiative

JHMRI - Johns Hopkins Malaria Research Institute

LSTM - Liverpool School of Tropical Medicine

NACCHO - National Association of County and City Health Officials

NGO – Non-Governmental Organization

PHRDI – Public Health Research and Development Institution[2]

[2] This is not the name of my organization. The actual name is being replaced with this generic name to ensure their identity is protected.

NMIMR - Noguchi Memorial Institute for Medical Research of University of Ghana

NPR - National Public Radio

OA – Office of Acquisitions

P. – plasmodium

RBM - Roll Back Malaria

RDT - Rapid Diagnostic Testing

R&D – Research and Development

SARS - severe acute respiratory syndrome

SME – Subject Matter Expert

UCSF – University of California San Francisco

UNICEF - United Nations Relief and Rehabilitation Administration

UoL – University of Liverpool

USD – United States Dollar

WHO – World Health Organization

WWII – World War II

CHAPTER 1

THESIS INTRODUCTION: THE FIGHT AGAINST MALARIA

Chapter Introduction

By the end of calendar year 2016, the global community spent over $2.7 billion fighting malaria worldwide (World Health Organization (WHO), 2017) in contrast with $100 million spent on the same activity in 2000 (WHO, 2012). The World Health Organization reported an estimated 262 million cases of malaria in 2000 (WHO, 2012) and an estimated 216 million cases of malaria around the world in 2016, which mostly occurred in Sub-Saharan Africa (WHO, 2017). Over these 16 years, the budget for malaria increased by more than 2,600% while the number of malaria cases only improved by approximately 20%. There was a dramatic increase in funding from 2000 to 2016 but little improvement was made in malaria morbidity during the same period. The persistence of such a high number of cases, despite the large sum of funds spent on malaria, raises concerns about how resources are managed. These concerns were the prompt for my investigation on how we are managing the available resources, which is an important component of the fight against malaria (Utzinger, Tozan, & Singer, 2001). This thesis examines how resources are allocated and utilized. My own office is used as the research sample and qualitative research and a literature review are carried out. The literature review offers a detailed inquiry into malaria and resource management. In particular, it looks into the mismanagement of resources and the impact of poor communication during the aftermath of the 2004 tsunami in Asia and the 2010 earthquake in Haiti. The examples of the 2004 and 2010 disasters are used because they demonstrate the impact of effective resource management and collaboration in

dealing with large-scale crises. This approach also offers evidence on the need for research in the field of resource management.

Researcher's Background

I work as a Contracting Officer at a public health research and development institute (PHRDI). In this capacity, I am authorized by my organization to negotiate, sign, and administer contractual agreements between PHRDI and other profit or non-profit organizations to meet our specific programme needs (Federal Register, 2015). My specific area of work consists of approximately 45 contracting officials who negotiate and enter into research and development contracts to learn and tackle infectious diseases in collaboration with our programme counterparts. A team of approximately nine of these officials are responsible for administering malaria-related research contracts. As a member of this team, I conducted research as an inside researcher. I engaged in an in-depth discussion and reflective process with my colleagues in my own office and individuals from organizations that are funded by PHRDI to gain a better understanding of how resources allocated for malaria were managed.

Interest in the Proposed Study

After completing my undergraduate degree in global business and public policy in 2006, I had the opportunity to work on a number of malaria vaccine research and capacity building projects in West Africa, while working at PHRDI. This opportunity allowed me to learn about the disease and its impact around the world. In particular, I discovered the devastating impact of malaria in endemic regions, particularly Sub-Saharan Africa. Through a series of trips to West Africa, I observed the negative impact of malaria on local economies and people's livelihood, and, particularly, its harsh impact on children. I further developed my knowledge on the topic through the examination of relevant literature and reports from organizations, such as the WHO, which

have evidenced the devastating effects that malaria has on underdeveloped countries. My goal was to see how someone in the business field, such as myself, could play a role in tackling this horrendous disease. While looking through WHO reports from 2000 to 2017, I noticed that funding and support for malaria increased significantly through this period but the number of cases remained very high. These experiences and observations led me to undertake this project and explore the question of whether resources are being utilized and managed effectively in the fight against malaria. Given that this is a global issue, my goal is to conduct inquiry on the effectiveness of the collaboration amongst stakeholders and parties involved and implications for allocation of resources to fight the disease. This thesis presents qualitative research within my own office, which was carried out to gain a better understanding of how my own department is engaging in the whole process of combating malaria.

Methodological Framework

To further investigate how resources are managed, a qualitative research was conducted by gathering data from stakeholders within and outside my office. The data were collected through interviews and focus group discussions. The goal was to learn about the process and determine areas of improvements. I aimed to implement a series of action plans through action research cycles in an effort to bring about change and improvement to the organization. These plans and their outcomes are discussed in detail in this thesis. Although this research is looking at the process of resource management within my own office, West Africa is often used as a source of observation. The malaria cases in West Africa are very high with a number of countries, and particularly Ghana, topping the list of recipients of our funds.

This chapter offers an introductory discussion of my thesis as a whole. It begins by offering background information on malaria and its impact on the world. It, then, considers the research context in greater detail and gives an account of how this research came to fruition. It is followed by a discussion on the aims and objectives of this study and an account of my research question and sub-question. Finally, I discuss my motivation and justification for undertaking this research project and outline its importance.

Malaria has been impacting on individual human lives and on societies and economies on a significant scale for centuries. A large portion of global resources has been used to combat the disease for many years. The endemic countries generally depend on richer countries to acquire the much-needed resources to treat and fight the disease. Therefore, even countries with few or no malaria cases have a stake in the fight against the disease as they offer funding and support to global bodies such as WHO to tackle it. It is important to actively examine whether the current approaches to resource management are transparent, result-driven, and that there are no gaps or overlaps in research and treatment. Strengthening global cooperation and coalition can help in reducing research and treatment gaps or overlaps through data and surveillance sharing.

Malaria is a mosquito-borne, parasitic, infectious disease that causes fever, fatigue, vomiting, and, potentially, coma, and death to humans and animals (WHO, 2014). Researchers such as Shahin et al. (2011) have argued that this high burden of infection and mortality due to malaria is caused by the poor economic conditions and lack of resources in the region. Furthermore, many authors, particularly Owens (2015), Fosu and Mwabu (2007), Ricci (2012), and others have shown that malaria is also a major contributor of poverty in Sub-Saharan Africa, thus creating a downward economic spiral.

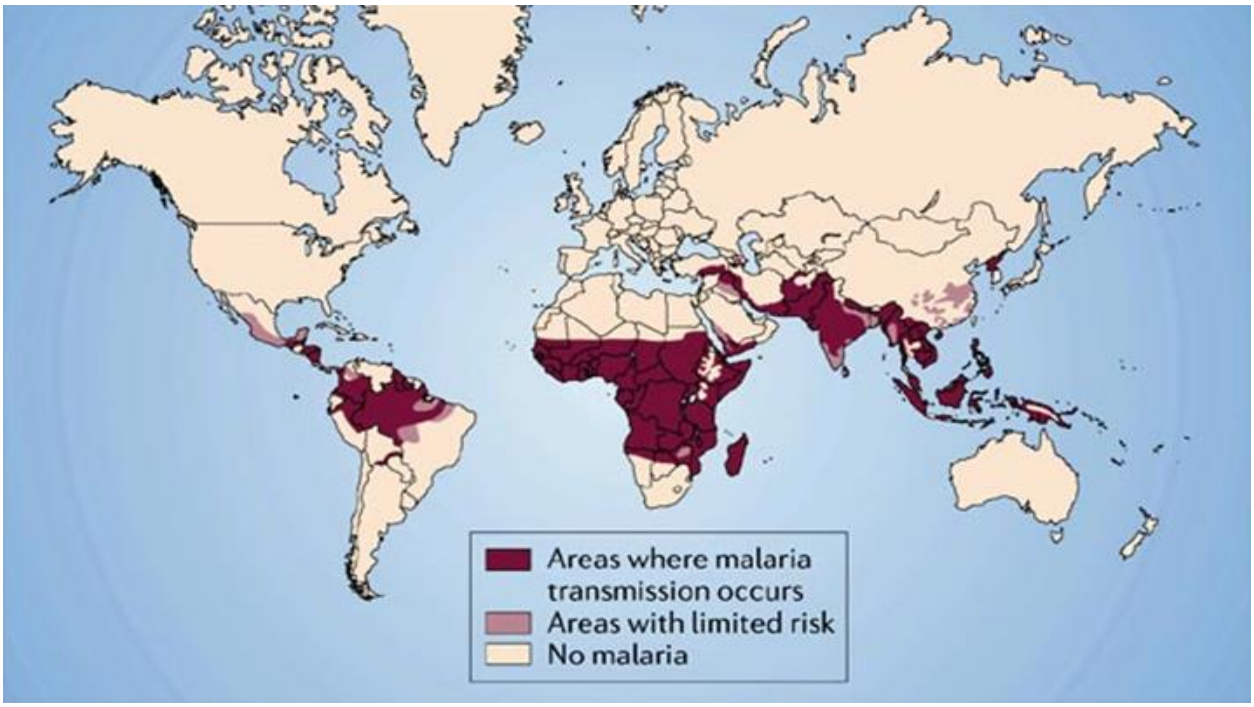


Figure 1.1: Malaria cases around the world in 2012 (Source: Soria, 2012)

According to Shahin et al. (2011), malaria causes major economic burdens on families and communities within an endemic region. The authors have explained that countries in malaria-endemic regions have a 0.25–1.3% lower annual growth rate per capita of gross domestic product (GDP) than countries outside of the malaria-endemic regions. According to the Johns Hopkins Malaria Research Institute (JHMRI, 2014), a low-income family in Sub-Saharan Africa spends approximately 28% of its annual income on treating malaria. As JHMRI (2014) have further explained, malaria strikes heaviest during harvest time, which hinders the overall productivity within these hard-hit regions. Malaria impacts the most vulnerable members of society, in particular. In Africa, for instance, up to 23% of infants are born with malaria and the most common age for death from malaria is four years old (JHMRI, 2014). Many families must use a great deal of their time and resources caring for their sick children. In addition, a huge portion of national resources are dedicated to healthcare, which hinders the ability to invest in

education and infrastructure. Thus, malaria negatively impacts on trade, investments, savings, and the tourism sector throughout the endemic regions (Shahin et al., 2011). In the face of these serious impacts, it is obvious that eradicating malaria could play a positive role for economic growth and prosperity in endemic regions. For example, if treatment and preventative approaches are properly utilized in these regions, there can be a positive trend in productivity levels. By protecting children from malaria through bed nets or insecticides, parents can continue to work and contribute to their country's economy.

There have been increasing efforts to fight against malaria by international agencies such as the WHO, governments of malaria-endemic and non-endemic countries, large multinational non-governmental organizations (NGOs), such as The Global Fund to Fight AIDS, Tuberculosis, and Malaria (The Global Fund), and numerous smaller non-profit organizations. Nevertheless, malaria continues to be a deadly disease. According to a 2017 WHO report, an estimated 216 million cases of malaria around the world, with the majority of these cases being identified in the African continent. Amongst the main areas for improvement in tackling this disease, the WHO have stressed the importance of '[Strengthening] partnerships, multi-sectoral participation and international collaboration in malaria control and elimination' (WHO, 2014, p. 4).

Research Context

Throughout the 20th century, many deadly diseases, such as polio and yellow fever, have been eradicated from the developed countries and have been declining rapidly in the rest of the world in recent years. Even though malaria has been eradicated, for the most part, in developed nations, it continues to be a deadly disease in many developing parts of the world, particularly in Sub-Saharan Africa. According to a 2017 report by the WHO, international funding against malaria

increased from $100 million in 2000 (WHO, 2012) to approximately $2.7 billion in 2016. Even though funding and support against malaria increased significantly during these 16 years, the WHO (2017) have reported an estimated 216 million malaria cases globally in 2016, 90% of which were in Africa (p. 1). Unfortunately, the evidence has demonstrated that the significant scale of registered illness and death from malaria continues to drain the national economies of many African nations. According to Centers for Disease Control (CDC) (2014), lack of resources, insecurity, and political instability have left Africa most vulnerable to malaria. As a result, many of these countries lack basic malaria control infrastructures, which leads to a high number of cases and deaths in comparison with other countries in endemic regions such as Asia and South America.

This research project predominantly focuses on learning how resources against fighting malaria are allocated and managed. It examines how other infectious diseases were eradicated or contained in modern history and determines whether some of those lessons can be applied to the case of malaria. For example, one area of concern raised by various organizations has been the focus on treatment rather than research. According to Zarocostas (2009), even though treatment is an important part of helping those infected with malaria, focus on research and development (R&D) toward its eradication can help future generations from suffering from this disease. Therefore, an important issue to examine is whether shifting focus from treatment to eradication can offer more favourable outcomes.

When observing resource allocation and management, two important factors should be taken into consideration. These factors include how general funding and other resources are distributed in endemic areas and whether those allocated funds are meeting the intended objectives of the donors. In the former case, it is important that the decision-making process is transparent, and

that the criteria is clearly defined without any pressure or conflict of interest. D'Souza and Newman (2012) have suggested that the decisions to select and fund organizations should be based on current data. They have further indicated that the capability of an organization should be assessed by an independent expert body. In the latter case, there is a need for effective reporting systems and active observation and reflection of projects.

Resource allocation and management within a country can be very challenging and complex. Furthermore, security and political instability can lead to corruption and the disruption of completing the mission. These issues are occurring in many Sub-Saharan African countries. In 2005, for example, The Global Fund suspended $367 million funding in Uganda due to 'gross' mismanagement of funds (Kapiriri & Martin 2006). According to The Global Fund's report, lack of project management, poor communication, and lack of proper vetting of fund recipients were amongst the reasons for this suspension (Kapiriri & Martin 2006). Despite the efforts made by The Global Fund to curb mismanagement of funds, in 2011, Germany, Ireland, and Sweden suspended their funding to a number of African countries due to widespread corruption (Boseley, 2011). Therefore, it is important for the organizations to evaluate how much autonomy they may allow in a given country and whether they can freely distribute and manage the resources at their disposal. Moreover, it is critical that organizations actively conduct independent monitoring of the projects in these countries.

Another effective approach to resource allocation is to break down the overall funding into milestones. Thus, a country should not receive the entire funding award at once; rather, they should receive funds either through time increments or based on completion of tasks or milestones. Large sum of money made available to an unstable country, without effective transparency and monitoring procedures, could lead to corruption and mismanagement. A good

example is the earthquake that occurred in Haiti in 2010, which took hundreds of thousands of lives and destroyed much of the country's infrastructure. In response to this disaster, the global community (public and private donors) contributed over $9 billion in funding and support to help rebuild Haiti (Ramachandran & Walz, 2013). Four years after the disaster, a substantial proportion of these funds is unaccounted for. Haiti's capital is still suffering from lack of basic infrastructure, such as roads, and over 250,000 Haitians are still living in tents (Vijaya & Owen, 2013). Vijaya and Owen (2013) have explained that the global community is generous in responding to disasters, as can be seen in Haiti, but they fail to ensure that their donations reach those that desperately need them. Transparency and accountability are essential steps in ensuring that a project meets its intended outcomes in an efficient manner. Ramachandran and Walz (2013) have suggested that in such cases, donors should work with independent organizations such as International Aid Transparency Initiative (IATI) to ensure stakeholders' donations are used effectively and efficiently. As noted earlier, despite the global organization's efforts, mismanagement of funds continues to occur. Suspending funds and halting projects from countries suspected of mismanagement of resources can have dire consequences for people who are in desperate need of help. Active monitoring of projects and independent review of the progress of how resources are managed are extremely important to avoid mismanagement of funds and sudden suspension of funds. In the case of mismanagement of funds, if an NGO such as The Global Fund and government officials maintained an active involvement in the progress of projects in Uganda and other African countries, they, most likely, would not have had to suspend the payment of such large sums of money.

One of the key areas of resource management is to ensure that there is effective collaboration amongst governments and NGOs. A number of global bodies, in particular, Roll Back Malaria

(RBM) and Global Malaria Action Plan (GMAP), have formed over the last ten years to foster partnership amongst major stakeholders. Despite the establishment of these organizations, it continues to be a leading cause of death in Sub-Saharan Africa (WHO, 2017). Forming a global coalition to eradicate malaria can be a positive approach in tackling this disease. As observed in the case of polio, cooperation amongst different governments and NGOs led to a major breakthrough against it. According to Grassly (2013), the formation of a coalition by global organizations and governments in the late 1980s helped to decrease polio cases to below 1% worldwide. This approach can certainly play a positive role in the fight against malaria. One of the key factors in resource management is to ensure research and treatment efforts are not duplicated. Lack of effective cooperation and coordination can lead to duplication, and this is what happened after the 2004 tsunami in Asia. According to Vijaya and Owen (2013), in many places, particularly Indonesia, people were showing symptoms of measles because they were given the same vaccinations three times by three different organizations. This was mainly caused by the governments and NGOs' lack of cooperation and data sharing. This problem not only wasted substantial resources, it actually contributed to more devastation in the region (Vijaya & Owen, 2013). Therefore, it is essential that the governments and NGOs collaborate and work together in achieving their objective of eradicating malaria. Malaria is a very complex disease and requires a great deal of research and study to better understand it. Organizations can avoid duplication by sharing data and information in addition to being aware of the resistance to drugs in various parts of the world.

Research Aims and Objectives

Effective resource management and cross-country collaboration can play an important role in the fight against malaria. Much like polio and even malaria in North America and Europe in the 20th century, battling malaria in the endemic regions can also be effective if the global communities and governments collaborate and re-examine how their resources are being managed. There is a need for a comprehensive approach to tackling malaria, as it can easily impact multiple countries within an endemic region. Bharati and Ganguly (2013) have been examining malaria in the Southeast Asian region, where malaria cases have been on the rise in recent years. The authors have blamed the recent surge in malaria cases on climate change, political instability, increased population mobility, and drug resistance. They believe one of the keys to effectively tackling this disease is cross-border collaboration. Through this approach, the stakeholders can actively network and share data as well as utilizing and developing cutting edge technology for controlling this disease. This approach can play an important role in ensuring that resources are not wasted through duplicated efforts by different stakeholders. It can be a significant milestone in resource management.

This research focuses on gaining information and insights from experts within my office and from external stakeholders on how resources are allocated and managed. It seeks to learn whether there is effective collaboration amongst the stakeholders within the governments and organizations we work with. Through this effort, the research assists in answering questions on inefficiencies and possible overlaps in research, development and surveillance efforts. Furthermore, the data gathered could help PHRDI in ensuring treatments are not duplicated, and to further improve on the research efforts conducted by others.

Research Questions and Sub-Questions

In order to better understand how resources are managed in the fight against malaria, this thesis poses the following main research question:

- How are resources toward controlling and eradicating malaria being managed?

Although the global organizations state their annual funding and budgets in their websites, they do not offer details on how funds and resources are allocated, distributed, and managed. The study and analysis of this question can lead to gaining knowledge on how resources are allocated and managed. This may help to determine whether the current funding and resources are effectively utilized and even, further, assert the need for additional funding to eradicate malaria. This study can enrich the existing literature by examining resource management in challenging environments such as Sub-Saharan Africa. To further understand the main research question, this thesis examines the following sub-questions:

- Are there effective collaboration and communication amongst the stakeholders managing resources in the fight against malaria?
- Are there inefficiencies and gaps or overlaps in resource distribution?

These questions are examined throughout the analysis of the reviewed literature and a number of action plans are implemented as a result of the study through action research approaches. The action plans are implemented through action research cycles of planning, acting, observing, and reflecting (Riel, 2017). This approach plays a pivotal role in fostering an environment of learning and actively seeking to improve how we manage our resources through active observation and reflection (Riel, 2017). The study of literature in this thesis sheds more light on how malaria was effectively eradicated in developed countries many decades ago, while it continues to be a

challenge in Africa. The research on these questions is focused on the effectiveness of resource utilization in the fight against malaria. It takes into consideration the economic impacts of malaria on low-income families in endemic countries and where resources can best be utilized. According to Russell (2004), in Malawi, for instance, a poor family spends approximately 28% of its annual income on malaria compared to less than 2% spent by other families. This is an indication that more resources and efforts should be focused on impoverished families than middle-income to richer families.

Another example is to frequently monitor the progress of distributed resources. The developed nations have donated millions of bed nets treated with insecticide to Africa over the past two decades to protect people and children from mosquitoes (Shah, 2010). These bed nets have been very effective over the years to protect people, particularly children, from malaria. Therefore, the global community began mass production and distribution of these bed nets to maximize their positive impact. Unfortunately, many poor families in rural Africa refuse to use them. According to Shah (2010), in some places nearly half of these bed nets are not used properly due to their discomfort, and many believe that it is not an effective tool. Therefore, these nets are often used for wedding gowns, room dividers and even for fishing instead of their initial intentions of keeping mosquitoes away. As a result, mass distribution of bed nets and 'one size fits all' approach led to significant inefficiencies and the waste of resources. In the case of rural areas of Africa, it is essential to conduct a study of local culture and collaborate with local officials to ensure effective production and distribution of the bed nets.

Research Motivation

Existing literature looking at the incidence of malaria cases has indicated that there are new challenges associated with the disease that cannot be ignored. According to Pascal et al. (2006), global warming is causing *Anopheles* mosquitoes to travel to higher altitudes, which is causing people with no immunity to the disease to be exposed to malaria. Another major challenge has been the antimicrobial resistance to drugs that have been commonly used throughout the years against malaria. According to Islam (2011), Artemisinin-based combination therapies (ACT) have been a common practice to treat malaria in endemic countries. However, a recent study from the Thai Ministry of Public Health has shown that there has been a significant increase in clinical failures along the borders of Cambodia and Thailand (Islam, 2011, p. 121). This development can certainly raise concerns in Africa, which has over 90% of the malaria mortality in the world (WHO, 2013, p. 1). Another major concern to note is the phenomenon of easy mobility from one country to another. Today, more and more people from developed countries travel to endemic regions and are exposed to malaria. According to Voelker (n.d.), in 2011 the United States registered record numbers of malaria cases since 1971. According to Cullen and Arguin (2013), CDC received 1,925 reported cases of malaria in 2011, as shown in figure 1.2. These cases were mainly from people who travelled to endemic regions.

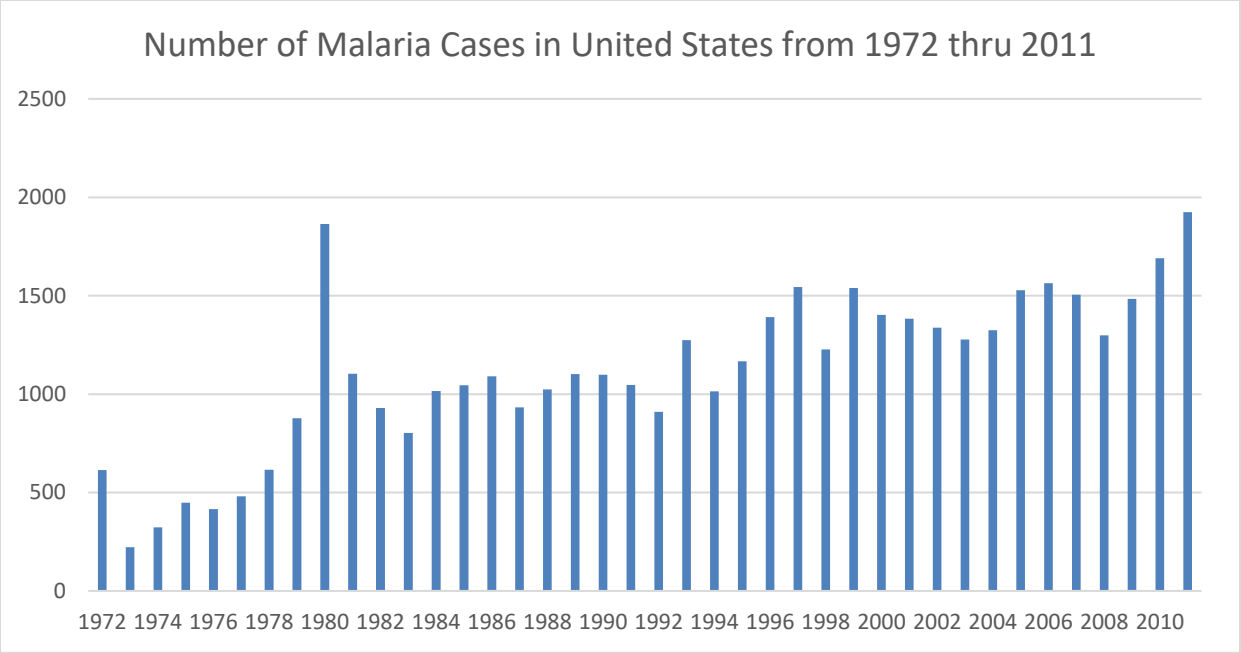


Figure 1.2: Number of malaria cases in the United States from 1972 to 2011 (Source: CDC, 2012)

Cullen and Arguin (2013) have found that preventive measures continue to be inadequate and the incidence of malaria in the United States has been on the rise over the past few years and may continue to increase further. This rise is a clear indication that a focus on fighting malaria should become a priority for the global community. Many scholars, most notably Bharati and Ganguly (2013) and Grassly (2013), have argued that one of the key factors in tackling diseases such as malaria is a global coalition and cross-country collaboration. Grassly (2013) has explained that global cooperation and cross-border collaboration were the key factors in reducing polio cases to under 1% globally. This effort enabled the research community and the impacted countries to share data and work together in achieving a common objective. Bharati and Ganguly (2013) have shown that a great deal of resources go to waste due to duplicated efforts. Malaria cases are beginning to rise in the Southeast Asian region once again and the countries in the region have to work together to combat the disease (Bharati & Ganguly, 2013). Effective networking and data

sharing can keep stakeholders up to date on new developments and technologies. Funding and support for the fight against malaria have increased significantly since 2000, but there continue to be an alarming number of malaria cases, suggesting the potential, ineffective use of resources. The examination of how resources are currently being used and managed by global organizations and countries can help in identifying shortcomings and ineffectiveness. The high number of malaria cases in recent years in the United States is more evidence of the seriousness and importance of tackling this disease.

Research Justification

The new development of malaria cases in places such as the United States, as demonstrated in figure 1.2, clearly shows that malaria is not going away, and, if not properly contained, the cases may increase dramatically. This issue is certainly a global issue and should be taken very seriously. Organizations and governments working toward fighting malaria should take advantage of various modern changes that have been occurring in recent years, such as technological advances and easy access to limited resources such as skilled labour. Nowhere in the world is immune from malaria and the acceleration of globalization and increased integration of economies around the world have been exposing a much larger population to the disease through travel. Since the global community succeeded in reducing polio cases significantly by cooperating with one another, the approach to malaria could be much the same. The attitude toward malaria should be a global one and not considered as simply a developing country issue. According to the WHO (2014), the global community possesses only half of the funding needed to effectively tackle the disease. However, it does not offer details on how resources are utilized and whether their intended objectives are met. Additionally, there is not enough research on

whether there is effective collaboration and data sharing amongst stakeholders around the world in fighting malaria. For instance, PHRDI dedicates substantial resources to malaria monitoring and research, but little attention is given to whether other organizations are undertaking the same activities. There is a risk of a duplication of efforts.

In addition to malaria treatment, global cooperation needs to focus on research and development. Since research is conducted by various organizations, data needs to be shared so that it can be used in the development of new vaccines and drugs. The development of a malaria vaccine can help to protect future generations from the disastrous effects of the disease. The developed nations succeeded in tackling malaria by annihilating the *Anopheles* mosquitoes.

This thesis examines how resources are allocated and managed, seeks to find inefficiencies, and encourages a global coalition by governments and NGOs toward tackling malaria. Despite the global effort to combat it, malaria continues to be a deadly disease, particularly in impoverished regions of the world. However, malaria cases have been spilling into other parts of the world, even in places such as the United States, which eradicated the disease over five decades ago.

Some of the causes of the spread of malaria include global warming, antimicrobial resistance, and people travelling to endemic regions. Tackling malaria should be a global priority with increased support to eradicate it, but this effort can only be successful through transparency and the active monitoring of how resources are being utilized.

The goal of this thesis is to offer a new perspective on how resources should be managed when working on a complex project. This research examines how projects are funded within PHRDI, finds areas for improvements, and finally offers a series of action plans to address the challenges. The knowledge gained from this study can help others within the organization in managing

large-scale projects and applying some of the models presented here to other challenging issues. It encourages leaders to re-examine the status quo and work toward more innovative and creative processes rather than asking for more funding and resources. Many nations around the world, particularly the countries in the northern hemisphere, succeeded in eradicating malaria decades ago, while many nations in the southern hemisphere, in particular, Sub-Saharan Africa, continue to be devastated by this disease today. As noted earlier, this situation prevails despite significant increases in funding since 2000. Through examining how resources are allocated and managed, the aim is to reveal potential shortcomings and offer more effective approaches.

The thesis structure consists of two main sections. The first section deals with the study of the literature in the field and the presentation of data, discussion of the research sample and methodology. The second section presents the research analysis, a critical discussion of the findings and final conclusions. The literature section discusses resource management and explores the scientific context of malaria, its economic impact, and the challenges it poses. The thesis aims to enhance knowledge on the management of resources. It offers an explanation and discussion of the research method and outcomes, and presents a conclusion and final recommendations.

CHAPTER 2

LITERATURE REVIEW

Chapter Introduction

According to the WHO (2016), malaria has been one of the top contributors to poverty and death in Africa, particularly in Sub-Saharan Africa. Despite an increase in resources and support from the global community in recent years, an estimated 216 million cases of malaria affected people in 2016, mostly children under the age of five (WHO, 2017). One of the key approaches to tackling this disease, which was identified in the introduction to this thesis, is effective resource management. Two particular areas of resource management that are emphasized are the identification and resolution of research gaps, and the formation of a global coalition against the disease. In order to ensure the efficient allocation and use of resources, it is important to understand the history of malaria and its impact on populations around the world. This thesis examines the current and future impact of malaria across the globe. The main points and focus of the discussion throughout this thesis tend to concentrate on Africa because of the incredibly slow progress in the malaria crisis there despite the increase in resources in recent years.

Malaria is a very old disease and continues to devastate people around the world. There have been intense research and study activities on biological aspects of malaria over the years and many remedies and cures have been introduced and used. However, the complex nature of the disease has caused many of these remedies to be useless over time due to the parasite's ability to evolve and build resistance to them (Vodopija et al., 2012). The fight against malaria has been a costly endeavour over the years. There is a need for an analysis of resource management to determine if funding and other support toward fighting the disease is used effectively and, more

importantly, in an efficient manner. Moreover, there is a need to find proficient and streamlined processes for tackling the disease. Transparent resource distribution and active monitoring can play a positive role in ensuring that funds are not expended on futile efforts (Gaventa & McGee, 2013). This approach can identify and eliminate corruption and the misuse of resources (Gaventa & McGee, 2013).

This chapter considers the history of malarial disease by examining various studies on the origins of the disease and how it has impacted people around the world. The history of the disease sheds more light on the epidemiological nature of the disease and how it infects people. Furthermore, the timeline history of malaria can help in comprehending the infectious nature of the disease and how it quickly became a pandemic disease throughout the world in the early 20th century. The chapter continues by focusing on the impact of malaria on the population within endemic regions. This section considers the impact of malaria and poverty. Although the disease continues to affect millions of people around the world, the majority of the developed nations eradicated the disease from the mid- to late 20th century. Therefore, this chapter examines these successes through analysis and critical discussions of relevant research studies in the field. The next section of this chapter explores the challenges malaria continues to pose for humanity. These challenges are investigated in detail and some of the causes to be discussed include climate change, resistance to malarial infectious drugs, resistance to insecticides, and exposure to the disease caused by increasing number of people travelling to the endemic regions. The chapter also explores the methods of inquiry used by other researchers undertaking similar studies and provides a discussion on core organizational issues in the area of resource management. Finally, this chapter focuses on exploring resource management and how the lack of it has impacted on other infectious diseases. This focus allows insights into the complexity of the problem and

proposed solutions. The chapter ends with a summary and a discussion of core findings and their contribution to the overall research efforts.

Resource Management

Many scholars, most notably Bharati and Ganguly (2013) and Grassly (2013), have explained that one of the key areas in tackling diseases such as malaria is to form a global coalition with the ultimate objective of eradicating the disease. Grassly (2013) has asserted that global cooperation and cross-border collaboration were the key factors in reducing polio cases to under 1% worldwide in the late 1980s. This effort enabled the research community and the impacted countries to share data and work together in achieving a common objective. In the case of malaria, the global coalition against malaria in recent years has not been as strong as it was in the 1950s (Shiffman et al., 2002). The global community is divided on the issue of malaria eradication. Nagel (2011) has argued that some in the global community are afraid to focus on the eradication of malaria, as its failure could lead to a significant disaster and setback in malaria treatment efforts. On the other hand, organizations such as the Bill and Melinda Gates Foundation are pushing for eradication as the ultimate goal of tackling the disease. These positions have left the community divided on the ultimate objective of how to deal with malaria. Therefore, this division is hindering global efforts to form a coalition with the common objective of eradicating malaria.

Shiffman et al. (2002) have explained how diseases become global priorities and what the international community should do to effectively tackle a disease. The authors have examined various diseases that took the global stage since World War II (WWII). In the 1950s, malaria was the main focus, since it killed many people around the world. The global community succeeded

in decreasing the number of malaria cases significantly through the utilization of dichlorodiphenyltrichloroethane (DDT) and the antimalarial drug chloroquine. The authors have further described that, in the 1970s, smallpox was the main focus and later in the 1990s, HIV/AIDS took the world's attention. In the 2000s, malaria once again became the focus, as malaria parasites from many endemic regions began building immunity to the drugs and new cases of the disease began to surface. Shiffman et al. (2002) have argued that a disease becomes a global priority when it puts a heavy burden on people and when researchers cannot effectively tackle it. In the case of malaria, the researchers simply have not been able to find a remedy and, in many cases, as Nagel (2011) has explained, researchers are beginning to abandon the eradication efforts. According to Shiffman et al. (2002), when the fight against a disease prolongs and researchers cannot find a remedy, the whole effort can lose global focus.

Following the eradication or near-eradication of smallpox, leprosy, measles, and polio in the 1990s, organizations around the world began looking into other diseases to eradicate. These successes led to the formation of global coalitions against other diseases. In the case of malaria, the global funding jumped from $100 million in 2000 to over $2.7 billion by 2016 (WHO, 2017). The global coalition against malaria can certainly play a positive role in the face of increased funding and support. This effort can also bridge the research gaps and avoid dual research.

While working on resource management, two areas should be taken into consideration, to include plans on how general funding should be allocated to regions and countries around the world and how it should subsequently be monitored within those nations. In the former case, it is of utmost importance that the decision-making process is transparent and the criteria are clearly defined without any pressure or conflict of interest. One of the key suggestions in this case is to ensure that the decision is based on current data and information and selection is made by

independent experts. Resource allocation and management within a country can be very challenging and complex. Insecurity and political instability can lead to corruption and disruption in completing the mission. According to Jooma et al. (2012), it is important to look into healthcare policies to ensure funding is effectively used toward healthcare expenses. The authors have conducted a study of Pakistan's healthcare disaster during the 2008 global recession. According to the authors, healthcare spending in Pakistan is a discretionary expenditure, therefore, a significant portion of the healthcare budget is redirected to other projects during the economic recession. Consequently, it is recommended that organizations evaluate how much autonomy they may have in a given country and whether they can freely and effectively expend the resources at their disposal. Therefore, collaboration, ongoing engagement and communication, and cooperation are some of the key tenets of resource management (Fabricius et al., 2004). These key points will be further discussed later in this chapter.

The History of Malarial Disease

According to Edson (1896), the word malaria originated from 'bad air', which was based on the understanding that the disease derived from contaminated air. Up until the mid- to late 1800s, scientists began to realize that the disease was caused by something other than 'bad air' and decided to explore its root causes. Many theories had surfaced in the late 1800s. In particular, some scientists made the assertion that extreme heat can lead to fever and chills, which was ultimately the root cause of malaria. Edson (1896) has recounted that, in 1881, a French physician named Alphonse Laveran examined blood samples of malaria patients and discovered microscopic organisms that did not exist in healthy patients (Edson, 1896, p. 120). His discovery of these microorganisms was called *the plasmodium* of malaria, a term that is still being used in

malaria studies. This discovery played a significant role in identifying malaria patients and taking appropriate measures in treating the disease. Despite this discovery in the late 1800s, scientists at the time were debating how malaria was transmitted and their conclusions were not always accurate. This is certainly evident in Edson's (1896) article as he has noted the following:

> *Some have advanced the theory that mosquitoes carry it and inoculate man when they insert their proboscis in the flesh! The facts, however, I think, bear out the conclusion that it may be taken in with the air breathed, that it is air-borne and from the earth where it finds its origin*. (1896, p. 122)

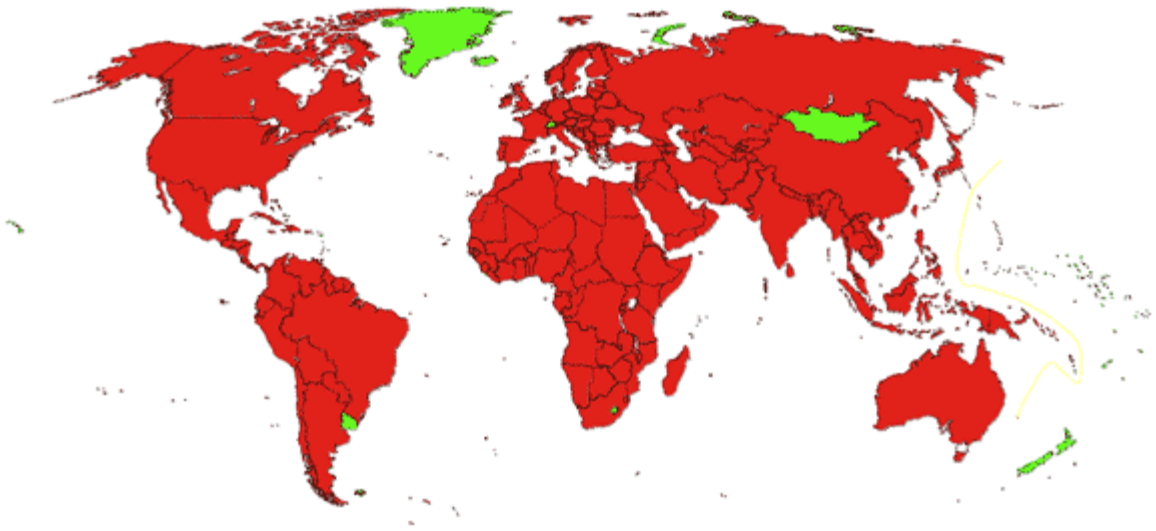


Figure 2.1: Malaria Elimination Initiative University of California San Francisco (UCSF) Global Health Group (Source: Bardi, 2011)

By the early 1900s, malaria was present in almost every country around the world, as shown in figure 2.1, and the disease continued to spread as global trade increased (Bardi, 2011). In 1910, Waite has conducted a study to understand the relationship between the number of mosquitoes and malaria cases in humans, aiming to gain more insight on how malaria was transmitted. Through this research, Waite (1910) has discovered that malaria is caused by the bite of a species of mosquitoes called *Anopheles,* which can spread the malaria by biting an infected individual and then transmitting the disease to others. Waite (1910) has described how the prevalence of malaria greatly depends on localities in which those who have recovered from malaria in the past can be partially or entirely immune to the disease. Therefore, immigration and emigration play an important role in determining the prevalence of malaria. When people with little to no immunity to malaria immigrate to endemic regions, they are exposed to the disease and spread it quickly to those around them. Figure 2.1 further demonstrates this pattern. When people from colder areas migrate to warmer regions where malaria is more common, people are infected and spread the disease. The author further explains that the increase and decrease in malaria cases in communities is heavily dependent on the number of *Anopheles* mosquitoes and the number of infected individuals.

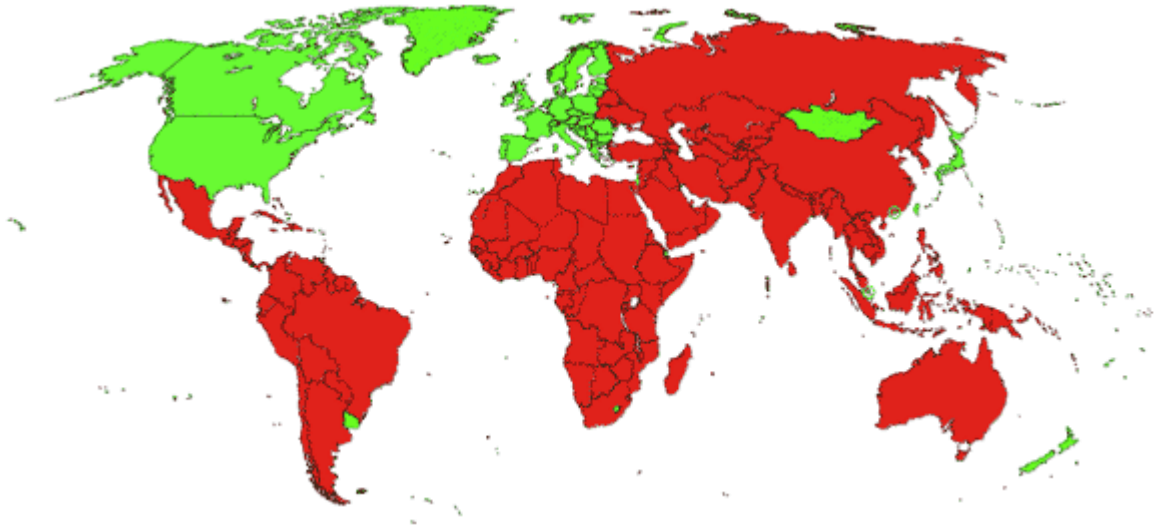
The spread of malaria can be swift and deadly in a very short period. A good example of the devastating impact of malaria can be found in Brazil. According to Pinto (1939), the initial traces of malaria in Brazil can be found somewhere between 1928 to 1930, during which steamer ships travelled back and forth from the West African coastal city of Dakar, Senegal to the coast of Brazil. During this period, traces of *Anopheles* mosquitoes were found in the harbour of Natal, Brazil. According to the author, by 1938, only approximately eight years after the first *Anopheles* mosquitoes entered the country, over 40,000 people had been infected and more than 20,000

people had died from the disease. The author has described how the pandemic impacted over 55 localities by 1938 (p. 342). The author has suggested the proper fumigation of commercial freights, planes, and ships during departure and arrival to avoid the further spread of the mosquitoes in the Americas. Despite these warnings and cautions, *Anopheles* mosquitoes have rapidly spread all over North and South America.

The disastrous effect of malaria continued to impact the world during WWII (Masterson, 2014). According to Masterson (2014), the effects of malaria on U.S. soldiers during WWII were so bad that the U.S. military was on the verge of losing the war against Japan. In order to tackle this disease effectively, the U.S. government began a secret malaria project initiative that allowed the scientists and researchers to conduct their work without any repercussions. According to the author, the scientists conducted studies on minorities and prisoners, which led to many deaths and unethical acts. Despite all the research and efforts made, the U.S. researchers eventually found the treatment drugs in a Nazi laboratory in 1943 (Masterson, 2014). Even though the drug to treat malaria was discovered, the mortality rate continued at an alarming rate after WWII. According to Gupta (2015), malaria's complex lifecycle has made it very difficult to develop the right vaccine to effectively tackle it. As a result, the majority of the developed nations, including the United States, decided to eradicate the *Anopheles* mosquitoes altogether rather than expending more resources toward the development of vaccines and other treatment tools.

The efforts to deal with mosquitoes led to the redesign of city water drainage systems and the widespread use of Larvicide, an insecticide used to kill mosquitoes (Frederick & Smith, 1945). Many cities around the world began reconstructing their public infrastructure to avoid sitting water that attracted mosquitoes (Frederick & Smith, 1945). Although this method was effective in urban and populated cities, it proved to be costly and ineffective in rural areas. In the United

States, Frederick and Smith (1945) have conducted research in a rural town, which involved spraying over 500 homes with DDT. They have compared the outcomes against the situation of other homes in the area. Their data analysis has shown that a significantly smaller number of mosquitoes remained in treated homes compared to untreated homes. According to the CDC (2012), the United States and many countries around the world began to spray DDT in rural and agricultural areas to get rid of mosquitoes beginning in the mid-1940s through the 1950s. This approach resulted in a significant reduction of malaria cases around the world (CDC, 2012). However, despite its popularity and success, due to its uncontrolled usage and toxicity to humans and other animals, many countries around the world, particularly the United States and many European countries, began banning the use of DDT in the early 1960s (Vodopija et al., 2012). Beard (2006) has described how the use of DDT led to a dramatic decline in animals, in addition to having major environmental consequences, which reduces the rate of decomposition and mineralization of soil (Perfect, 1980). In a study conducted by Duke University (n.d.), the researchers found that the microorganisms in water showed a slow rate of growth when the water was contaminated with DDT. Moreover, the study showed that DDT was a major contributor of the thinning of many bird species' eggshells and severely affected bats and large mammals. Human studies showed that a large amount of DDT led to headaches, nausea, vomiting, confusion, and in some cases an increase in a woman's chance of developing breast cancer (Szaflarski et al., n.d.). By the 1970s, malaria was more or less eliminated from the United States, most European countries, and a few other countries around the world, as shown in figure 2.2.



1970

Transmission

No transmission

Figure 2.2: Malaria Elimination Initiative UCSF Global Health Group (Source: Bardi, 2011)

Research efforts aiming to eradicate malaria continued and a number of treatment drugs and practices became commonly used to reduce the number of deaths caused by malaria. One of the most common and widely used treatments has been artemisinin-based combination therapy (ACT) (Islam, 2011). Although malaria is currently heavily concentrated in the African continent and a few other countries, it continues to infect millions of people around the world and is responsible for more than half a million deaths per year (WHO, 2018). However, as figure 2.3 clearly shows, significant improvement has been made in eradicating malaria around the world. Many countries have succeeded in containing the disease successfully and reducing its transmission.

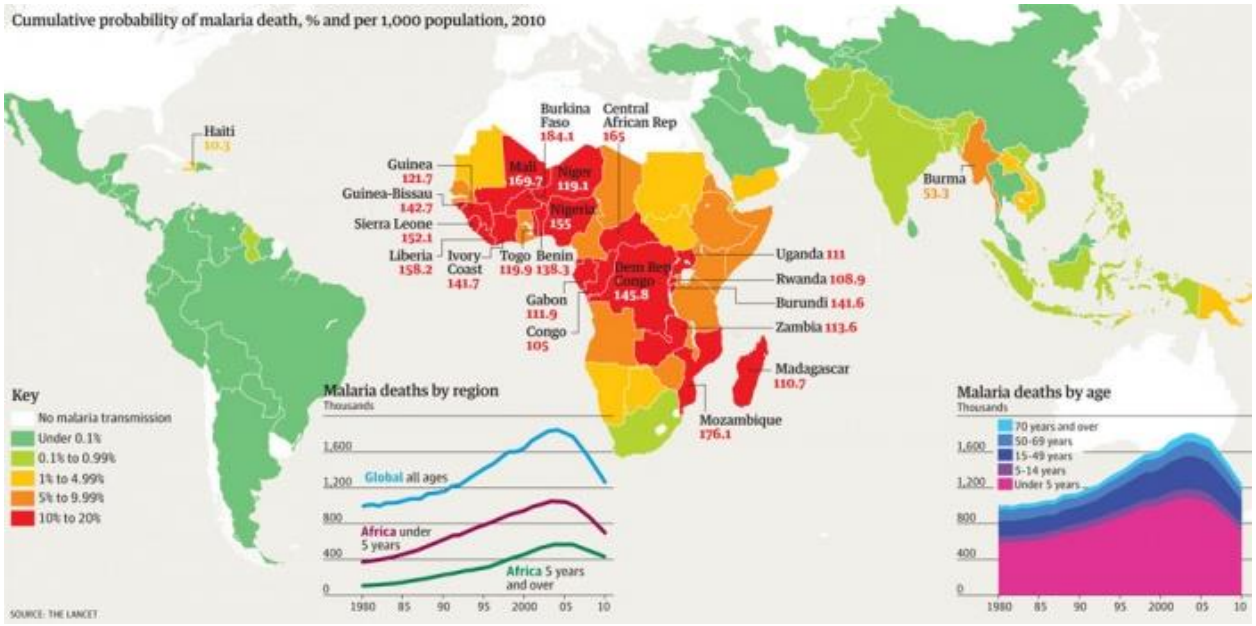


Figure 2.3: Malaria cases around the world in 2010 (Source: Rogers, 2012)

Malaria Transmission Lifecycle

Malaria is a mosquito-borne parasitic infectious disease that causes fever, fatigue, vomiting, and sometimes death in humans and a number of animal species (WHO, 2014). According to the WHO (2014), there are many malarial parasites around the world, but there are four kinds that cause malaria in humans. The four kinds of malarial parasites affecting humans are *plasmodium (p.) falciparum, p. vivax, p. malariae,* and *p. ovale,* of which p. falciparum and p. vivax are the most common types. According to Nagel (2011), p. falciparum is the most deadly type of malaria and kills many people in Sub-Saharan Africa. Nagel (2011) has further described p. vivax, though not fatal, as the most common of the four species of malaria parasites. Shah (2010) has outlined how malaria has been plaguing humans for thousands of years, particularly in Africa. She has noted that traces of the disease date back to before the discovery of fire. Throughout human history, the malaria parasite has managed to evolve and adapt to the environmental

changes and develop resistance against many drugs and remedies. Today, it continues to affect millions of people around the world. Despite advancements in medical discoveries and technology, one in 21 people around the world is affected by the disease and millions of people suffer from it daily (Shah, 2010). Figure 2.4 shows the malaria transmission lifecycle and how it can spread from one person to another.

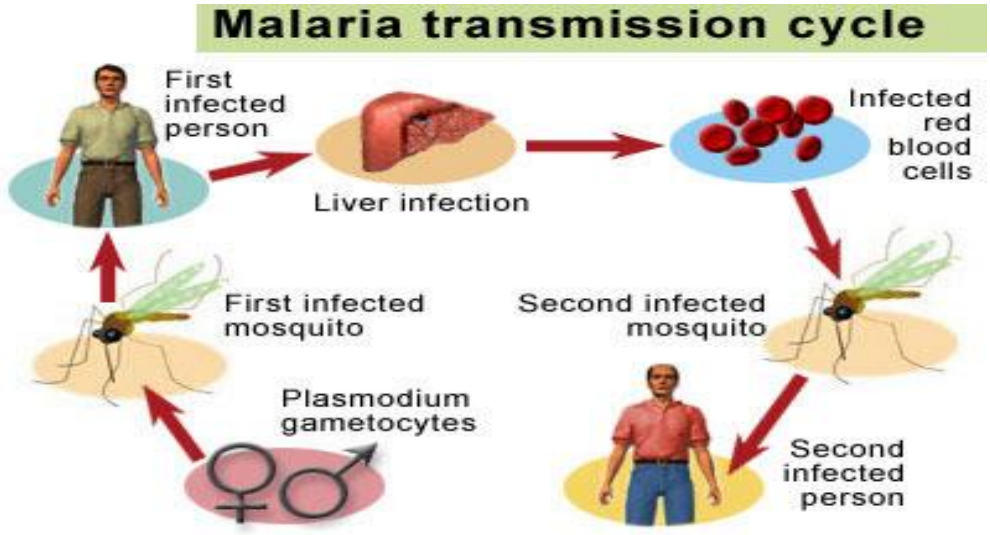


Figure 2.4: Malaria transmission cycle (Source: Cambodia First Center Poly Clinic, 2015)

The lifecycle of the malaria parasite requires two hosts to thrive. As shown in figure 2.4, humans and *Anopheles* mosquitoes are the two hosts helping the parasite multiply and thrive. According to Cambodia First Center Poly Clinic (2015), an infected female *Anopheles* mosquito transmits the disease to a person by injecting the parasites into the blood stream. The parasites are then transported into the human liver, infect the red blood cells, and continue to multiply. When an *Anopheles* mosquito bites the infected person, it ingests the parasites from the red blood cells. The parasites, then, invade the *Anopheles* mosquito's salivary glands and begin to infect another person when bitten (Cambodia First Center Poly Clinic, 2015). As the process repeats, the

number of parasites increase and, in uncontrolled areas, where antimalarial drugs and remedies are not used, the parasite can spread very quickly among people.

Impact of Malaria on Populations

Malaria imposes a very heavy burden on families in endemic areas, particularly on children. As mentioned earlier, once infected, malaria symptoms are very severe and generally hinder an individual's ability to work or be active. In most cases, malaria infected individuals would have to seek treatment and be hospitalized as soon as they show symptoms of malaria. When infants fall ill to the disease, family members have to care for them and be further burdened by the costs and loss of productivity. When these factors affect a large portion of a population, an entire country or region can be affected. Shepard et al. (1991) have conducted rigorous research on the economic impact of malaria in various endemic countries. They have studied the direct and indirect costs of malaria. According to the authors, direct costs were estimated through the actual health system expenses in relation to the actual number of malaria cases. The indirect costs were estimated through the time lost by adults and children while burdened with malaria. The authors have analysed data from Rwanda, Burkina Faso, Chad and Congo. The research has demonstrated that a case of malaria in these sites costs an estimated amount of $9.84 (in 1987 currency values), of which $1.83 was the direct expense and the remaining expenses were indirect costs. Of these expenses, direct costs are immediate expenses such as treatment expenditure, while indirect costs are the average loss of productivity due to working members of society falling ill or attending to family members burdened with malaria. These costs may seem low but $9.84 is equivalent to 12 days of average output of goods and services produced in these countries (Shepard et al., 1991). As the research shows, a large portion of the malaria costs go

toward indirect expenses, which affect the society as a whole. The loss of productivity and resources hinder a country's efforts for growth and development.

Malarial disease is a major contributor to poverty in many endemic regions around the world. According to Shahin et al. (2011), countries in malaria-endemic regions have a 0.25–1.3% lower annual growth rate per capita of GDP than countries outside of the malaria-endemic regions. In Sri Lanka, for example, Konradsen et al. (1997) have carried out a study of economic cost of households impacted by malarial disease. The authors have examined 223 cases of malaria, with ages ranging from 14 to 60, over a one year period. They found that an average of approximately 2% of working days and approximately 6% of household incomes were lost to malarial disease.

In Africa, the burden on families is even worse with approximately 28% of a low-income African family's annual income goes toward treating malaria-related illnesses (JHMRI). The JHMRI has discussed how the mosquito population increases heavily shortly after the rainy season, which is also the harvest season for many farmers. As a consequence, malaria cases increase heavily and many farmers fall ill to the disease. Overall productivity is, therefore, significantly hindered in these hard-hit regions. In addition, malaria has heavy impacts on children within households, which further burdens the working members of those families. In Africa, up to 23% of infants are born with malaria and the majority of these children die from the disease (JHMRI, 2014). Moreover, malaria has been a major obstacle for governments of many African nations aiming to invest in education, infrastructure, research, and other public services. According to Roll Back Malaria (2011), a WHO affiliate, in many countries that are heavily affected by malaria, as much as 40% of public health expenditure goes toward malaria treatment. Therefore, it is safe to say that malaria is a disease that leads to poverty and deprivation.

Slow Response to the Malaria Problem in Developing Nations

Despite the ongoing efforts and generous funding of the international community to combat malaria, many factors impact upon the global efforts to eradicate malaria altogether. Some of the key factors include the complex scientific nature of the parasite, a lack of political will, and political instability and insecurity in many countries in the malaria-endemic regions. In scientific terms, malaria is a very complex disease and quickly evolves to resist remedies against it. For example, the *Anopheles* mosquitoes began building resistance to the significant use of DDT and other insecticides (Vodopija et al., 2012). As Nagel (2011) has reported, the different types of malaria parasites noted in previous sections respond very differently to various medical remedies, which makes the development of vaccines very challenging. Moreover, these parasites develop resistance to drugs when exposed to them for a long period of time, which makes the development of effective treatments and vaccines even more challenging. A good example of this issue is the recent increase in the resistance to ACT treatments in Asia. There have been confirmed cases of p. falciparum resistance to ACT treatments in four populated countries in Asia: Cambodia, Thailand, Myanmar, and Vietnam (Nguyen, 2014).

The characteristics of malaria hinder the fight against the disease. Nagel (2011) has described how vaccines are generally a weakened strain of an actual virus that is injected into the blood stream, thus enabling the human body to develop immunity against the disease. This practice has helped us evade many deadly diseases, such as measles. The author has stated that malaria, on the other hand, is caused by a single-cell parasite that lives in a host organism and has the ability to evade the immune system. Therefore, exposure to the parasite does not necessarily protect an individual from future contraction of malarial disease. These biological complexities make it extremely difficult to develop an effective vaccine against malaria.

Another reason for the slow response against malaria is the lack of political will amongst many organizations and governments around the world. As Nagel (2011) has explained, over the past few decades, and particularly in recent years, there has been a major debate amongst global leaders on how to tackle malaria. On one side, organizations, such as the Bill and Melinda Gates Foundation, have been arguing that there must be a campaign to eradicate malaria as an ultimate goal instead of actively seeking to find treatments for it. Others have argued that eradication efforts against malaria have failed many times throughout the 20th century. As a consequence, malaria continue to be at large amongst innocent people (Nagel, 2011). Moreover, the WHO (2014) has estimated the cost of eradicating malaria at $5 billion a year, which is more than double the amount of current global funding to combat malaria. Figure 2.5 illustrates annual funding for malaria control from 2000 to 2014, and shows a dramatic increase since 2000. The eradication effort can be a tough challenge but not impossible, according to David Sengeh, an MIT graduate student, and Amitabh Chandra, professor of Public Policy in Harvard Kennedy School (Powell, 2011). Powell (2011) has described how malaria parasites need a human host to thrive and reproduce. If the transmission of the disease could be completely stopped in humans, the parasite could be eradicated. The disease, however, is present in 97 countries, and particularly in African countries (WHO, 2014). Many of these countries are poor with very little resources to meet this objective (Powell, 2011). As figure 2.3 shows, malaria is heavily concentrated in Africa and has been crippling their economy. It has been projected by the WHO that funding of over $5 billion could play a positive role in achieving the goal of eradicating malaria. In Africa, this funding would provide the necessary tools and resources to combat the disease. Chandra has asserted that raising this funding target is possible, since current global funding for healthcare has increased dramatically (Powell, 2011). Chandra has stated that the

United States alone spends $4 billion in four days on healthcare and the projected malaria funding is only a fraction of the overall global health care expenditure. As figure 2.5 demonstrates, the global community has been generous in recent years and significantly increased funding to tackle malaria. The relationship between the evolution of funding expenditure and the amount required to effectively eradicate the disease can be observed in figure 2.5.

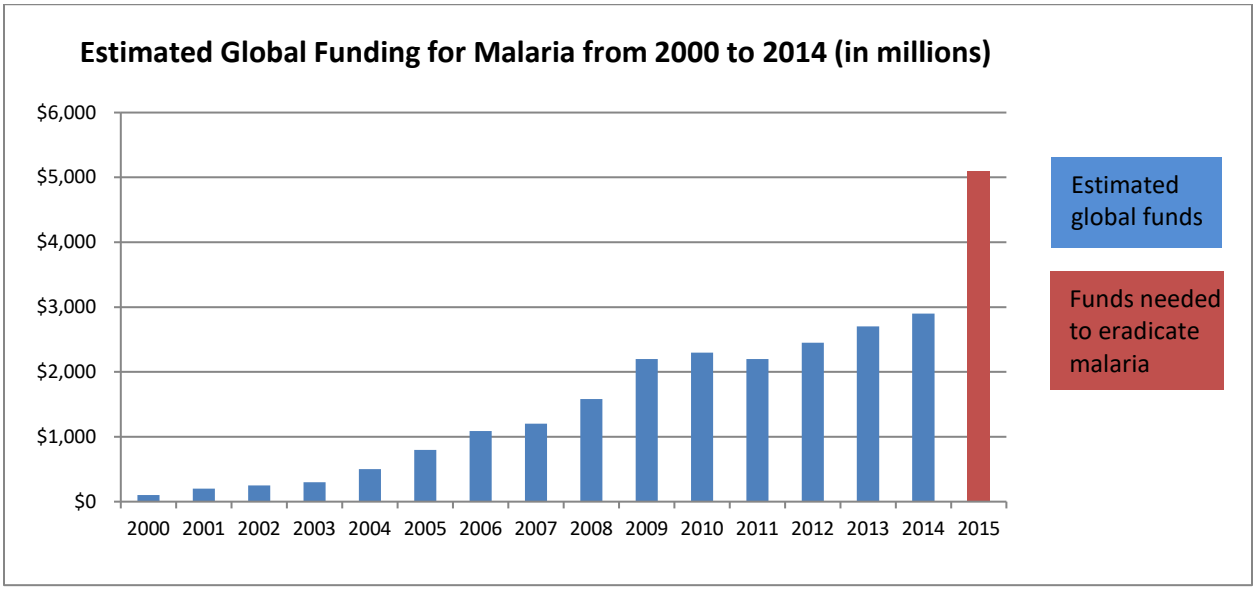


Figure 2.5: Estimated global funding for malaria from 2000 to 2015 (WHO, 2016)

Therefore, even though many organizations, such as the Bill and Melinda Gates Foundation, have already made eradication of malaria their ultimate objective, many governments and NGOs are also actively working to promote treatments and remedies, such as the use of antimalarial drugs.

The final challenge impeding the fight against malaria in recent years has been the political instability and corruption in many endemic countries, particularly in Africa. Wars and political conflicts can have a major impact on the populations living in malaria-endemic regions. These

factors can force people to migrate to places where medical facilities may not be available or accessible. Martins et al. (2009) have conducted a study of the effect of the Timor-Leste 2006 internal political unrest on malaria. According to the authors, the unrest and violence in April and May of 2006 led to the displacement of a large portion of the population and destruction of many key infrastructures, including health centres and hospitals. The authors have deduced that many routine malaria treatments and training were affected. Due to the swift organization of makeshift medical support and the provision of antimalarial resources such as bed nets and insecticides, it was possible to avoid a serious outbreak of malaria. If proper measures had not been taken, a malaria outbreak would have occurred. In regions such as Africa, this is a major concern as many countries within the region are grappling with frequent civil wars and unrest. These factors play a significant role in slowing down the fight against malaria.

Recent Challenges in Relation to Malaria

Significant improvements have been made in the fight against malaria, particularly in comparison to a century ago. According to Meier (2011), malaria cases have dropped as a result of increased global funding, greater utilization of user-friendly insecticide-treated bed nets, various indoor residual sprays against mosquitoes, and the availability of new treatment drugs. Despite these successes, today, millions of people continue to suffer from malaria and in some places, such as Kenya, the cases seem to be resurging. Modern challenges posed for the combat of malaria include climate change, proliferation of antimalarial drug resistance, and an increase in travel to endemic regions.

Climate change

There is a bipartisan consensus from businesses and environmental bodies on the topic of climate change. In recent years, there has been debate on whether human activities such as greenhouse emissions are speeding up the rate of climate change. On one side of the debate, according to DiMento and Doughman (2014), researchers and scientists have argued that greenhouse emissions and human activities are heavily contributing to the global warming that is leading to the global sea level rise. Moreover, the blame for recent natural disasters, such as tsunamis, hurricanes, and floods, has been placed on rapidly rising global temperatures. On the other hand, according to the same authors, other players, particularly business groups, have argued that climate change is a natural occurrence and human activities have little or no impact on it. These groups further argue that there has not been any convincing research or arguments to prove otherwise. The authors have argued that the global climate change crisis has not been taken seriously by the public mainly due to the fact that it is not clearly understood. People are grappling with so many other obvious issues such as war, violence, and economic concerns, which climate change hardly features as a crisis. Therefore, public support for effectively researching the cause of the recent surge in global climate change has been weak. This debate amongst various parties has failed to address the underlying impacts of climate change in recent years, such as the devastating tsunamis, earthquakes, floods, and hurricanes.

A number of studies have been published that demonstrate the impact of climate change on mosquitoes and malaria. According to Molyneux (2014), as the temperatures at higher altitudes increase, increasing numbers of malaria cases are reported and new cases have emerged in areas with no prior record of malaria. These findings are based on a collaborative study conducted by Ethiopian, Colombian, British, and American universities on malaria cases in Western Colombia

from 1990 to 2005 and Central Ethiopia from 1993 to 2005. The correlation between climate change and malaria has been further studied by other scientists. According to Reiter (2008), human activities have played a significant role in impacting on temperature and spreading the disease to higher altitudes. In Kenya and New Guinea, for example, deforestation, road constructions, airstrips, plantations, and mines have changed the ecological condition of the countries, which has contributed to the spread of malaria throughout these countries. As a consequence of these human activities, parasites have more opportunities to thrive in areas with open sun and still water due to deforestation and ecological changes (Reitner, 2008). Pascual et al. (2006) have conducted a study on a dramatic increase of malaria in four sites in East Africa from 1950–2002. The authors have found a direct correlation between increase in temperatures at higher altitudes and the population of *Anopheles* mosquitoes. It is important to note that, because the populations in such areas had not previously been exposed to malaria, they do not have immunity to the disease. As Pascual et al.'s (2006) data have shown, the impact of higher temperatures on malaria has been occurring for some time. These findings contribute to predictions that more and more people are likely to be exposed to malaria as climate change progresses. According to Molyneux (2014), the rapid rise in global temperatures can potentially reverse the recent successes in the fight against malaria.

Malaria drugs and insecticide resistance

Malaria parasites are very complex and have the ability to evolve and adapt to their surroundings, hence the reason for their prolonged existence (Nagel, 2011). Therefore, insecticides and treatment drugs against them can become ineffective over time. In recent years, organizations such as the WHO, CDC, Global Fund, and Roll Back Malaria, have demonstrated that bed nets treated with insecticides have been a major resource for saving millions of people

around the world, particularly in Africa. Governmental and non-governmental organizations have invested a considerable amount of resources into procuring and making these bed nets available in endemic regions. Unfortunately, there have been reports of resistance to insecticides from various areas of Africa. Toé et al. (2014) have conducted a study of the effectiveness of bed nets treated with insecticides in Burkina Faso to quantify the degree of resistance. The authors have found that resistance to pyrethroid, a common household insecticide, by *Anopheles gambiae* mosquitoes is by far worse than the recent reports have indicated. This finding is alarming, especially at a time when many of the endemic countries are heavily relying on bed nets and insecticides to contain malaria.

Another major challenge has been the resistance to drugs that have been commonly used to treat malaria. Various remedies have been used to treat malaria for hundreds of years, according to Sibley (2014). The first commonly used and widely manufactured antimalarial drug was chloroquine, which was used to treat millions of malaria patients after WWII (Sibley, 2014). By 1957, there were reports of resistance in Southeast Asia and Latin America and, by the 1980s, poor responses to the drug also started to be recorded in Africa (Sibley, 2014). As the resistance to chloroquine became more and more prevalent, a new treatment was introduced. According to Islam (2011), it became common practice to treat malaria in endemic countries with ACT since the 1970s. Unfortunately, this treatment is also beginning to face issues. A study from the Thai Ministry of Public Health has shown that there has been a major increase in clinical failures with ACT along the borders of Cambodia and Thailand (Islam, 2011, p. 121). Moreover, there have been widespread reports of ACT resistance in Myanmar, India, and Vietnam since beginning of the 21st century.

Malaria has been a major source of poverty in much of Africa, mainly due to the lack of resources and adequate healthcare systems. The impact of malaria goes beyond the health of those affected by it. A large portion of Africa's resources is lost through treatment costs and loss of productivity. According to Earth Institute of Columbia University (n.d.), Africa loses an estimated $12 billion a year in economic output. This figure factors in healthcare costs, loss of productivity, loss of education, and loss of investment and tourism. According to a 2011 report by Roll Back Malaria, 72% of the companies in Sub-Saharan Africa reported negative productivity due to malaria-related illnesses. These reports have shown an increase in absences due to malaria illnesses and decreased productivity from employees suffering from brain damage caused by cerebral malaria. The same report by Roll Back Malaria has indicated that African families, on average, spend up to 25% of their household incomes on malaria-related illnesses. According to WHO (2013), on average, annual economic growth in countries without malaria is 1.3% higher than countries with malaria. As noted earlier, many African countries continue to suffer from political instability and corruption, which further exacerbates the problems for the fight against malaria. These factors make the case for Africa being placed at the forefront for this struggle against malaria. Moreover, it further makes the case for re-examining how resources are managed and ensuring that the global resources are distributed in transparent and effective ways.

Increased mobility of people to endemic regions

Another major concern to note is the frequency of travel and ease of mobility of people to endemic regions. The integration of economies and globalization has led to the phenomenon of cross-country trades and frequent travel. Although this phenomenon has contributed to economic growth, it has also raised challenges, such as exposure to malaria and other infectious diseases. According to Voelker (n.d.), in 2011, the United States registered record numbers of malaria

cases since 1971. According to Cullen and Arguin (2013), the CDC received reports of 1,925 cases of malaria in 2011. These cases were mainly from people travelling to endemic regions. Cullen and Arguin (2013) have found that preventative measures continue to be inadequate and the incidence of malaria has been on the rise for the past few years and may continue to increase. This is a clear indication that the fight against malaria needs to be a priority for the global community.

Means of Combating Malaria

Malaria is a global issue since it continues to burden people around the world physically, mentally, and monetarily. Global productivity is impacted by malaria as hundreds of millions of people are infected with the disease annually (CDC, 2013). Governments and NGOs around the world dedicate billions of dollars in funding and resources to combat malaria annually, which hinders their efforts in combating other diseases and crises. Therefore, there is a need for increased funding and resources, as the WHO (2016) has suggested. More importantly, there is a need to re-examine the current approach and identify areas for improvement. In the case of increased support, there is a track record, during the last two decades, of how increased funding has led to success in decreasing malaria deaths. As the funding has increased, the number of malaria deaths has decreased. The figure below further demonstrates this trend.

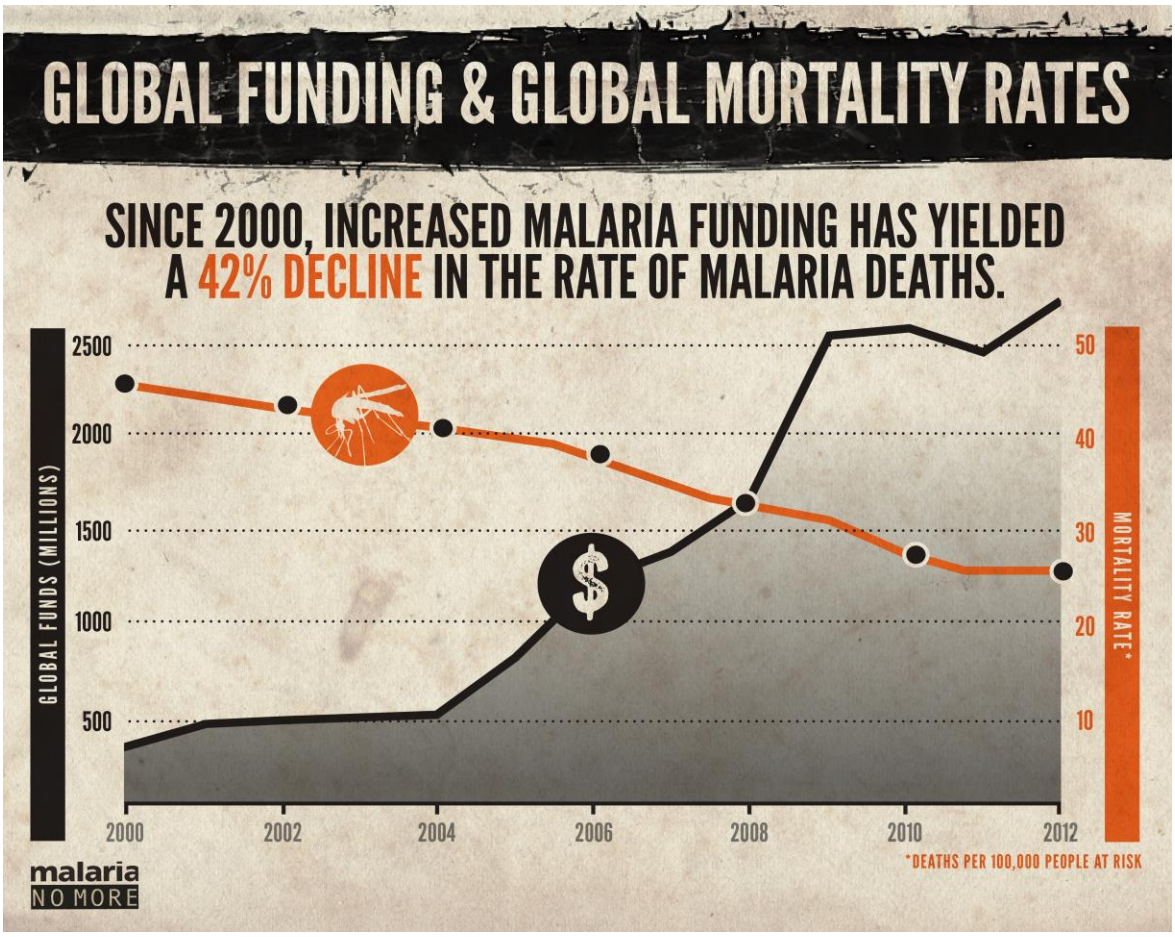


Figure 2.6: Global funding and global mortality rates from 2000 to 2012 (Malaria No More, 2014)

As shown in figure 2.6, and as noted in the WHO's annual report (2014), there has been a negative correlation between malaria funding and mortality rates. Unfortunately, the global research and medical community requires twice the amount of current funding to successfully eradicate the disease. Moreover, new challenges such as climate change and increased mobility to affected regions further exacerbates the fight against the disease. Therefore, it is important to look into various alternatives to effectively utilize the current funding and resources.

This thesis raises the question of how resources for controlling and eradicating malaria are being managed. Examining and addressing this question can lead to identifying research gaps and

inefficiencies that can then contribute to further success in the fight against malaria. As noted earlier in this chapter, various treatment and remedies against malaria have produced short-term success as the parasite actively builds resistance to them. Therefore, it is important to vigorously seek new and innovative ideas for fighting the disease, which means that further support and funding for research and development is required. The literature reviewed further validates the importance of global coalition against the disease. Global cooperation and coalition has proven successful against measles, polio, yellow fever, and other infectious diseases since WWII. This approach can play a pivotal role in the case of malaria as research gaps and redundancies can be identified and corrected. As noted in the first chapter, after the 2004 tsunami in Asia, many people in Indonesia and other neighbouring countries were given the same vaccination three times by the three different organizations, which led to the spread of measles (Vijaya & Owen, 2013). These issues occurred due to the lack of effective global coalition. Governments and other organizations began working on their own without sharing data or collaborating against the disease. Therefore, this thesis proposes that effective global coalition against malaria can prove to be successful, much as it did in the case of resources invested to combat polio.

These findings clearly demonstrate the complexity and extended duration of the fight against malaria. The funding for malaria cases increased from $100 million in 2000 to over $2.7 billion by 2016 (WHO, 2017). Despite this dramatic increase in support, the number of malaria cases globally is in the hundreds of millions (CDC, 2013). It is widely believed to be one of the major causes of poverty in Africa and in many parts of Asia. In order to effectively tackle the disease, it is important to effectively manage and utilize resources. Forming a global coalition and ensuring that funds are distributed in transparent and constructive manners are two areas of focus in this thesis. Global coalition and collaboration can assist researchers in sharing data and research

findings on vaccines or drugs. Moreover, it can help to avoid research duplication and efforts. Through collaboration, organizations can save time and money by using each other's data and research findings. Another important area to take into consideration is the fostering of an environment of transparency and accountability. The fostering of such an environment would have to begin with adequate funding and resource distribution and then be followed with active monitoring of how resources are being used. The literature review for this thesis has illuminated the history of malaria and its impact on people around the world. It has shed light on how malaria has been impacting on lives throughout human history. It has enhanced understanding of the biological aspects and the lifecycle of malaria, in general, and how it impacts people around the world. Moreover, the literature has helped to develop a better understanding of the human struggle against the disease and how it continues to cripple economies, particularly in Africa. An important area of the literature review has been identifying the patterns of success and failure in the fight against malaria over the years. One particular finding is that treatment options are only temporarily helpful since the parasite begins to build resistance against a drug or insecticide. This is particularly true in the case of chloroquine, an antimalarial drug, that saved millions of lives after WWII but, approximately three decades later, the parasite had built a strong resistance against it. This resistance caused the drug to be useless against the disease. Therefore, an important lesson is that as remedies are used and developed, the research community should actively prepare for resistance against the drug and research for the next generation of remedies. In other words, the global community should actively strive to be one step ahead of the parasite. Finally, the negative correlation between funding and malaria cases makes a strong case for increasing funding for the fight against malaria.

Critical Insights from Literature

In order to effectively tackle the challenges that malaria eradication poses, it is important to better understand the issues malaria causes and identify the areas for improvements. The focus of this thesis is predominantly on learning how the resources against fighting malaria are distributed and utilized. It is important to also examine how other diseases such as polio and measles were mostly eradicated in the 20th century and how those lessons can be applied in the fight against malaria. The campaign against polio, for example, was heavily focused on eradication rather than treatment (Grassly, 2013). The global community, on the other hand, is heavily involved in malaria treatment rather than eradication and research (Zarocostas, 2009). According to Zarocostas (2009), even though treatment is an important part of helping those infected with malaria, focusing on R&D projects for its eradication would be likely to help protect future generations from getting this disease. Moreover, eradication efforts can help with treatment costs in the future. Additional investment today to develop a vaccine or focus on eradicating malaria can be a successful endeavour in the long run.

According to the Liverpool School of Tropical Medicine (LSTM) (2003), the majority of global investments develop drugs rather than investing in appropriate, accurate, and cheap resources to combat the disease (p. 9). A report from Liverpool School of Tropical Medicine (2003) has further noted that many developing countries lack effective laboratories where malaria cases can be reliably tested and identified. While many endemic regions lack the very basic resources to fight malaria, the WHO (2013) has reported global funding of over $2 billion toward combating malaria in 2012. Although significant efforts have been made to reduce the number of malaria cases in recent decades, the issue is far from resolved. In order to effectively eradicate this disease, the WHO (2013) has estimated that the global research and medical community require

over $5 billion annually. This is more than half the current funding amount but it can play a positive role in addressing many issues and gaps surrounding the fight against malaria. According to the WHO, these funds could be allocated toward:

- building more medical facilities in remote areas in endemic regions,
- funding and supporting research and development labs,
- making antimalarial drugs and insecticides readily available; and,
- deploying health workers to many remote regions to educate families on how to identify and deal with malaria.

The malarial parasite is complex and finding a vaccine or cure against it requires significant research and development. Through cooperation, governments and NGOs can build upon one another's research efforts, avoid potential research duplication, and identify possible research gaps. According to Malaria Consortium (2014), a non-profit organization, engaging and cooperating at community levels can provide effective monitoring and delivery of services. The formation of a global coalition could play a particularly positive role in helping people in remote regions of Africa, through the creation of makeshift clinics and offering resources more effectively. Moreover, it is imperative to track the success and failure of each method being used. This is particularly important in the case of malaria as the parasite actively builds immunity to drugs and insecticides. With effective monitoring and evaluation, the funding can be expended at a manageable rate.

Research Studies on Resource Management

As I examined the literature on malaria, I came across many studies on the epidemiological aspect of this crisis. Additionally, I found a number of studies on the importance of increasing

resources and funding to tackle malaria. However, there are few studies on how those available resources are utilized and managed. Most reports are provided by the organizations utilizing their own or donated resources. Therefore, I found a need to conduct an overarching study on how resources are allocated and managed. Conducting this study within my own office offers value because PHRDI plays a pivotal role in the fight against malaria. Moreover, I, initially, wanted to look into this issue at the global level. As I undertook the project, I came to the realization that the scale of such a project at global level would be too large and time-consuming. As a result, I decided to narrow my study to my own office and shifted my focus onto how we manage our resources to fight malaria.

Effective resource management is an area that is characterized by communication, collaboration, and cooperation (Sauer, 2017). These key tenets play an essential role in ensuring resources are effectively allocated and managed. As noted above, these tenets played a key role in forming a global coalition to reduce the polio cases to approximately 1% (Grassly, 2013). Fabricius et al. (2004) have provided an in-depth study of community-based natural resource management in rural development in South Africa (p. 5). The authors have outlined that natural resources are limited and require collaboration, communication, and cooperation amongst community members to ensure they are effectively utilized. Community-based resource management has been practiced for centuries and has offered great value to rural development in South Africa (Fabricius et al., 2004). However, there has been a lack of attention given to this phenomenon in recent decades that has led to challenges in resource conservation and community development. This lack of attention was caused by a lack of effective collaboration and cooperation within the community. The authors have suggested that the community leaders should rely more on collaboration and foster an environment of cooperation amongst the people. These key tenets

have also been discussed in Schuett, Selin, and Carr's (2001) article, which has explored the impact of collaboration on resource management. They sent a questionnaire to 671 participants who were involved in collaborative initiatives. The authors have found common responses that heavily stressed the importance of communication, peer support, and cooperation as significant areas for effective resource management. These are some of the issues I intend to explore within my own organization.

Effective communication, cooperation, and collaboration require an organization that is agile and open to change (Noguera, 2018). Cultivating an environment of open communication and collaboration is particularly important while managing complex projects and issues such as malaria (Miller, Butts, & Rode, 2002). A lack of these traits can sometimes lead to crises and a good example of this is the outbreak of severe acute respiratory syndrome (SARS) in 2003. This disease spread very quickly from Guangdong province of China to 37 countries around the world in 2003 (Wang & Jolly, 2004). Although the global community managed to contain the spread of SARS quickly, the lack of adequate and effective communication to travellers and to the general public at risk of exposure put a significant economic strain on some countries (Smith, 2006). Additionally, the Chinese government failed to share the SARS outbreak data to other countries that were at risk. The spread of inaccurate news and information halted travel and business to many countries in Asia (Smith, 2006). A number of studies put the global economic impact of SARS between $30 to 100 billion (Chou, Kuo, & Peng, 2004; Fan, 2003; Hanna & Huang, 2004; Lee & McKibbin, 2004; Smith & Sommers, 2003; Wen, Zhao, Wang, & Hou, 2004). It is important to note that the global community, led by the WHO, was ultimately able to contain the disease. They were able to do this by forming a coalition of countries impacted by SARS and offering ongoing guidance and instruction to travellers and to people impacted by the disease on how to protect

themselves (Heymann & Rodier, 2004). They succeeded in containing the disease within a few months and relied heavily on information sharing and collaboration (Heymann & Rodier, 2004). Fighting complex and dynamic diseases such as malaria requires an agile organization that actively strives to be stable and dynamic (Aghina et al., 2016). This applies to fighting malaria and I intend to examine how PHRDI deals with change and how flexible it is.

Methods of inquiry

I also reviewed the research literature to better understand which research methodologies other researchers have used in the area of resource management. I learned that qualitative research has been a predominant method of research. This methodology is often appropriate for the interpretive paradigm where a contribution to knowledge is made through discovering the underlying meaning of events and experiences (Scotland, 2012). According to Ghauri and Kjell (2005), qualitative research takes place in a natural setting and the data and information is sought through observations and ideological descriptions to build a hypothesis. Authors utilizing qualitative research methodologies have been able to come up with important results in the area of resource management. In a study conducted by Gosling et al. (2015), the authors have led participatory research using qualitative methodology to explore how effective project management can play a positive role in malaria elimination. The authors have concluded with a series of recommendations on improving programme management approaches to eliminating malaria. Piva and Dodd (2009, p. 930) have conducted a qualitative study to demonstrate how funds are available to recipients. The authors have suggested rigorous and continued monitoring of aid distribution and management.

Other studies that have examined resource management in malaria and other global health crises include Bendavid et al. (2015), Breman et al. (2004), Dieleman et al. (2014), and all used

qualitative methodologies to contribute to knowledge in the field. Windisch, Wyss, and Prytherch (2009) have used this qualitative method to present different approaches to human resources in health development. Their study has raised awareness of the importance of human resources in health development and reforms in public policies. Adhikari et al. (2017) have utilized qualitative study to measure the impact of community engagement in mass antimalarial administration in Laos. The study results have demonstrated that community engagement contributes to high levels of participation. Examination and review of this literature helped me widen my worldview of research methods.

Interviews and focus group discussions are commonly used in qualitative research (Savin-Baden & Major, 2013). These methods offer the maximum flexibility for enabling participants to speak freely and share their experiences (Savin-Baden & Major, 2013). Moreover, in the area of resource management and malaria, these methods have often been used to collect optimal data. A good example has been given by Starchan et al. (2016) who have conducted qualitative research on ‘what drives the consistent use of insecticide nets’ in Uganda. They used in-depth interviews as their main source of data collection and were able to conclude that people are well aware of the benefits bed nets offer and have been using them as part of their day-to-day lives. Chandler, Whitty, and Ansah (2010) have also conducted a similar study using in-depth interviews and focus group discussions with field workers on ‘rapid diagnostic testing (RDT)’ of malaria in Ghana. These RDTs are medical diagnostic kits that are designed to be easy to use by field workers to diagnose malaria rather than using costly hospital resources. They are designed to reduce the overuse of antimalarial drugs throughout endemic regions (Chandler, Whitty, & Ansah, 2010). The authors have concluded that the field workers did not have proper instructions for using RDTs and generally utilized them through interactions and experience rather than

following medical instructions. Interviews and focus group discussion are ideal sources of collecting data in the area of resource management because they allow access to the participants' personal histories, insights, and experiences (Mann, n. d.). Moreover, these methods offer access to a participant's worldview, experiences, and beliefs, expressed in their own words (Kvale, 2008).

Chapter Summary

Malaria has been a deadly disease throughout recorded human history and the fight against it began centuries ago (Shah, 2010). Although the disease has been controlled and eradicated from many parts of the world since the mid-20th century, it is one of the causes of poverty and crisis in Sub-Saharan Africa and some Asian countries (Shahin et al., 2011). While the funding and resources to fight malaria have increased dramatically since 2000, the number of malaria cases and its impact on the population of the endemic regions has improved marginally (chapter 1). The literature in the field has often emphasized the importance of increasing support and funding, but very few studies examine how we manage the available resources. There is very little in-depth research interrogating effective and efficient ways of utilizing the significant funds available to fight malaria. The key objective of this research is to see how resources are allocated and managed to continue the fight against malaria.

Malaria is likely to become an even broader issue globally as the world population continues to rise and mobility becomes easier. According to Waite (1910), malaria rates increase significantly with the number of Anopheles mosquitoes and infected people increasing in a community. In other words, immigration and emigration of people from and to endemic regions can expose people to the disease who have little or no immunity to it. Many factors impact on malaria. The

most notable factors, as discussed in this chapter, include the complexity of malaria parasites, climate change, and the increased migration of people from and to endemic regions. Malaria's ability to adapt and evolve to drugs have helped it to maintain its existence over the centuries, which make the development of vaccines even harder.

This chapter examined how the global community has eradicated or controlled other devastating diseases around the world. By the mid-1900s, shortly after WWII, many countries around the world began forming coalitions facilitated by organizations such as the WHO to combat and eradicate various diseases. They were very successful in significantly reducing the number of cases around the world for many diseases such as measles, polio, yellow fever, and others. They even decreased malaria cases in many parts of the world through rigorous treatment and preventive methods. However, the malaria parasite is very complex and builds resistance to drugs quickly. Shortly after WWII, chloroquine was discovered to treat the disease, but by the 1970s, the majority of the countries around the world, particularly Asia, stopped using it due to widespread reports of resistance to it (Sibley, 2014). Despite the fact that chloroquine saved millions of lives, the resistance to the drug made it useless in many parts of the world. Therefore, the global community began using ACT to treat malaria, which proved to be a successful remedy for a short period. As noted earlier in this chapter, since the early part of this century (20^{th}), the health ministries in Thailand, Cambodia, Vietnam, and Myanmar have been reporting resistance to ACT (Islam, 2011).

The fight against malaria, according to the WHO (2013), can be successful with increased funding and resources. As figure 2.6 shows, the increase in funding for malaria has yielded a significant decrease in malaria deaths since 2000. In addition to increased funding and resources, it is important to focus on effective resource management and transparency. This chapter

examined the successes of global coalition in combating similar diseases such as polio and yellow fever.

CHAPTER 3

RESEARCH METHODOLOGY

Chapter Introduction

According to Kothari (2004), research is concerned with the search for knowledge through an objective and systematic method of finding a solution to a problem, and a systematic approach concerning generalization and the formulation of a theory. In this chapter, I discuss my research paradigm, various types of research methodologies, the considerations for selecting a methodology, reflect on the details of my selected methodology, and how it is linked to my study. This chapter mainly emphasizes the qualitative methodology for conducting my research and considering interpretivism as my paradigm. I have examined a combination of research methods to gather data where various approaches were used and highlighted. The data were collected through interviews and focus group discussions that offered a great deal of insight into resource management within PHRDI. These approaches enabled me to reach participants from within PHRDI and those outside of it working in endemic regions. The exploration and attempt to collect data through these two methods helped me to further pinpoint the most effective research methodology in the context of the outlined research problem.

This chapter also examines other relevant studies in the area of resource management to further support my points and to justify why a qualitative methodology was chosen. The application of a qualitative approach was chosen for my research because it focuses on the experiences of the individuals involved and enabled me to observe and understand reasons behind certain actions and behaviours (Yin, 1994). In the analysis of other studies, such as the earthquake in Haiti (chapter 2), the research methodologies used by researchers have usually focused on a qualitative

approach. Qualitative research offers a rich and in-depth insight to issues where researchers gain the opportunity to observe and reflect upon how participants respond (Rosenthal, 2016). When analysing how resources are managed, researchers have the opportunity to go beyond traditional data collection. They can observe people's experiences and behaviours to gain necessary knowledge and insight (Rosenthal, 2016). Further discussions on similar studies are provided in this chapter. It also concludes with a section focusing and reflecting upon the relevancy of qualitative research and its role in this study and data description.

Research Paradigm

A research paradigm is a set of common beliefs on how to understand and address problems (Kuhn, 1962). It is important to clearly dissect and identify the research paradigm that underpinned my research process. My research relied on seeking ideas and investigating how people in PHRDI and those similar to mine utilize resources to fight malaria. My research framework needed to work in conjunction with my application of action research in PHRDI, where change is actively introduced and observed through the whole process. Action research can actively lead to changing our environment where new ideas flourish and new meanings develop through those ideas and connections between the participants and researcher. It was important for my research paradigm to be flexible and take into account new ideas and frequent changes occurring in an organization through the communication and application of new ideas. I found that the interpretive paradigm offered significant flexibility due to its *heuristic* nature, where it allows the researcher to interpret and make meaning of human connection and the world (Willmott, 1993). For this reason, I employed the interpretive paradigm for my research. However, before considering this paradigm, it is critical to discuss how it came to fruition and

how my worldview evolved through the process. Guba (1990) has explained that a research paradigm is categorized through the following:

- Ontology: the nature of reality or how reality is perceived.
- Epistemology: how do we know the knowledge and reality?
- Methodology: how do we develop or contribute to the knowledge?

The concepts of ontology and epistemology predominantly follow two competing paradigms, which are positivism and interpretivism. Positivism is based on a single reality and it is driven by absolute natural law (Easterby-Smith, 2012). Throughout my life and my career, my worldview has been aligned with a positivist paradigm, through which I often conducted quantitative research to seek a solution to a given problem (Morgan, n.d.). Reflecting on my actions and my day-to-day activities, it is clear that I am a pragmatic individual. Additionally, the nature of my work and actions throughout my career enhanced my tendency toward pragmatism rather than constructivism. It is inevitable that I attempt to solve problems through the pragmatic lens. This unconscious bias often leads to overlooking other approaches and paradigms in solving various issues. Reflecting on this notion now, it is clear that overlooking other approaches might have hindered the way in which I dealt with issues. This narrow view of the world may have potentially impeded my ability to seek ideas and observe behaviours within the organization. After further examining and reflecting on this issue, I began exploring other paradigms, such as constructivism, and followed a qualitative approach to exploring the impact of effective resource management in tackling malaria. I utilized action research cycles to avoid my biases. This included my identification of the problem, which demonstrated my unconscious bias toward positivism. Reflecting on this issue led me to examine other paradigms and approaches and,

finally, to take action, which was to choose a paradigm that suited my research problem most effectively.

Upon further reflection of my worldview, I became aware of my failure to see the world from other perspectives. A good example was my approach to the research for this thesis, in which I decided to explore constructivism and see the issue through the lens of this paradigm. This reflection mainly came to fruition when I initially began my research and data collection approach method. As a pragmatist, I began developing survey questionnaires and sent them to a number of organizations around the world dealing with malaria. Very few responded, but when the data from those that responded came in, I noticed that I was not getting the data I needed to fulfil the objectives of my thesis. As a result, I referred to the action research cycle of observing the issue, reflecting, planning, and acting (Maestrini et al., 2016). Upon reflecting on my actions, I noticed that my bias toward a positivist paradigm led me to believe that a quantitative approach was the only way to find the solution for my problem. As a plan of action, I began to explore constructivism and the qualitative approach to data collection to fulfil the objectives of my thesis. I also learned that, for my study, a pragmatic paradigm can be challenging to follow as it focuses on experimentation and testing under carefully controlled conditions (Cook & Campbell, 1979). Through the lens of constructivism, I was able to view reality in a holistic manner and through social constructions such as experiences, ideas, and shared meanings (Myers, 2008). This paradigm offered the ability to appreciate the different ideas and experiences between people. It helped me understand that there is no single answer or solution to certain problems (Saunders, Lewis, & Thornhill, 2012).

Taking into consideration the two research paradigms described above, my research tended more toward the interpretive paradigm. My transition from the positivist approach to interpretive was

mainly driven by the introduction of action learning and action research by the University of Liverpool Doctor of Business Administration (UoL DBA) programme. Through action learning, I was able to gather and meet a team of colleagues within the organization who share knowledge and experiences through regular discourse and dialogue. Furthermore, action research led me to be more reflective and actively go through the cycle of planning, reflecting, and acting within PHRDI (Lawless, 2016). These two approaches played a great role in my transition to interpretivism while maintaining my appreciation for positivism. Unlike positivism, the interpretive paradigm is not based on a single reality. Rather, knowledge can be interpreted through observation and reflection (Crotty, 1998). The aim of my research was to learn how resources relating to our fight against malaria are managed within PHRDI. This required a considerable amount of observation and data gathering through interviews and focus groups with individuals directly involved in allocating and distributing the funding and resources. The main intention was to find a solution to the problem of slow progress in malaria elimination despite dramatic increases in funding over the last 15 years. The nature of the data I needed for this research was to discover the process of resource allocation and whether those resources were meeting their intended objectives.

A substantial amount of research in the field of malaria and the slow response to treating malaria has been dominated by the use of qualitative research. For example, Sundararajan et al. (2015) have undertaken a qualitative research study that looks into the 'sociocultural and structural factors contributing to delays in treatment for children with severe malaria in Southern Uganda'. The authors have conducted in-depth interviews with the family members and guardians of children infected with malaria. In the analysis of this study, the qualitative research carried out by the authors has provided a significant volume of data and interventions that could help

improve the response rate to malaria infection in children. As my research paradigm and reality was constructed, it was important to utilize a research methodology to help me acquire the data that leads to actionable knowledge. As I reflected upon my own research, I became more and more aware of my own single dimensional worldview and experiences. I noticed that my environment and the nature of my day-to-day work has carried me towards pragmatism and seeking solutions to issues through testing and validation. However, I learned that reality can also be formed through human connections, behaviours, insights, and experiences. For my research, I could seek data by observing and communicating with participants rather than searching for data. This exposure to different dimensions of reality led me to seek out other paradigms and approaches. Therefore, the next section of this chapter considers research methodology in relation to my study.

Research Methodology

According to Brown (2006), research methodology is the philosophical framework within which the research is conducted (p. 12). As *University of Manchester Skills* (2016) informs its students, methodology is more than just a mode of collecting data, it is essential for considering the concepts and theories that inspire the methods. As such, if the intention of research is to identify a specific sociological theory or examine the validity of a system, one has to demonstrate an understanding of the underlying concepts of the methodology. Essentially, in order to follow a scientific method, one needs to follow a systematic approach to solve a problem. Previous studies on resource management relating to malaria and other global health issues have utilized various methodologies in an attempt to fill research gaps and to solve problems relating to these crises. In a study conducted by Gosling et al. (2015), the authors have led participatory research

using qualitative methodology to explore how effective project management can play a positive role in malaria elimination. The authors have conducted in-depth interviews and examined literature in the area that helped them to offer a series of recommendations on how to improve the programme management approach to eliminating malaria. Piva and Dodd (2009, p. 930) have conducted quantitative research examining 'how health aid is spent and channelled … across countries and between subsectors'. In this study, the authors' main objective was to examine the many qualitative research studies through a quantitative study to demonstrate how funds are available to recipients. The study has demonstrated that even though there has been an increase in support, there is a significant need for effective aid allocation. The authors have suggested rigorous and continued monitoring of aid distribution and management.

Other studies that have examined resource management in malaria and other global health crises include Bendavid et al. (2015), Breman et al. (2004), Dieleman et al. (2014), and others that have used qualitative or quantitative methodologies to contribute to knowledge in the field. Upon further examination and reflection on these studies, I came to the interpretation that although both quantitative and qualitative approaches can be used to solve problems and to better understand a phenomenon, qualitative research is more prevalent in my area of study. A number of studies on resource management have been conducted using qualitative research methods. Windisch, Wyss, and Prytherch, (2009) have used this method to present different approaches to human resources in health development. Through these approaches, the authors have called attention to the importance of human resources in health development and reforms in public policies. Adhikari et al. (2017) have conducted a qualitative study to measure the impact of community engagement in mass antimalarial administration in Laos. The study results have demonstrated that community engagement contributed to high levels of participation.

In my particular study, qualitative research offered more flexibility and enabled me to access the participants' experiences and opinions of how resources are managed. This methodology enabled me to gather data through observation and interaction with those involved in the field. It could offer in-depth and deeper analysis of how people think and behave in PHRDI. I was, therefore, able to better understand the environment in which resources are managed and how ideas are formed through human interactions and connections. This learning was formed through planning, observation, and acting, which is the foundation of action research. As I implemented new ideas into my practice, I observed and reflected upon them and sought to improve them in the process.

While both quantitative and qualitative methodologies have been utilized in malaria-related research, most of the research studies relating to resource management have been conducted through qualitative methodology. This is mainly due to the fact that this type of study requires a significant amount of observation and reflection on the key stakeholders and the processes in which resources are utilized. Hanefeld and Musheke (2009) have carried out a study on the impact of resources allocated by Global Health Initiatives (GHI) in Zambia in relation to malaria and other infectious diseases. The authors have explored this issue through qualitative research by conducting in-depth interviews with over 90 policy makers in this field. The authors have concluded that human resources are much more valuable than treatment drugs and other interventions. This study has led them to find a more effective approach to resource management through which resources would be most effective if they were used through human resources. This was particularly important because using methods such as interviews and focus groups could help me further explore the areas of concern by observing and listening to participants' views, experiences, opinions, behaviours, and their interpretation of how resources were being managed and PHRDI's motivation in tackling infectious diseases, particularly malaria.

Qualitative research enabled me to effectively understand the issue I intended to explore through observation and discussion. Moreover, the data collected helped me in effectively finding the solution to my problem.

As noted above, qualitative research was chosen for my study because it offered the maximum flexibility to gather data, specifically in the area of resource management to fight malaria. This approach helped me observe and listen to participants' experiences and give them the ability to openly offer important information. They were able to describe the resource allocation process and discuss the challenges they faced. However, upon further reflection and examination of other methodologies, in particular quantitative research methods, I learned that the conditions were too restrictive. For example, I had to come up with a series of questions for the participants to answer rather than giving them the floor to openly speak and share their opinions. Although a small number of participants responded to the survey questionnaire, the answers did not offer relevant insights to this thesis' main research objectives. Upon reviewing and reflecting on the survey responses, I realized that I needed to go beyond those responses. The participants had more to offer than simply answering questions. Thus, I decided to do just that by conducting interviews and focus group discussions. This approach enabled me to have open discussions with my study subjects. I came to the realization that qualitative research would offer more flexibility for gathering data. For my particular study, the qualitative approach offered the ability to enable the participant to provide the knowledge and data through his or her experiences. My interpretation of the two methodologies is that the qualitative approach offered me a wide range of ideas rather than focusing on a specific item that was too restrictive for the kind of research that was being considered.

Types of Research Methodologies

This thesis examined the three main research methodologies including quantitative, qualitative, and mixed research methodologies to ensure that an appropriate research framework was selected and coherent with existing studies in the field of malaria. Quantitative research, according to Marcus (2008), is the systematic empirical study through mathematical, statistical, or computational techniques. The main goal of this methodology is to validate or reject hypotheses or theories through mathematical or statistical analysis. In other words, quantitative research is used to verify or to validate whether hypotheses are true or not and attempts to fill a knowledge gap. This methodology is widely used in the fields of economics, demography, marketing, physics, and political science (Kasim, Alexander, & Hudson, 2006). Thus, it often falls under the positivist paradigm as it is enacted through a controlled setting by conducting experiments and computations (Cook & Campell, 1979). While taking action research into consideration, it was clear that I was not seeking a single response to a problem. My aim was to examine how resources are managed toward eliminating malaria. This required learning and exploring how funds and other resources are allocated and exhausted within PHRDI, which is one of the global bodies working toward fighting infectious diseases. Therefore, my approach was to focus on a methodology that assisted in exploring a problem and seeking knowledge rather than validating or rejecting a hypothesis. Therefore, quantitative methodology would not effectively serve my purpose.

On the other hand, qualitative research generally takes place in a natural setting through everyday routine. The topics of study are defined and made into questions through those day-to-day activities (Denzin, 1971; Van Maanen, 1983). Qualitative research is less focused on data collection and more emphasis is placed on observation and ideological descriptions (Symon &

Cassell, 2012). This methodology is used in many academic and non-academic fields, particularly in natural and social sciences and often in non-profit organizations for market research purposes (Denzin, & Lincoln, 2005). For my thesis, this methodology was an effective tool for data gathering through observation and reflection. This methodology is often in line with the interpretive paradigm, where contribution to knowledge is made through discovering the underlying meaning of events and experiences (Scotland, 2012). One of the main distinctions to note between the quantitative and qualitative methodologies is that the former uses mathematical, statistical, and computational data to prove or reject a hypothesis while the latter uses observations and ideological descriptions to build a hypothesis (Ghauri & Kjell, 2005; Kasim, Alexander, & Hudson, 2006). Creswell (2009) has described how quantitative research begins with a problem statement and then develops a theory or a hypothesis through the composition into a discussion of data collection and data analysis. On the other hand, as Creswell (2009) has explained, a qualitative study begins with the purpose for the study and then research questions are developed and analysed through data collected from a smaller group. This methodology was helpful and effective in my study as it offered me the ability to observe and interview key stakeholders within PHRDI and gather data regarding how resources are managed. Through this approach, I was able to hold in-depth interviews and focus group discussions with key stakeholders in PHRDI and those working directly on malaria projects related to my study. An attempt was made to seek out a larger pool of participants, but only a small number of them responded and were willing to participate in the study. Although the number of participants was smaller than what I initially looked for, I was able to gather the data from the interviews and focus group discussions that was required to support the aims and objectives of this thesis.

As I further explored and reflected upon various methodologies, I considered the mixed method approach. This research approach includes the combination of quantitative and qualitative methodologies. John Creswell (as cited in Johnson, Onwuegbuzie, & Turner, 2007, p. 119) has defined mixed methods as research design where a researcher collects and analyses both qualitative and quantitative data in a single or multi-phased study. This method gained popularity in recent years and has been used in various disciplines. It is particularly useful when a researcher intends to further explore and interpret a phenomenon or to test a new theory (Miller, Salkind, Creswell, & Maietta, 2003). For my particular study, the focus is to learn how resources targeted at fighting malaria are managed within PHRDI. The goal of this study is to observe PHRDI's routine activities, conduct an analysis of how resources targeted against malaria are distributed, and offer effective suggestions for improvement.

As discussed, we know that there are three main research methodologies: quantitative, qualitative, a mixed research approach. Research in the field of malaria, particularly resource management, seems to be concentrated in qualitative studies and the reasons for this are outlined as follows:

- Quantitative research seeks to answer a question through hard data and analysis, while the qualitative approach enables the researcher to investigate a particular topic through understanding views and perceptions. As noted above, while conducting studies relating to human resources, cultural factors, and sociocultural impacts of malaria, researchers most often lean on qualitative methodology to gather data. Through this approach they have the maximum flexibility to seek out knowledge through investigative research. This is important to my own study because I seek to gain information on resource management through people's experiences and involvement in the areas of malaria. The

more I enquired into the research methodology approaches, I found that qualitative research can add much more value to my study, as it offers me the ability to seek human interactions and engage in in-depth discussions. This is particularly important for my study as I am able to learn how resources are managed and form new ideas through interactions and human connections.

- Qualitative research does not simply look for a solution to a problem, it seeks to dissect the problem through observing new thoughts and opinions. This method uses unstructured and unrestricted practices to collect data. In my particular research, for example, in-depth interviews and focus group discussions were very helpful for gathering the data. If I had not used the unstructured qualitative research, I believe my research would have been very restricted. For instance, under a structured condition, I would have needed to develop a series of questions and the participants would have simply responded to them without offering deeper knowledge and personal experiences in the field. This would have limited my ability to access the participants' day-to-day experience and involvement in the field. Moreover, my analysis would have been limited to only the answers participants provided in the survey, rather than openly discussing their experiences.

Although a quantitative approach might bring value, there are restriction on the information that can be obtained (Smith, 2017). This approach limits the researcher's ability to probe participants and seek their knowledge through experiences and opinions (Smith, 2017). As mentioned above, the main intention of this research was to gain further knowledge on how PHRDI allocates and manages its resources toward the fight against malaria. The data and further knowledge gained in

relation to this problem would help in developing a plan of action and recommendation that seeks to ensure that resources are used in an efficient manner and effectively used in endemic regions. For this reason, a qualitative approach seemed to be most appropriate. While conducting my research through a qualitative approach, I was able to learn about the value of open discussion and enabling others to freely express their opinions.

Qualitative Research

As the Qualitative Research Consultants Association (2016) has explained, qualitative research aims to divulge a target participants' range of behaviour and perceptions that drive it in reference to specific topics or issues. Moreover, it utilizes in-depth examination of small groups of people to support the construction of hypotheses. Once qualitative research is completed, the outcome is more descriptive than predictive. At its core, qualitative research is very different from quantitative research. Quantitative research is mainly used in scientific research methods while its counterpart, qualitative research, is most suited for social and humanities studies. According to Kawulich (2005), in quantitative studies, the research methods are set before observation begins and specify the methods of observation that may be used and the type of data that may be collected. Observations are used as raw data and are collected before the analysis begins. Once the analysis is complete, no additional observations take place. On the other hand, in qualitative studies, research methods are created that suggest the type of methods of observation that can be used and the type of data which may be collected. Under this methodology, the analysis is carried out concurrently with data collection. In other words, analysis and data collection proceed in a recurring fashion, where preliminary analysis informs subsequent data collection and so forth (Smith, 2017).

Using qualitative research was important in my study because it enabled me to go beyond the restrictive boundaries drawn by quantitative research and it helped me to explore the data through participants' experiences and ideas. In this study, I was not seeking hard data and a mathematical solution to the problem; instead, my goal was to learn about a process and pursue approaches to improving it. As I reflect on my experience in PHRDI, I found the use of focus groups and interaction extremely helpful in gathering the information needed about resource management. This is mainly derived from the notion that the procurement process used within PHRDI requires a great deal of critical thinking and creative approaches. There was not a single, clear approach to distributing funds. These particular processes cannot simply be answered through questionnaire and surveys. Therefore, enabling the participants to speak freely to share their ideas and experiences led me to observe those actions and document relevant information that was not easily available otherwise.

Data Sample

In order to learn how malaria resources are managed, I attempted to gather data through various sources and using different methods of data collection. The two most common qualitative research methods are in-depth interviews and focus group discussions (Savin-Baden & Major, 2013). For my research, each of these methods were found to be applicable and particularly well suited for obtaining my data. These methods offered the maximum flexibility in enabling the participants to speak freely and share their experiences. Moreover, these methods have been used for similar studies in which the researchers were able to collect optimum data for their studies. Starchan et al. (2016), for instance, have undertaken qualitative research to learn 'what drives the consistent use of insecticide nets' in Uganda. The authors have utilized in-depth interviews as

their main source of data collection and found that people were well aware of the benefits these nets offered and have been using them as part of their day-to-day lives. In another study conducted by Chandler, Whitty, and Ansah (2010), the authors have sought to learn the effect of RDT of malaria in Ghana. The RDT medical diagnostic kits are designed to be easy to use by field workers to diagnose malaria rather than using costly hospital resources. These RDTs are designed to reduce the overuse of antimalarial drugs throughout endemic regions (Chandler, Whitty, & Ansah, 2010). Chandler et al. (2010) have undertaken qualitative research using in-depth interviews as their method of inquiry with field workers to learn about their experiences and the impact of RDTs. The authors have learned that the field workers did not have adequate instructions to use RDTs and utilized them through interactions and experience. Lambert and Loiselle (2008) have conducted a similar study by combining interviews and focus group discussions to further enhance the quality of the data received. These studies have demonstrated that interviews and focus group discussions are effective sources of data collection in my field of study and when the researcher is seeking data on participants' experiences and insights. This applies to my own study, where I am seeking to learn how resources within PHRDI are being used to fight malaria.

In-depth interviews

In-depth interviews are ideal for collecting data on individuals' personal histories, perspectives, and experiences, particularly when specific topics are being explored (Mann, n. d.). According to Kvale (2008), interviews offer access to a participant's worldview, experiences, and beliefs in their own words. These interviews often help in gathering data that are not readily available. In particular, it helps in gathering subjective information about an individual's feelings and perception of an issue (Turner, 2010). While interviews appear to be easy and simple, they have

weaknesses that are worth noting. Interviews can be dull, can go off topic, the interviewer and interviewee relationship can affect the data being collected, and it can even be taken for granted. When a participant is given the chance to openly discuss his or her knowledge and experience on a particular topic, he or she can potentially either go off topic about it for a long time or offer very little information. The long period of communication can become dull and the interviewer can lose focus and be inundated with unnecessary information. Mann (2009, p. 30) has explained that 'interviews are both mundane and memorable, both ubiquitous and unique'. It is important to ensure that the range of the interview is considered and that it stays focused on the topic. Another challenge is that many aspects of interviews can be taken for granted. It is critical for the researcher to actively remain reflective (Kvale & Brinkman, 2009). For my particular research, I decided to utilize a semi-structured interview (Cohen, 2006). This type of interview enabled me to set the tone of the questions and interview process while also leaving room for the participants to openly discuss their experiences in utilizing the resources tackling malaria. This approach helped me avoid the pitfall of participants going off topic and not remaining focused. Another benefit of this type of interview is that I could be more reflexive and ask follow-up questions outside of the guide developed (Bernard, 1988). Given that many of the participants worked with me in the same organization, I was concerned that they may not openly discuss their experiences and challenges of managing resources on an individual basis. I, therefore, decided to form a focus group discussion to ensure everyone could freely discuss the common issues.

The target for my interview participants were staff within my own organization and those within endemic regions that are on the frontline of fighting malaria. Within my own organization, I contacted 13 procurement staff within my office and seven agreed to participate in face to face interviews. The participants included procurement staff in my office who are responsible for

soliciting, negotiating, and awarding funds, through contracts, to organizations around the world who are fighting infectious diseases, including malaria. The interviews were held in person where I asked open-ended questions and they responded. There was no strict timeline for the interview in an effort to give the participant the freedom to speak. The resulting average time of each interview was approximately 45 minutes.

In addition, I contacted 14 key individuals within various hospitals and NGOs working in endemic regions of Africa. These individuals held key roles within their prospective organizations and I believed they had the necessary insight on how they managed the resources they received. Of these contacts, only two responded and agreed to participate in virtual interviews with me. The remaining participants either opted out of being interviewed or did not respond to my multiple inquiries. Additionally, I did not have the necessary funding and resources to travel to these sites to interview participants in person; therefore, virtual resources were the only available tools at my disposal. The two participants included a physician in Kigali General Hospital in Rwanda and the finance director at Noguchi Memorial Institute for Medical Research of University of Ghana (NMIMR). These individuals hold key positions within their respective organizations in organizational-level decision making and resource management. Although they agreed to participate in the study, they requested that their names not be used in the thesis because they work for their respective governments. Interviewing and gathering data from these participants in endemic regions was important because I wanted to hear about their experiences of how funds were received and whether they had all the necessary tools to manage and fight malaria. Additionally, I wanted to know whether their objectives and understanding of the challenges malaria brought to them aligned with my own organization's mission.

The majority of individuals within my office were contacted in person and the external users were contacted via email and phone. The external participants were one male and one female and internal participants were four males and three females. All of these participants were between 34 and 50 years old. The range of my sample was representative of PHRDI, and the point to consider is that the research sample that could be targeted within the organization was very limited. All guidelines and protocols regarding ethics and participants' confidentiality were followed in accordance with University of Liverpool guidelines. The interview setting was in the English language and prior to the interview, the participants were given the 'participant information sheet' to enable them to decide whether they wanted to participate or not. Once they had agreed to participate, the participants were given informed consent forms to sign and then I began the interviews.

Focus group discussion

A focus group is another type of interview where data is collected through a moderated group discussion (Cohen, 2006). For my research, I mainly focused on expanding on the individual interview questions in the focus group discussion. The goal was to find common issues within the organization and observe the participants' discussions on them. The discussion was held face to face in a meeting space where topics of discussions were introduced and discussed. The focus group discussion's strength included the collection of data that would otherwise have been unobservable, collection of innovative ideas for improvement, and, in my particular case, to further discuss some of the common issues that arose during the individual interviews (Asbury, 1995). Ashbury (1995) has described focus groups as an effective method for collecting valuable data from participants who would ultimately benefit from the research results themselves. Some of the weaknesses of focus group discussions that I had to take into consideration were 'group

think', staying on topic, and, most importantly, moderator bias (Focus Groups, 2006). In order to avoid these challenges and limitations, I engaged in an ongoing reflection on my actions, played an observer role in the discussion, and avoided offering any opinion during the discussions. Using this method, I was able to gather a great deal of insight on how resources are managed within PHRDI and how we can find ways to be more efficient and effective in tackling infectious diseases.

The focus group discussion was held amongst five of the participants I had interviewed individually. These participants were selected because they had a distinct interest and opinions on areas of improvement within my office. They had long tenure within the office and had a significant level of experience in contract administration. The main point of the focus group was to open the floor for the group's dialogue and discourse and observe participants' discussion on how resources are managed. My goal was to further discuss some of the common issues raised by individuals without singling anyone out and to give participants the chance to engage in a dialogue on the way resources are gathered and allocated. The meeting took place in an office setting where participants gathered around an oval table facing each other. I moderated the discussion by raising topics for discussion and occasionally asking clarifying questions. I avoided injecting my opinions into the discussions, in an effort to avoid any moderator bias or leading. The duration of the discussion was approximately 90 minutes.

Gathering data from a larger sample of participants from endemic regions was very challenging. Limited resources and lack of responsiveness from the target participants in those countries led me to keep my focus mainly within my own organization and the two respondents in Ghana and Rwanda. Although I was not able to interview all participants I reached out to, the information gathered from those who participated was very insightful and met the objectives of my research.

For instance, the two participants from Ghana and Rwanda were members of large organizations and played significant roles in their respective countries to fight malaria. The data gathered from these participants offered me useful information to proceed with my study. Interviews and focus groups were used because they offered me the maximum flexibility to enable my sample participants to openly share their experiences and insights on how resources are managed and utilized in tackling malaria. The interviews and focus group discussions enabled me to learn more about PHRDI's process of resource allocation, monitoring, and management. It also helped me identify the gaps, challenges, and difficulties these participants face as they work toward fighting malaria. Better understanding these challenges helped me find the issues within my own organization and further apply action research within my own office. One of the main learning outcomes from the process of collecting data through interview and focus group was to commit to an ongoing reflection (Mann, n. d.). This was particularly important as every detail and information from the participants could be unintentionally taken for granted and the main content would have been lost. Staying focused and engaged throughout the process was critical. As noted above, qualitative research has been an effective approach for conducting my research and gathering the findings for my study, which are discussed in detail in the next chapter.

Sample limitations and justification

The initial intent of this thesis was to undertake a much broader study of how resources for tackling malaria are managed globally. I aimed to reach people from as many global organizations as possible. However, I realized that was not possible, and the scale of the study was going to be too large. I faced significant problems when trying to contact participants, as response rates were very discouraging. Furthermore, I would have needed more time and resources to complete a broader study. I also realized that many of the individuals from the

organizations and institutions I targeted worked with governments and often shied away from interviews and speaking out about their work. Therefore, I narrowed my focus to my own organization. I attempted to reach out to as many people as possible within my own division, which deals with malaria-related projects. We have a small group of individuals responsible for managing contracts and funds related to malaria, hence the reason for the small sample size. Additionally, my agency gives a few qualified employees the authority to bind the organization into a contractual agreement and allocate funds. They total only 13 individuals with the authority to allocate government funds. I asked as many authorized personnel as I could and was able to interview seven of them.

In terms of external participants, my intent was to approach finance directors and medical directors of large institutions receiving funds from PHRDI. There are a very limited number of people holding senior positions within a large institution. As noted earlier, I contacted 14 officials of organizations that are recipients of funding from organizations such as mine to participate in this study. They included hospitals, universities, and other non-governmental organizations. Most either declined to participate or did not respond to several inquiries; however, two did agree to participate. One was from a hospital in Kigali and the other from the University of Ghana. This was adequate participation for my research because both organizations were significant players in endemic regions and are in the forefront of the fight against malaria. Additionally, a large portion of their revenues come from organizations such as mine. Even though the number of external participants was small, it was representative for my research because my focus was to look within my own organization and find areas for improvement. Both participants were from organizations that are relatively large and the information from them was extremely helpful in my research. Both participants played important roles within their

organizations to fight malaria and had considerable knowledge about how funds were received and spent.

I am fully aware that the sample was small; however, it was sufficient to comply with the aims and objective outlined in my study. Furthermore, and according to different studies, these types of small samples are appropriate under the particular circumstances of my research. Chandler, Whitty, and Ansah (2010) have conducted a qualitative study on how malaria rapid diagnostic tests (RDTs) can achieve their potential. They have carried out the study at various health facilities and interviewed health workers involved in the trial. They have only interviewed 11 health workers and have been able to find a number of areas for improvement. Although the sample size was small, the authors have been able to gain an optimal amount of information on how RDTs were being administered. In another study, Munguambe et al. (2011) have undertaken a qualitative study to improve the use of indoor residual spraying (IRS) against malaria in a district in Mozambique. They have used interviews as one of their methods of collecting data. They have approached community leaders for interviews and have selected a small number of participants for their study. Despite the small sample, they have been able to make meaningful suggestions for encouraging more IRS usage in malaria-endemic regions. In my study, the sample size selected offered perspective on how resources are currently managed and how I could find areas for improvement within my own office to more effectively utilize the resources to fight malaria. Overall, I had some difficulties conducting the research because it is a government organization and I was worried that people may not comfortably interact and share information and opinions. However, I was able to find a number of participants willing to engage with the research. This was quite complex and it is important to note these constraints.

Data Analysis Strategy

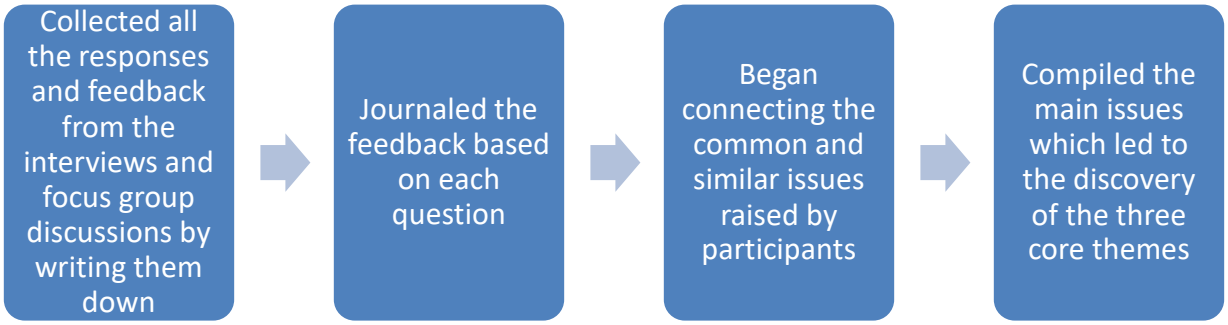


Figure 3.1: Data analysis strategy

My initial intent with the interviews and focus group discussions was to electronically record the discussion and later go back to the transcripts and filter the data. However, the participants asked not to be recorded because this was a government office and participants were not comfortable being recorded. I, therefore, took hand-written notes of the conversations and collected close to 50 pages consisting of questions and answers. My strategy included the use of journaling of responses to each question as I asked each participant. I carefully reviewed the notes and responses collected and began to identify key points that I could connect that led me to the three common themes identified in this study. The journaling of responses to questions led me to connect common issues participants raised during the discussion. These common issues were further analysed and used in my study.

Concluding Reflection

This chapter has offered a detailed account of why I chose a qualitative methodology and how it presented the optimum value for my research compared to other methodologies. This choice was made through careful examination of other methodologies, rigorous review of literature in the

field of resource management and consideration of why other researchers chose this methodology. When I began this thesis, I had a very ambitious plan for my research and was hoping to examine how resources are managed on the global stage. In other words, I was hoping to find some practical solutions as to how we can effectively utilize available resources for controlling or eradicating malaria. I was planning to conduct this research through the lens of quantitative research. However, the more I engaged with the issue and learned about various paradigms and research methodologies through literature, the more I came to the understanding that I had a strong bias toward quantitative research due to a pragmatic outlook. This bias derived from the nature of my work and my pragmatic approach to solving problems. I also learned that given my limited resources and time, I could not effectively tackle such a dynamic and complex issue as malaria on the global stage. I initially attempted to gather data through survey questionnaires from other organizations to learn how they managed their resources. However, due to low responses and limited resources to engage global organizations, I decided to explore the issue through my own office. I decided to explore the process of resource allocation and how resources are managed in the fight against malaria.

The literature and the teaching in this DBA programme helped me to view the world from a different perspective. I began to explore the interpretive paradigm and accepted the fact that there may not be a single solution to complex issues such as malaria. I learned that reality can also be formed through social constructs such as experiences, ideas, and shared meanings (Myers, 2008). Keeping these recognitions in mind, I decided to conduct qualitative research on how resources are managed within my own office. The main methods of data collection were interviews and focus group discussions. They turned out to be helpful methods for gathering data through participants' experiences, opinions, and knowledge in the field (Kvale, 2008). This

chapter has offered an account of how these methods have commonly been used in similar studies.

CHAPTER 4

RESEARCH FINDINGS

Chapter Introduction

This chapter further emphasizes the importance of active observation and evaluation of how we manage resources in the fight against malaria. By actively learning and observing how resources are managed in this effort, weaknesses in the process are quickly identified and can potentially be remedied more effectively. The main purpose of this chapter is to offer critical insights that help address the research question presented in the introductory chapter: 'How are resources toward controlling and eradicating malaria being managed within my organization?' (Chapter 1, p. 4). It is important to be aware of difficulties associated with efforts to fight malaria. Malaria is a complex and dynamic disease and the fight against it is complicated. The disease continues to affect millions of people around the world (chapter 2). The economic and social benefits of eradicating malaria are of extreme importance, particularly in endemic regions (Snowden, 2016). A study conducted by Barofsky et al. (2015) on the economic outcome of malaria eradication in Uganda has found dramatic improvements in education and the lives of men and women of all ages. The study has demonstrated an increase in education participation, a rise in primary school completion, and approximately 40% increase in wages (Barofsky et al., p. 129).

Although there has been a significant increase in resources to fight the disease since the late 20th century, malaria's impact on certain regions, in particular Sub-Saharan Africa, has decreased only marginally (WHO, 2015). This marginal decrease clearly indicates that there are areas for improvement and it is important to examine how we allocate and manage resources in these endemic regions. My organization is amongst those heavily involved in tackling infectious

diseases, and, in particular, malaria in endemic regions. Major efforts have been made by PHRDI, which is in the forefront of the fight against infectious diseases around the world, but more particularly in the fight against malaria in the African continent. Through observing and reflecting on the complexity of this endeavour, I came to the understanding that it would not be easy to tackle a problem of this magnitude in the context of action research without carefully considering my own practice. PHRDI is amongst many other bodies actively working towards eradicating or exploring ways of controlling the disease. As an employee of the organization, I conducted research to find areas for improvement and to find effective ways of managing resources within my office. I further investigated these issues by interviewing participants directly involved in the field. This study focused on my own office since other types of research approach would not have been feasible due to the scale and complexity of the organization. I aimed to ensure that the study focused on how resources allocated to malaria are managed. My office manages contracts with organizations in the endemic regions in the fight against malaria. Thus, this chapter focuses on the data I collected through interviews and focus group discussions with individuals directly involved in the field. Moreover, this chapter examines the process of funds allocation, challenges identified, and a discussion of my core findings. The purpose of this chapter is to present the research findings and offer critical insights and reflections in the context of the reviewed literature. It aims to offer a critical assessment of the main findings and their implications for PHRDI and, in particular, for my department and my practice.

The research findings in this chapter begin with a presentation of the interview outcomes with participants in my own office who play an active role in allocating funds and resources toward the fight against infectious diseases, and, in particular, malaria. The standard processes, from inception to completion of a contract funding are shown in chart 4.1. By breaking down the process and

engaging in discussion with participants, I was able to uncover common issues that have been tackled through action research cycles. As a result, three common themes and concerns are presented, which include the outcomes of individual participant interviews within my office, focus group discussions, and external interviews. Finally, each theme is concluded by a critical analysis.

Interview Insights and Participants Description

My particular work area, the Office of Acquisitions (OA), consists of approximately 45 procurement officials responsible for assisting and collaborating with our programme officials on R&D projects focusing on infectious diseases. My particular team consists of approximately 13 contracting officials, seven of whom were found to be directly involved in projects similar to malaria and agreed to participate in my research. These participants were selected mainly because they work on similar projects that follow the same procedures presented in chart 4.1. (pp. 2–3). As I interviewed these participants, I observed three common themes and issues that form the basis of this chapter and are discussed in detail.

In order to gain more insight into how others within my office allocate funds and later monitor the impacts, I interviewed seven mid-level professionals who are responsible for allocating funds and managing contracts (see table 4.1 below). In addition, I interviewed two external professionals at the receiving end of the funding to observe their accounts of how resources are utilized and whether their objectives align with those of PHRDI. It is important to note that my role within the organization is similar to those seven individuals interviewed in my office. Although we all work toward the same mission of eradicating infectious diseases and follow the same funding process presented in chart 4.1, our experiences and opinions differ greatly as each project has a unique set of objectives of its own. The projects we undertake to tackle infectious diseases are very complex

in nature and carry unique tasks and timelines. For example, I may be working on a five-year contract specifically dealing with clinical trials while another colleague could be working on a project to build infrastructure to treat malaria patients. Therefore, I have a general knowledge of the processes we follow to allocate the funds and ensure contracts are properly negotiated and executed. However, there is uncertainty regarding the impact of those allocated resources. As I viewed our process and my office through the lens of a scholar-practitioner, I observed a number of issues and shortcomings in how we allocate resources and manage contracts. I hoped to validate this knowledge and gain more insight through discourse and dialogues with the participants in my office. Because the nature of our projects differ, and everyone has a unique experience on long-term contracts, it is helpful to gain insight on how others, most notably the seven participants in the office, perceived our funding process. The goal of this research, thus, is to see whether the funds distributed have a positive impact on the ground. This goal can be approached by understanding the process of resource management, by observing those directly involved in the field, seeking their opinion on the impact of resources, and whether the initial objectives are being met after a contract ends. Table 4.1 presents the list of participants I interviewed and their roles in the office and their respective organizations.

Participants	Number of participants	Roles
Contracting Officials	7	Procure goods and services through negotiating and administering contracts for the institute
NMIMR Budget Administrator	1	Assist in developing proposals and applications in response to malaria solicitations and proposal requests and manage expenditures
Physician in University Teaching Hospital of Kigali	1	Treat malaria patients

Table 4.1 - Interviewee roles and responsibilities

The participants were asked questions in three different categories and were given the opportunity to freely express their insights, opinions, and experiences. The question categories were as follows, but the interview was interactive and there were follow-up questions:

- Category 1 – Funding Process:
    - How are resources allocated to fight malaria?
    - How is/are (an) organization(s) selected for funding?
- Category 2 – Concerns with the way funds are allocated:
    - What are some of the major challenges you encounter with the current funding process described in the previous questions?

- Based on your experience, is the current process of funding working?
- Do you think the initial objectives of malaria projects are met from the time a contract is funded to the end?

- Category 3 – Suggestions for improvement
  - What are your suggestions and insights in tackling the issues raised?

The purpose of the questions above were to gain an understanding of how funds are allocated and whether the process of funding was meeting PHRDI's intended objectives in the participants' experiences and opinions. These questions were broken into three categories, as shown above, to help me understand the foundation and process of funding, then learn the areas of concerns based on the participants' experiences and insights and seek their suggested improvement plans. The first category helped me gain clarity on the steps the participants follow on funding projects. The second category of questions helped in identifying areas of concern with the funding process. The final category was to receive the participants' suggestions for tackling those issues. These questions were relevant to my research because the discussion with the participants led to the discovery of a series of common issues and concerns relating to the funding process that are discussed in the sections that follow.

Background and Objectives of my Practice

Prior to presenting my core findings, it is important to offer some context on the objectives of my office and what we do in regard to fighting malaria. This is important to help the reader gain a better understanding of my working environment, based on my own observations over the years of work there and in particular over the period of this study. My office supports the PHRDI in procuring goods and services toward fighting various infectious diseases. In the case of malaria,

we negotiate and award multi-year contracts to organizations around the world, particularly those in endemic regions, for surveillance, R&D, and clinical trials. We actively engage in negotiations and work collaboratively with our scientific team to ensure that there is a transparent and rigorous competitive process in place to allow our contracts to offer best value to the organization.

Once the funding budget for malaria is determined and approved by senior management, the scientific team make recommendations on how to tackle the disease and to support those involved in this effort. This endeavour requires numerous negotiations between my office and those organizations in endemic regions. Our main goal through these contracts is to ensure that best value is achieved through negotiations and those organizations receiving the funds meet the objectives of the contract. The process of funding is further demonstrated in chart 4.1 and explained in later sections of this chapter. Throughout this study and the DBA programme, I observed my office and our process more carefully and noticed that once contracts are signed and funded, the level of scrutiny and oversight decreases. Once the resource recipient meets the criteria to obtain the funds, they are often entrusted to perform the work as intended through their interactions with assigned technical staff. In other words, the level of monitoring and quality control decreases in a worrying manner after the allocation of funds. Naturally, the argument made by our team is that these companies have been carefully vetted and should be entrusted to complete the work. However, malaria is a complex and dynamic disease that requires ongoing attention and the recipients of funds and resources should be actively monitored to ensure the intended outcome is being achieved. Kivumbi, Nangendo, and Ndyabahika (2004) have further supported this notion through their investigation of the impact of decentralized financial management systems on malaria control in Uganda. The authors have found that a combination of highly bureaucratic systems and corruption made the financial system ineffective and the resources were hardly used

for effective control of malaria. The authors have made the recommendation that effective malaria control requires good governance and more efficient financial systems (Kivumbi, Nangendo, & Ndyabahika, 2004). Looking back at my own organization, I observed that the process of funding itself is very lengthy and bears weaknesses that are worth exploring. Therefore, the following sections of this chapter offer details of our funding process, themes and issues raised by research participants through interviews and focus group discussions, and additional contexts from those on the receiving end of the funding. The main intention is to help the reader fully understand the themes and issues presented in this chapter.

Process of Funding a Contract

In order to effectively understand the nature of funding contracts within PHRDI, it is important to break down the steps and processes we follow from planning to allocation of funding. Clarifying this process is of assistance in examining whether resources meet the objectives of PHRDI and contribute to control or eradication of malaria as initially intended by the funds allocated. As flow-chart 4.1 demonstrates, the process of resource allocation is very organized and universal. This process is aligned with the United States Federal Acquisitions Regulations (FAR, 2017). The research participants, the contracting officials from table 4.1, are responsible for carrying out and facilitating all of the phases shown on chart 4.1. Our office policy mandates that staff within the office follow these general procedures to award R&D contracts. Regardless of the nature of the work, the process is generally the same. However, timelines may vary as more complex projects require more time in different phases. To further clarify for the reader how contracts are awarded and managed, chart 4.1 shows how the process of funding projects is broken down into phases.

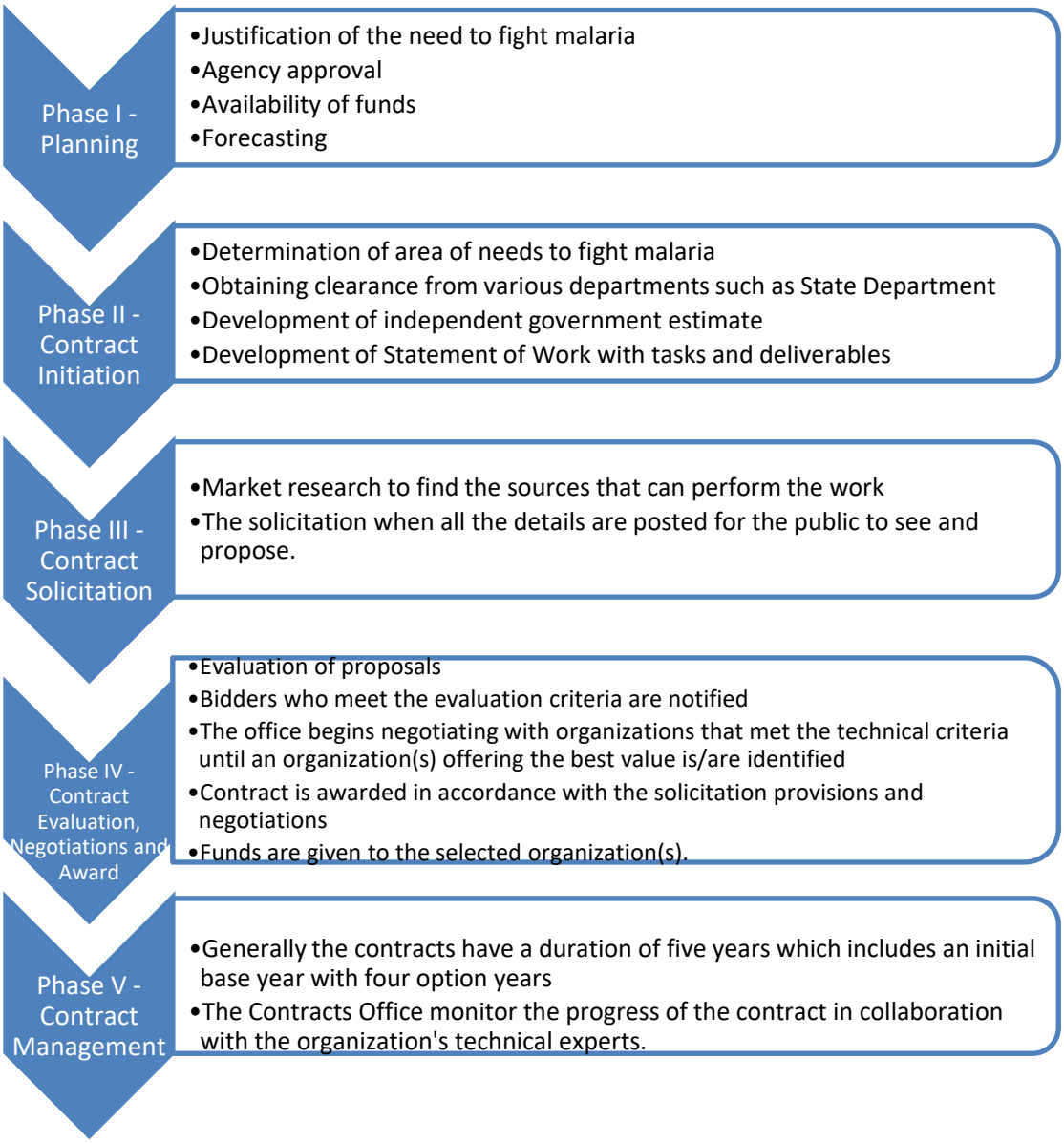


Chart 4.1 Process of Contract Funding (Source: Federal Acquisition Regulation, 2017)

Insights from the funding phases

The description and summary of the phases in this section are based on my own observations throughout the course of this study and my years of experience in the area. Further insights were gathered from my discussions with the research participants during the interview process that are

combined to offer further understandings on the importance of the process and to bring a practitioner's insight throughout the discussions. Under phase I, planning, an expert panel within the organization makes recommendations to the senior management on the importance of fighting malaria and the necessary resources needed to tackle this disease. The scientific experts present and explain the current state of the disease and its impact around the world. Moreover, they present how they intend to use the requested funds to tackle the disease. Once the request for funds are approved by the United States Congress, the technical and business team work together to develop the details of the projects, which include phases two through five of chart 4.1.

Once general funds toward malaria have been determined under phase one, subject matter experts (SME) determine which areas of malaria work should receive the funding and begin to develop the project details by tasks and deliverables, under phase two. In this phase, the team determines which portion of the funds should go toward surveillance, clinical trials, vaccine studies, and so on. Once the area of need is determined, the scientific team, in collaboration with contracting officials, begins to seek departmental approvals and clearances, articulates the tasks and deliverables, and conducts market research to identify the sources capable of performing the tasks.

Phases two through five shown on chart 4.1 are extremely important as they focus on identifying the most capable organization(s) to tackle malaria and fulfil the needs of PHRDI. In these phases, the contracting officials, which consists of the large majority of the research participants (table 4.1), play a direct role in facilitating and rigorously working with the scientific team to develop a robust statement of need with clearly defined tasks and deliverables for the potential contractor to fulfil PHRDI's objectives. These steps are critical in ensuring a capable organization(s) is (are)

identified and they have the necessary tools and infrastructure to complete the tasks and effectively utilize the funds allocated to them.

Under phase two, through my own experience and discussions with the participants, I learned that the SMEs along with the contracting official draft the statement of needs by tasks and deliverable. This document is then shared with a number of departments, including information security office, scientific review office, the administrative office, foreign services office, and office of the directors. Each of these departments take some time to review and offer their feedback and concerns and return them to the contracting official and SMEs. The SME and contracting official spend some time addressing the issues and begin to work with each of the offices to address the concerns. The research participants noted that, in most cases, it is extremely difficult to bring these parties together to address all issues at the same time. A considerable amount of time and effort goes toward working with each office independently to achieve the clearance and approvals.

In phase three, the contracting officials develop a solicitation for perspective organizations to propose. During this phase, interested organizations carefully review the documents and begin to develop a proposal in response to it. They have an opportunity to raise any questions or concerns they may have, and the contracting officials would clarify these through amendments to the original solicitation.

Phase four of the contracting process is where the proposals are evaluated, negotiations take place, and awards are made. In the evaluation of proposals, a team of experts begins to review each proposal against the evaluation criteria set out in the solicitation. They often use a scoring system to assign points for each category. Once all proposals have been evaluated and scored, those that meet the technical requirements are ranked according to their scores. The contracting officials then

work with the SMEs to review the budgets and other evaluation factors. During this phase, a series of back and forth between parties takes place to clarify questions and concerns with the proposal. The negotiations continue until one or more organizations that offers the best value are identified. The contracting official proceeds with assigning the funds to the contract to enable the new contractor to initiate the work. Some of the challenges observed and noted by the participants included the lack of effective communication tools amongst the reviewing and evaluating officials, lack of effective communication with the offerors or bidders, and the long duration of concluding the evaluation phase and awarding phase. A lack of effective communication amongst public and private sectors has been an issue for a long time, mainly due to each sector's fundamental priorities (Buse & Waxman, 2001). The government strives to use resources for public service while businesses aim to maximize profit. These competing priorities lead to mistrust and a lack of effective communication amongst parties (Uttig, 2000). These characteristics can be observed in my own organization. Despite these differences, both sectors need one another to tackle some of the challenging issues plaguing our society, such as malaria. Therefore, effective public-private sector partnership is paramount for successfully tackling issues such as malaria in the 21st century (Donahue & Zeckhauser, 2011). While governments have the power to make meaningful policies and pass sound regulations, they often lack the skills, will, and resources to meet their impending objectives. On the other hand, the private sector organizations may not have the power to develop policies, but they have the skills and resources to tackle major issues such as malaria. Public-private sector partnerships can be beneficial, not only to the governments and private sector organizations but also to society at large (Donahue & Zeckhauser, 2011). On the other hand, the private sector can benefit greatly from sound government regulations. Building an effective

partnership and collaboration with the private sector has become the WHO's priority in the 21st century (Buse & Waxman, 2001).

Finally, the last phase of the project is the actual administration and management of the contract. During this phase, the contractor is responsible for completing the tasks within the agreed upon budget with the direction of a delegated official. This official has the technical knowledge of the requirement and works as a liaison between the contractor and the subject matter experts within a programme office. This phase often takes up to five years with multiple stages. Overall funds are divided into these stages and allocated on an annual basis or based on completion of each milestone.

By breaking down and describing these phases, the goal is to demonstrate and dissect the current state of our funding process and to offer context into the issues being presented in the following sections. The issues raised by the participants and the researcher often tie into the complex process we have in place, which lacks flexibility and agility. As I further reflect on these steps, I find that they do not take into consideration the dynamic nature of a complex disease such as malaria. The process does not offer flexibility and autonomy to the project participants to stop and re-evaluate their plan of action during each phase. They are often moving quickly from one step to another to meet critical deadlines, rather than examining the potential success or failure of the project. The phases are designed with good intentions, but it appears to be a 'one size fits all' approach rather than strategic planning on a case-by-case basis. In the case of malaria, there is a need for strategic planning and active examination of how each step contributes toward the success of the intended objectives.

Research Findings

On interviewing the participants and reflecting on my own observations of PHRDI throughout the course of this programme as a scholar-practitioner, three common issues or themes were found to be relevant to my research question. These themes are evidence of fundamental concerns with the way we manage resources in the fight against malaria. It is important to note that the focus of these themes is mainly on PHRDI's process of allocating funds and concerns with how we carry out the process. Therefore, there are two components in this chapter. The first is to explain the current process as shown in chart 4.1, and the second has been organized into various common themes according to the outcomes of the research interviews and focus groups, where research participants offered their views on the whole process. Table 4.2 provides a summary of the themes and their implications based on my discussions with the study participants. Details of each of the themes and quotations from participants are provided in the next subsections. The suggested remedies and reflections are further discussed in the next chapter of this thesis.

Common Theme	Continued focus on the status quo	Lack of effective communication amongst stakeholders and others, particularly smaller organizations, working on the same mission of fighting malaria	Complex and ineffective funding process
Participants	Four internal participants from my own office	Three internal and two external participants	Two external participants
Implications	Failure to look into more innovative and creative ways of tackling the disease and staying up to date on the current status of the disease	Lack of communication with internal stakeholders at the planning stage leads to failing to focus on core issues and our inability to properly fund the projects. Lack of communication with external researchers and organizations can lead to potential for duplicate efforts and/or high cost of taking massive projects on our own	Smaller and leaner organizations cannot afford to develop and submit proposals in response to solicitations. A significant amount of resources is spent on pass-through funding. For example, funds go to large universities who charge an overhead fee and pass the funds to other subcontractors and

		rather than working collaboratively with others.	the subcontractors further pass the funds to smaller local entities.

Table 4.2 – Summary of the common themes described by the participants

Theme 1 – Continued focus on the status quo

One of the initial feedback points made by the interview participants was a heavy reliance on the status quo and a continued focus on previous years' research activities. As a result, very little attention was given to innovative and creative approaches or even to carefully assessing whether the previous activities achieved the intended outcomes. This was a concern I had observed throughout the course of this study. As I conducted the interviews, most of the participants expressed similar concerns. Participants stated that our funding contracts are designed to be transparent. They, further, stated that business and contracting officials follow a rigorous process of allocating the resources in support of the research areas identified by the scientific team, as described in chart 4.1. However, the participants noted some shortcomings with how research areas were being prioritized based on their own experiences and observations, as evidenced by some of the excerpts below:

> *During the initial planning phase [of the contract funding process from chart 4.1], even though plenty of discussion is placed on the current state of the disease, the final decision, oftentimes, is to continue with what we had been doing previously.*
>
> Contracting Official Participant 1

This participant was very concerned that decisions are made too quickly by upper management without focusing on the status of the disease at the time of planning. This often leads to overlooking

more innovative and creative approaches in tackling the disease. The focus is often on the amount of the budget available and how to use it rather than getting most out of what we have. Another participant raised the issue of upper management's failure to engage the mid-level professionals and stakeholders in the planning phase.

> *The discussions at the planning level rarely include those staff directly involved in the projects, particularly the contracting officials. We don't have the opportunity to share our experiences and how the project was completed previously. Or, whether the objectives of the previous projects were met so that we could continue the approach.*
>
> Contracting Official Participant 2

A decision on how much resource should be allocated toward tackling malaria should include those stakeholders directly involved in the field. As participant 2, above, notes, the experiences and insights offered by direct stakeholders can be very helpful in effectively allocating the right amount of resource toward the diseases and avoiding over or under funding various areas of research. Another participant was concerned that even though previous years' approaches in tackling malaria were being contemplated, very little attention was given to their outcomes.

> *As research decisions are often made in accordance with the status quo and continuation of activities, there is very little discussion on the results and outcomes of the previously funded projects. We could very easily be funding projects on the very same activities that provided poor results.*
>
> Contracting Official Participant 3

Participant 3 raised the concern about the speedy decision-making process made by upper management, which often leads to carrying out the same R&D project that they had been doing in previous years without soliciting feedback from staff involved in the day-to-day activities of the projects. As I reflect and observe upon this discussion, it is clear that phase one of our funding process (shown in chart 4.1) has been created with good intentions but it has room for improvement. To further clarify, it is a good idea to look at historical data to form future plans, but the final decision should also take into consideration the current state of the disease. In other words, the decision should not only be based on previous projects and continuation of them, it should be coupled with the current state of the disease and other organizations' efforts toward tackling the disease. During the focus group discussion, a participant noted that:

> *We are often asked to start working on projects without knowing how those projects came about. There is no open dialogue and discourse with direct stakeholders, which is supposed to lay the foundation for how resources are utilized.*
>
> Contracting Official Participant 4 (as part of the Focus Group Discussion)

Critical analysis of theme 1: continued focus on the status quo

As my research and interviews with the participants demonstrates, there is a need for a more rigorous planning process within PHRDI. Although our funding allocation and planning phase takes into consideration historical data, the participants were concerned that it fails to carefully look into their outcomes and current status of the disease and data. Additionally, the decision makers fail to engage direct stakeholders, in particular the contracting officials. Overall, this shows weak planning, which is often the main foundation of a project. Research in the field has shown that some of the main causes of project failures or their poor outcomes are driven by a lack of

proper planning, not engaging lower level staff, and not using up to date data (Vargas, 2007). In my particular area of research, a lack of effective prioritization of resources during the planning phase can lead to a great deal of futile efforts in the remaining phases of the project and ultimately lead to poor results in the fight against malaria. A good example to take into consideration is the study conducted by Murdock and Al-Hilaly (2009) of the outcome of the efforts to combat malaria in Yemen despite the government receiving grants and other funding. According to the *United Nations Migration Agency Report* (2017), Yemen, historically, has had one of the highest number of malaria cases in the greater Middle East region. When observing the data, from 2005 to 2013, where annual funding to fight malaria increased consistently, malaria cases in Yemen either remained steady or at times even increased (Murdock & Al-Hilaly, 2009). Table 4.3 below shows the number of malaria cases from 2005 to 2013.

Year	**2005**	**2010**	**2011**	**2012**	**2013**
Suspected malaria cases	629,380	835,018	804,940	891,394	927,821[3]

Table 4.3 - Reported malaria cases in Yemen from 2005 to 2013 (Source: UN Migration Agency, 2017)

Murdock and Al-Hilaly (2009) have shown that the biggest reason for such high malaria rates despite consistent increases in resources were poor planning, and this was identified as a major source of concern. The Yemen government's lack of utilizing up to date data and surveillance of people with malaria is the most likely cause. As a result, a substantial portion of the grant funds were mismanaged and underutilized. This finding offers some insights for my own research because it clearly shows that having resources is not enough to tackle complex diseases such as

[3] The data beyond 2013 was not readily and accurately available due to the political instability and war in Yemen in recent years. As a result, the data is presented from 2005 through 2013.

malaria. There is a need for effective planning and management of how those resources should be utilized. Going back to my literature review, I found the three core tenets of resource management theories, including communication, collaboration, and cooperation, to be lacking within my own organization. This indicates major areas of concerns within my own organization. Our planning process should be robust, and we should actively examine their successes by monitoring the outcomes and ensuring that there is accountability and agility that focuses on meaningful results.

Theme 2 Lack of effective communication amongst stakeholders

Effective communication across the research community is extremely important in the fight against malaria. This could help to ensure research activities are not duplicated, as well as working collaboratively in filling research gaps. Collaboration and cross-country cooperation amongst governments and organizations lead to innovative approaches in tackling infectious diseases (Vazquez-Brust et al., 2014). This is especially true in the case of malaria, which is a regional, or even a global, issue that requires a global response. This is an area where PHRDI could make many improvements. Below are some excerpts from the focus group discussions that shed further light on this issue.

> *As we plan our research projects on infectious diseases through the several months' long process, there is very little encouragement to engage other similar organizations or see if they're undertaking similar tasks. This is not included in the process of funding either. As a result, we could potentially duplicate efforts with another large organization without even knowing about it.*
>
> Contracting Official Participant 6

During the focus group discussion, there were many discussions concerning PHRDI's lack of active engagement with other global organizations focusing on similar objectives of fighting malaria or other infectious diseases. The participant above, specifically, noted that while we spend over a year trying to fund R&D projects, we fail to observe other organization's projects to see if similar activities are undertaken. This would avoid duplication of efforts and possibly help us shift focus as we move forward with our funding process.

> *Many of the research and development projects bear repetitive tasks from previous years without taking into consideration current events or developments on malaria. Although this is an effort to continue the objectives set in previous years, it fails to see what improvements have been made by others in the field. Moreover, the data from previous years' projects are often filed without rigorous reviews and analysis. The new contracts bear similar tasks as those in previous years, which results in a large majority of collaborators being the same organizations over and over.*
>
> Contracting Official 1

As stated in the above excerpt from the participant, there is not a rigorous procedure in place to determine the successes of previous study outcomes to ensure our objectives were met. Unlike the rigorous process of funding a contract, there are no proper steps effectively evaluating the outcomes and ensuring the deliverables meet the organization's objectives as initially intended. Additionally, there is very little focus on engaging other research organizations working on the same mission of tackling malaria. Participants explained that the entire process of a contract from planning to completely closing it out can take up to nine years. Therefore, a particular objective or mission can evolve over time and team members often change in the midst of the project duration,

which is the main cause of inconsistencies and duplication of tasks. This further exacerbates the efforts of adapting to changes and ensuring that we keep up with others in the field.

Based on my own previous experiences and observations of PHRDI during the research, I learned that NMIMR has been a long-time partner of PHRDI that received funding over the years to fight malaria. Located in an endemic region, they have been in the forefront of the fight against malaria with R&D activities being one of their top priorities (NMIMR, 2017). In particular, NMIMR worked with PHRDI to conduct malaria surveillance and clinical trials. To continue its operation, NMIMR relies heavily on funding from organizations such as PHRDI. Therefore, gaining feedback and information from this organization is a key factor in achieving the objectives of this thesis. I interviewed the budget administrator of this university to gain some insights into his experiences of developing a proposal and seeking feedback on whether his organization's objectives are met by working with us. The interviewee for my research actively works toward ensuring funding and resources are properly allocated amongst the various divisions of its organization. In addition, he works with his team and Principal Investigators to develop proposals for various solicitations around the world. Therefore, his input is extremely valuable in ensuring resources are properly utilized at the receiving end in endemic regions.

The interviewee expressed the following sentiment:

> *The resources we receive from [PHRDI] have a very positive impact on the fight against malaria. Once a solicitation is posted by [PHRDI], we gather a team with diverse backgrounds in science, business, and legal within the organization to review the requirements and contribute toward writing the proposal. The solicitation requirements are very lengthy and tedious. Development of these proposals are very expensive and time-*

consuming. For this reason, I believe, only large organizations, resourceful organizations, are capable of participating in the process while smaller local organizations don't even look into these opportunities.

NMIMR Budget Administrator

Orazem et al.'s (2017) research on why start-up companies do not participate in government contracts has further validated the point made by the NMIMR Budget Administrator that start-ups and small companies find the contracting process complex, time-consuming, and hard to connect with the responsible parties within the government. This may indicate that innovative and creative companies with limited resources are not able to participate in malaria research activities. Below is another excerpt from the interview addressing reasons why smaller organizations are not able to effectively participate in the solicitation process:

The solicitation posted by your organization is so complex; we often have to have a team of legal, technical, and business professionals to draft the proposal. This effort generally costs our organization thousands of dollars that we won't get paid if we don't get the funding ultimately. As a result, many smaller and local organizations in the endemic regions are not able to propose to the solicitation.

NMIMR Budget Administrator

Another major concern with the lack of effective communication is the organization's failure to engage smaller local parties in the endemic regions. While interviewing the participant in Ghana University, I learned that they allocate the resources to smaller organizations in the region. Through this effort, a percentage of the original funds from my own organization gets reduced through overhead and passes through expenses.

> *My organization cannot do all the work being outlined in the solicitation. We often re-allocate the funding to subcontractors and other partners. Once funds are allocated to NMIMR, we then distribute major portions of those funds to our subcontractors after charging overhead fees. The subcontractors then further distribute those funds to smaller local clinics and institutions, after charging their own overhead fees. A huge portion of the original funding goes toward administrative and overhead costs.*
>
> NMIMR Budget Administrator

Other issues raised by the participant were cultural misunderstanding and lack of proper communication.

> *We often failed to see eye to eye on many issues such as organizational structure and how to deal with problems. For instance, if an employee violates a protocol, he or she would face much harsher penalties in the United States than in Ghana. The employees within your organization were often blunt and direct while dealing with issues, whereas this was not the case in my organization. This often led to conflict where employees misunderstood the points raised. Overall, senior managers often have the expertise to work with one another but when the contract is awarded, the two sides often face conflict as mid-level staff begin to engage one another.*
>
> Contracting Official Participant 3

Critical analysis of theme 2: lack of effective communication amongst stakeholders

In my reflection on the interviews and discussions with participants, two competing concerns could be observed, including our lack of ongoing engagement with other organizations and our failure to work directly with the local NGOs. The fight against malaria is very dynamic and many

organizations around the world aspire to eradicate it as much as we do. It is essential that these organizations engage with one another actively to further advance this objective and avoid duplications of efforts. In particular, organizations such as mine can benefit from various tools and data made available by others rather than creating our own. A lack of effective collaboration with other organizations can be costly and unsustainable (OXFAM, 2015). According to a study by OXFAM (2010) looking at the US efforts to buy and test HIV/AIDS antiretroviral drugs in Kenya, the U.S. government paid as much as four times what Global Fund spent on the same activity. According to this source, while many organizations and donors used a procurement system developed by Global Fund to buy the test kits to fight AIDS, tuberculosis, and malaria, the United States decided to build its own system. This resulted in duplication and could have easily been avoided by active engagement with Global Fund.

Another area of concern is our lack of direct engagement with local institutions. As the participant from University of Ghana noted above, a large portion of our funds often goes toward overhead fees and other administrative expenses from large governmental institutions to local organizations, which appears to be an inefficient use of resources. In today's globalized environment, where we have the ability to interact and communicate with almost anyone around the world, relying on large institutions to disburse our resources seems redundant. A number of studies have shown the positive impact of directly working with local NGOs. According to the 2013 progress report by the US Agency for International Development in Afghanistan, the impact of local aid doubled when donors provided funding and resources directly to local NGOs. Lentfer (2015) has also argued that supporting the local NGOs as the social fabric of their communities reduces corruption and empowers them to directly reach the populations that are in desperate need of help. The U.S. government can gain long-term benefits by building local capacity with the help of local NGOs

rather than hiring outside contractors (Person, 2010). According to Modernize Aid (2010), when large institutions fail to build local capacity to tackle diseases such as malaria, they duplicate efforts, spend more money in the long term, and fail to reach optimum outcomes in the short term. Consequently, PHRDI, as one of the leading institutions fighting malaria, should further engage others with similar objectives. This engagement would keep us informed of the latest state of malaria research and allow us to effectively focus our attention on gaps in research. Moreover, we should focus on engaging directly with local institutions to help us fulfil our objectives.

Theme 3: Complex and ineffective funding process

Under this theme, both internal and external participants raised concerns that our procurement process is time-consuming and complex. Internal participants were mainly concerned that the long procurement planning and award process leads to futile efforts as leadership priorities shift and initial plans could change. External participants raised concerns that the long and complex procurement process often limits competition to larger and resource-rich organizations. As a result, smaller and innovative organizations are not able to participate in the competition. Below are some of the comments from the participants that are pertinent to this theme.

> *This entire procurement planning to award phases can take up to 18 months and a lot can change within that period of time. One major issue is that when leadership changes within the organization, and that does happen quite often nowadays, the priorities shift. So, if one leader was focused on eradication, another could change focus and would want to focus on treatment only. This can cause some issues as we plan one way and then have to go a different direction.*
>
> Contracting Official Participant 4

This participant's concerns focused on the long duration of the process of planning to fund, which can be up to 18 months. During this prolonged process, many changes could occur, particularly changes in leadership and a shift in priorities. Changes to senior leadership often means shifting in priorities and how funds should be used in the organization. One administration would want R&D while another would want to focus on treatments. In either case, we are fighting malaria and helping those suffering from it. If the process of funding was more flexible and quicker, the organization could better utilize its resources and efforts in adapting to shifting priorities.

> *Our internal bureaucratic system is in need of a major overhaul. One of the reasons for the long tedious procurement process is that we have to go through so many departments such as IT, State Department, Office of Communication, and Legal, to seek clearance and approval. This causes a lot of time and resources to be expended to move things forward.*
>
> Contract Official Participant 5

This particular concern is at the micro level of why so much time goes toward the process of funding. According to the participant above, we have an internal clearance process where various departments would need to see the project prior to us proceeding to our solicitation. Each department can take weeks and sometimes months for review and offering comments.

> *As a physician in a very busy hospital actively dealing with patients, we find the solicitation requirements very complex and often determine if we have a high chance of winning the award prior to expending our limited resources toward developing a response. We find it easier to be subcontractors or sub-recipients of funding of another large institute rather than getting involved directly.*
>
> Physician in University Teaching Hospital of Kigali

Reflecting on my observation of PHRDI and the interview with the physician at the University Teaching Hospital of Kigali, I find that the long funding procedure in PHRDI negatively impacts on those interested in our projects. The long, complex solicitation requirements deter many organizations such as the Kigali Hospital from spending time developing a proposal and participating in the competition.

> *Proposal development often requires a highly qualified team of technical, financial, and legal experts. These individuals spend much of the resource ensuring that they submit a high-quality proposal that truly captures their organization's capabilities. Unfortunately, the organization has to use its own internal funds and resources toward this. This process can often cost their organization thousands of dollars.*
>
> NMIMR Budget Administrator

Another significant concern with the complex procurement request is that organizations in endemic regions have to use their own internal resources to develop a proposal. This is a luxury available to larger institutions with ample resources, while smaller and local organizations are not able to participate in the process.

> *The process of developing proposals, negotiations and awards can take up to 18 months. During this long period, the interested organization cannot conditionally employ the staff and collaborators within the organization. The long process can cause difficulties in keeping highly qualified staff on-board. Large organizations can keep staff active on other projects, but smaller organizations may not have the resources and funds to keep personnel employed conditionally. These two factors create a heavy burden on the organization.*
>
> Contracting Official Participant 3

Critical analysis of theme 3: complex and ineffective funding process

In the contemporary fast-paced and unpredictable political environment, organizational planning and priorities often shift with new leadership and administration. One administration's objectives could be different from the next, which would significantly influence the way we procure goods and services within the government. This is echoed in my own observations and experiences of the organization and participants of this study. As noted above, the participants are concerned that the long and complex funding process is costly and often leads to major readjustment by the time it reaches the implantation phase of the funding due to shifting priorities. The impact of shifting priorities can be observed during the outbreak of Zika in 2015 and 2016. According to a study conducted by the National Association of County and City Health Officials (NACCHO) in 2016, when a huge number of Zika cases were being reported around the country, officials had to shift priorities and redirect funding to respond to this crisis. Despite this effort, they had difficulties addressing the preparedness objectives and were not able to respond to mass care in emergency facilities (NACCHO, 2016, p. 4). Additionally, responding to this emergency delayed many activities of other programmes. There is a need to revisit our procurement duration to either shorten it or make it flexible enough to shift focus and keep up with the priorities. As the findings above show, the long duration of procurements and the complexity of solicitation have been deterring smaller, sometime more impactful, organizations from competing in solicitations. This finding concurs with the conclusions of a number of other studies examining why competition for government funding is low. Other studies on this question have included Perlman (2007), Orazem et al. (2017), Johnston and Girth (2012), and Grimmelikhuijsen and Feeney (2017).

Another area of concern is the complexity of our procurement process. As noted, this complexity is prohibiting us from reaching innovative and creative local organizations who are fighting

malaria. As noted by one of the participants above, when participating in an 18 months funding process, larger organizations can afford to keep highly skilled staff on their payroll, while smaller organizations cannot. For this reason, many small organizations do not apply to solicitations, due to their limited resources. According to Owrid (2012), the complex government funding process in the United Kingdom constrains small businesses and subject matter experts from considering participating in government work. The author has argued that the government needs to engage these experts and 'learn their language'. Private industry has made a great deal of improvements in simplifying their purchasing processes. A number of private institutions have been using block chain technology to simplify the procurement process (Henke & Schulte, 2015). This technology also makes the process much quicker and transparent, as the information within the system is safe and secure (Henke & Schulte, 2015). In order to meet the many challenges we face in procurement to tackle diseases, it may be important to follow the industry models. Technological advancements and globalization are the driving forces for changes around us, particularly when we deal with global diseases such as malaria (Jackson, 2016).

Critical Insights

The findings in this chapter led me toward a number of key business research theories that form the foundation of this thesis. These theories include effective communication, collaboration, and development of an agile organizational structure. The literature review chapter analysed these theories by helping to identify key aspects that are connected to this research work. Cultivating an environment of open and effective communication is extremely important in managing complex projects and dealing with global issues such as malaria. This is evidenced by the lessons learned from the outbreak of severe acute respiratory syndrome (SARS) in 2003, which very quickly

spread from the Guangdong province of China to 37 countries around the world (Wang & Jolly, 2004). The global community, in particular the WHO, did an excellent job of forming a coalition offering ongoing and effective guidance to officials in affected countries on means of managing the spread of the disease. This advisory coalition led to the containment of SARS within a few months (Heymann & Rodier, 2004). However, as Smith (2006) has pointed out, although the global community managed to contain the spread of SARS quickly, the lack of adequate and effective communication to travellers and to the general public placed a significant economic strain on some countries. The spread of inaccurate news and information halted travel and business in many countries in Asia (Smith, 2006). Various studies have placed the global economic impact of SARS between $30 to 100 billion (Chou, Kuo, & Peng, 2004; Fan, 2003; Hanna & Huang, 2004; Lee & McKibbin, 2004; Smith & Sommers, 2003; Wen, Zhao, Wang, & Hou, 2004). These research findings offer an important lesson for my own organization as we work on tackling malaria. The SARS example strongly suggests that the planning process should take key stakeholders into consideration and actively engaging these stakeholders throughout the funding process.

Effective communication should lead to building coalition and collaboration with other global organizations and bodies working toward the same mission of eradicating and containing pandemic diseases. When tackling major global initiatives, ‘successful efforts take planning, coalition building, and patience’ (Carney, 2006, p. 199). As noted above, the WHO’s success in containing SARS within a few months was a direct result of its effective link to host country officials and its ability to quickly form a coalition. A number of participants within my own organization noted that while working on malaria projects, we do not engage in meaningful interaction with other organizations around the world to share data and information on what we

plan to do and vice versa. We continue to focus on the status quo and may be duplicating the same activities as others. The second half of the 20th century demonstrated the valuable impact of coalition building and collaboration when organizations such as the WHO, United Nations Relief and Rehabilitation Administration, UNICEF, and many others were formed (Markel, 2014). These organizations succeeded in working at international and national levels to tackle and contain infectious diseases. A good example noted from chapter 2 is the successful effect of coalition building that lead to the eradication of polio toward the end of the 20th century (Grassly, 2013).

It is also important to note the value communication brings to an organization. Open discussions lead to new ideas and suggestions that have not previously been thought of (McLean, 2005). For example, through an open discussion, a participant raised the issue of senior management's lack of proper understanding of the endemic region's culture. The participant believed that the senior management actively focused on buying bed nets for children to shield them from mosquitoes. However, they failed to understand that people in many remote African villages did not sleep on beds. They sleep on the floor and the bed nets were not effective. This information was provided to me through an interactive interview. This unstructured research led me to find very important information on how resources were being allocated ineffectively. I found the qualitative research helpful and flexible for my particular study.

Finally, fighting complex and dynamic diseases such as malaria requires an agile organization that is quick at adjusting and responding to changes. A truly agile organization or team learns to be stable and dynamic (Aghina et al., 2016). Moreover, such an organization actively observes and reflects on its practice and seeks to be more reliable, efficient, nimble, and adaptive (Aghina et al., 2016). This is particularly necessary in my own office, which is very hierarchical and bureaucratic

and as a consequence does not take into consideration the dynamic nature of malaria and the need to seek information from others conducting the same types of activities. As a result of my engagement with action research in this DBA programme, small changes are starting to take place within PHRDI, which will be further discussed in the next chapter.

Concluding Reflection

My own role within the organization provided me with the ability to experience and observe the process of resource allocation and understand the problems associated with it. However, these are my own experiences and are unique to the specific projects I managed. Therefore, interviewing and discussing the process with colleagues provided me with a different perspective and helped me identify patterns of systematic issues that are directly related to my research question. By conducting this research, I was able to further dissect the process of how funds are distributed and utilized in endemic regions and was able to gain valuable knowledge regarding assumptions on how resources were allocated. This led to valuable discoveries and identification of gaps and areas for improvement. The action research approach has helped and continues to help provide richer discussions and details of specific problems and issues that need to be addressed. These interviews offered valuable knowledge on the process of awarding contracts and managing R&D initiatives.

According to the participants, chart 4.1 is the general process for PHRDI's allocation of funding through contracts to tackle malaria. The scope of projects we fund on malaria includes surveillance, clinical trials, laboratory research, and local community level training and services. Chart 4.1 shows the process described by the participants of how resources are allocated. Examining each phase through the action research cycle enabled me to find weaknesses in our process and ways to improve on these weaknesses. Interviews and focus group discussions with the participants helped

me assess these different phases of our funding process and gather relevant data that contribute to examining and observing the practices in PHRDI. The interviews and focus group discussions looked into identifying areas of concern associated with some of the phases that influence the allocation and distribution of funds. Moreover, these discoveries led to recommendations and action plans to improve the way we manage the resources targeted against malaria. These recommendations are addressed in the next chapter, where I offer insights on my learning development as a scholar-practitioner.

Based on my literature review (chapter 2), there are very few in-depth studies on resource management and how resources are monitored and allocated in the case of malaria at organizational level. As mentioned in chapter 2 of this thesis, people are often generous in donating and helping in times of crises but fail to evaluate the outcome of those resources and donations and how they are being used in practice. There are studies on many crises around the world that relate to my research, such as the mismanagement of resources after the 2010 Haiti earthquake or the challenges raised by corrupt politicians in many African countries receiving global funds (chapter 2). In the case of the Haiti earthquake, according to Laura Sullivan of National Public Radio (NPR) (2015), over half a billion US dollars was donated to American Red Cross to assist and rebuild Haiti after the earthquake. However, half a decade later, the author has noted that very few changes have occurred in Haiti's infrastructure and the vast majority of the population continue to live in poverty. As Sullivan (2015) has outlined, the majority of the resources were mismanaged through frequent staff changes, ineffective bureaucracy, and language barriers. In the case of malaria, the WHO (2017) reports have shown that funding for malaria increased dramatically from $100 million in 2000 to $2.5 billion in

2015, a 2,500% increase, while the malaria cases from 2000 (approximately 62 million) to 2015 (approximately 214 million) decreased by only 18% (Roser, 2016).

Although there have been improvements in malaria mortality rates from 2000 to 2015, the persistently high rate of malaria cases continues to devastate many parts of the world, particularly Sub-Saharan Africa, year after year (Shane, n.d.). A considerable amount of research has been conducted on the success of malaria control, however, there are very few research studies at organizational level on how funds are distributed and managed. A study conducted by Mwenesi (2005) has pointed to the lack of social science studies on the state of malaria. The author has commended the research community on the significant progress made toward tackling malaria, while also raising concerns about the unsatisfactory integration of social science research into programme and policy implementation. Mwenesi (2005) has suggested a greater focus on capacity building and effective policies toward malaria elimination. This study has focused on the research gap of looking at the fight against malaria from an organizational perspective that helps to bring practical insights to this field of research. This chapter has discussed the connection between my research findings and the literature, my reflections in terms of action research and action learning, the implications of my research findings, and a final reflection on the importance of the study for my department and my practice.

CHAPTER 5

ACTION LEARNING AND REFLECTION

Chapter Introduction

This chapter is engaging with an assessment of the connection between the core issues and my research findings and how they were integrated with my action plans. It examines how this connection fits through my experiences, dialogues, and collaborative approaches with my organization's leaders. This chapter begins with an introduction and summary of why I decided to conduct this research, a discussion of the connection between action research and my own research, and follows with information about how my action plans were implemented within my office. The chapter continues by demonstrating how I implemented the action plans, including proposing leaner organizational structure, utilization of effective communication toolkits, and the introduction of agile project lifecycles to improve our funding processes. These action plans clearly define the actionable knowledge that have been generated. Finally, the chapter concludes with a reflection of the outcome of my action research and action learning experience through my development as a scholar-practitioner.

My research aimed to find effective and efficient ways of using resources within my organization to tackle malaria. I developed a passion to fight malaria through my travels to Ghana and other African countries, where I frequently observed the hospitals crowded with people, particularly children, infected with malaria. I grew up in the United States where malaria is a thing of the past and hardly ever mentioned in day-to-day life. Seeing the dire consequences of malaria in West Africa prompted me to further study the disease and explore its impact on the population. I

learned that the global funding toward fighting malaria increased from $100 million in 2000 to well over $2 billion a decade later, while during the same period the malaria cases in places such as Sub-Saharan Africa remained steady or slightly decreased (WHO, 2017). This motivated me to conduct this research to find out why, in the light of such an increase in resources, we are unable to eradicate or even effectively control this disease (Shane, n.d.). While the scope of the research may appear to be ambitious, I narrowed my focus to my own work and office to help me understand the role we play in the fight against malaria. Therefore, it was extremely important for me to learn how resources are allocated and whether they are used in the most productive and efficient ways. I aim to contribute to the fight against malaria and to bring meaningful changes to my own workplace.

I began observing my organization to determine how we manage resources, and sought additional information from participants within and outside of my organization through a qualitative research (chapter 3). This led to the discovery of a number of inefficiencies and areas of improvement in the way we manage the resources to combat malaria. They include:

- Poor communication amongst stakeholders
- Complex funding allocation processes
- Lack of focus on innovative approaches.

From my professional experiences, we face these kinds of problems in my department and they are linked to my findings, which further corroborates my suspensions and concerns with the way we have been managing the resources. I examined these issues through action research and have been working toward implementing meaningful changes to my office and organization as a whole.

Critical Reflection and Actionable Knowledge

In the previous chapter, Research Findings, I was able to uncover three core issues within my organization through interviews and focus group discussions. They include:

- My organization's continued focus on status quo instead of exploring new approaches and ideas
- Lack of effective communication amongst stakeholders and others, particularly external organizations working on the same mission of fighting malaria
- Complex and ineffective funding allocation process

In order to better understand the connection between my research and action research, it is important to dissect the issues, their implications, and how I intended to tackle them. The following sections of this chapter show how I applied and recommended changes through action research cycles to reach the desired outcomes and objectives in response to the core issues identified in the previous chapters.

By introducing small and carefully measured changes to a small sector of my organization, I hope to demonstrate their effectiveness and apply them to other sectors and, ultimately, to the organization as a whole. This objective was undertaken through action research's iterative process of planning, taking action, collecting and analysing data, and reflecting (Riel, 2017). For example, during one our management meetings, I proposed to my leadership to regularly revisit our organizational structure, which was developed over a decade ago, and make it more relevant to our current workload and align it with our available resources. A number of our senior management and colleagues were indifferent about this feedback and some even challenged the implementation of it. I engaged them in group and individual discussions and observed their

concerns. During these interactions, while they acknowledged that we needed to bring about some changes to the organization, their primary scepticism was that any change to the status quo could lead to poor morale and decreasing productivity. After carefully reviewing the notes from our discussions and reflecting on my interactions with them, I came to the realization that they needed reassurance and confidence that my proposal to change the organizational structure can be a force for good. As such, I formed a team of volunteers to collect relevant data on the current status of our workload and available resources, developed several models for improvement, and chose a model that was most feasible with significantly positive impact. I then went back and presented the data to the leadership and asked that we implement the changes to a smaller sector of our office instead of the broader division. This approach would help them observe the impact of the change and then decide whether it is worth the effort or not. They agreed to my proposal and also asked to revisit the project after implementation to see the impact and to determine whether this could be applied to the whole organization. This approach helped me gain their support and confidence. Once implemented, we examined the new organizational structure's effectiveness through observation, seeking feedback from colleagues, and reflection. In a year from now, I am hoping to revisit this structure and see if another model can be implemented through the same practice, taking into consideration the feedback received from the implementation of the older model. I believe the iterative action research cycles can be an effective approach to keeping up with a dynamic and heterogeneous environment. The figure below (fig. 5.1) offers a snapshot of the process I followed to apply the changes within my office. This model was chosen because of its iterative nature, through which the researcher actively works to improve his or her practice. In particular, in dynamic environments such as mine, there is an ongoing need for improvement in communication, organizational structure

development, and efficiency. The use of iterative action research cycles helps to improve our processes and keep us engaged in our practice. From my experience, it helped me to actively examine the status quo. I particularly find the following action research model in figure 5.1 useful in tackling many of our issues (Riel & Rowell, 2016).

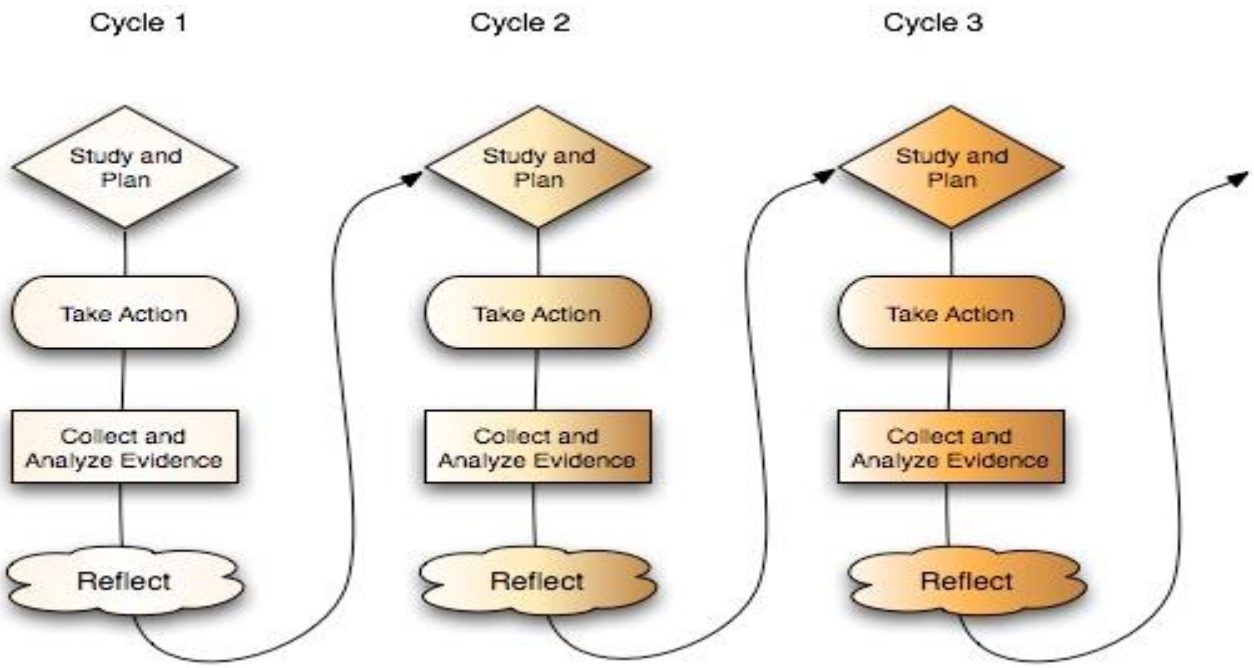


Figure 5.1 – Action research cycles. Source: Riel (2017) - The iterative process of action research

Application of Action Research Cycles and Action Plan

This section examines the use of action research cycles to tackle the core issues discussed in previous sections. Through this method, I can effectively dissect the issues and engage others in searching for more optimal approaches to finding efficient work processes. In order for me to deal with the core issues, I am proposing a number of action plans within my office to further improve our project funding and management. They include:

- The development of an agile project timeline that is result-driven

- Encouraging the use of interactive tools to improve our communication with the stakeholders
- Development and formation of a sound organizational structure that is in line with our up to date workload and resources

I intend to bring about these changes through action research cycles and plan to carefully reflect on their outcomes. These points are relevant to my research because they can lead to improvements in my office and will contribute toward actionable knowledge. Action research has been a contributor of actionable knowledge, as demonstrated by literature. For instance, action research cycles were used in a study by Maindal et al. (2014) to find feasible and effective intervention for people at risk of diabetes. Through their research, the authors have learned that the European general guidelines and interventions to prevent diabetes were not producing the intended objectives. Therefore, they have explored action research approaches to develop a model and then test it. The authors have been able to find positive results through short lifestyle interventions and professional consultations to assist individuals with prediabetes symptoms. The optimal solution was found through various phases where phase one did not meet expected results, so they went on to phase two after learning from their mistakes from phase one, which was an improvement and produced much more effective results. They initiated phase two by reflecting on the data and results of the actions of phase one. The iterative action research cycles helped the researchers to find optimal solutions to the problem. Learning about this research and the dynamic nature of action research cycles made a difference in my own study. I understand that I may have to actively follow the iterative nature of action research cycles and improve as I go forward.

The Three Core Issues within my Organization, their Implications, and Implementation of Action Plans

This section offers further insight into the core issues within my organization, their implications, and their connection with my interviews and focus group discussions. There is no one solution to these common issues, my aim is to use approaches such as action research cycles to make improvements within the organization and maintain a competitive edge against the rapidly changing global economy. Furthermore, I dissected each core issue described above, its implications, and the actions plans that were formed through my interactions and collaboration with my colleagues and management. The chart below demonstrates the stages I followed to deal with the problems within my organization and implementing the action plans.

Chart 5.1 – Stages of implementing action plans

Theme 1 – Issues with focusing on the status quo

The process of allocating funds appears to be universal and the team in my office follows a standardized series of phases, as described in chapter 4. Unfortunately, these phases do not leave much room for flexibility nor allow our team to seek new ideas. It continues to follow the same old plans and approaches to allocate the resources. The information and data gathered from the participants from my research demonstrated that the process is neither flexible nor agile. The determination of budget and research focus is generally based on previous years' expenditures and is not aligned with market-driven prices nor is it competitive with the industry. This leaves

very little room for rigorous and open negotiations with the prospective parties and recipients of funds. The team is often scrambling to stay within the budget; not go over or below it, as it would affect their budget in future years. Based on a study conducted by Liebman and Mahoney (2017), the majority of government funding has an expiration date and can only be used within a set period. The study found that the main part of government expenditure occurs toward the very end of the fiscal year. This leads to the purchase of lower quality goods and services, often at higher prices (Liebman & Mahoney, 2017). The implication of this approach is that less attention is given to the actual research area, instead, the focus remains on the annual budget. Another implication, as noted in chapter 4, is once contracts are negotiated and funds are allocated, the level of scrutiny of the recipient's work declines and the team within the organization begins to focus on the next project. From my professional experiences, we face these kinds of problems in my department and this is linked to my research findings. This further corroborates my concerns with our process of resource allocation and validates the need for a fundamental change to our process. As such, in our monthly standing meeting with different managers of the department, I raised this issue and proposed to make our projects agile that focuses on results instead of annual budget. During the meeting, the situation was quite tense because this was an unexpected proposal and it would changes a long-standing process within the organization. I proposed to set up another meeting to specifically discuss my proposal and to answer any questions they may have. In the meantime, I provided the managers with materials to read ahead of the meeting. The next section of this chapter further discusses the action plan.

Agile projects focusing on results

Given the nature of the government and its complexity, I came to the understanding that we cannot change the policy of 'expiring funds' as it is imbedded into the foundation of the United

States government as a whole. However, after engaging with my team, we found a much simpler solution to this issue, which was to initiate our projects much sooner than we had planned previously through an agile procurement process. We would need active observation and reflection of our projects and to improve as we go forward. This would require our projects to be flexible and open to changes so that we can improve each phase of a project as it progresses (Nicoletti, 2018).

Nicoletti (2018) has explained that agile procurements are more effective when working in high pressure and dynamic organizations. Bjarnason et al. (2011) have emphasized that agile processes lead to improved communication and better management of a project scope. The authors have also cautioned against challenges such as maintaining stability and keeping up with cross-functional teams. In my office, instead of developing a project milestone based on when funds expire, which is often close to the end of the fiscal year, we should initiate it months in advance. This would relieve us from a lot of stress in meeting last minute deadlines toward the end of the year. In addition, it would lead to the simplification of the project by actively dealing with a smaller portion of the project rather than looking at the overall project and dealing with issues at the end. I followed the stages below to implement this action plan within my organization:

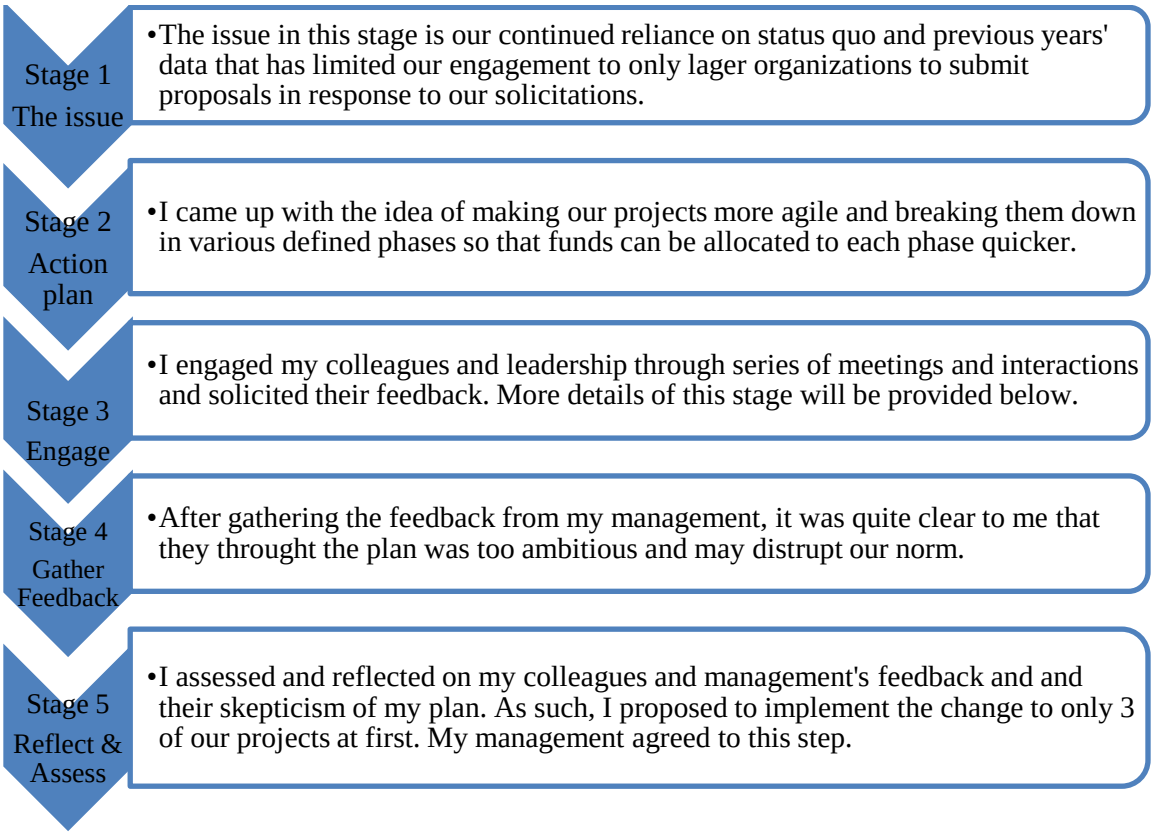


Chart 5.2 – Stages of implementing action plans

For my plan of action, we chose three new projects due in the fiscal year 2019 and developed a milestone that would initiate the work at least six months sooner than planned in previous years. In our subsequent meeting with my managers, this plan was proposed and we presented the pros and cons of this approach. I explained that agile projects would help us in rigorous review of our solicitation documents and give plenty of time to prospective organizations to develop proposals. This presentation brought some positive energy to the meeting and we began to engage in meaningful dialogue on how to implement this change. They agreed to initiate the pilot projects and to actively assess their successes.

In today's dynamic economy, where new and modern technological ideas are introduced regularly, it is critical to be forward thinking and flexible to change. Over three decades ago, in response to the rapid technological advancements and the proliferation of a global economy, the National Research Council in Washington DC stated that *'[it] is indeed a time of transition for firms and governments alike'* (1988, p. 1). Over the years, the majority of private industry companies have managed to keep up with these changes, while government institutions have moved very slowly. A heavy focus on the status quo and previous years' data in planning future activities can take attention away from innovative market ideas. Steele and Murray (2004) have raised awareness of the importance of fostering a culture of innovation and forward thinking in an organization operating in a global setting. A culture of innovation and creativity is likely to lead to sustainability and keeping up with its industry as a whole (Steele & Murray, 2004). This is particularly true within my own organization. We have to change our mind-set of doing what we have been doing, focus on the bigger picture, and explore innovative and creative approaches to funding contracts.

Theme 2 – Lack of effective communication with stakeholders

The participants in this research raised concerns that there is a lack of communication between senior management and project stakeholders during the planning phase of our projects. Specifically, the lack of communication with the stakeholders is most obvious when senior management are the only people in the room planning to determine the focus of our projects and the amount of funds needed for those projects. Those missing in room are the direct stakeholders whom have up to date knowledge and experience of where the focus of the project should be and generally have the knowledge of the budget needed to address those areas of concerns. The implication of this is that we often have to make drastic changes to our projects after the

decisions are made. This leads to a great deal of time lost in the project development phase. Additionally, lack of effective engagement with stakeholders, internal and external, can lead to potential duplication of efforts.

Effective communication is the lifeblood of an organization and *'is paramount to business success'* (Hargie et al., 1999, p. 4). It is a particularly critical resource in large organizations where there are multiple channels of hierarchy, as is the case with my office (Hargie et al., 1999). There is a need to promote efficient and effective communication models amongst our leadership and stakeholders when we plan for funding various projects. Getting stakeholders involved in the planning phase is likely to lead to increased productivity and reduced costs throughout the lifecycle of the project (Hargie et al., 1999). Lack of adequate communication between upper management and stakeholders has led to only marginal success on many of our projects. The planning phase requires a considerable amount of collaboration and involvement by all parties. This ensures that there is clear communication and cooperation on how to initiate a project, particularly using new and creative ideas from direct stakeholders. Stakeholders' influence on organizational management and policy has been growing rapidly in recent decades (Scholes & Clutterbuck, 1998). Various factors such as globalization, educated consumers, empowered employees, proliferation of information, and technological advancement have led this increased influence (Scholes & Clutterbuck, 1998). Scholes and Clutterbuck (1998) have emphasized on the importance of ongoing communication and engagement with stakeholders that is likely to lead to sustainability and innovative approaches to dealing with various organizational issues. From my professional experiences, we face communication problems in my department as it is linked to my research findings. This further validates my concerns with

our communication and supports the need for a fundamental change to our process. The chart below outlines the stages I followed to implement this action plan in my organization:

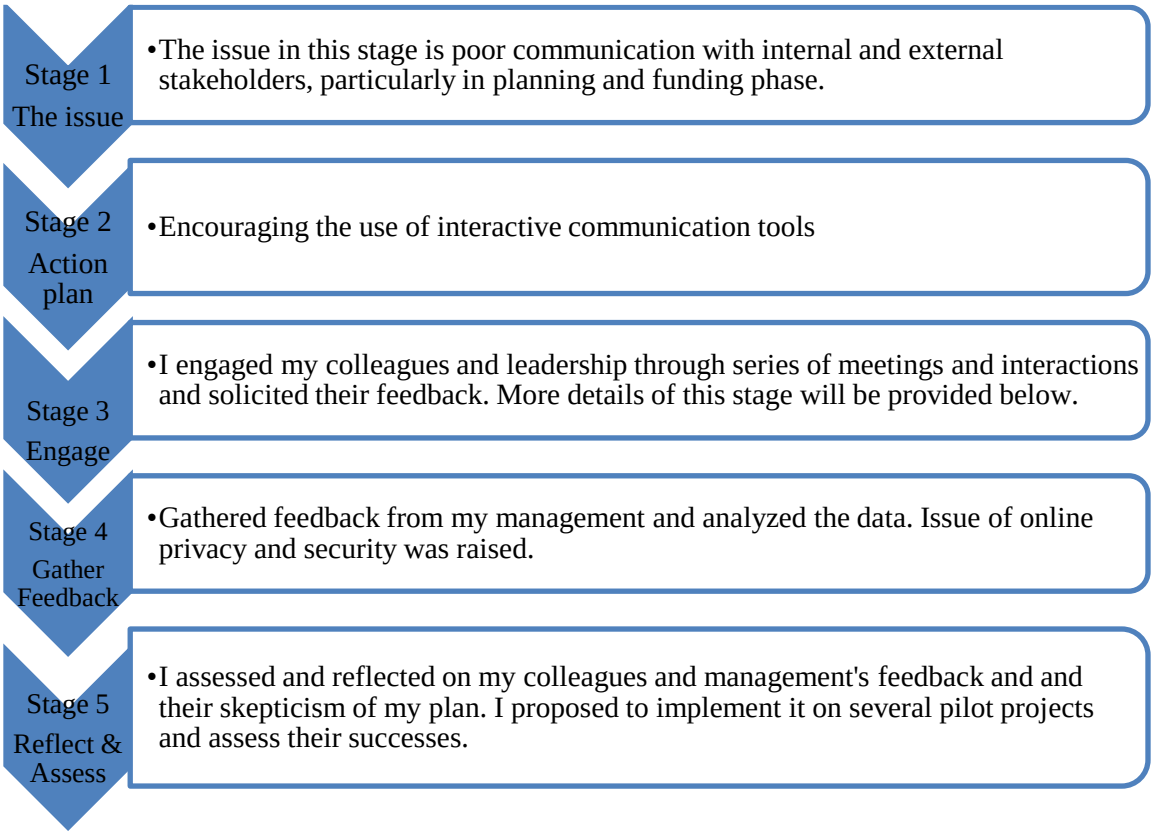


Chart 5.3 – Stages of implementing the action plan

In one of our monthly standing meetings with the office managers, I raised this issue and proposed to use an interactive communication tool to improve our communication with the stakeholders. I explained that our current process is very outdated and caused months of delays to our project milestones. Additionally, the industry has been using various technological tools such as SharePoint to streamline their project life-cycle and communication. While majority of our managers agreed for the need to tackle this issue, our policy office managers raised concerns about the security of such systems. I assured them that whichever system we use, it would be

vetted and approved by our IT office in advance. Overall, they agreed to hear more about this tool and how it would be implemented.

Encouraging the use of interactive communication tools to improve communication

In order to foster a more effective communication, I proposed the use of an interactive Microsoft SharePoint toolkit where stakeholders could engage upper management in planning projects at the initial stage. The introduction of this toolkit derived from my examination of literature in the area. Specifically, Atkins and Cole (2010) have pointed out that collaboration tools such as SharePoint streamline communication, promote innovation, and enable the effective dissemination of corporate knowledge. In another article, Diffin et al. (2010) have used SharePoint as a central tool for online collaboration, communication, and data storage to further improve the online programmes at the University of Maryland University College. The goal of this initiative was to enhance efficiency, organization and cooperation. The outcome of the study has demonstrated great improvement in these areas and a realization that there is no one solution to these major management areas.

For my office, SharePoint was test piloted for a small project and key stakeholders were given training and opportunities to offer feedback into how to make it more user-friendly. A few months later, this interactive tool is being used for other upcoming projects, indicating its success. Figure 5.3 offers a better picture of how our SharePoint communication toolkit has been used toward improving cooperation amongst team members.

Active communication and interaction with external stakeholders who strive to fight malaria is also important. The SharePoint system can be an excellent resource for actively sharing data amongst the parties involved and in soliciting more interest. Orazem et al. (2017) have conducted

a study to learn why start-up companies do not bid on government contracts; particularly, at a time when they are making a difference around the world. Start-up organizations are often innovative, lean, and creative in meeting their objectives (Orazem et al., 2017). Amongst many issues the authors have pointed out that ‘lack of clarity on how to connect with agencies’ was an important factor that dissuaded start-ups from bidding on government contracts. As a result, a large proportion of government contracts are with incumbents and larger organizations. This is the case in relation to malaria projects. Most of our malaria contracts have been with large and bureaucratic universities and government agencies, particularly large institutions in West Africa. This deters many small local establishments from competing with these organizations. The goal of rolling out a communication tool is to solicit interest from all parties and help them participate in our procurement process. In this way, we can avoid duplicating efforts and further improve on other projects. Additionally, smaller and leaner local organizations in endemic regions can engage us with their ideas and experiences.

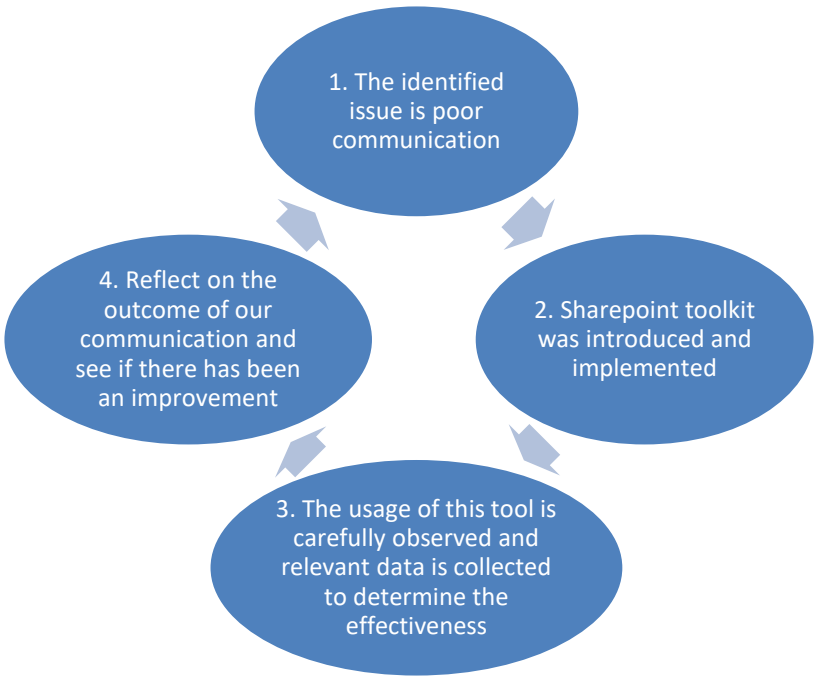


Figure 5.2 – The introduction of SharePoint communication toolkit.

Source: The concept of action research cycle was taken from Riel (2017)

While internal communication is important to ensure projects are planned effectively, it is also imperative to maintain effective communication with external parties. In particular, when we plan for a large malaria R&D project, interacting and communicating with external organizations can help us avoid duplication of efforts and further refine our project goals and objectives. Kuchenmüller et al. (2009) have supported this notion through their study on the 'global burden of foodborne diseases'. The authors have explored the impact of contaminated and unsafe food on the global community and have found that millions of people die from curable diseases, such as diarrhoeal diseases, every year. The authors have concluded that the key to improvement in this area is partnership and collaboration with stakeholders. This would enable organizations to avoid duplication of efforts and share data and ideas toward making meaningful improvements in fighting common foodborne diseases (Kuchenmüller et al., 2009).

Theme 3: Complex funding process

As discussed in chapter 4, the research participants, particularly the external ones, raised concerns that the procurement procedures are very complex and time-consuming. As a result, there is a possibility that we fail to seek out innovative and creative approaches from smaller and local organizations fighting malaria. In particular, local entities in endemic regions have very few resources to participate in our solicitations. This results in larger organizations receiving funds and then distributing them to the local entities, whereby a portion of funds is spent on overhead and administrative fees. Complex procurement processes has driven away start-ups and smaller organizations from bidding on many government contracts (Orazem et al., 2017). There is a need for government agencies to find more creative approaches to encourage start-up and smaller organizations to participate in government procurements.

Another concern raised is that our projects are not flexible to changes throughout their lifecycle. Contracts are generally set up with a base period of approximately one year and four option years. The funding for each option year is intended to be based on the evaluation of the state of malaria and a determination of whether revision should be made to the original scope of work. Unfortunately, very few revisions are made to the original scope of work despite major breakthroughs happening around the world. The implication of this practice can include the potential repetition of work by my organization, and the potential loss of resources through duplicate efforts that may have been carried out by other organizations. A good example of this point, as described by Shah (2010) and noted in chapter 2, is when millions of dollars were donated by people in the United States and other Western countries to purchase insecticide-treated bed nets to save African children from mosquitoes. However, according to the author, in some parts of Africa, people refused to use the nets for various reasons, including discomfort and

cultural reasons (Shah, 2010), which led to wasting valuable resources that could have been better used.

Finally, due to the nature of US politics, priorities shift as a new administration comes to power through elections. This shift in power leads to shifts in the leadership of my organization and the priorities of the new administration. Therefore, many funded projects with one set of objectives could be cancelled and funds could be shifted to other areas. This is certainly the current state of R&D in the United States, as the new leadership has a different set of priorities and objectives. When our projects are not set up to be agile and flexible, shifting priorities may mean cancellation of an entire project. This can lead to time and resources going to waste, which is a major area of concern for my own practice. From my professional experiences, we face these kinds of problems in my office and this is clearly linked to my research findings. This further corroborates my concerns with our process of resource allocation and validates the need for a fundamental change to our process. As such, in our monthly standing meeting with different managers of the department, I raised this issue and proposed to reassess our organizational structure and develop one that is aligned with our workload and resources. This would enable our team to ensure the resources are effectively allocated. The next section of this chapter further discusses the action plan and the various stages of my engagement with the leadership to implement the change. I followed the stages below to implement this action plan within my organization:

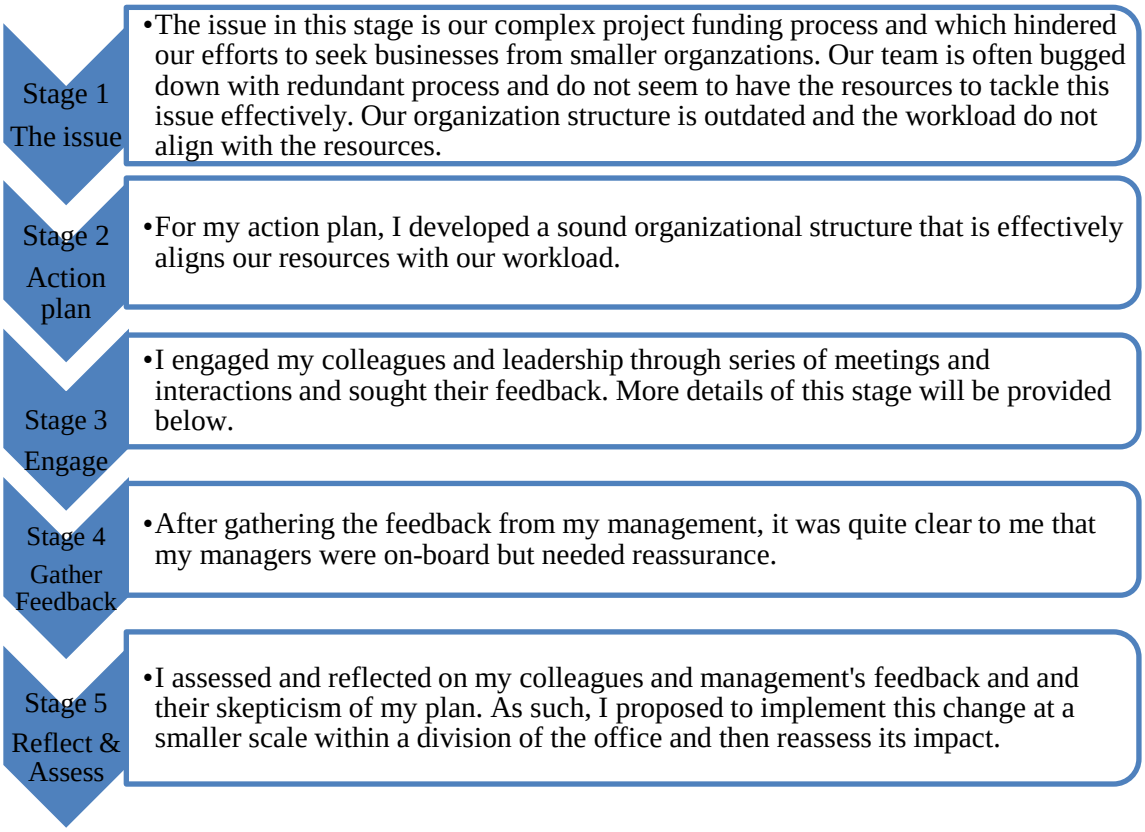


Chart 5.4 – Stages of implementing the action plan

Development and formation of a sound organizational structure

One of the areas of improvement identified within my office is to ensure our organization is properly structured in accordance with our up to date workload and available resources. This helps us to keep up with the shifts in priorities and effective utilization of resources. As I look back at my research findings from the interviews and further reflecting on my professional experience, it is quite clear that my organization is very bureaucratic with a hierarchical management structure. The research participants consistently pointed to the fact that funding decisions from upper management rarely include engagement and feedback from lower to mid-level professionals. There is very little collaboration in planning phase, particularly with those individuals involved in the day to day of the project lifecycle. Moreover, minuscule decisions

often involve upper management which adds redundancies to the process. There is a need for us to shift from a hierarchical organizational model to a flat management structure. This is where the leaders actively seek feedback from lower level staff to make decisions and they themselves work amongst the team on the organization of projects. According to Meehan (2018), a flat management structure fosters an environment of inclusion and reduces unnecessary management layers. This leads to more effective communication and coordination amongst team members. My organization includes a highly talented and educated team who are passionate about fighting malaria and other infectious diseases and they understand the challenges these illnesses pose to the world. Therefore, promoting an environment of inclusion where discourse and dialogue amongst stakeholders can play a very positive role in the organization's success, particularly against dynamic diseases such as malaria. In order to tackle this issue, I proposed a sound organizational structure where key stakeholders of malaria projects will be involved in all facets of the project planning and its lifecycle. In this model, we actively examine our workload and resources to ensure there is effective balance between them.

Figure 5.5 sums up my plan to change our organizational structure to be lean and effective by applying the action research cycles. For my action plan, I developed and proposed to my leadership an organizational study that consists of the following steps to bring about the much-needed changes to our office.

- Step 1: Carefully observe and document the resources available to us, including office budget, number of full-time and part-time employees, and other relevant resources
- Step 2: Examine and organize the workload managed by our office
- Step 3: Observe similar offices and see how they operate and manage workload
- Step 4: Present the plan to the staff and seek their feedback and opinion

- Step 5: Implement the plan to action and continue to observe its effectiveness and follow steps 1-5 on an annual basis

Once I developed my plan of action, I requested a one hour meeting with my office managers to present the plan to them and seek their feedback. My office overall includes seven managers leading different teams focusing on various infectious diseases. It was a bit hard to get everyone together because of the scheduling conflict but I was able to extend one of our standing meetings by one hour. They were uninterested at first and were often distracted with their mobile devices, particularly when we were discussing problems with our organizational structure. At least two of the participants raised concerns that this type of change could potentially cause unhappiness amongst the staff because they may be moved to other areas of the office. I explained to them that all changes will involve staff feedback and support. Additionally, employees will not simply be moved to areas they do not want to be in. I continued to explain the need for this change and presented the data I gathered from the research participants and how this change would increase our productivity. After the meeting, I further engaged them in smaller groups and individual discussions and observed their concerns. During these interactions, while they acknowledged that we needed to bring about some changes to the organization, their primary scepticism was that any change to the status quo could lead to poor morale and decreasing productivity. After carefully reviewing the notes and reflecting on my interactions with them, I came to the realization that they needed reassurance and confidence that my proposal to change the organizational structure can be a force for good. As such, I formed a team of volunteers to collect relevant data on the current status of our workload and available resources, developed several options to explore, and chose a model that was most feasible with significantly positive impact. I then went back and presented the data to the leadership and asked that we implement the changes

to a smaller sector of our office instead of the whole organization. This approach would help them observe the impact and then decide whether it is worth the effort. They agreed to my proposal and also asked to revisit the project after implementation to see the impact and to determine whether this could be applied to the whole organization. This approach helped me gain their support and confidence. Once implemented, we examined the new organizational structure's effectiveness through observation, seeking feedback from colleagues, and reflection. By introducing small and carefully measured changes to a small sector of my organization, I was able to gain their confidence and support to test my idea and provide an assessment of the impact of this change. This objective was undertaken through action research's iterative process of planning, taking action, collecting and analysing data, and reflecting (Riel, 2017).

Although my immediate managers offered positive feedback of this action plan, implementing it requires organizational approval and it is currently being reviewed by senior leadership. Once implemented, my goal is to reflect on the plan and actively monitor and measure each division's output to see whether improvement is needed. Moreover, the dynamic nature of the organization demands possibly annual restructuring of the office. This can be done through the iterative action research cycle.

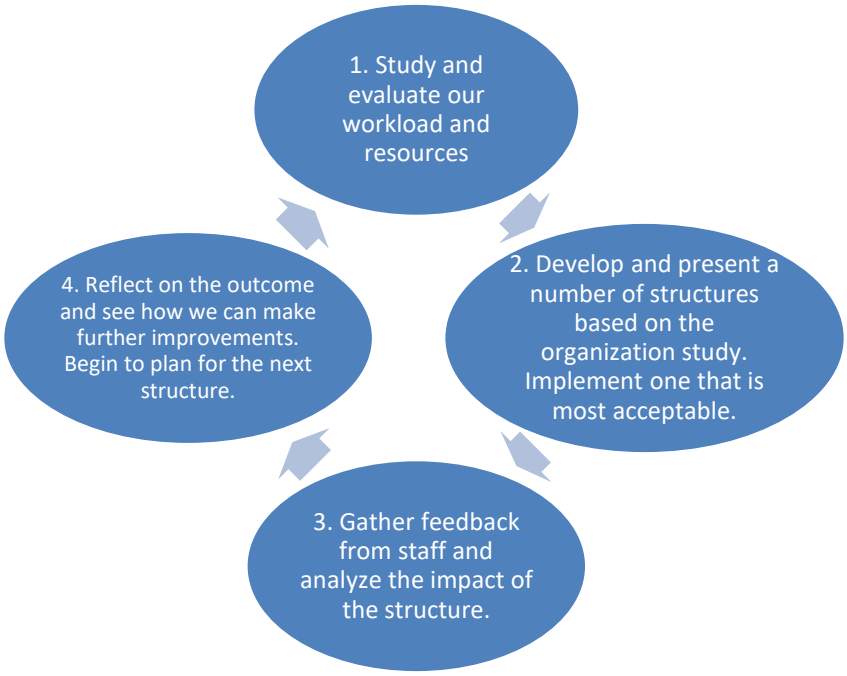


Figure 5.3 – Development of a lean organizational structure.

Source: The concept of action research cycle was taken from Riel (2017)

Actionable Knowledge

The roll out of my action plans received positive feedback from a majority of my management and team members. The use of the interactive communication tool has been piloted on a number of projects and we were able to observe its impact on the office from the beginning. We were able to gather effective data on project milestones and status from the system rather than traditional methods of asking participants. In addition, the system brought a new level of transparency where we could actively see how projects were progressing and address any issues arising in the project lifecycle. The use of the SharePoint system has significantly improved communication about managing the project and shortened the timeline of various phases of the project. Additionally, this interactive system also helped us identify the delay points and address them. The agile model is being used on a number of our projects and has been extremely helpful

in improving our projects through each phase. In particular, some initial data has shown positive results where the concept of action research is gaining momentum within my office. Even though these action plans are offering positive outcomes thus far, it is important to note some of the challenges. A number of my team members are sceptical of this approach and have raised objections. They are concerned that various initiatives have been proposed in the past where they did not see an overall value and led to staff doing more unnecessary work. These individuals prefer the status quo and may not buy into the idea of action research. Additionally, I cannot report on all of these action plans because these are long-term changes and they require time to assess their overall outcomes.

We implemented the agile procurement on three of our projects that are currently in progress and had positive outcomes thus far. By breaking down the project to various phases, we were able to effectively develop our documents without the pressure of meeting critical deadlines and give the interested organizations enough time to ask us questions and develop their proposals. Additionally, if our final negotiated budget is less than the original allocated funds, the office has enough time to allocate those funds on another related project, as applicable. On the other hand, if we need additional funds, our budget office would have enough time to determine if additional funds could be added to our project.

A simple change to our milestone has made a great difference in how we conduct our business and I am hoping we can effectively apply the agile model to other projects within the office. It is important to note that core guidelines and concepts of this model would be taken into consideration while adjustments would be made to ensure we consider the unique nature of each project. The main goal with this theme is to create a process where a rigorous evaluation of the marketplace is part of the decision in the planning phase of the project. By revising our milestone

plans, we were able to make a significant stride toward developing effective market research and focusing more on our programme needs rather than on how much funds we need to spend.

Effective communication and engagement with stakeholders is the key to a successful action learning approach. Effective communication and collaboration work hand in hand with action learning in an organization (Maddison & Strang, 2018). One effective way of addressing the issues identified in my research has been fostering an environment of dialogue and discourse. Wells and Mejía (2005) have noted that learning is achieved through meaningful dialogue and discourse. Greenwood and Levin (2007) have argued that 'the encounter between local stakeholders and the professional researcher is the cornerstone on which mutual learning is built' (p. 135). Through action research and interaction with my colleagues, I learned that change at the micro level was a better start. This is mainly due to the fact that my organization is very large, complex, and diverse.

The divisions within PHRDI are decentralized, which limits my access to the upper management. Therefore, I decided to take the approach of *interlevel dynamics*, as suggested by Coghlan and Brannick (2010), which is an insider action research. Through this approach, change begins at an individual level and is then adopted by the team and then other teams. Once I have the ability to show successful outcomes from my own division, I can effectively propose it to the managers and eventually help other teams and divisions adopt it. Through cooperative inquiry, participants interact with one another by sharing their thoughts and experiences and reflecting upon them together (Ness & Strong, 2013). The participants brainstorm different ideas and options for change. The researchers would then evaluate those proposals and choose or modify the most effective options (Coghlan and Brannick, 2010). Greenwood and Levin (2007) have argued that cooperative inquiry fosters an open environment that leads to new ideas and new knowledge. By

using the SharePoint system, we were able to effectively get the support of our management to use it for approximately 15% of our projects in this fiscal year.

As I observed and reflected upon my office and my discussion with the research participants, one of the main areas of improvement has been our organizational structure. Our organizational structure is outdated, roles overlap, some divisions have more workload than others, and it does not align with our current priorities. As such, I raised these concerns to upper management and it was agreed to observe two team's workloads and to see where they stood. I conducted a series of research projects and presented the number of actions that each team completed in a given year and the amount of time in a given week that each team spent to complete those actions. The results showed the disparity amongst the two teams. The management decided to shift workload more evenly amongst the two teams. Although this was a small change in comparison to the overall organizational structure, the result, a year later, was very positive. Staff were able to meet their goals ahead of deadlines and our customers were very happy with the outcome. Further changes have not been made to our organizational structure, but I am continuing to make my recommendations. This is a direct outcome of my research activity because the efficiency within my office leads to our effectiveness in ensuring our focus remains on the fight against infectious diseases. This also concurs with my literature review findings where lack of effective communication and oversight after the Southeast Asian tsunami led to double vaccination and the outbreak of measles (chapter 2, cited in Vijaya & Owen, 2013).

The research conducted under this thesis helped me better understand the challenges that large, bureaucratic organizations face in effectively managing their resources. Some of the challenges we often face are changes in the US administration, which lead to frequent shifts in priorities. As I reflect upon my experiences, I come to the understanding that there is a need to plan how funds

should be utilized, to ensure our organizational structure is sound, and to actively monitor and evaluate our projects' success and failures. Additionally, it is critical that the support to non-profit organizations and local populations is based on sound judgement and is in line with the local culture and lifestyle. The action learning from this research include the active review of the process that is being followed. I may not be able to make major changes to the department at large, but I can promote a collaborative environment within my own office and frequently revisit our process of allocating resources, which can be considered a major achievement. Moreover, I learned that I can raise awareness of certain issues and seek feedback from our staff through dialogue and discourse. These are relevant issues that are discussed as part of my own learning and development process as a scholar-practitioner and that I develop further in the section that follows dealing with generated actionable knowledge and recommendations for further growth and development within my organization.

My Development as a Scholar Practitioner

From the start of this programme, I have engaged with the phenomenon of the scholar-practitioner, which, in the simplest terms, is the linkage of experience and academic knowledge into action (American Psychological Association, 2007). However, as Anderson et al. (2015) have noted, there is no specific formula for becoming a scholar-practitioner. It is an ongoing process of learning and improving. At the core of our learning has been the application of action research in our practice. Carr and Kemmis (1986, p. 162) have defined it as: '[a]ction research is simply a form of self-reflective enquiry undertaken by participants in order to improve the rationality and justice of their own practices, their understanding of these practices and the situations in which the practices are carried out.' At first, I was quite sceptical of action research

as I thought it would add more time to our very demanding and fast-paced environment. My other concern was that my colleagues and superiors may simply shrug it off and might not have any interest in this model. However, as I learned more about it through reviewing relevant literature and engaging with my professors in this DBA programme, I began to develop an appreciation for it. The scholar-practitioner mind-set is a way of thinking and cultivating innovative and creative approaches (Tyler & Lombardozzi, 2017). I began to observe my organization in a completely different dimension and discovered a number of improvement areas within my office. I then began to engage my colleagues to work toward marginal changes by applying the action research cycles. I followed a participatory and iterative process between myself, as the researcher, and the stakeholders, who are actively seeking to solve problems or bring about change (Greenwood & Levin, 2007).

The exposure to action research and action learning in this DBA programme and literature taught me three important lessons. The first lesson is the reliance on research studies and literature in the area of my work and projects. I learned that research studies in my field could offer me ideas on how I could improve the organization. The second lesson is to be more reflective of my actions and experiences. In the past, I was not reflecting a lot in terms of the initial intention of my project and its outcome. Once a task was completed, I did not look back to see if the results were what I had in mind initially or what was expected. My transformation into a scholar-practitioner was further inspired by Schön (1991), Westberg and Jason (2001), and Gibson (2015). Schön (1991) argues that education and technical knowledge alone are not enough to tackle the complex challenges leaders face in today's dynamic and uncertain environment. Knowledge must be coupled with intuition, which is developed through reflective practice, to maintain sustainability and success. Westberg and Jason (2001) have discussed the importance of

reflection in the medical and patient-care field. The authors have argued that active reflection enables medical professionals to build on their knowledge and experiences, leads to further collaboration, and helps generate new ideas. Gibson (2015) has asserted that critical thinking and reflection are important pillars of action for both individuals and organizations concerned with social development and sustainability in today's uncertain global economy. Active reflection helped me think more strategically, and to frequently reflect on the tasks throughout the project cycle and phases. Finally, I learned the importance of dialogue and discourse with team members while completing projects. By engaging in active discussion and communication with the stakeholders in my office, I was able to find areas for improvement or more efficient approaches to completing tasks through others' experiences. Learning about action research and action learning helped me become more analytical and reflective.

This DBA programme taught me to be more thorough and strategic in conducting business and managing projects. It helped me question the traditional means of doing work and exploring new ideas toward improving my office. As a scholar-practitioner, it is important that I actively seek innovative and creative theories to improve my practice while use the power of reflection to improve those theories and ideas (Thompson, 2010). For instance, as I observed my organization, I learned that we used to spend millions of dollars on meeting-space contracts. Each office and division within the organization would spend weeks to secure meeting spaces, requests would often come late, for their conferences and large conventions. I began to carefully observe and reflect on these repetitive and costly endeavours and proposed a plan through action research. The plan was to gather the organization's available meeting and conference data by looking into our historical and future meeting-space needs. I began analysing the data and identify the true administrative costs of securing logistical contracts. I then started looking at

how other similar organizations manage these types of needs. This helped me explore setting up broad contracts with pre-negotiated rates with local hotels and conference sites that would guarantee them future business and help us manage our costs. As such, I proposed this plan to my leadership during one of our monthly focus-group meetings. They raised a number questions and concerns on this proposal. A key concern amongst the management was what if a meeting gets cancelled shortly before the scheduled event, would we be bound to pay for all expenses. I asked them to give me a week to explore different options and discuss this concern with the conference site managers. After some deliberation with the hotel and conference site managers, we agreed that our office would need to give a two weeks advance notice of cancellation and all fees would be refunded. I brought this back to my management and they agreed to proceed with this action plan. In the end, we entered into three contracts with local hotels and negotiated rates at the beginning of the year. We made a number of adjustments throughout the process as I observed our actions. We, not only saved a lot of money through these contracts, our divisions were able to quickly secure meeting spaces at pre-negotiated rates. Through action research, we followed a series of events that comprises 'planning, taking action, evaluating the action, and leading to further planning and so on' (Coghlan & Brannick, 2010, p. 5). This example shows that through active observation and reflection, I was able to disrupt how we secured space and was able to present more effective approaches to it.

While action research has been a valuable model in my practice, it is important to note some challenges and issues I faced. My office consists of heterogeneous team members and not everyone likes or favours action research approaches. Engaging leadership and our frontline staff through the lens of action research was quite daunting at times and led to a series of delays in reaching our desired outcomes (Hammersley, 2007). In particular, when introducing new

approaches to collaboration and engagement, resistance can be inevitable in an environment that embraces the status quo. It can create completely different dynamics within the organization. For example, when introducing tools that help employees work more independently, a number of our team members resisted them. This is because they prefer to have strict and concrete procedures in place where they want their superiors to direct them and make decisions on their behalf. In another case, while introducing electronic collaborative tools such as SharePoint, in an effort to improve communication, some members resisted it and preferred the traditional communication modes such as the telephone. In order to seek support from team members and leadership, I engaged individuals within the organization regarding their concerns and found ways to come to a mutual understanding (Anderson, 2012). The table below is a general summary of the problems within my office and the action plans to mitigate their impact to my organization:

Problem	**Impact**	**Action Plan**
Continued focus on status quo	Lack of exploring new approaches and ideas to fund future projects.	The development of an agile project timeline that is result-driven
Ineffective communication amongst stakeholders, particularly smaller organizations, working on the same mission of fighting malaria	This led to miscommunication amongst internal parties and caused major delays to funding projects.	Encouraging the use of interactive communication tools to improve communication
Complex and ineffective funding allocation process	This continues to contribute to poor competition among interested parties. Historically, only larger and resource-rich organizations have been able to spend the money to prepare proposals to our solicitation and led to excluding smaller and local companies to be able to participate.	Development and formation of a sound organizational structure that is in line with our up to date workload and resources

Table 5.1 – Summary of issues, their impacts, and action plans

While it is important to consider these issues, the use of action research has offered overall value to the organization and to my personal development as a leader who promotes change. I learned

that some aspects of action research might be good for the organization, while other aspects of it can be challenging when working with a heterogeneous team. Ensuring that upper management is on-board with the changes and making sure they buy into them were extremely important factors to my success. Through this model, I have been able to implement effective communication tools, develop an effective organizational structure, and form various industry events to cultivate a cooperative public-private relationship. Action research helped me become more analytical and reflective in my practice. Even though I enjoyed completing tasks, action research and active reflection have brought a different dimension to how I manage projects and deal with my colleagues and team members.

CHAPTER 6

CONCLUSION AND FINAL REFLECTIONS

Chapter Introduction

This thesis is about finding effective and efficient ways of managing resources toward fighting malaria. This idea came to fruition when I learned about the global communities' dramatic increase in funding of malaria related activities from approximately $100 million in 2000 (WHO, 2012) to over $2.7 billion in 2016 while the malaria morbidity decreased from 262 million to 216 million cases in the same periods. This led me to investigate how we manage our resources and whether improvements can be made in the process of resource allocation and management. I conducted the research within my own organization as an insider researcher and began to implement changes through action research cycles.

I gathered data through interviews and focus-group discussions with key stakeholders within and outside of my organization. This led to the discovery of core management issues and areas of improvement. They include:

- Issues concerning how contracts are structured,
- Poor communication issues, and;
- Challenges with the organizational structure.

These issues are relevant because they lay the foundation to successfully managing resources. A contract that does not clearly stipulate our objectives can lead to poor outcomes and deliverables. Poor communication had led to chaos and delays on a number of initiatives. Finally, a poor organizational structure had led us to high turn overs among staff because a few people in the team would do more work than others. An organizational structure effectively utilizing our

internal resources in response to our workload can play a very positive role in our success. This is a way of monitoring how the resources are allocated, utilized, and followed up. By finding these issues, I was able to implement meaningful changes through action research cycles. A summary of these changes will be presented in this chapter.

This DBA program, as a whole, has helped me grow professionally and become an effective scholar-practitioner. This was done through my ongoing engagement with action research and action learning. Through this program, I learned to deal with issues by being reflective and analytical. With this in mind, I also learned that not all issues can be resolved through action research. In some cases, I will have to make quick decisions where I may not have the time to go through the cycles and action research approach. This has been a great learning experience for me; I am more aware of situations where action research might not be effective while being aware that the reflection can play a major role in the decision-making process. These experiences have offered me valuable lessons in progressing and growing as a scholar-practitioner.

This chapter provides a concluding summary of this thesis. It will explain what has been done through each chapter of the thesis. What were some of the challenges I faced through each chapter and what are my core learning outcomes. Finally, it delves into what I learned throughout the DBA program. To support this, I have developed this chapter into several main sections. It begins with a discussion on the background and context of how this thesis came to fruition. It then offers the context on my organization and its setting to present the challenges we are facing. The main point of this thesis will be discussed and why it was important for me to undertake this project. This chapter examines the impact of action research in light of the research findings and how it helped me as a scholar-practitioner and contributed to my organizational development. It offers an account of my journey through this DBA program and

how I developed and evolved into an action learner and scholar-practitioner. Finally, the chapter concludes with an overall reflection and how I can further contribute to my learning and development, and to my organization progression through the integration of action research practices.

The Organizational Context

The organization I work in, PHRDI, has various operating divisions and agencies that collectively work toward the mission of enhancing the public health. The organization's objectives range from advancing medicine to public health and social services. My specific agency heavily focuses on fighting infectious diseases such as malaria, predominantly through research and development. We negotiate and administer large and complex contracts with various organizations around the world to further advance our mission of eradicating infectious diseases. Throughout my career within the organization, I have had the opportunity to predominantly work on malaria related projects. These projects consist of clinical trials, malaria incident surveillance, R&D activities, and capacity building. As noted in chapter 4, we use a standard set of processes to fund these activities. In summary, the activities include planning, compiling the specification package, posting solicitation, receiving proposals, negotiations, awards, and contract administration (FAR, 2018).

As a large bureaucratic organization, change does not occur very easily in my office. Management resistance, redundant bureaucratic structure and constant changes to senior management with shifting priorities make it particularly difficult to bring about the much-needed changes to the organization (Kelman, 2005). These issues pose a great deal of challenge in keeping up with the 21st century's rapidly changing environment caused by globalization and

swift advancement of technology (Volz-Peacock, 2016). Through my learning in this DBA program, I am confident that action research can play a very positive role in such environment. Action research works in real settings and seeks knowledge through collaboration, action learning, and simply creates a learning through practice (Martindale & Tomlin, 2010).

As I reflect upon my own practice and the environment I operate, it is also important to note that in the United States, companies and organizations often focus mostly on short term objectives instead of long term sustainability compared to other countries (Porter & Kramer, 2011). As such, action research is not something commonly used in the organizational and leadership development in the United States. This philosophy is often driven through the culture of individualism where individual growth at times trumps team collaboration and cooperation (Wu, 2006). This is a point of discussion I have introduced to my organization in an effort to bring about change. I came to the understanding that action research by its own cannot be considered as a solution to the problem, but it offers a step by step process to improving our actions and learning as we go (Martindale & Tomlin, 2010). As noted in Chapter 5, I was able to present and implement a number of changes using action research cycles of planning, acting, observing and reflecting (Reil, 2017). For example, I presented and implemented a communication tool that helped us improve our interactions with our stakeholders (Chapter 5). After further reflection and seeking feedback from participants, we were able to identify areas of inefficiencies that required examination and improvement. Since that point, the system has improved our communication significantly, but we have also made a number of improvements to it through the practice of action research cycles. Action research has been a great tool to improve not only our communication but the actual tool we use to communicate. For example, we were able to bring all stakeholder together in one platform so that they could see common issues and address them.

Thesis Highlights

In an effort to learn how resources against malaria are being managed, I conducted a research on the process of resource allocation and utilization within my office through qualitative research. Through this effort, I found areas of improvement and was able to bring about meaningful changes to my office through action research. As I developed this thesis and each chapter, action research was a helpful tool for me to reflect on each section, go back and review, analyse, synthesize, and reframe each chapter. Moreover, active observation and reflection helped me improve as I moved forward.

When I started this thesis, the introduction was framed with the main points of resource management and the impact of malaria to the global community were highlighted. I then explained my rationale and justification for undertaking this research project. As I developed the introduction, I engaged with action research and the role it played for that chapter. In the next chapter, I developed the literature review keeping in mind that I have to connect action research toward what I want to do. My literature review offered a general account of malaria and a history of it. In addition, it offers accounts of other crises caused by ineffective collaboration and resource management. These examples were presented because they are global issues and I wanted to show the impact of such issues to the region. This pivoted into the research methodology chapter detailing my research approach. In particular, I used the qualitative research approach to gather and analyse collected data. This methodology enabled me to seek data from direct stakeholders by engaging in dialogue and discourse with them. It helped me gather data based on their opinions and experiences on how resources are allocated. I tapped into their opinions and suggestions on the areas of improvement in my organization. I came to use qualitative research as the most feasible approach through reflection and the conducted literature

review. In the past, I had mostly engaged in quantitative research and found myself leaning toward it for various inquiries. However, upon learning about qualitative research and what it entailed, it widened my perspective on how I should approach my research. I learned that this methodology was more adequate in what I wanted to achieve. Through the use of this methodology, I was able to gather extremely useful data for the research findings chapter. In this chapter, I was able to find core issues within my office relating to how we manage our resources. These core issues included problems with the structure of our contracts, communication issues, and our ineffective organizational structure. Once these issues and their implications were identified I moved on to the next chapter, which focused on action learning and reflection. I outlined how to implement a series of changes in my office through action research cycles. I also offered an account of my journey through this DBA program in addition to the successes and challenges I experienced.

As I come to this conclusion chapter, I still have to go back and make sure everything is properly synchronized and is coherent. Moreover, I want to make sure I am being reflective and complying with the action research model. As I reflect upon my work, I am noticing positive results on most of the changes I presented and implemented. The first initiative was to ensure our projects are agile by breaking the activities into milestones. This helped us become more reflective of our practice and improve our work as we completed each milestone. We were able to effectively meet sensitive deadlines and work within the given budget. The second change was the use of interactive communication system. This system helped us maintain our communication through one platform. We test piloted a project through it and was able to carefully observe its progression. The system helped the stakeholders to be more interactive and anticipate issues much quicker and avoid it from escalating. Although it helped us build a more

collaborative environment, we faced some resistance from some team members. They were more interested in the traditional modes of communication such as emails and phone. The last change proposed was to change the organizational structure in accordance with our resources and workload. Since our projects and workload change frequently, I proposed this change be done through iterative action research cycles. This practice helped me become more reflective and ensure our workload is fairly distributed amongst the team members.

Through observation and the data collection phase of action research cycles, I faced a number of limitations and issues. One of the main issues was resistance from some of our stakeholders. They insisted on keeping up with the status quo and avoid taking risks. This is mainly due to the fact that I work in a heterogeneous organization and people have different competing viewpoints. As a scholar practitioner, this is something that I have to take into consideration and keep in mind that not everyone will buy into my idea. Another limitation of using action research was that some projects within my organization required quick decision and I learned that I have to interact in different ways. The lesson I learned from this is that action research is not the only solution to all problems and I have to think critically and apply sound judgement in dealing with different issues. I also have to consider that in some cases, I may not have the time to reflect on every single decision, but it is a skill I learned through this program and I believe it can be developed further.

Summary of Core Findings and Implications

In order to examine how we manage resources toward the fight against malaria, I conducted qualitative research where I interviewed and held focus group discussions to gain information from experts and stakeholders within and outside of my office. The main intend of this research was to find areas of improvements on how resources are allocated and managed. I, particularly, wanted to see if there was an effective collaboration amongst the stakeholders internally and externally. Through these efforts, three core issues were identified in the research findings of this thesis that contributed toward inefficiencies and possible overlaps in various efforts. They include:

- My organization's systematic approach to status quo, particularly in the planning phase. This derives from the culture of avoiding risk rather and seeking new and innovative ideas. The leadership often based their funding decisions on previous years' activities and how things were done in the past. The main implication of this issue is that we continue to overlook creative and innovative approaches to tackling malaria and other infectious diseases (Jackson, 2016).
- The second core issue was lack of proper communication between internal stakeholders and then between our team and our external partners. These communication issues often led to major delays and, at times, to our failure to find local organizations fighting malaria.
- The last core issue was the complexity of our solicitations or request for proposals. This issue was raised by the external research participants and were further supported by the literature. Smaller and local companies often complain that participating in government contracts is costly and time-consuming which frequently leads to low competitive turnouts. The implication of this issue is that much of our resources continue to go to

> larger organizations with high overhead expenses and we miss the opportunity to work with more innovative and lean organizations (Orazem et al., 2017).

These issues, collectively, hinders our efforts to be creative, keep up with the rapid changes around us, and get the optimum return on investment. This was further validated as I explored the implications of these issues through the literature review. For example, Sutcliffe, Lewton, and Rosenthal (2004) conducted a study on the impact of communication failures in medical settings by conducting interviews amongst 26 residents. The authors found that poor communication led to a large number of mishap incidents. They concluded that communication is not as simple as transmitting information but understanding the nature of the organization, culture and the setting one operates in. When looking at the impact of complex project solicitations, other studies, particularly by Orazem et al., (2017), demonstrated how leaner and innovative start-ups end up losing business to larger organizations, mainly due to their limited resources to develop strong proposals. These concerns led me to introduce and implement various change initiatives by utilizing action research cycles model.

Thesis Action Research and Action Learning Process

In order to tackle the core issues identified in my research findings, I put in place a number of changes that I learned through my engagement with the literature and dialogue and discourse with stakeholders and experts in the field. I implemented these changes through action research cycles and continue to observe and reflect on their effectiveness. A good lesson learned on action research is that it does not give one a solution to the problems but helps the researcher to be a critical thinker and leads to actively working toward improving the process (Greenwood & Levin, 2007). As I worked through finding solutions to the challenges we face, action research

helped me become more reflective and consider different angles to tackling the issues. In particular, it helped me to determine in which way relevant players could be involved in the whole process. With this in mind, the changes I brought to the office include:

- The development of an agile project timeline that is result-driven
- Introduced an interactive tools to improve communication
- Development and formation of a sound organizational structure that is in line with our up to date workload and resources

When working on complex and highly dynamic projects such as malaria, it is extremely important to be agile and flexible to changes throughout the project lifecycle (Thomke & Reinertsen, 1998). As such, we test piloted a project with milestones. Through this approach, we were able to revise each milestone based on the completion of the previous one. This approach provides the opportunity to improve as we go and keep up with the latest changes and advancements. In order to improve our communication, I implemented an interactive toolkit for direct stakeholders to use and communicate in one place. It became a platform for stakeholders to engage one another and ensure project is meeting its objectives. Given that my organization is heterogeneous and we often face resistance from a small number of team members, I ensured that this toolkit goes through the iterative action research cycles by actively soliciting feedback from users. These feedback and my careful observation of the system helps me gather effective data to further reflect and improve it. This gave everyone the opportunity to see the project lifecycle and effectively communicate with one another. Finally, the last change proposed is to ensure our organizational structure is lean and our workload and resources are properly aligned with our mission. This approach is also done through the iterative action research model where we conduct ongoing observation and reflection to improve the organizational structure.

These changes have received positive responses and have improved how we conduct business. Those pilot projects were completed ahead of schedule and the deliverables have shown above satisfactory results. We also had some negative feedback and resistance from some of our team members. Those team members were concerned that the proposed changes bear some uncertainties and insisted on keeping the status quo. I plan to continue to engage these colleagues and reassure to them that the changes are designed to improve our work. I learned that some aspects of action research might be good for the organization, while other aspects of it can be challenging when working with a heterogeneous team, and this is an aspect that requires further analysis and examination. I also hope to share my experiences with my colleagues from other areas of the organization in an effort to help them improve their approach to resource management issues. The changes noted in this chapter can be a good resource for other organizations managing resources.

Development as an Action Learner and Scholar-Practitioner

As I reflect upon my worldview prior and after this DBA program, I can clearly note several areas of growth and development. My worldview on problem solving and management, prior to this program, was very much pragmatic and hierarchical. I would often follow the direction of my superiors to complete tasks. I had a very narrow view of managing projects where I predominantly relied on historical patterns of various projects I was assigned to. For example, many of the projects I managed were based on a waterfall model, which is widely known for its inflexibility to change during the life-cycle of a project development (Barden, 2017). This DBA program helped me to change my perspective on the world and how I view and solve problems. As Surdek (2016) explains, being aware of our perspectives and reflecting on our decisions can

play an important role in management. This program helped me to become more reflective and analytical when dealing with issues and managing a team. I learned to engage others in the team to make sound and meaningful decisions. I come to appreciate action learning and action research as models for learning. They promote the platform for individuals to participate, engage and collaborate with one another within the organization.

While learning about different paradigms and research methodologies in this program, I learned that my worldview was more aligned with the positivist paradigm, due to the nature of my work and my past experiences. I would often solve problems through quantitative research and view the world through the lens of single reality (Easterby-Smith, 2012). My exposure to different paradigms and research methodologies through literature, in particular by Barbour (2008), Cohen and Crabtree (2006), Creswell (2007), Easterby-Smith et al., (2012), Guba (2012), and Kothari (2004), offered me a whole different perspective on how to approach research activities. I began to view my research under a different lens and came to the understanding that I can explore and examine my research questions more effectively through qualitative research. This approach helped me become more flexible and to be open to new ideas. Additionally, I come to learn that there may not always be one solution to every issue. This helped me engage my research participants in a meaningful dialogue and discourse which led to the discovery of several areas of improvements (Wells & Mejía, 2005). It further developed me as a leader to seek solutions through different perspectives. As an action learner, I am able to keep up with the dynamic environment of today's leadership. The proliferation of globalization and integration of economies around the world since WWII led to a dynamic and fast-paced environment. Action learning has become a timely, innovative, effective, and adaptive tool for leaders to develop (Leonard & Marquardt, 2010). Action learning can help leaders to be agile, adaptive, and flexible

in this rapidly changing environment (Volz-Peacock, 2016). These are some of the main lessons I have learned through this program and that I believe they have contributed to my development and growth as a scholar-practitioner.

Future Learning and Development

This DBA program has offered me an invaluable knowledge in becoming an effective change agent and a scholar-practitioner. I learned that there is a need for me to develop and grow as a leader. As I reflect upon my journey through this thesis, I marvel at the fortunate circumstances of applying the action research cycles toward my work to deal with some of the daunting issues in my office. Moreover, I learned the value that the literature brings into the organizational development and problem-solving process. Literature review and examination of other studies can be a significant resource to gather relevant information as I form ideas and attempt to resolve issues. This is something I need to apply more and more into my day to day activities. There is a need for me to gain more experience in actively applying action research into my work which can help me become a more skilful leader in the face of rapid changes in our environment. I believe there is room for me to further develop my career. In particular, I need to work toward improving my communication skills by being mindful of my organizational culture. For instance, unlike previous years, my work environment is becoming more and more uncertain and priories often shift as we go through different leadership and administration styles. This is something I may need to explore and learn to be able to effectively adapt toward.

In recent years, the U.S. politics has become very polarizing (Johnson & Roberto, 2018) and as a result, the agencies within the government have to adjust to new priority shifts as new administration from opposing parties take control. This may result in poor transition from one

administration to another as long-term visions and objectives can shift quickly. This can cause a lot of time and resources being wasted. As I move beyond this DBA program, one of my challenges would be to learn how I can be more adaptive and can contribute to developing an agile organization that can weather these changes. Additionally, the world is changing rapidly and shifting priorities can cause issues (Jamison & Mosley, 1991). We need to be more flexible and learn how bureaucratic organizations can move into a more adjustable environment. Action research could be a helpful model in such environment because it enables leaders to be reflective, analytical and agile (Zuber-Skenitt, 1993). Action research can play a significant role in my professional development if it is used as an effective tool to keep up with rapid changes.

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