ADS
D132
49

Development of a Cost-Benefit Projection Model for the Namibian Workplace

May 3, 2013

An Interactive Qualifying Project
submitted to the faculty of
WORCESTER POLYTECHNIC
INSTITUTE
in partial fulfillment of the
requirements for the
degree of Bachelor of Science

Sponsoring Agency: Namibia Business Coalition on AIDS

Submitted by:

Alaina Blanker
Taylor Briseno
Claire Hambright

Report Submitted to:

Ms. Beatrix Akuake
Mr. Matthew Black
Professor Creighton Peet
Professor Alexander Smith

Abstract

In Namibia, where reduced aid from international organizations has adversely affected access to healthcare, the private sector needs to increase their involvement in workplace health and wellness. We helped the Namibian Business Coalition on AIDS develop a cost-benefit projection model, which evaluates the cost-effectiveness of workplace wellness programs. To achieve this, we identified Namibia's prevalent health problems and determined possible health interventions. The model allows companies to make informed business decisions about investing in employee wellness.

Acknowledgements

We would like to thank everyone who assisted us in completing this project. First, we would especially like to thank our sponsors, Matthew Black, Beatrix Akuake, Peter van Wyk as well as the entire NABCOA staff for their support and invaluable input to our project. We would also like to thank all those who attended the cost benefit projection model workshop and training sessions who provided us with extensive amounts of invaluable feedback. We would finally like to thank our Worcester Polytechnic Institute advisors Professor Creighton Peet and Professor Alexander Smith for their guidance and encouragement through all stages of our project.

Authorship

Alaina Blanker, Taylor Briseno, and Claire Hambright all contributed to the research, analysis, and authorship contained in this report. Listed below are the original authors of each section of the final draft; however, each member proofread and edited all other sections of the report.

Abstract: Claire

Acknowledgements: Taylor

Executive Summary: Alaina

Authorship: Taylor

Table of Contents: Alaina

Table of Figures: Alaina

1. **Introduction:** Claire
2. **Background:**
    - 2.1 Healthcare Worldwide: Alaina
    - 2.2 Healthcare in Africa: Claire
        - 2.2.1 Public and Private Sector Roles in Healthcare: Claire
        - 2.2.2 Public Private Partnerships: Claire
        - 2.2.3 Issues with African Healthcare: Claire
    - 2.3 Healthcare in Namibia: Claire
        - 2.3.1 Namibia's Reclassification as an Upper-Middle Income Country: Alaina
        - 2.3.2 Namibia's Decrease in International Financial Support for Healthcare: Alaina
    - 2.4 The Namibia Business Coalition on AIDS: Taylor
        - 2.4.1 NABCOA's Return on Investment Toolkit and Cost Projection Model: Taylor
3. **Methodology:**
    - 3.1 The Epidemiological Profile: Taylor
    - 3.2 Determining the Standard Interventions: Alaina
    - 3.3 Populating the Model: Claire

4. Results/Analysis:

4.1 Epidemiological Profile: Mortality, Morbidity, and Risk Factors: Claire

4.2 Interventions and Costs: Claire

5. Conclusions and Recommendations:

5.1 Summary of Findings: Taylor

5.2 Conclusions: Taylor

5.3 Recommendations: Taylor

Glossary or Nomenclature/Acronyms: Taylor

References: All group members

Appendices:

Appendix A: Taylor

Appendix B: Taylor

Appendix C: Claire

Appendix D: Claire

Appendix E: Claire, Alaina

Appendix F: Claire

Appendix G: Alaina

Appendix H: Claire

Table of Contents

Abstract i

Acknowledgements iii

Authorship iv

Table of Contents vi

Tables of Figures viii

Table of Table ix

Nomenclature/Acronyms x

Executive Summary: xii

Chapter 1: Introduction 1
- **2.1 Healthcare Worldwide** 4
- **2.2 Healthcare in Africa** 6
  - 2.2.1 Public and Private Sector Roles in Healthcare 6
  - 2.2.2 Public-Private Partnerships 8
  - 2.2.3 Problems with African Healthcare 8
- **2.3 Healthcare in Namibia** 9
  - 2.3.1 Namibia's Reclassification as an Upper-Middle Income Country 12
  - 2.3.2 Namibia's Decrease in International Financial Support for Healthcare 14
- **2.4 The Namibia Business Coalition on AIDS** 15
  - 2.4.1 NABCOA's Return on Investment Toolkit and Cost-Benefit Projection Model 17

Chapter 3: Methodology 19
- **3.1 The Epidemiological Profile** 19
- **3.2 Determining the Standard Interventions** 24
- **3.3 Populating the Model** 27

Chapter 4: Results & Analysis 31
- **4.1: Epidemiological Profile: Mortality, Morbidity, and Risk Factors** 31
- **4.2: Interventions and Costs** 43

Chapter 5: Conclusions and Recommendations 50
- **5.1 Summary of Findings** 50
- **5.2 Conclusions and Key Characteristics** 51
- **5.3 Recommendations** 52

References 57

Appendix A: Sponsor Description 61

Appendix B: What is a Cost-Benefit Projection Model? 65

Appendix C: Interview Protocols 67

Appendix D: Mortality Rates 68

Appendix E: Morbidity Rates, In/Outpatient Ratios, and Hospital Stay Lengths 69

Appendix F: Risk Factors and Annual Unproductive Days **72**
Appendix G: WHO-CHOICE Interventions **74**
Appendix H: Data Request Form for the Epidemiological Profile **76**

Tables of Figures

FIGURE 2.1: GNI Per Capita of Namibia.....13

FIGURE 3.1: An overview of the cost-benefit projection model's organization.....28

FIGURE 4.1: Namibia's Top Mortality Rates for Males and Females.....32

FIGURE 4.2: Namibia's Top Morbidity Rates for Males and Females.....35

FIGURE 4.3: WHO Risk Factors for Males and Females.....38

FIGURE 4.4: PharmAccess Risk Factors for Males and Females.....38

FIGURE 4.5: Combined Risk Factors for Males and Females.....41

Table of Tables

Table 3.1: Sources for Epidemiological Data Collection……..21

Table 4.1: Costs for Peer Education……..……..45

Table 4.2: Bophelo! Costs for Wellness Screenings…….....……..46

Table D.1: Namibia's Top Mortality Rates for Men……...……..……68

Table D.2: Namibia's Top Mortality Rates for Women……...……..……..68

Table E.1: Namibia's Top Morbidity Rates for Males and Females……..……..69

Table E.2: Assumptions used in Inpatient & Outpatient Morbidity Pairings……..70

Table E.3: Inpatient to Outpatients Relative Proportions…….....…70

Table E.4: Average Length of Hospital Stays for Top Causes of Morbidity……..……..……71

Table F.1: WHO Risk Factor Percentages for Males and Females……..……..……..……...72

Table F.2: PharmAccess Risk Factor Percentages for Males and Females……...……72

Table F.3: Annual Unproductive Days for Males and Females……..73

Table G.1: WHO-CHOICE Interventions for HIV/AIDS……..74

Table G.2: WHO-CHOICE Interventions for Tuberculosis……..……74

Table G.3: WHO-CHOICE Interventions for HIV/AIDS and Tuberculosis Combination……...74

Table G.4: WHO-CHOICE Interventions for Alcohol Consumption.....……75

Table G.5: WHO-CHOICE Interventions for Tobacco Use……...75

Table G.6: WHO-CHOICE Interventions for Schizophrenia……75

Nomenclature/Acronyms

AIDS	Acquired Immune Deficiency Syndrome
BMI	Body Mass Index
CBA	Cost-Benefit Analysis
CDC	Center for Disease Control
DHS	Demographic Health Survey
FBO	Faith Based Organization
GFATM	Global Fund for AIDS, TB, and Malaria
GIZ	Gesellschaft für Internationale Zusammenarbeit
GNI	Gross National Income
HAART	Highly Active Anti-Retroviral Treatment
HIV	Human Immuno-Deficiency Virus
MCC	Millennium Challenge Corporation
MoHSS	Ministry of Health and Social Services
NABCOA	Namibia Business Coalition on AIDS
NGO	Non-Government Organization
NHS	National Health Service, a healthcare plan in England
O&L	Ohlthaver & List
PEPFAR	President's Emergency Plan for AIDS Relief
RoI	Return on Investment
SHI	Statutory Health Insurance
SHOPS	Strengthening Health Outcomes through the Private Sector
STI	Swiss Tropical and Public Health Institute

TB Tuberculosis

UNAIDS Joint United Nations Program on HIV and AIDS

UNICEF United Nations Children's Fund

USAID United States Agency for International Development

WHO World Health Organization

WHO-CHOICE World Health Organization Choosing Interventions that are Cost-Effective

WPP Workplace Programs

Executive Summary:

Establishing effective healthcare systems has proved to be a difficult task worldwide. In Africa specifically, one of the greatest challenges is making healthcare more accessible. Namibia, a country that has recently been reclassified as a middle-income country, faces the challenge of limited accessibility as well as reduced health-related funding from international donors. One step toward improving the healthcare situation in Namibia is greater private sector support through the implementation of workplace wellness programs. To inform Namibian companies that healthcare can also be a worthy financial investment, a cost-benefit projection model can be used to quantify the benefits of workplace wellness programs.

Devoted to advocating the importance of workplace wellness programs to Namibian companies, the Namibia Business Coalition on AIDS (NABCOA), in close collaboration with the Gesellschaft für Internationale Zusammenarbeit (GIZ), has begun developing a cost-benefit projection model that conveys the cost-effectiveness of these programs, also known as health interventions. The model calculates the economic benefits of interventions by determining projected employee absenteeism and presenteeism, which is when health issues adversely affect employee productivity when present at work. The goal of our project was to further develop NABCOA's cost-benefit projection model by:

1. Creating an epidemiological profile that identifies the most prevalent health issues for the Namibian working population
2. Determining the key information needed in order to apply and evaluate desired health interventions within the model.

Developing the Model

The epidemiological profile was comprised of three sections: the top causes of mortality, referring to death, morbidity, referring to sickness, and risk factors, behaviors or conditions that can lead to serious health problems. We calculated the incidence rates of each cause of mortality and morbidity and the prevalence rates of each risk factor. Data from the Ministry of Health and Social Services (MoHSS) revealed that the top three causes of mortality for males and females included HIV/AIDS, tuberculosis, and pneumonia, while the top three causes of morbidity included musculoskeletal system disorders, respiratory diseases, and trauma. We obtained two sets of data for risk factors: one from the World Health Organization (WHO) Global Health Observatory, and the other from Bophelo! Mobile Wellness Screenings test results. These rates for mortality, morbidity, and risk factors were used to develop Namibia's epidemiological profile for the projection model.

To develop a better understanding of existing interventions, we obtained information from the World Health Organization CHOosing Interventions that are Cost Effective (WHO-CHOICE) project, NABCOA, and the Walvis Bay Corridor Group (WBCG). We discovered that most of the WHO-CHOICE interventions involve medical treatments, which realistically cannot be provided in the workplace, but that programs such as peer education and wellness screenings could be possible interventions used in the model. Generally, we found that interventions will vary based on company size and location, making it difficult to determine a standard cost that would apply to all companies.

We introduced our cost-benefit projection model to several stakeholders at discussion-based workshops, where we evaluated the strengths and weaknesses of the data we collected. The following points were considered and agreed upon:

- Gender-specific data is very important for the epidemiological profile to make accurate estimates, and so the morbidity section should be updated when gender specific data becomes available.
- The health problems identified in the profile should be as specific as possible to allow users to determine which problems need to be addressed in interventions. Research should be conducted to define any broad categories.
- The risk factor dataset from Bophelo! wellness screening test results represented the Namibian working population best, as they were data directly obtained from test results rather than estimation.
- Wellness managers will be the primary source of adding interventions to the model, as they are most aware of their company's health situation and needs.

Recommendations

Based on these findings, we developed several recommendations. We encourage NABCOA to work with the MoHSS to improve data collection standards so that data is gender-specific and the health problems are clearly defined. If possible, a project between NABCOA, GIZ, and the MoHSS to merge all sixty-one of the Ministry's databases would allow all data to be easily accessible in one location. To maintain the credibility of the model, it is necessary to update the epidemiological profile regularly to ensure Namibia's health situation is represented accurately. During the piloting process of the model, we recommend NABCOA check in monthly with the pilot companies to ensure that any

problems are addressed, the success of interventions are monitored appropriately, and that no data is lost throughout the process. We also recommend that regional, industry, and sector specific data be collected as available so that the model can be adapted more specifically to companies in the future.

With the completion of this cost-benefit projection model, companies will be able to use the tool to make informed business decisions when considering whether to implement workplace wellness programs. Once wellness managers enter company-specific data, the projection model will clearly convey which health problems have the biggest impact on productivity and can be addressed with cost-effective interventions. By illustrating how companies can benefit financially from implementing wellness programs in the workplace, the model has the potential to increase the number of companies that offer health-related services to their employees and simultaneously improve both the health of employees and the productivity of businesses.

Chapter 1: Introduction

In recent years, countries throughout Africa have encountered challenges providing healthcare services to prevent and treat a multitude of diseases (Rundell, 2010). While HIV/AIDS has been a major health issue and the focus of many advocacy campaigns, there are numerous other health problems, including pneumonia, diabetes, and high blood pressure, that also require treatment, medications and diagnostic technologies not easily accessible or affordable in many regions of the continent. A greater emphasis on overall healthcare and prevention to achieve better health and wellness is being developed and advocated in many countries.

Namibia specifically faces two main healthcare challenges. Due to the country's vast geography and scattered population, accessibility to healthcare is limited. There is also a growing need for self-sustainability as a result of reductions in international health-related donors after being reclassified as an upper-middle income country. In response to these challenges, the private sector has begun investing and showing interest in employee healthcare. Organizations like the Namibia Business Coalition on AIDS (NABCOA) work with businesses to increase wellness services in the workplace. While NABCOA encourages member companies to participate in their workplace wellness programs, not all companies decide to make the investment, meaning that employees who could potentially benefit from the support of wellness programs may not have access to them.

Other countries in Africa have made progress in providing quality healthcare services to their populations. South Africa and Rwanda have established universal healthcare systems to make health services more readily available (Rundell, 2010). In Nigeria and Ghana,

organizations are working to support programs that increase the accessibility of healthcare in isolated regions (Hygeia Nigeria, 2013; Rural Healthcare, 2012). In Ghana, Kenya, and Tanzania, a cost-benefit projection model has been used by the private sector to identify the most prevalent health concerns in the working population and to evaluate the economic benefits of implementing workplace interventions. This has resulted in a larger number of companies in these countries recognizing the financial benefits of investing in workplace wellness programs.

It is likely that the economic benefits of investing in workplace programs have never been clearly conveyed to Namibian companies in a comprehensive and credible manner. If the financial advantages of workplace wellness programs were fully explained to companies, they could understand why it would be a good business decision to increase their investment in healthcare. In an effort to inform companies of these advantages, NABCOA has begun developing a Return on Investment Toolkit that advocates for wellness programs and makes a cost-benefit projection model available for use by the private sector.

Our goal was to aid NABCOA in developing the cost-benefit projection model component of their Return on Investment Toolkit. Using the model, Namibian companies will be able to estimate the cost-effectiveness of workplace wellness programs. We accomplished our goal by populating the model with Namibia-specific epidemiological data and identifying possible health interventions that can be evaluated using the model. The successful introduction of this cost-benefit projection model has the potential to allow companies to make an informed decision when considering whether or not to invest in a workplace wellness program. Conveying the financial benefits of these programs could lead to an

increase in the number of companies providing healthcare services to their employees. An increase in such investment would improve the health of the Namibian workforce and result in increased productivity due to averted workdays lost to sickness.

Chapter 2: Background

To provide an understanding of the challenges associated with providing healthcare in Africa, this chapter describes features of healthcare systems worldwide and in various African countries. We then discuss challenges specific to Namibia with respect to healthcare and international funding, and how the Namibia Business Coalition on AIDS is looking to make improvements in its healthcare outreach operations.

2.1 Healthcare Worldwide

Countries tend to provide healthcare services to their populations in ways that are compatible with their economic, political, and social structures. For example, England has universal healthcare under the National Health Service (NHS) plan (Thomson et al., 2011). Citizens only pay partial costs for some prescriptions and some dental care, while the government provides all primary care, specialist care, and hospital services. English residents receive broad healthcare that is funded through taxes, and people who are not residents receive free treatment for accidents and emergency care for some infectious diseases. The NHS focuses on improving any problems there may be in the public healthcare system.

France also has universal healthcare (Thomson et al., 2011). Similar to England, all residents in France receive healthcare provided by the Statutory Health Insurance (SHI), which is also financed publicly through taxes. However, not all costs are covered by the SHI. Hospital care, ambulatory care, and prescriptions are free for the country's population, but dental care and outpatient vision services are not fully covered. Preventative care is not initially covered by the SHI but can eventually be reimbursed.

Healthcare in the United States is provided by private and public insurance plans (Chua, 2006). Unlike England and France, private insurance companies are the dominant providers of healthcare coverage in the United States, as most people receive healthcare through their employers. The main public systems include Medicare, a federal program that covers people over the age of 65, and Medicaid, a program that covers low-income and disabled populations. There are also public healthcare systems that cover government employees as well as veterans. While the different healthcare systems in the United States cover a large portion of the American population, there are problems that have led to an emerging need for healthcare reform (Vortruba, 2010). The United States spends about double per capita on healthcare compared to other developed countries. Medicare and Medicaid are also financially unsustainable because healthcare costs are rising faster than the rate of productivity growth. These rising costs are causing an inequality of healthcare services throughout different regions of the country. Lastly, it can be difficult for many people to afford and access healthcare in the United States, especially for those who do not receive health insurance from their employer.

Depending on a country's circumstances, healthcare can be often provided in different ways. Some countries have universal healthcare, such as England and France, while the citizens of other countries receive more healthcare through the private sector, like in the United States. Although differing in some respects, healthcare systems in developed countries often share similar characteristics. For example, these systems are generally self-sustainable and aim to be accessible to the whole population. Countries in developing parts of the world, such as Africa, strive to structure their healthcare systems to achieve

similar goals. In the next section we will describe some specifics of African healthcare systems.

2.2 Healthcare in Africa

Africa is a very diverse continent where each country has different cultures, governments, and social structures. Health challenges also vary throughout the continent, but many countries are confronting several health problems, including HIV/AIDS, tuberculosis, and non-communicable diseases such as diabetes and cardiovascular disease. To provide adequate treatment to the millions of people affected by these diseases, healthcare programs should be easily accessible. In 2007, the financial management corporation Merrill Lynch reported that healthcare was to be one of the most promising investments in Africa (Rundell, 2010). Due to the high rates of infection from diseases like HIV/AIDS, the life expectancy of people living in Sub-Saharan African countries decreased from 62 years to 47 years between 1990 and 2005 (Uwah & Ebewo, 2011). Many African countries are also working toward being economically self-sufficient and not requiring international aid. With these goals in mind, there is potential for healthcare systems to improve considerably, and the public and private sectors of countries in Africa have been taking on different roles to address these challenges.

2.2.1 Public and Private Sector Roles in Healthcare

The public sector consists of organizations that are owned and managed by the government, while the private sector is composed of companies and non-profit organizations that operate financially independently from the government (Rundell, 2010). While in many countries the government may not have the means to provide the funds necessary to implement healthcare services on a large scale, an objective for the

future is the establishment of some kind of universal healthcare system (Knijn & Slabbert, 2012; Mayosi et al., 2012). African countries that have already achieved universal healthcare include South Africa and Rwanda. The South African government provides a flat-rate basic plan of "R800 a month for an individual and R2,000 for a family, regardless of age or state of health" (Rundell, 2010, para. 27). Rwanda has had national health insurance for eleven years, successfully providing coverage to 92% of the country's population.

Many African countries have healthcare programs sponsored by the private sector. On the role of the private sector in healthcare, Sarah Rundell (2010) reports, "…of the $16.7bn in total health expenditure in 2005, around 60% was privately financed, and about half of the total spent went to private providers" (para. 4). The private health sector has "outperformed general economic growth" and has exhibited the potential to develop even more (para. 4). In Nigeria, the private healthcare company Hygeia Nigeria (2013) provides services to about 150,000 people. Since its establishment in 1986, the company has expanded to include Hygeia Nigeria Limited, a branch that manages hospitals and clinics, and the Hygeia Community Health plan, which is a donor funded initiative to make quality healthcare more accessible to low income populations of Nigeria. In Ghana, a local organization, Medicine on the Move, trains women to build, maintain, and pilot aircrafts to supply isolated rural areas of the country with resources to help prevent the parasitic infection Schistosomiasis (Rural Healthcare, 2012).

The private sectors in many countries continue to become more involved in healthcare. One way some countries are achieving this is through companies offering healthcare services to their employees, similar to how the United States offers health insurance

through the workplace. One country that has begun doing this is Ghana (Wilson, 2012.), where the Ministry of Health has worked to promote employee wellbeing programs in many companies to increase the private sector's role in healthcare. The programs consist of services such as educational programs, health screenings, and health insurance. Not only have these wellbeing programs improved healthcare in Ghana and the private sector's involvement, but they have also improved business productivity through healthier employees. While these programs alone are making healthcare more accessible, both the private and public sectors continue to be involved with healthcare in African countries.

2.2.2 Public-Private Partnerships

In some cases the public and private sectors have combined their resources through public-private partnerships. One example is in Lesotho, where South Africa's biggest private healthcare company, Netcare, the Development Bank of South Africa, and the Lesotho government came together to build a new hospital building (Rundell, 2010). The hospital, a $100 million dollar, 425-bed building, was the first hospital built in Lesotho in fifty years. It has eight well-equipped operating rooms, an intensive care unit, and a laboratory. The partnership was structured so that the Lesotho government will gradually "buy back" the hospital from Netcare over the next eighteen years. While initially Netcare and the Bank fronted the funds to build the new facility, the partnership was arranged so that the government would eventually have control of a modern, highly functional medical facility.

2.2.3 Problems with African Healthcare

One of the greatest challenges associated with African healthcare is its accessibility. Many countries in Africa are still developing working healthcare systems, and may not have the highest quality health services. Numerous countries have been addressing this issue and

making improvements to their healthcare systems. To help with this goal of improving their healthcare systems, countries often receive financial donations from international organizations. Some of these organizations include The Global Fund to fight AIDS, Tuberculosis, and Malaria (GFATM), the Joint United Nations Programme on HIV/AIDS (UNAIDS), the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the Bill and Melinda Gates Foundation, and more.

Receiving aid from these international organizations leads to another challenge with healthcare in many countries. Over time, countries may develop a financial dependency on these organizations, leading to healthcare systems that are unable to be self-sufficient without international aid (Grogan, 2012.) Funding from donors may eventually be discontinued, and many of these systems will need to be able to provide quality healthcare without outside support. These two issues are common for a number of countries in Africa, and the private and public sectors could play an important role in developing self-sustainability through an increased investment in healthcare.

2.3 Healthcare in Namibia

Namibia is one of the many countries in Africa that has a high prevalence of diseases such as HIV/AIDS, as well as non-communicable diseases (Guariguata et al., 2012). It can be difficult for many Namibians to afford and access high-quality healthcare, as many healthcare services and clinics that most people can access are lower quality due to facilities being overcrowded and understaffed. Focused on combating the spread of these health system problems, Namibia has been proactive in its efforts to improve its healthcare system.

Health reform has been a priority for the Namibian government since the country's independence in 1990 (World Health Organization, 2010). Overall, there has been an increase in the number of people able to obtain some healthcare coverage, a result of efforts made by public and private health sectors.

The Namibian public health system is controlled by the government, specifically the Ministry of Health and Social Services (MoHSS), and consists of 1,150 outreach points, 265 clinics, 44 health centers, 30 district hospitals, 3 intermediate hospitals, and 1 national referral hospital (Brockmeyer, 2012; World Health Organization, 2010). The public health sector is structured so that authority is divided among 13 MoHSS regional directorates, which oversee 34 districts. While only 8.5% of the Namibian population is publicly insured, public hospitals provide care to the majority of the Namibian population. This is because public hospitals provide consultations for all of the population, including the 83% who are uninsured (Mbapaha, 2011). According to Brockmeyer (2012), the MoHSS is working on structuring the public healthcare system so that "everybody can have access to public healthcare, even if they are not able to pay, but those who are able to pay should pay for health services" (p. 3).

The private health sector consists of 844 private health facilities, 557 medical practitioners, and 75 pharmacies (World Health Organization, 2010). There are 13 private hospitals, 8 private health centers, and 75 private primary care clinics. The private health sector is financed largely by private, non-profit medical aid funds and provides care mainly to the middle/high income population, approximately 8.5% of the total population (Brockmeyer

2012; Mbapaha, 2011). For many Namibians, especially low-income workers, accessing private healthcare is difficult because of financial limitations (Brockmeyer, 2012).

Faith-Based Organizations (FBOs) and Non-Governmental Organizations (NGOs) play a large role in promoting health and social welfare in communities (World Health Organization, 2010). Many NGOs focus on diseases like HIV/AIDS, Malaria, and Tuberculosis, and receive financial donations from organizations such as PEPFAR, and GFATM to operate their programs (Brockmeyer, 2012).

After analyzing the quality and success of the Namibia's health systems, the Ministry of Health and Social Services (MOHSS) (2008) recognized several weaknesses. One of the greatest healthcare challenges is accessibility (World Health Organization, 2010; Ministry of Health and Social Services, 2008). The geography of the country makes it difficult for many Namibians to travel the long distances to clinics. In a study from 2008, the MOHSS found that of 295 people interviewed while leaving a health facility, 41.5% had travelled less than 5 kilometers, 27% had travelled 5-10 kilometers, 8% had travelled 11-20 kilometers, and 13% had travelled a distance greater than 21 kilometers. Finding the transportation to travel longer distances to clinics can be difficult for many people in rural areas, restricting accessibility to healthcare.

Another challenge is the equality of health services (Brockmeyer, 2012). Inequality exists between urban and rural areas, as well as between both white and black, and rich and poor populations. The issue of inequality of health services is related to the challenge of socio-economic inequality. For example, people with a wealthier background would be able to

afford and travel to better quality health clinics while those who do not have the financial means may only be able to access a low-quality health service.

Namibia's economic situation poses another challenge for healthcare. Economically, Namibia is different from many other African countries, as it is now classified as an upper-middle income level country (The World Bank, 2013). Because of this classification, Namibia receives a substantially smaller amount of international donor support for health and wellness programs than other African countries. This financial challenge is addressed in more detail in the following sections.

2.3.1 Namibia's Reclassification as an Upper-Middle Income Country

In the past ten years, Namibia has experienced a dramatic change in its economic status. In the early 2000's, Namibia was classified as a lower-middle income country based on its per capita gross national income (Gootnick, 2011). Since 2006, the gross national income per capita of Namibia has been steadily rising, increasing from about 2,370 US dollars in 2006 to about 3,360 US dollars in 2009. In 2010, however, Namibia's increase in gross national income per capita was greater than almost the previous three years combined. The per capita income rose from 3,360 US dollars to almost 4,200 US dollars and led The World Bank to officially classify Namibia as an upper-middle income country. The cutoff point between lower-middle income and upper-middle income was at about 3,700 US dollars in 2010. Figure 2.1 illustrates Namibia's increase in per capita gross national income and identifies the cutoff for lower-middle income status and upper-middle income status as provided by the Millennium Challenge Corporation (MCC).

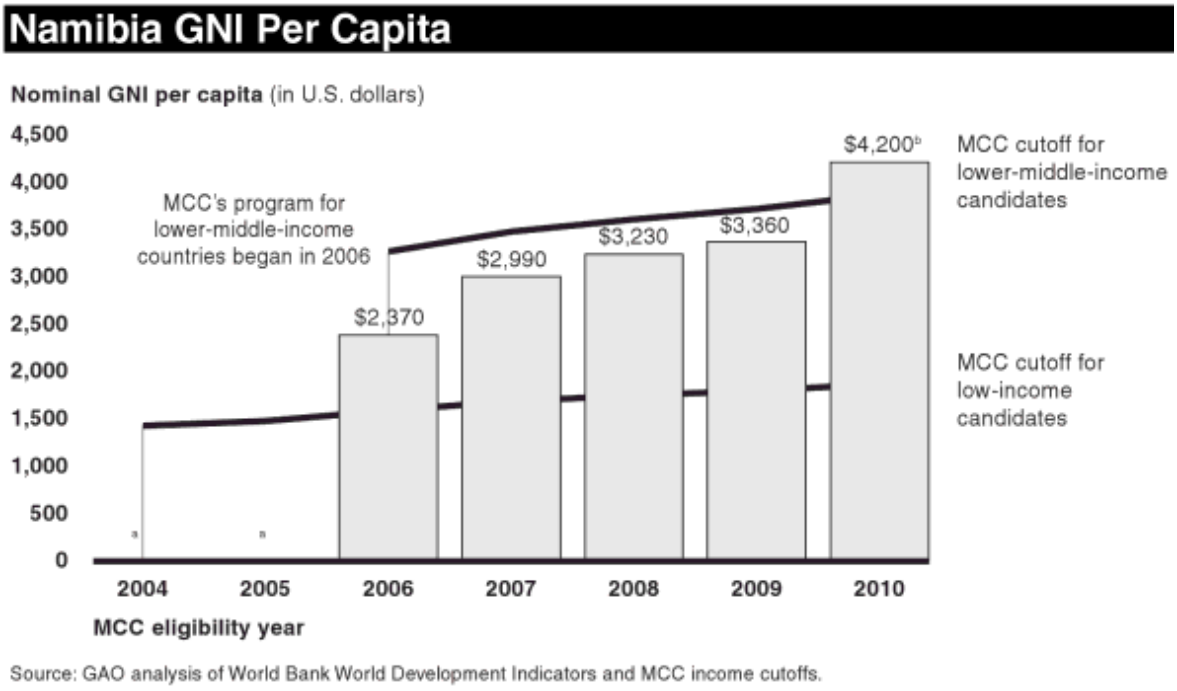

Figure 2.1: GNI Per Capita of Namibia *(Millennium Challenge Corporation, 2011, p. 62).*

Namibia's reclassification as an upper-middle income country is perceived as a positive advancement; however, it says nothing about the distribution of income across the country (Van Rooy, Roberts, Schier, Swartz, & Levine, 2006). The uneven distribution can be measured using the Gini coefficient, which measures the inequality of income among a country's population. The Gini coefficient ranges from 0 to 1, where 0 represents perfect income equality and 1 represents complete inequality. Specifically, to have a Gini coefficient of 1, one person would have to earn all of the country's income and everyone else would have to earn nothing. The Gini coefficient for Namibia is believed to be 0.697, which is among the highest in the world. The income inequality and the reclassification of Namibia as an upper-middle income country have implications for the healthcare system (Shebaya, Sutherland, Levine, & Faden, 2010). For example, a higher income family should be able to afford healthcare. However, there are many families living on less than three US

dollars a day who are not able to afford quality healthcare without donor support. The inequality of incomes in Namibia indicates that the gross national income per capita is not representative of the economic standing of all Namibians. This has negatively impacted the Namibian healthcare system.

Due to Namibia's former classification as a lower-middle income country with a high prevalence of many fatal diseases, the country received assistance and funding from many international organizations (O'Hanlon, deBeer, Feeley, Sulzbach, & Vincent, 2010). Some of these organizations include GFATM, UNAIDS, the United Nations Children's Fund (UNICEF), the United States Agency for International Development (USAID), PEPFAR, and more. Funding from these organizations helped Namibia make significant progress in healthcare by supporting programs and services that allow treatment for many diseases, such as antiretrovirals for AIDS and antibiotics for tuberculosis. However, when Namibia was reclassified as an upper-middle income country, the funding from these organizations decreased significantly, specifically affecting non-government organizations that provide health services.

2.3.2 Namibia's Decrease in International Financial Support for Healthcare

The World Bank's reclassification of Namibia as an upper-middle income country has led to the expectation for the country to take on a greater financial responsibility for sustaining health and wellness (O'Hanlon et al., 2010). A decrease in donations from many international organizations means Namibian healthcare must be funded from different sources. After several years of being classified as a lower-middle income country, Namibia became financially dependent on international organizations after receiving a greater

amount of financial support (Sulzbach, De, & Wang, 2011). Between 2001 and 2009, the funding received from international organizations for HIV/AIDS programs increased from 3.8 percent to 21.7 percent, leading to a large decrease of funding from Namibia's public and private sectors. The public and private sectors must now adjust their finances to help fund more healthcare programs to continue improving the general health of the population.

With this loss of healthcare system funding in Namibia, steps have been taken to increase aid from the private sector (O'Hanlon et al., 2010). Some international organizations are still assisting Namibia with its funding transition by educating the private sector about the benefits of investing in healthcare. For example, USAID sponsors a project called Strengthening Health Outcomes through the Private Sector (SHOPS). The project seeks to provide funding for wellness and HIV/AIDS programs, and aims to convince the private sector that investing in health and wellness is profitable. Some organizations, non-governmental and governmental, are looking to gain private sector support by encouraging businesses to provide health services to their employees.

2.4 The Namibia Business Coalition on AIDS

A nongovernmental organization that supports health and wellness programs in the workplace is the Namibia Business Coalition on AIDS (NABCOA) (van Wyk, 2008). When founded, NABCOA promoted mainly HIV/AIDS programs rather than addressing general wellness. NABCOA has received funding from many of the international organizations that donate to healthcare services in Namibia, such as GFATM, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), UNAIDS, and more. Of these, GFATM has donated the most to NABCOA. However, similar to many other healthcare-promoting organizations in

Namibia, NABCOA has not received as much international funding since Namibia's reclassification to upper-middle income status. Therefore, NABCOA now needs funding from other sources inside Namibia.

NABCOA receives its funding from the membership fees companies pay to use NABCOA's programs, revenues from services, and donations from international organizations (van Wyk, 2008). In 2008, only 80,000 US dollars of NABCOA's funding was received through membership fees and revenues from services, while 360,000 US dollars of NABCOA's funding was from international donors.

NABCOA is now looking for more funding from Namibia's private sector (Chickering et al., 2012). To receive funding from the private sector, NABCOA aims to convey to companies that wellness programs are a worthwhile investment. NABCOA (2012) has begun to undergo changes to increase investment from the private sector. Changing the focus of its programs to wellness as a whole and revising its business strategies to adapt to Namibia's new financial situation should have a positive impact on NABCOA's effort to increase company membership.

NABOCA recently changed the focus of its programs from targeting only HIV/AIDS to the general health and wellness of employees (Chickering et al., 2012). General wellness of employees encompasses HIV/AIDS as well as other prevalent health issues that affect the Namibian workplace. The negative stigma that is often associated with HIV/AIDS in Namibia caused employers to be hesitant to invest solely in HIV/AIDS programs. Therefore, there is a better chance that companies will invest in health programs if they focus on

overall wellness. NABCOA hopes that there will be more investment from the private sector in these broader wellness programs.

Another way that NABCOA (2012) can increase support from the private sector is to attract more companies to become members. An increase in membership means that more companies will invest in workplace wellness programs offered by NABCOA, generating more fees while making healthcare services more accessible to employees throughout Namibia. NABCOA will need to reach out to companies that have a high potential to benefit from workplace programs but have not already done so. To do this, NABCOA plans to improve its service quality and reliability. NABCOA has already begun to improve upon its offered services in order to satisfy current member companies and attract new members.

2.4.1 NABCOA's Return on Investment Toolkit and Cost-Benefit Projection Model

One way that NABCOA (2012) may attract new members while keeping current member companies interested in available health services is to show the financial advantages of workplace wellness programs. NABCOA believes this can be achieved through a Return on Investment Toolkit, which consists of a wellness advocacy toolkit and a cost-benefit projection model. However, before the toolkit can be used, the projection model needs to be developed and piloted. While the development of the model will take time due to the need to collect data and to consult with member companies to understand their current views on wellness, a cost-benefit projection model has the potential to benefit NABCOA by increasing the number of companies interested in investing in wellness programs.

In particular, the cost-benefit projection model will enable private sector companies to make informed decisions about investing in wellness programs. The mathematical tool

illustrates the financial benefits of investing in wellness programs, one example being an increase in employee productivity. The country specific tool identifies the most prevalent health issues with an epidemiological profile and shows how interventions can be used cost-effectively to combat these issues. From this information, businesses may input company-specific data to project the initial costs of the wellness programs and the expected financial return that follows from the investment.

The cost-benefit projection model is being introduced in different countries as it is developed. Recently, GIZ and the National AIDS Council developed a cost-benefit projection model for employee wellbeing programs for the private sector of Kenya. The model was piloted from October 2012 until February 2013 to evaluate its functionality. It was piloted at Kenya Airways, the Ministry of Public Health and Sanitation (MoPHS), the Ministry of Medical Services (MoMS), and Thika Municipal Council in Kenya. Once the tool was used in practice it was well received and has proven to be successful in providing private companies with valuable evidence of the financial benefits of employee healthcare. The tool has the capability of promoting employee healthcare to the private sector in countries that lack access to such healthcare. The cost-benefit projection model is a milestone in achieving global healthcare as additional countries, such as Namibia, begin developing their own.

To address the healthcare challenges identified in this chapter, we worked with NABCOA to bring the cost-benefit projection model to Namibia. In the next chapter we will describe the methods we used to adapt the model to represent the Namibian workplace.

Chapter 3: Methodology

The goal of this project was to help NABCOA with the development of a cost-benefit projection model, which, through a series of algorithms, identifies the long-term financial benefits of a company of providing employees with healthcare. The purpose of the projection model is to convey to companies the economic benefits of investing in workplace wellness programs. To achieve our goal we identified two objectives. The first was to create an epidemiological profile identifying the largest health issues that affect Namibia's working age population. The second was to develop a standard list of health interventions that companies can implement in their workplaces. After we collected this information, we populated and finalized the model by using this data. In this chapter, we discuss in greater detail how we achieved our objectives and our goal.

3.1 The Epidemiological Profile

One of the most important components of the cost-benefit projection model is an accurate epidemiological profile of the target population. This ensures that when Namibian companies input their company-specific data into the model, which includes the number of males and female employees, the total annual salary cost, total annual healthcare costs, number of working days per year, the model will clearly illustrate how the most prevalent health problems affect employees and company profitability. We completed this profile by conducting research on the most prevalent health issues that affect the Namibian workplace. In order to provide accurate information, we divided our epidemiological profile into three main categories: morbidity, mortality, and risk factors. We identified the top causes of employee morbidity, referring to sickness, and the top causes for mortality, referring to death. Additionally, we identified the top risk factors that lead to presenteeism

in the workplace. These factors were defined as general health issues that may lead to illness or injury. For example, high blood sugar and physical inactivity can ultimately lead to the development of diabetes or other chronic health problems.

Data Collection

Gathering data required searching through a variety of government reports, as well as maintaining consistent contact with individuals in Namibia's healthcare system. Matthew Black, NABCOA's Technical Advisor from the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), put our team in contact with several individuals in the Windhoek region who were able to help us find relevant information. Some organizations with which we spoke included the Namibian Ministry of Health and Social Services (MoHSS) and PharmAccess, an NGO that provides primary healthcare to rural Namibian workplaces through mobile testing units. The information from these sources was helpful in determining which health concerns were the most prevalent causes of morbidity and mortality in the workplace, and helped us determine the key risk factors for the working age population. The informal meetings that we attended are listed in Table 3.1.

Table 3.1: Sources for Epidemiological Data Collection

Organization	Positions Interviewed	Information Gathered	Source of Data
Ministry of Health and Social Services: Directorate of Special Programs (DSP)	Chief Program Administrator Chief Director of DSP	HIV/AIDS, Malaria, Tuberculosis	Government Documents
Ministry of Health and Social Services: Primary Healthcare (PHC)	Deputy Director of Epidemiology Division	Communicable/Non-communicable diseases	Government Reports
PharmAccess	Operations Manager of Programs	Morbidity causes, risk factors	Wellness screening Results

In addition, we reviewed documents including World Health Organization (WHO) regional health reports, which provided us with an initial list of morbidity causes for the year 2008, as well as Ministry of Health and Social Service health reports, such as Demographic Health Surveys, which report health problems for the entire population.

We learned that it can be difficult to obtain health data in Namibia. The challenge was especially evident when working with the morbidity section of the epidemiological profile. Incidence rates of various diseases were harder to find through independent research because the rates require data on the number of reported cases of a specific health problem per year, which is not a commonly available figure. We had to request morbidity data from sources like the Ministry of Health and Social Services (MoHSS) several times before receiving usable data. Getting the data from the MoHSS took several weeks, due to the logistics of formally requesting the release of this information. Once this data was obtained,

we were able to determine causes of morbidity, as well as update our mortality causes from the 2008 WHO data.

Calculations

As we made calculations for the epidemiological profile, we were in close contact with Dr. Patrick Hanlon, a consultant from the Swiss Tropical and Public Health Institute (STI), who has worked closely with NABCOA to develop their cost-benefit projection model. Dr. Hanlon previously developed a cost-benefit projection model for Ghana's private sector, which we used as a reference for our Namibia-specific projection model. He also aided our team in identifying the most relevant epidemiological information to use for the Namibian projection model.

Once the data had been collected, we identified the most prevalent health issues and used specific equations to calculate their incidence and prevalence rates. The generic equation used was as follows:

$$Rate = \frac{Number\ of\ cases}{Population} \times 1000$$

To specifically target the working age population we limited our data to include only health issues that affect the population aged 18-59. To find the appropriate population figures we referred to the Namibian Housing and Population Census from 2011 as well as the Labor Force Survey from 2012. To allow for gender specific incidence and prevalence rate calculations, we found the populations for women 18-59 as well as for men 18-59. Incidence and prevalence are two slightly different measurements. To clarify the difference, incidence rates measure the number of new cases of a disease in a given time

period, often within a year, while prevalence rates measure the total number of cases of a disease within a population at a given time period. Typically, prevalence is used as a measurement when referring to illnesses that are chronic or long-term. We determined the incidence rates of the top twenty causes of morbidity and top ten causes of mortality, along with the prevalence rates of the top ten risk factors. These rates were determined on a national scale.

Additional values we needed to complete the projection model included: inpatient/outpatient ratios and the average length of hospital stay for the morbidity causes, and the annual unproductive days for the risk factors. The inpatient/outpatient ratios are included in the model because they are used to determine absenteeism and workdays lost. An inpatient morbidity cause refers to an illness where one would need to stay in the hospital and receive treatment for an extended period of time. An outpatient morbidity cause refers to an illness where one would go to the hospital for diagnosis or treatment without needing to stay overnight. The ratio was calculated for each morbidity health problem using the following equation:

$$Ratio = \frac{Number\ of\ inpatient\ cases}{Total\ number\ of\ cases}$$

For some health problems, the number of inpatient cases may be much greater than the outpatient cases and vice versa. The ratio represents this difference and makes the projected workdays lost a more accurate figure. To calculate the ratio, we had to pair inpatient and outpatient morbidity causes from the data we collected. We had to make a few assumptions because not all of the inpatient causes corresponded directly with the

outpatient causes. The diagnoses used when reporting the data were not consistent and so we grouped together inpatient and outpatient causes that were similar, enabling us to calculate the ratios for eight of the top morbidity causes.

Using these same pairings, as well as some rough estimates, we determined the average length of hospital stays for the morbidity causes. We obtained the average length of hospital stays for the inpatient causes from the MoHSS, so we used these values for the health issues that were paired. For the remaining morbidity causes, we referred to the figures used in the cost-benefit projection model from Ghana. We assumed similar hospital stay figures for the health issues that corresponded with Ghana's profile, and then for the remaining we worked with Dr. Hanlon to develop rough estimates.

Annual unproductive days represent the approximate amount of time an employee is unproductive at work due to risk factor symptoms. This figure is important for the model to calculate presenteeism, which reflects the number of employees who continue to attend work when ill. To determine these figures, we referenced the Ghana model for risk factors that corresponded and then developed rough estimates for the remaining factors.

3.2 Determining the Standard Interventions

After collecting the epidemiological data, we focused on identifying how standard health interventions can be applied in the cost-benefit projection model. The standard interventions are the health services that companies may offer to their employees. The concept of standard intervention implies that certain interventions can be developed and easily implemented in the workplace of many companies. The standard interventions will have one basic cost per employee that is calculated based on an average from multiple

sources so that it is applicable to companies on a wide scale. Using the model, employers may select the interventions that they wish to evaluate, and the model will calculate the expected economic benefits based on the cost of the intervention and company specific data. Specifically, the model identifies the net benefit and cost-benefit ratio of each intervention, projecting how much the company saves financially.

To decide which interventions should be included in the model, we determined the most costly health problems from the epidemiological profile, conducted research on workplace interventions, investigated current NABCOA wellness services, and held interviews with two Namibian companies. We compiled a list of health problems that should be addressed with interventions in the model based on which health problems the model calculated to have the highest costs. To develop a better understanding of the interventions that exist currently, we referred to the World Health Organization's CHOICE (CHOosing Interventions that are Cost Effective) project, which lists the costs of interventions used in the southern African region, the estimated cost-effectiveness of each intervention, and the Disability Adjusted Life Years (DALYs)[1] averted. We compared the WHO-CHOICE interventions to our list of prominent health concerns and selected the interventions that would be most appropriate for inclusion in the model.

Additionally, we focused on creating a package of interventions that targeted general wellness. Since many of NABCOA's programs are aimed at promoting wellness, we worked with representatives from NABCOA to determine which wellness services and programs

[1] As stated on the WHO (2013) website, DALYs are a "time-based measure that combines years of life lost due to premature mortality and years of life lost due to time lived in states of less than full health" (para. 3).

are most often offered to the private sector. Through informal discussions with wellness coordinator staff members at NABCOA, we gathered the costs associated with some of these programs. Another source of information recommended by NABCOA was Walvis Bay Corridor Group (WBCG). WBCG offers health and wellness programs similar to NABCOA, but specifically for the transport sector. We met informally with the Wellness Service Program Manager to see if we could obtain the costs of their programs so that we would be able to calculate averages when developing the costs of our standard interventions.

We also interviewed two companies, Olthaver & List and De Beers Group, to identify the programs they offer and to compare the programs and costs with those listed on the WHO-CHOICE project website. We looked for any overlap between the programs that these companies have implemented in the workplace and the interventions we selected from the WHO-CHOICE website. We defined the presence of an overlap to be an indicator that the intervention would be a suitable addition to our list of standard interventions, as the overlap suggests that the intervention may be used by a number of companies already. The standard interventions are meant to be feasible for most companies, so in identifying which interventions are already commonly used we were able to consider how to best modify their wellness service components and costs so that they can be standardized.

For interventions to be entered into the model and the net benefit and cost-benefit ratio calculated, there are specific values that must be determined. These values include: the duration of the intervention in years, the percentage of employee coverage, the annual cost per employee, and the resulting percent reduction in morbidity and mortality. In our interviews and informal meetings we included questions to determine these values for our

wellness package interventions, but we had difficulty getting answers for each value. In addition to the interviews, we searched for studies conducted on health interventions in developing countries to help identify the reduction in morbidity and mortality rates of these interventions. The reduction rates are an important part of the model because they illustrate the cost-effectiveness of the interventions and their direct impact on health in the workplace. Most companies cannot easily calculate these reductions because they involve extensive monitoring over a long period of time.

3.3 Populating the Model

After collecting epidemiological data and identifying the standard interventions, we entered our findings into the cost-benefit projection model, which was formatted in Microsoft Excel by Dr. Hanlon using a structure similar to the Ghanaian model. The model was organized into several different sections as seen in Figure 3.1 We worked closely with Dr. Hanlon to enter data in both the magenta-colored tab categories, containing the epidemiological profile, and the orange-colored tab categories, containing the intervention information.

Figure 3.1: An overview of the cost-benefit projection model's organization

We shared our collected epidemiological data with Dr. Hanlon through email. Dr. Hanlon then reviewed our data and advised us regarding which data would be most relevant to use. We entered prevalence rates for the risk factors as percentages and the incidence rates for mortality and morbidity per 1000 people, as advised by Dr. Hanlon. This way, the data were in the correct format needed for the algorithm calculations used in Microsoft Excel.

We worked to further develop interventions that suited the concept of standardization, but faced the challenge of missing data values. Our interventions were not added to the model, but are discussed in the next chapter as examples of how an intervention could be applied to the model. The model does not need interventions to calculate the most costly health problems, but instead allows for companies to evaluate if they can cost-effectively reduce certain issues that are prevalent in the workplace. The model calculates how much of an

impact an intervention would have on their workforce based on the intervention's initial costs and costs per employee. Companies can add interventions to the model to target specific health issues as needed.

On April 22nd, Dr. Hanlon arrived in Namibia from Switzerland to examine and help finalize the cost-benefit projection model. On the 22nd and the 23rd, we presented our epidemiological profile and interventions at workshops to get feedback before Dr. Hanlon held training sessions during the latter half of the week. These workshops provided a first look at the model for about twenty wellness managers from organizations including GIZ, NABCOA, The Center for Disease Control (CDC), the Standard Bank, Bank Windhoek, UNAIDS, De Beers Group, Olthaver & List, PharmAccess, and the MoHSS. After presenting the data we had collected for the model, we were able to get feedback from these representatives on any concerns or reactions they had about the model. Dr. Hanlon also provided insights on how the model could be improved before the training session, and based on his recommendations we made changes to the model in the areas that needed strengthening. One of the major areas that was addressed in the workshop pertained to risk factors. We presented two sources of risk factor data, from the WHO and PharmAccess, and asked for input on which set would represent the working population best. We also discussed using prevalence rates in place of incidence rates for chronic conditions such as HIV. For HIV, the incidence rate only measures how many people were reported to test positive in a year, not the total population affected by the health problem.

After finalizing the model, Dr. Hanlon and GIZ facilitated a training session from April 24nd to the 26th for members of GIZ, NABCOA, PharmAccess, WBCG, and private sector

representatives from the Standard Bank, Bank Windhoek, and Olthaver & List on how to use the model. Our team attended these training sessions to evaluate whether the tool was user-friendly and understandable based on how easily individuals understood the model. Comments and suggestions were noted by the team and considered when making final recommendations for the projection model's future success. After attending the training sessions, we were able to make final recommendations to NABCOA on how to prepare for the piloting of the cost-benefit projection model.

In the next chapter of this report, we will discuss our findings on the epidemiological data and interventions. We will identify the top causes of morbidity, top causes of mortality, and top risk factors for the working age population in Namibia. We will also explain the possible and most likely healthcare interventions in detail.

Chapter 4: Results & Analysis

In this chapter, we will discuss the epidemiological data that we collected on Namibia's working age population and our findings on how healthcare interventions should be included in the cost-benefit projection model being developed by NABCOA and GIZ. Using the data we obtained from various sources, we were able to complete an epidemiological profile, determine Namibia's top causes of morbidity, mortality, and other health-related risk factors, and identify how several interventions can help employee health and wellness.

4.1: Epidemiological Profile: Mortality, Morbidity, and Risk Factors

To present the results for the epidemiological profile, we will breakdown each component by first giving the results for mortality, then morbidity, and then risk factors.

Mortality

The rates for the top causes of mortality amongst Namibia's working aged population are graphed by gender in Figure 4.1. Originally, we found mortality rates using the WHO's online database. The data were collected in 2008, so while they provided a strong foundation for the mortality section of the epidemiological profile, they needed to be updated. We were able to obtain the top ten causes of mortality in Namibia in 2011 from the MoHSS. Some of the mortality rates are high, such as for HIV/AIDS and tuberculosis; these are commonly known illnesses in Namibia. Other problems, including pneumonia, digestive diseases, and heart health are not issues that are generally a focus of advocacy and awareness, but they also ranked high on our top ten list. This shows how focusing on wellness as a whole, rather than only on HIV/AIDS and tuberculosis, has the potential to address other health issues that are just as prevalent in the Namibian working population. The full list of mortality rates can be found in Appendix D.

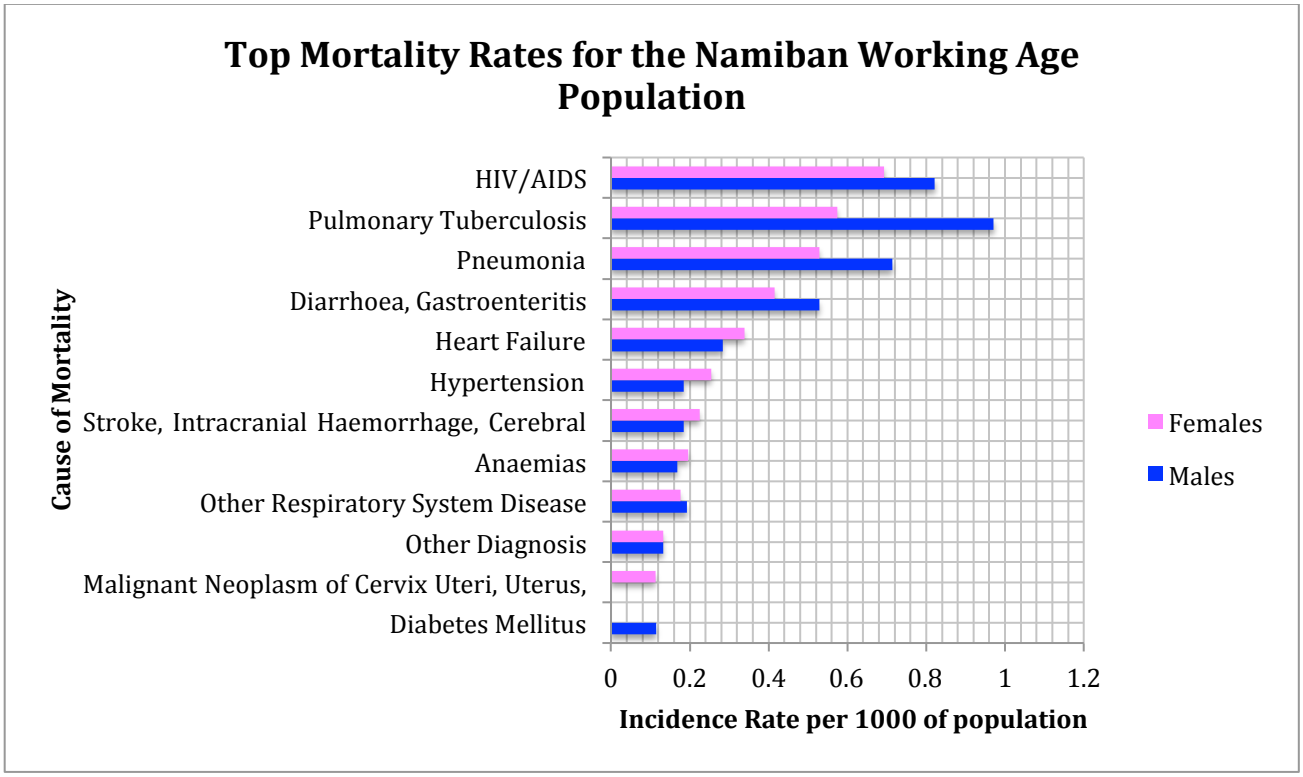

Figure 4.1: Namibia's Top Mortality Rates for Males and Females

There were significant differences between males and females for a number of the mortality causes. The data show that HIV/AIDS is the number one cause of death for women, but that tuberculosis is the number one cause of death for men. Many data reports have suggested that HIV infection rates are higher among women than men. In an Estimates and Projections Report from the MoHSS (2012), we found that 67% of new HIV infections in the 15-24 age population are young women (p. 19). The MoHSS also reports in their Demographic and Health Survey (2006) that on average, the number of sexual partners reported by men is seven, while the number reported by women is two (p. 207). It is possible that these numbers could have been falsely reported in an attempt for men to seem manlier and women more matronly. In some Namibian tribes, men are allowed to have numerous wives and sexual partners, and in many cultures the male acts as the

dominant household figure (Brown, Sorrell, & Raffaelli, 2005). These statistics and cultural beliefs could lead to women being put at a higher risk of contracting HIV from a male with riskier sexual practices, potentially causing HIV to be a greater cause of mortality for women than men. The data we obtained from the MoHSS supports this conclusion, but it is possible that there is data missing from the MoHSS reports, or that some people infected with HIV are not seeking care from medical facilities and are thus underreported. For HIV to be accurately reported, individuals must be willing to be tested. However, it is possible that many refrain from being tested because of the stigma against HIV. In the case of reporting a death caused by AIDS, family members may sometimes say that another health problem was the cause of death to avoid being stigmatized by having a family member that died from HIV/AIDS.

Another difference is that tuberculosis is a much higher cause of death for men than women, a trend that is supported by the WHO (2013), as they state on their website that many men are diagnosed with and killed by tuberculosis (p. 1). Often times in HIV positive persons, it is common to contract other illnesses, as HIV weakens the immune system and makes the body more susceptible to pathogens. It is not uncommon for someone who is HIV positive to also become infected with tuberculosis. The method of data collection for this information is not known, so it is possible that there are errors. Specifically, there could have been a misreporting of deaths caused by tuberculosis in HIV positive persons. For example, in a person infected with both HIV and tuberculosis, tuberculosis may be reported as the primary cause of death when the underlying cause was actually AIDS. This underrepresents the fatality rate from HIV/AIDS, but is also a relevant consideration for any chronic condition that makes the body more susceptible to illness. While these errors

are speculated, they quite likely exist, and therefore should be considered in interpreting the data and identifying the necessary health interventions.

Overall, the main takeaway from the mortality section of the epidemiological profile is that there are other prevalent causes of death besides the widely reported health issues such as HIV/AIDS and tuberculosis. While these illnesses are still very common, non-communicable diseases and various injuries are other conditions that should be considered when analyzing causes of mortality of the working age population. These other health problems accounted for the remaining eight mortality causes.

Morbidity

One of our main findings was that there is a very limited amount of country-specific data available. However, we determined the top twenty morbidity causes, from 2012 data provided by the MoHSS, as listed in Figure 4.2. The calculated incidence rates can be found in Appendix E along with the in/outpatient ratios and average length of hospital stay data.

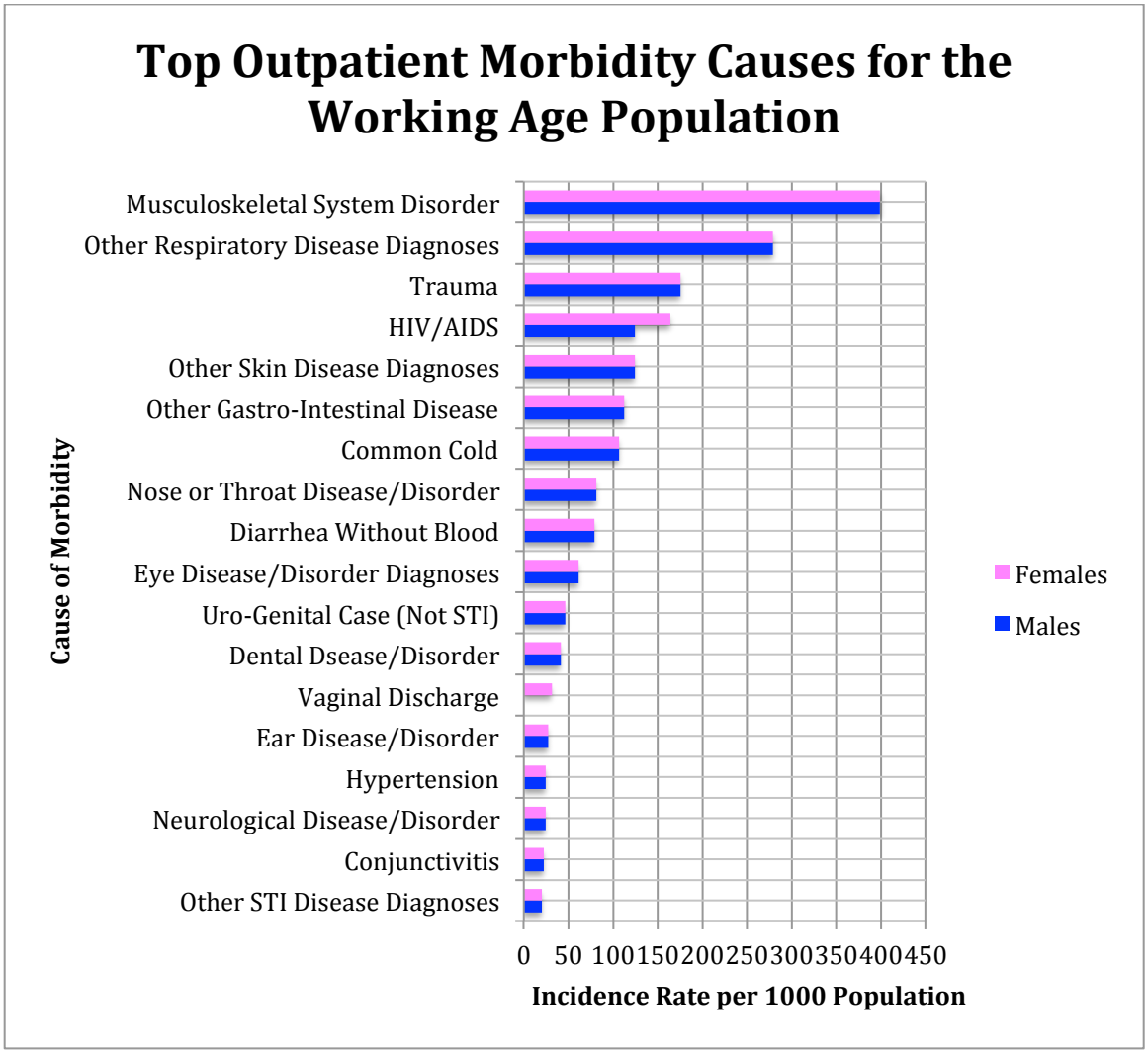

Figure 4.2: Namibia's Top Morbidity Rates for Males and Females

The number one cause of morbidity was musculoskeletal system disorders, followed by other respiratory disease diagnoses, trauma, and HIV/AIDS. We were concerned with the broadness of some categories, especially with many of the top causes of morbidity being categories that started with "other". These could encompass a variety of health problems, which is of little use to the cost-benefit projection model. To understand why, we will explain using the top cause of morbidity as an example. The top cause of morbidity, musculoskeletal system disorders, is a very broad category of health problems. After some

speculation on what this classification may include, we consider that, among others, issues such as back pains and pulled muscles may be included. The epidemiological profile needs to identify specific health problems so that when companies use the projection model they can identify which problems are most relevant and should be targeted with an intervention. During discussions at the workshop preceding the training sessions on the cost-benefit projection model, we decided the best way to move forward would be to return to the MoHSS, where we got the data, and ask for clarity on what each broad health category includes.

Based on feedback from the workshop discussion, we replaced the incidence rate with a prevalence rate for HIV/AIDS. Originally the incidence rate put HIV/AIDS as the last of the top morbidity issues, as it was a measure of how many people were tested positive and not the total number of people living with HIV/AIDS. Upon replacing the rate to represent prevalence, HIV/AIDS became ranked as the fourth morbidity cause, which is a more realistic representation of the disease's presence in the population.

While the data obtained from the MoHSS provided a general overview of Namibia's health profile, there were some additional limitations to the data. Mainly, the data was not separated by gender. The values in Figure 4.2 were calculated for males and females using the total number of reported cases, assuming that there is no significant difference in how these health problems affect men and women. We had to then assume that for the health problems that are specific to females, such as vaginal discharge, that the rate for males would be zero. It is important that the incidence rates are gender-specific so that the algorithms accurately calculate how health problems impact males and females. These

values provide a strong basis of the top morbidity causes, but could use more specificity in definition of health problems as well as in incidence rates for males and females.

Risk Factors

We identified the top health risk factors for the working age population, which are represented in Figures 4.3 and 4.4 These data came from two sources: the WHO and PharmAccess. We refrained from combining the risk factors from each source because they represent two different populations. The WHO data is based on national averages for the ages corresponding to the working age population 18-59, whereas the PharmAccess data represents the private, rural working age population using data from Bophelo! mobile testing units. There were some differences between the two sources. For example, for high blood pressure, the WHO reported that 51% of men are at risk while PharmAccess data suggested that only 8% are at risk. The difference is from each source having a different threshold for "high blood pressure." The WHO measures raised blood pressure, defined as a systolic blood pressure greater than 140 mmHg, and Bophelo! measures high blood pressure, which was defined as a systolic blood pressure greater than 155 mmHg. A group discussion at the workshop on the epidemiological profile led us to discover that Bophelo! can also provide data using the same baseline as the WHO, making the data more comparable. Once this information becomes available, it can be used in the profile. The percentages for each of the other risk factors and their annual unproductive day values can be found in Appendix F.

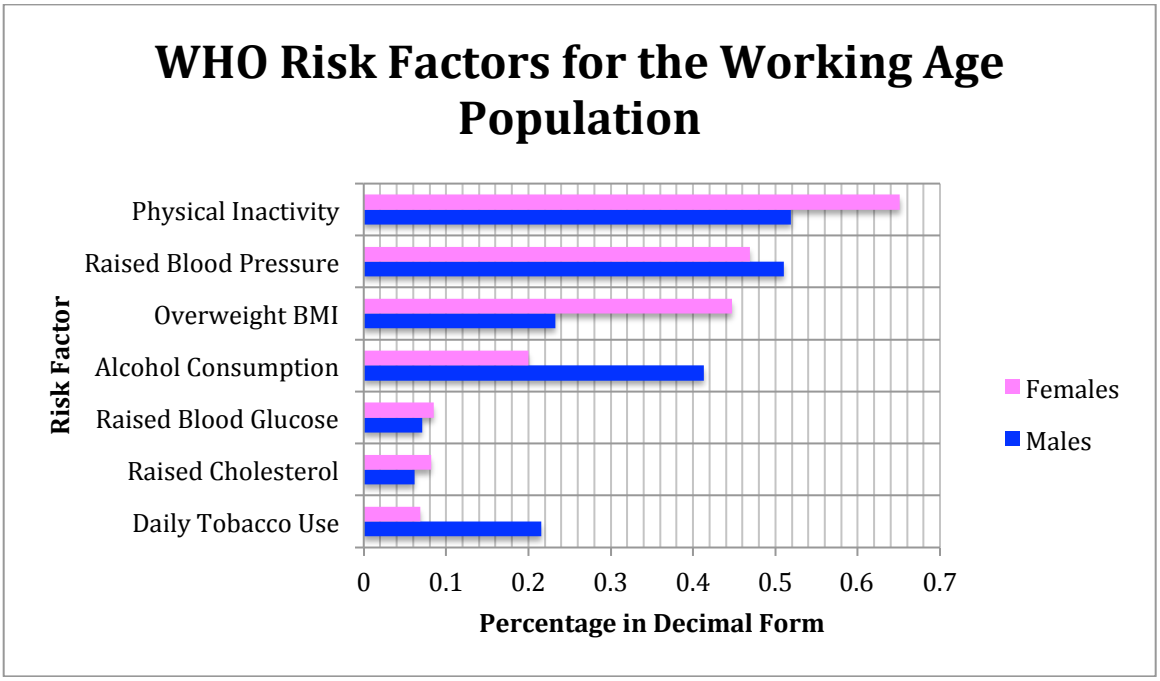

Figure 4.3: WHO Risk Factors for Males and Females

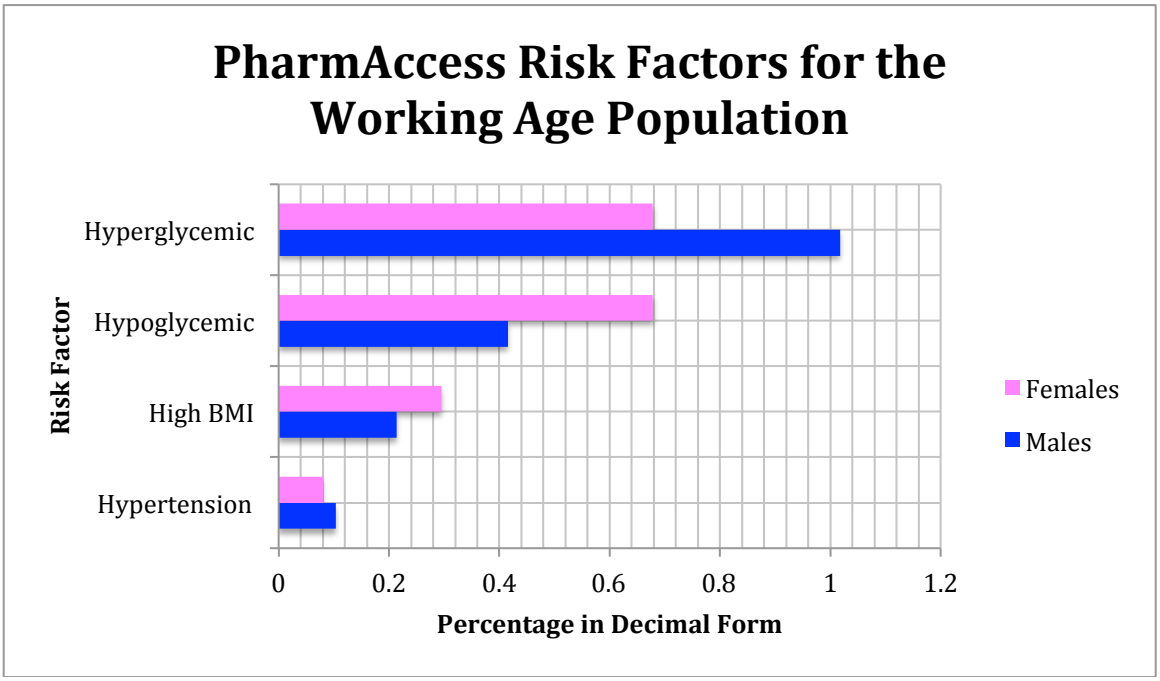

Figure 4.4: PharmAccess Risk Factors for Males and Females

Another difference between the data sets is that WHO measures raised blood glucose while PharmAccess measures hyperglycemia (high blood sugar levels) and hypoglycemia (low

blood sugar levels). These risk factors are not directly comparable, since the WHO data measures a raised level of glucose while the PharmAccess data measures high and low levels, which are merged into one abnormal glucose level prevalence rate.

In general, it is important to consider risk factors in the cost-benefit projection model when evaluating people's health because if left unaddressed, these risks have the potential to develop into more serious health problems. For example, excessive alcohol consumption has been linked to causing more cases of risky sexual practices, which can increase the chance of contracting HIV (Woolf-King, et al., 2013). Tobacco, as another example, is commonly known to lead to cancers of the lungs, mouth, lips, nasal cavity, and esophagus (American Cancer Society, 2013).

We noticed several trends in the risk factor data. Tobacco use and alcohol consumption are slightly more prevalent in men than women. We found that obesity is more common in women than in men. After speaking with some of the NABCOA staff, we learned that in a Namibian household relationship, if a woman is overweight, it is understood that her husband is providing for her wellbeing. This cultural belief could be a contributing factor to the prevalence of obesity in women in the working age population. It was interesting to see that the WHO reported the top risk factor for both men and women to be physical inactivity, which is surprising as one of the main methods of transportation among the working class is walking to and from their jobs. The WHO data defines physical inactivity as less than 30 minutes of moderate exercise five times a week, or less than 20 minutes of vigorous exercise three times a week. For men and women who live in the Khomas region informal settlements surrounding Katutura, the walk to Windhoek's places of employment

can be long and, in some situations, strenuous. This type of exercise is most likely not considered in the data provided by the WHO.

At the workshops where we presented our data among wellness managers and other health representatives, the final consensus was that the Bophelo! data would be the most appropriate for the model. There were some concerns raised with the method of data collection used by the WHO when determining the risk factor data, as it was derived by estimation based on modeling and not direct data collection. Many of those who attended the workshop preferred the Bophelo! data, as they were directly collected by the mobile testing units that visited company workplaces. The data from Bophelo! were also collected in a year when the participation rate for testing was about 90%, providing a good representation of the workforce. Additionally, the mobile testing units travelled to rural areas in almost all of Namibia's regions, collecting data that was geographically diverse. For these reasons, the Bophelo! risk factors were selected to be included in the model. To incorporate as many risk factors as possible, we also decided to use the WHO risk factors that were not measured by Bophelo!, which included alcohol consumption, daily tobacco use, physical inactivity, and raised cholesterol. These combined risk factors are shown in Figure 4.5.

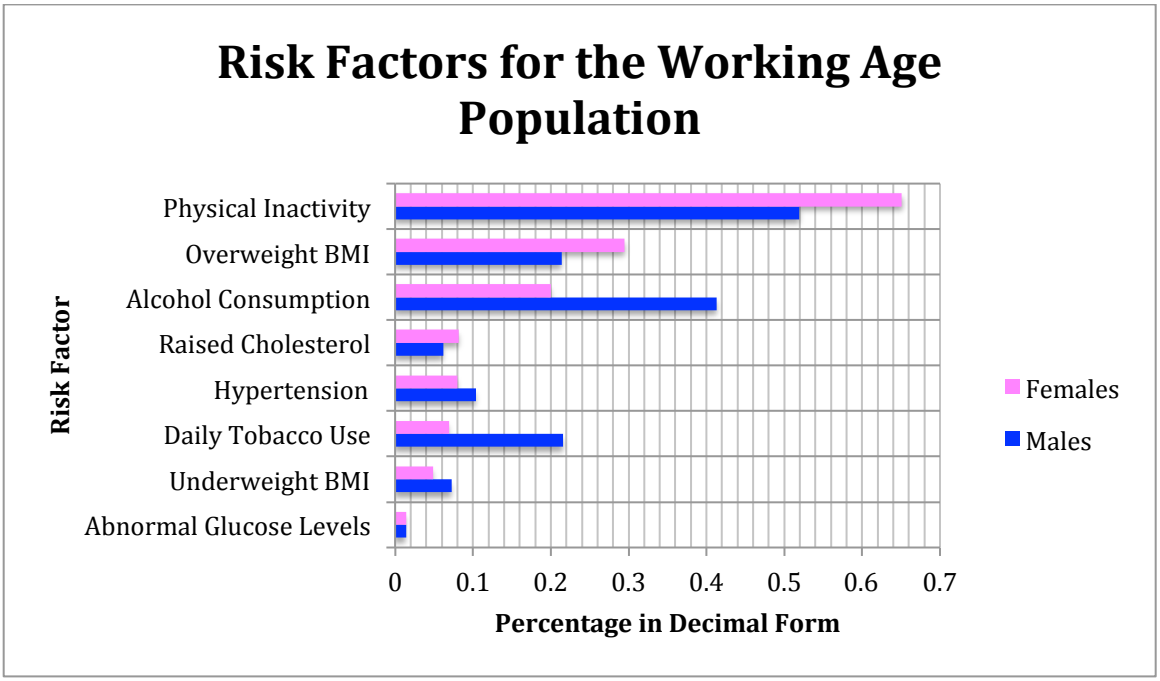

Figure 4.5: Combined Risk Factors for Males and Females

We also determined that there might be underreporting of some risk factors. Regarding substance abuse, the values can be difficult to measure, as they require individuals disclosing information that they may not want to share. If individuals under-report their use of alcohol or drug use, it may result in rates that are lower than the true values.

Epidemiological Profile: Limitations and Future Developments

We assembled a complete epidemiological profile of Namibia's most pressing health concerns using available data, but there were several limitations to our data collection. Initially, it was difficult to find recent data for the working age population, ideally gathered within the last three years. We also had a limited number of data sources. The only three places we located health-related data for Namibia were the WHO website, PharmAccess, and the MoHSS. As mentioned, the WHO data was out of date, the PharmAccess data

captured a relatively small population from the private sector, while the MoHSS data was only for the population that uses public healthcare facilities.

The information collected from MoHSS contained cases from the public hospitals in Namibia. To make sure that we used the most accurate population figures in our calculations, we had to calculate how many people use public healthcare facilities based on who was covered by government health insurance, private health insurance, or who is not covered at all. We received information from medical aid saying that 8.5% of the Namibian population is covered by private health insurance, 8.5% is covered by public health insurance, and 83% of the population is uninsured (Mbapaha, 2011). Based on these figures and estimates provided by the MoHSS, we recognized that for the morbidity cases requiring only outpatient care, the insured population visited private health facilities and therefore the number of morbidity cases used in the model accounted for 83% of the population. For the mortality cases, 91.5% of the population was included, since both the uninsured and publicly insured people would use the public hospitals for inpatient care, while the privately insured people would only use private hospitals. Therefore, the projection model is currently missing the part of the population that is privately insured. The missing information could skew our data by elevating mortality and morbidity rates, as the population who can afford private healthcare insurance most likely does not fall ill as severely or frequently. To work toward a more balanced representation of the working age population as a whole, we would like to obtain data on the privately insured. Medical insurance companies could supply these data based on claims.

Overall, there may be some errors in the data. It is possible that a portion of the population does not visit the hospital when they are sick and therefore is not represented in the data. Also, some people may choose to not get tested for certain diseases, and therefore they may contribute to the under-reporting of cases such as HIV/AIDS.

Another limitation involves the ages included in the reported cases. For morbidity and mortality, the data include ages 18+, meaning that of the reported cases for each health problem, there could have been a number of retired persons included. Ideally, the cases that relate to the retired population would not be included in the model, as they most likely skew the data by elevating mortality and morbidity incidence rates for certain illnesses or causes of death. To remove this population from the model, we would need to obtain the health problems by age group. Then any reported cases for ages 60+ could be disregarded. Additionally, as mentioned earlier, some health categories in these sections are overly vague, and the privately insured population still needs to be represented in the model.

4.2: Interventions and Costs

Due to time constraints, we chose to work with healthcare interventions pertaining to general health and wellness, as more interventions can be added to the model as needed in the future. Companies using the cost-benefit projection model will be able to select interventions they wish to consider implementing in their workplaces, and the model will calculate the cost/benefit ratio and produce a graph to visually present the results. This allows companies to make informed decisions as to whether they will implement wellness interventions in their workplaces. We found that it was difficult to standardize many interventions because costs vary by company depending on its size. We were unable to

determine standard interventions as a result of this challenge. Based on the feedback from discussions at the workshop, we found that wellness managers, who are most knowledgeable about their workplace and its health situation, will be the primary source for adding their own interventions into the model. These interventions are likely to be the workplace wellness programs with which they are most familiar. The research we conducted provided a better understanding of the types of programs that wellness managers can include in the model. We focused on peer education and wellness screenings as interventions because the costs were readily available from NABCOA and WBCG, and they can be used to address multiple health problems identified by the epidemiological profile.

Peer education is a wellness service that is supported by organizations like NABCOA and WBCG. For a fee, which varies based on factors such as the cost of travel to a company's location, lodging accommodations, and the salary of a trainer, companies can have representatives trained on how to become a peer educator in the workplace. Peer educators are responsible for holding a certain number of discussions on health topics that are specific to the needs of a company. For example, in a workplace where diabetes may be a prominent health issue, the peer educator would host informative sessions about how certain preventative measures against diabetes can be taken.

Listed in Table 4.1 is the breakdown of the total costs of NABCOA's peer education programs. There are many variables that factor into the overall cost of a peer education training session. Our goal was to develop a standard cost for the intervention, but this was a challenge due to the variation in expenses for travel to a company's location, the cost of

the trainer's wage, accommodations for the trainer, and several other factors. Each company would need to calculate these costs for their workplace, and then create an intervention in the model. This makes it difficult to develop an average cost that would be accurate for multiple companies.

Table 4.1: Costs for Peer Education

Peer Education
Local Trainer Fee
Co-Trainer Fee
Trainer S&T
Mileage Claim
Stationary Pack
Venue Fees
Refreshment and Meal Costs
Participation Costs

Wellness screenings allow employees to be tested anonymously for a range of health problems, which may include HIV, high blood pressure, abnormal glucose levels, high cholesterol, low hemoglobin, or Hepatitis B. There are different wellness screening packages that vary in the number of tests included and are offered at a range of prices. Companies can have mobile testing units from organizations such as NABCOA and WBCG come directly to their work site to increase the accessibility of testing services to

employees. The breakdown of the components that contribute to the total cost of Bophelo!'s wellness screenings are listed in Table 4.2.

Table 4.2: Bophelo! Costs for Wellness Screenings

Bophelo! Mobile Clinic Wellness Screenings
HIV Voluntary Counseling and Testing
Full Wellness Screening
Data Collection
Report Writing
KAPB Survey
Staff Costs for Mobile Clinic
Management Fee
Mobile Units Travel (Estimated km)
S&T Mobile Testing Team
Accommodations

Implementation & Impact of Wellness Programs in the Workplace

The goal of our interviews with Olthaver & List, a holding company that buys the shares of other businesses, and De Beers, a diamond mining company, was to obtain an understanding of the types of wellness programs in place in the private sector and their costs. We observed a large difference in wellness program monitoring between the two companies.

The Wellness manager at Olthaver & List (O&L) was able to explain the different wellness programs and policies in the company's workplaces but was unable to provide a cost for each specific program (H. Haimili, personal communication, April 9th, 2013). At O&L the

wellness manager is responsible for providing programs from the company's wellness budget to each of the companies under O&L. While the wellness manager elaborated on the variety of programs offered to each of the companies based on their locations and accessibility, there was no documentation regarding which programs had been implemented. The Wellness Manager also shared that there is no method of measuring effectiveness.

In contrast, the DeBeers wellness manager easily provided us with information on each of the many programs that DeBeers has used from 2003 to the present (E. Grötzinger, personal communication, April 11, 2013). Many of the programs were similar to those of O&L such as peer education programs and wellness screenings, but the programs were offered more frequently at DeBeers. The wellness programs at DeBeers are often held on a monthly, bi-monthly, yearly, or on a case-by-case basis. Many of the programs such as on-site clinics, offer employees improved accessibility as well. In addition to the plethora of programs DeBeers offers, the wellness manager clearly had strong trusting relationships with the 800 employees at DeBeers. These relationships can be used to promote the programs, as employees use services without fear of being stigmatized.

Wellness programs vary significantly between the two companies. Although both companies offer wellness programs promoting healthy lifestyles and offering opportunities to be tested for illnesses, DeBeers not only has control of each program and knows each cost, they also document the results of providing the programs to employees. The rate of absenteeism is under 1% for employees since the implementation of a wellness program in 2003 and surveys are continually used to measure the effectiveness of programs. The

differences between the two companies' wellness programs exemplify the effects strong wellness programs can have.

Interventions: Limitations and Future Developments

Due to time constraints, our work with interventions was limited. There are many considerations that are involved in the process of standardizing interventions, including cost, practicality of implementation, and the projected effectiveness at reducing workplace morbidity and mortality. The WHO-CHOICE website provided a number of suggested cost-effective interventions for countries worldwide, but it was a challenge to make these interventions applicable to the Namibian workplace. For example, a possible WHO-CHOICE intervention for HIV/AIDS is to provide Highly Active Anti-Retroviral Therapy (HAART) to those who are infected. Some companies are not able to do this themselves, but they can provide employees who need treatment referrals to doctors capable of providing the treatments. While NABCOA aims to increase awareness of wellness and investment in workplace programs, the goal is not to replace an employer's duties with those of a health practitioner. Some of these WHO-CHOICE interventions could potentially be modified to providing a doctor referral for treatment, rather than attempting to provide the treatment. We were able to identify two possible interventions from WHO-CHOICE that could be used in the workplace, which were Voluntary Counseling and Testing (VCT) and mass media education, as potential workplace interventions as provided by the WHO data. Although we did not develop the WHO-CHOICE interventions so that they could be used in the model, we continued to find the annual costs per person for each intervention, listed in Appendix G. Over time these interventions can be developed to suit the workplace and added to the model so that there will be more intervention options for companies to choose from.

Overall, many of the WHO-CHOICE interventions closely corresponded to health issues that were identified in the epidemiological profile. For example, tuberculosis, HIV/AIDS, alcohol consumption, tobacco use, and high cholesterol are all addressed with WHO-CHOICE interventions. While other health issues included in the model can be related to a WHO-CHOICE intervention, none of these overall top five issues are reflected in the interventions that the WHO-CHOICE project recommends.

Our greatest challenge was determining the reduction in morbidity and mortality rates that would result from each intervention. There were no reports to use as references, as there have not been many studies published on these topics in Namibia or internationally. To determine values for these two variables, wellness managers will have to use their best judgment and estimate rates based on their experience with the intervention. Additionally, the wellness managers are responsible for determining the duration of the intervention, the coverage, and the annual cost per employee. Each of these values will vary from company to company depending on its number of employees and the health problems that are being addressed.

In the next chapter of this report, we will present final conclusions about the findings we obtained during the development of the cost-benefit projection model and our recommendations on areas where the model can be improved.

Chapter 5: Conclusions and Recommendations

In this chapter we will present our conclusions and recommendations to aid NABCOA in the further development of the cost-benefit projection model. Based on our analysis and feedback collected from the cost-benefit projection model workshop and training sessions held April 22nd-26th, 2013, we were able to develop a stronger understanding of where improvements should be made. We will discuss in more detail a brief summary of our findings, our conclusions, and final recommendations for how NABCOA should best continue with the development and piloting of the projection model.

5.1 Summary of Findings

Once the appropriate data were collected, we were able to develop an epidemiological profile that identified the top causes of morbidity and mortality, as well as the top risk factors for the Namibian working age population. Using the incidence and prevalence rates from the epidemiological profile, the model projected the top health problems based on lost workdays. However, there were some limitations with the data that can be reduced so that the model will make more accurate calculations.

The data we collected provides a strong foundation for the epidemiological component of the model, there are several limitations. First, the morbidity data from the MoHSS was not gender specific. The model works optimally with gender specific data because it provides more precise calculations for health problems that may occur more frequently among one gender. The model currently does not represent the privately insured population, as the MoHSS data was collected from public hospitals. Also, the MoHSS data may be biased due to underreporting or misreporting of causes of death or disease.

By determining common workplace interventions and the information necessary for their integration into the model, we found that the costs were a very important aspect of the interventions. Comparing the costs of different interventions from the WHO-CHOICE project, NABCOA, and WBCG, we found that costs vary greatly depending on the size and location of the company. Thus, we found that it is essential that companies keep track of these costs, as well as the effects that interventions have on reducing the mortality and morbidity rates of health problems.

Based on these findings and limitations, we made several conclusions and recommendations that aim to continue improving the cost-benefit projection model.

5.2 Conclusions and Key Characteristics

The completed model is capable of providing employers with the top reasons for loss of productivity in the workplace. After analyzing the data we gathered, we have come to some conclusions that we will use to provide recommendations to NABCOA to assure the model's continued improvement.

In light of the challenges we had collecting data, one of the largest issues is the accessibility of health data in Namibia. Specifically, when trying to locate the relevant data needed from the MoHSS, we found that information was scattered among different sources and databases. In particular, we had difficulty finding information on causes of morbidity and mortality. Because of the organization of the data, we waited an extended period of time before receiving the information that the model requires.

Additionally, available data is often too broadly categorized. For example, the top causes of morbidity and mortality included "other diagnosis" categories, which gives no definition of

the specific health problem. This makes it difficult to identify the exact health problems responsible for reducing productivity in the workplace.

During the workshops and trainings we saw that the model is versatile in that it is capable of being adapted to suit the specific needs of companies. Employers can change the epidemiological profile to reflect the health profile of their companies if they have the data available. Since the model is currently populated with national data, this option of tailoring the model would allow for the calculations to be extremely accurate, as the population of the data would be based solely on the company.

When the epidemiological profile and interventions were presented to private and public sector representatives at workshop sessions, April 22nd-23rd, 2013, the information was well received by the group of attendees. Four out of five wellness managers expressed their interest in piloting the projection model in the near future. These responses are a strong indicator that the projection model is appealing to stakeholders. This workshop prompted helpful recommendations to strengthen the model, which we will discuss in detail in section 5.3.

5.3 Recommendations

Based on our findings and conclusions, we have developed several recommendations to ensure that the model continues to be well maintained and further developed throughout the piloting process.

To make data more accessible, we recommend that NABCOA and GIZ express interest in merging the MoHSS databases into one comprehensive database. There are currently over 60 databases with information from various MoHSS divisions. A variety of

information is included in these databases, however it is difficult to easily locate data due to a lack of organization. To help facilitate data collection and make it more efficient, the databases should be assessed to determine what information they contain. This could potentially become a joint project with NABCOA and the MoHSS. If steps are taken to organize country specific data, especially so that it is gender specific, age specific, and health issue specific, then collecting accurate data for the epidemiological profile will become a much simpler process.

The epidemiological profile should be updated as more relevant data become available. Over time, health problems will vary in prevalence based on outbreaks or successful national health interventions. It is important to keep these rates up to date so that the model makes accurate calculations. One potential source of information for the profile is the Demographic Health Survey for Namibia, which has a projected release date of June/July 2013, and may be used to obtain more current data. To help NABCOA transition from the work we have done collecting data to the future updates for which they will be responsible, we have identified several starting points, including: focusing on finding gender-specific morbidity data, determining the specific health problems included in the broad health categories for mortality and morbidity causes, and incorporating data from the privately insured population.

A NABCOA employee should be assigned to monitor the model and update it as needed. Our team has provided NABCOA with a standard data request form that outlines all the data used in the model. This form can be located in Appendix H. We have summarized the specific data needed for each section of the epidemiological profile in

another effort to simplify the data collection process. When requesting data, the form can be distributed to sources like the MoHSS or medical aid insurers so that there is no miscommunication regarding the kinds of data being requested.

When data becomes available, the model should be tailored to different industries, sectors, and regions of Namibia. To do this, the data in the epidemiological profile would be replaced so that it reflects health problems that are most common in Namibia's specific industries, sectors, or regions. This will target the specific needs of companies, and would be especially useful for companies with unique occupational health risks. Certain health problems vary by region, for example malaria is only an issue in the northern parts of the country, and so the incidence and prevalence rates will slightly differ from the national data. The idea of a model containing regional or industry specific data was well received at the model's training program.

We recommend that NABCOA follow up monthly with companies piloting the model. The success of interventions must be monitored closely to identify their effects on the workforce. NABCOA members should therefore be diligent in keeping contact with the wellness managers piloting the model. These follow ups should be geared toward addressing any questions or concerns employers may have and making sure that data on the effects of interventions on morbidity and mortality is being collected carefully. Maintaining the communication between NABCOA and the piloting companies will help sustain interest in the model, prevent the loss of data, and help to identify where the model can be improved.

To promote the model and the training programs during piloting and launch, we recommend that NABCOA market the model in the private sector. This can be done during peer education trainings where NABCOA trainers can mention the model to attendees. Another potential method of marketing is through NABCOA's newsletters and newspaper advertisements. Promotion efforts will not only be beneficial for spreading awareness about the model, but also for endorsing NABCOA's growing programs. In turn effective advertising can potentially increase company membership with NABCOA. Similarly, the model can be promoted by the Bophelo! Mobile Wellness Clinics. Since these mobile clinics travel across the country to different regions, marketing the model to these groups will target a larger audience and can increase the model's use to companies across Namibia.

GIZ plans to adapt the model to a web-based format. We strongly support this initiative, since during the training sessions there were some technical errors with Excel when using the model. Depending on the version of Excel software, the model was not always fully compatible. An online template that does not require a software download and is compatible with any operating system would be ideal and allow for the model to be used to its fullest potential by anyone who could access the webpage.

Each of these recommendations will strengthen the model by increasing data availability, making use of its versatility, and preparing for the piloting process. The cost-benefit projection model has been a success in Ghana, Kenya, and Tanzania, and can have a great impact in Namibia. By informing companies of the financial benefits that can result from investment in healthcare, the model promotes the concept that healthcare should be

thought of as an economically justified business decision in addition to an ethical one. It is an innovative tool that has the potential to encourage private and public sector involvement in healthcare, make wellness services readily available to more of the population, and improve the overall accessibility of healthcare to the Namibian population.

References

Brockmeyer, Benedikt. (2012). Friedrich-Ebert-Stiftung Namibia: Deliberations About an Affordable National Health Insurance for the low-Income Workforce in Namibia. Windhoek, Namibia. Retrieved March 27, 2013 from http://www.fesnam.org/pdf/2012/reports_publications/PAPER_HealthSystem_Benedikt_Brockmeyer.pdf

Brockmeyer, Benedikt. (2012). Deliberations About an Affordable National Health Insurance for the low-Income Workforce in Namibia. Windhoek, Namibia. Retrieved March 27, 2013 from http://www.fesnam.org/pdf/2012/reports_publications/PAPER_HealthSystem_Benedikt_Brockmeyer.pdf

Chickering, G., Nich, K., & Otto, N. (2012). *Improving service quality, business practices, and marketing strategies to ensure NABCOA's financial future through a fee-for-service model*. (Undergraduate Interactive Qualifying Project No. E-project-050712-085306). Retrieved from Worcester Polytechnic Institute Electronic Projects Collection: http://www.wpi.edu/Pubs/E-project/Available/E-project-050712-085306/unrestricted/NABCOA_WPI_Final_May_3_2012.pdf.

Chua, K. P. (2006). Overview of the US health care system. *American Medical Student Association*. Retrieved February 10, 2013 from www.meddean.luc.edu/Lumen/meded/ipm/ipm3/BPandJ/HealthCareSystemOverview-AMSA%2020062_25_09.pdf

Deutsche Gesellschaft für Internationale Zusammenerarbeit (GIZ). (2012). *More than just good business.* (German Health Practice Collection). Eschborn, Germany: GIZ.

Deutsche Gesellschaft für Internationale Zusammenerarbeit (GIZ), GMBH & National AIDS Control Council. (2013). *Cost Benefit Projection for Employee Wellbeing Programs: Report of Pilot: Adaptation of Cost Benefit Projection Tool to Kenyan context.* Nairobi, Kenya: Christoph Lodemann

El Obeid, S., Mendelsohn, J., Lejars, M., Forster, N., & Brulé, G. (2001). *Health in Namibia: progress and challenges*. Research and Information Services of Namibia. Retrieved on April 9, 2013 from http://wwwisis.unam.na/hivdocs/Health_in_Namibia.pdf

Gootnick, D. B. (2011). *Millenium Challenge Corporation: Summary Fact Sheets for 17 Compacts.*. Washington, DC: The Government Accountability Office.

Government of Namibia Ministry of Health and Social Services. (2008). Health and Social Services Review. Windhoek, Namibia: MOHSS (unpublished report).

Grogan, K. (March 2, 2012). Africa needs to be more self-sufficient in healthcare – EIU. *PharmaTimes.* Retrieved from http://www.pharmatimes.com/article/12-03-02/Africa_needs_to_be_more_self-sufficient_in_healthcare_-_EIU.aspx

Guariguata, L., deBeer, I., Hough, R., Bindels, E., Weimers-Maasdorp, D., Feeley, F. G., & Rinke de Wit, T. F. (2012). Diabetes, HIV and other health determinants associated with absenteeism among formal sector workers in Namibia. *BMC Public Health, 12* (44) 1-4.

Hanlon, Patrick. (May 26, 2011). Operational Public Health Research: Study Report: Economic Model for Employee Wellbeing Programme Ghana. Retrieved from file.

Health Information Services: Ministry of Health and Social Services. Top Causes Morbidity, Mortality, and Risk Factors for Namibian Population 18+. [Data File] Retrieved April 11, 2013.

Hygeia Nigeria. (2013). About Hygeia Nigeria Limited. Retrieved February 1, 2013, from http://www.hygeiagroup.com/?searchstring=34

Knijn, T., & Slabbert, M. (2012). Transferring HIV/AIDS Related Healthcare from Non-governmental Organizations to the Public Healthcare System in South Africa: Opportunities and Challenges. *Social Policy & Administration, 46*(6), 636-653.

Mayosi, B. M., Lawn, J. E., van Niekerk, A., Bradshaw, D., Karim, S. S. A., & Coovadia, H. M. (2012). Health in South Africa: changes and challenges since 2009. *Lancet, 380*(9858), 2029-2043.

Mbapaha, Gabriel. (2011). Facts and Figures pertaining to the Medical Aid Funds within the Healthcare Industry [Powerpoint Slides]. Retrieved from file.

Ministry of Health and Social Services. (2012). 2011/2012 Estimates and Projections of the Impact of HIV and AIDS in Namibia. (MOHSS Publication). Windhoek North, Namibia. Directorate of Special Programmes.

Namibia Business Coalition on AIDS. (2012, July). Asking Questions: latest research on wellness/HIV and public private engagement. NABCOA Newsletter, 2.

Namibia Planning Commission. (April 2012). Namibia 2011 Population and Housing Census Preliminary Results. Retrieved from http://www.gov.na/documents/10180/34849/2011_Preliminary_Result.pdf/0ea026d4-9687-4851-a693-1b97a1317c60.

Namibia Statistics Agency. (2012). National Labour Force Survey (NLFS) 2012 Report. [Data File]. Retrieved from http://www.nsa.org.na/files/downloads/12c_The%20Namibia%20Labour%20Force%20Survey%202012%20Report.pdf.

O'Hanlon,B., deBeer, I., Feeley, F., Sulzbach, S., & Vincent, H. (2010). Namibia private sector assessment. Strengthening Health Outcomes through the Private Sector. Bethesda, MD: Abt Associates, Inc.

Person, A. L., Colby, S.E., Bulova, J.A., &. Eubanks, J.W. (2010). Barriers to participation in a worksite wellness program. *Nutrition Research and Practice*, 4 (2)149-154.

PharmAccess. (2009-2010). Bophelo! Mobile Wellness and Primary Care. Namibia: Mulongeni, P., Weimers-Maasdorp, D.; Hough, R. & DeBeer, I.

Rundell, S. (2010). Private healthcare Africa's latest boom. *African Business* 367, 12 1-3.

Rural healthcare takes off around Africa. (2012). *African Business, 387,* 12 1. Retrieved February 1, 2013, from http://go.galegroup.com/ps/i.do?id=GALE%7CA294372205&v=2.1&u=mlin_c_worpoly&it=r&p=AONE&sw=w

Shebaya, S., Sutherland, A., Levine, O., & Faden, R. (2010). Alternatives to National Average Income Data as Eligibility Criteria for International Subsidies: A Social Justice Perspective. *Developing World Bioethics, 10*(3), 141-149.

Sulzbach, S., De, S., & Wang, W. (2011). The private sector role in HIV/AIDS in the context of an expanded global response: expenditure trends in five Sub-Saharan African countries. *Health Policy and Planning, 26*, 12 172-182.

The World Bank. (2013). Namibia. Retrieved January 31, 2013, from http://www.worldbank.org/en/country/namibia

Thomson, S., Osborn, R., Squires, D., & Reed, S.J. (2011). *International Profiles of Health Care Systems*. New York, NY: The Commonwealth Fund.

Uwah, C,. & Ebewo, P. (2011). Culture and HIV/AIDS: Analysis of the Perception of Culture and HIV/AIDS Prevalence in Southern Africa. *Journal of Arts Management Law and Society,* 41(3), 198-211.

Van Rooy, G., Roberts, B., Schier, C., Swartz, J., & Levine, S. (2006). Income poverty and inequality in Namibia. *Multi-Disciplinary Research and Consultancy Centre Discussion Paper* (1). Windhoek, Namibia: University of Namibia.

Van Wyk, Peter J. (2008). Namibia business coalition on AIDS profile. Retrieved on January 27, 2013, from https://members.weforum.org/pdf/GHI/Namibia.pdf

Vortruba, Mark. (2010). Form & reform: the economic realities of the United States healthcare system. *Journal of Law and Health, 23*(2), 89.

Woolf-King, S., Steinmaus, C. M., Reingold, A. L. & Hahn, J. A. (2013). An update on alcohol use and risk of HIV infection in sub-Saharan Africa: Meta-analysis and future research directions. *International Journal of Alcohol and Drug Research, 2(1)*, 99-110 doi: 107895/ijadr.v2i1.45

World Health Organization. (2010). Namibia Country Cooperation Strategy. Windhoek, Namibia: WHO.

World Health Organization. (2013). *Global Health Observatory* [Online Database]. Retrieved from http://apps.who.int/gho/data/node.main.

WPI. (2013). Interactive Qualifying Project. Retrieved February 22, 2013, from http://www.wpi.edu/academics/igsd/iqp.html

Appendix A: Sponsor Description

For over a decade, the Namibia Business Coalition on AIDS (NABCOA) has been committed to developing HIV/AIDS programs aimed at managing the growing epidemic in the Namibian workplace (P. van Wyk, personal communication, April 30, 2013). Recently, NABCOA has shifted the focus of their programs to incorporate general health and wellness. Many of these programs are made available to the Namibian private sector through membership enrollment with NABCOA. With the aim of targeting wellness through workplace programs, NABCOA brings awareness to varying health problems that can affect employees. One of the organization's forefront challenges is to increase investment of the private sector in their workplace wellness programs (WPP) as well as provide them with an understanding of the benefits following investment.

Through these programs, NABCOA unifies a variety of local businesses that have expressed interest in health and wellness (World Economic Forum, 2008*)*. The organization was originally founded in November 2002 by ten founding members, and began to formally offer its services in June 2003. According to the CEO of NABCOA, Peter van Wyk (2013), NABCOA currently has 50 members from a wide range of industries (e.g. Namibia Talanam Fish Processors, AVBOB Funerals, Trau Bros Diamonds, etc.).

NABCOA's members can be classified into five different tiers depending on their size: small/medium sized companies (less than 100 employees), large companies (101-250 employees), corporate (over 250 employees), and founder (P. van Wyk, personal communication, April 30, 2013). Founder companies are typically the same size as corporate companies but provide a larger contribution in fees and are therefore

recognized. NABCOA (2012) presently recognizes fourteen "Founder Members": Ohlthaver and List Group of Companies (O&L), Shell Namibia, Bank Windhoek, BP Namibia, Namibia Institute of Pathology (NIP), Coca-Cola Namibia Bottling Company, UNDP, NAMDEB, City of Windhoek, NAMPOWER, Standard Bank Namibia, SANLAM, NANASO, and UNAIDS.

The internal structure of NABCOA is currently composed of 24 staff members occupying eight different positions (P. van Wyk, personal communication, April 30, 2013). These positions are distributed among three divisions within NABCOA: programmatic, finance/administration, and wellness.

These divisions help NABCOA to offer health services to its members. NABCOA regularly hosts informative events around the country to engage members at various locations (van Wyk, 2008). NABCOA has the resources to send its own educated professionals to these events to train others in peer education, workplace HIV/wellness programs, policy development, affordable healthcare, and anti-retroviral treatment. Workshops, refresher seminars, and training sessions are also common services provided. Other resources include providing information and spreading awareness through its newsletter, providing cost-benefit analysis to participating businesses, and the ability to carry out research projects relevant to its mission. Members of the coalition can choose how extensively they participate in NABCOA's education programs. NABCOA's membership is comprised of certain businesses that routinely partake in the offered services, and others who are not as actively involved.

There are also other organizations in Namibia that address various health problems such as HIV/AIDS and overall wellness in the workplace (World Economic Forum, 2008).

NABCOA has some partner implementers in achieving this goal, including the Namibia Networks of AIDS Service Organization (NANSO) and the Alliance of Mayors and Municipal Leaders (AMICAALL). NABCOA is also a founding member of Pan Africa Business Coalition (PABC). Other cooperating partners of NABCOA (2012) include GIZ, The Global Fund, KNCV Tuberculosis Foundation & United States Agency for International Development (USAID), Sustainable Health Outcomes in the Private Sector (SHOPS), and Namibia's Ministry of Health and Social Services (MoHSS).

In 2003, NABCOA partnered with GIZ, a German government agency, to assist in NABCOA's development of HIV/AIDS programs and projects. This relationship has remained strong for 10 years as GIZ continues to work closely with NABCOA by providing technical advisors and local professionals. They also assist in financing projects focused on researching, monitoring, and evaluating workplace programs. GIZ has a HIV/AIDS team of individuals in Namibia who assist organizations such as NABCOA with various programs. GIZ currently operates with over 130 partnering companies and organizations worldwide to develop and offer services for sustainable development, The project team worked very closely with NABCOA's current technical advisor, Matthew Black, a consultant funded by GIZ, and Beatrix Akuake, the Workplace Programme and Project Manager.

NABCOA partners with different organizations to complete various projects (Guariguata, deBeer, Hough, Bindels, Weimers-Maasdorp, Feeley & Rinke de Wit, 2012). A major project that has been implemented is the Bophelo! Project, which piloted one of the first mobile wellness screening clinics in Namibia. NABCOA achieved this through a partnership with the PharmAccess Foundation and the Namibian Institute of Pathology under the support of

the Ministry of Health and Social Services. These mobile clinics travel to companies across Namibia to screen employees for a list of health measures. Within the NABCOA office, there are 10 employees who work very closely with Bophelo! as clinic supervisors, coordinators, and testers.

Other similar organizations to NABCOA in Namibia include the National Association of Planned Parenthood (NAPPA) and several faith related organizations, such as Catholic AIDS Action (CAA) (O'Hanlon, Barbara, Feeley, de Beer, Sulzbach & Vincent, 2010). There are also similar private, for-profit organizations such as Namibian Employers Federation (NEF) and National Union of Namibian Workers (NUNW). These companies also support HIV/AIDS and general wellness services for people in Namibia.

In an effort to increase involvement in employee healthcare through workplace programs, NABCOA has begun the development of a return on investment toolkit (P. van Wyk, personal communication, April 30, 2013). The toolkit aims to demonstrate that investment in employee wellness is not only an ethical decision, but also a business one. By presenting this toolkit to CEOs and Finance Directors NABCOA intends to convey that investment in workplace programs is economically worthwhile.

Appendix B: What is a Cost-Benefit Projection Model?

In order to promote the implementation of workplace programs targeting wellness within the private sector, evidence identifying the financial benefits of workplace wellness programs is needed (Lodemann, 2013). This can be done through the use of a cost benefit projection model, a mathematical tool that:

- Defines the most prominent health problems affecting the Namibian workplace in an epidemiological profile
- Calculates loss of productivity in terms of costs of workdays lost due to absenteeism and presenteeism
    - Absenteeism refers to employees being absent from work
    - Presenteeism refers to employees being unproductive while at work
- Evaluates the interventions for their cost effectiveness based on their costs and reduction in morbidity and mortality

When utilizing the model, employers input company specific data, such as numbers of male and female employees and the costs of the salaries of employees into the 'input parameters' section of the model (Lodemann, 2013). Then the company can choose an intervention to evaluate for its cost effectiveness.

There are two main components to the projection model: the epidemiological profile and the interventions section (Lodemann, 2013). First, the epidemiological profile identifies the most prevalent health issues for the specific country in which use of the tool is intended. It is comprised of three main parts:

- Top causes of morbidity (sickness)

- Top causes of mortality (death)
- Top risk factors (health conditions that may lead to more serious illness)

Each cause of morbidity and mortality is provided in terms of its incidence rate, which is the number of new cases of a disease within a specific time period. The risk factors are measured by their prevalence rate, the measure of the total number of cases of a disease at any given time period within a population (Lodemann, 2013). The model also uses standard values of the annual unproductive days as a result of the top risk factors. Using this country specific epidemiological information along with the company information that was entered, the model will provide values for predicted work days lost due to absenteeism from sickness, the costs for the company from the lost workdays, and the costs due to presenteeism from morbidity. With this knowledge of the health problems leading to a loss of productivity at the workplace supplies employers with the evidence necessary to begin evaluating what wellness programs can benefit the company.

Also in the model is a list of interventions, which are possible wellness services that companies can offer to employees, and their costs (Lodemann, 2013). Employers may plug in information on their own interventions that they wish to evaluate. The model will then calculate the savings per intervention. This is calculated using the costs of interventions and the reduction in morbidity and mortality that the interventions yield.

Ultimately, the cost benefit projection model is an informative mathematical tool that is capable of supplying companies with relevant information concerning the health of their employees as well as how they can be affected by various illnesses and risk factors.

Appendix C: Interview Protocols

Interviewee:_____
Company Association:_____
Date:_____
Interviewers:_____

1. (For Ohltaver & List only): From the company website we found a list of wellness initiatives, could you provide a basic description of what each entails?
    - O&L Vitality Program
    - Absenteeism Management
    - Executive Wellness Program
    - Wellness Awareness sessions at Operating Companies
    - Wellness Information corners at every Operating Company
    - Wellness Screening and voluntary Counselling and Testing
    - Peer Education Program
    - Commemoration of International Health Days
    - Wellness Care and Support
    - Wellness site visits

2. What was the initial investment in the initiative/program?

3. What are the annual costs for each initiative/program? The annual cost per employee?

4. Is there a separate training cost for some of the programs?

5. If incentives are used, were those costs factored into the final cost of the program or are they separate?

6. How long do the programs run for? Months? Years?

7. Any there any other costs associated with the programs?

Appendix D: Mortality Rates

Tables D.1 and D.2 give the rates of the top ten causes of mortality for Namibian males and females. The rates are given in the standard health data format of per 1000 people.

Table D.1: Namibia's Top 10 Mortality Rates for Males

Mortality Cause	Mortality Rate (per 1000 population)	% of Total Leading Causes
Pulmonary Tuberculosis	0.970	23.21
HIV/AIDS	0.821	19.65
Pneumonia	0.713	17.06
Diarrhea, Gastroenteritis	0.528	12.64
Heart Failure	0.283	6.78
Other Respiratory System Diseases	0.192	4.61
Hypertension	0.184	4.42
Stroke, Intracranial Hemorrhage, Cerebral Infraction	0.184	4.42
Anemia	0.168	4.04
Diabetes Mellitus	0.114	2.75

Table D.2: Namibia's Top 10 Mortality Rates for Women

Mortality Cause	Mortality Rate (per 1000 population)	% of Total Leading Causes
HIV/AIDS	0.693	19.6
Pulmonary Tuberculosis	0.574	16.2
Pneumonia	0.528	15.0
Diarrhea, Gastroenteritis	0.415	11.8
Heart Failure	0.338	9.6
Hypertension	0.255	7.2
Stroke, Intracranial Hemorrhage, Cerebral Infraction	0.224	6.4
Anemia	0.196	5.6
Other Respiratory System Diseases	0.175	5.0
Malignant Neoplasm of Cervix Uteri, Uterus, Ovaries	0.113	3.2

Appendix E: Morbidity Rates, In/Outpatient Ratios, and Hospital Stay Lengths

Table E.1 gives the top outpatient morbidity rates per 1000 of the population for males and females.

Table E.1: Namibia's Top Morbidity Rates for Males and Females

Morbidity Cause	Male Incidence Rate (per 1000 population)	Female Incidence Rate (per 1000 population)
Musculoskeletal System Disorder	398.70	398.70
Other Respiratory Disease	278.90	278.90
Trauma	175.17	175.17
HIV/AIDS	124.43	163.77
Other Skin Disease	124.23	124.23
Other Gastrointestinal Disease	112.72	112.72
Common Cold	106.56	106.56
Nose or Throat Disease	81.32	81.32
Diarrhea without Blood	79.04	79.04
Other Eye Disease	61.24	61.24
Uro-Genital Case (Not STI)	46.54	46.54
Dental Disease	41.25	41.25
Vaginal Discharge	0	31.33
Ear Disease	27.47	27.47
Hypertension	24.84	24.84
Neurological Disease	24.15	24.15
Conjunctivitis	22.58	22.58
Other STI Disease	20.47	20.47

The pairings used to calculate the in/outpatient ratio and hospital stays are shown below in Table E.2.

Table E.2: Assumptions used in Inpatient & Outpatient Morbidity Pairings

Inpatient Morbidity Causes	Outpatient Morbidity Causes
1. Other musculoskeletal or connective tissue disorders/procedures	1. Musculoskeletal system disorder
2. Other respiratory system disease, pneumoconiosis, lung abscess, etc.	2. Other respiratory disease diagnoses
3. Other diseases or procedures on skin, subcutaneous tissue	3. Other skin disease diagnoses
4. Diarrhea, gastroenteritis, presumed infectious	4. Diarrhea without blood
5. Other urinary system, including bladder diseases, UTI, urethral stricture	5. Uro-genital case (not STI)
6. Schizophrenia and delusional disorders	6. Neurological disease/disorder
7. Hypertension, essential	7. Hypertension
8. HIV disease (AIDS)	8. HIV clinical diagnosis

The in/outpatient ratio is provided for each pairing in table E.3. We did not enter a value in the model for the health problems that did not correspond with inpatient health problems.

Table E.3 Inpatient to Outpatient Relative Proportions

Disease	Inpatient/Outpatient Ratio
Musculoskeletal system disorder	0.00094
Other respiratory disease diagnoses	0.00122
Other skin disease diagnoses	0.00341
Diarrhea without blood	0.01131
Uro-genital case (not STI)	0.01063
Neurological disease/disorder	0.04169
Hypertension	0.03182
HIV clinical diagnosis	0.11984

The average length of hospital stay in days is given for in table E.4. For the health categories that matched in Table E.2 the MoHSS inpatient hospital stay data was used. For the remaining health problems we referenced the hospital stay values in Ghana's cost-benefit projection model and made rough estimates.

Table E.4: Average Length of Hospital Stays for top Causes of Morbidity

Cause of Morbidity	Average Length of Hospital Stay in Days
Musculoskeletal System Disorder	6.52
Other Respiratory Disease	5.89
Trauma	5.74
Other Skin Disease	8.31
Other Gastrointestinal Disease	5.32
Common Cold	1
Nose or Throat Disease	3.6
Diarrhoea, Gastrointentritis	6.66
Other Eye Disease	7.1
Uro-Genital Case (Not STI)	5.69
Dental Disease	0.5
Vaginal Discharge	0.5
Ear Disease	4.2
Hypertension	6.54
Neurological Disease	12.5
Conjunctivitis	2
Other STI Disease	3.8
HIV/AIDS	10.96

Appendix F: Risk Factors and Annual Unproductive Days

Included in Appendix F are the two groups of risk factors identified by the WHO (Table F.1) and from PharmAccess (Table F.2). The data are presented as decimal percentages, which are proportions. To convert to a percentage, multiply the value in the table by 100.

Table F.1: WHO Risk Factor Percentages for Males and Females

Risk Factor	Decimal Percentage for Males	Decimal Percentage for Females
Physical Inactivity	0.519	0.651
Raised Blood Pressure	0.510	0.469
Alcohol Consumption	0.413	0.200
Overweight BMI	0.233	0.447
Daily Tobacco Use	0.216	0.069
Raised Blood Glucose	0.071	0.085
Raised Cholesterol	0.062	0.082

Table F.2: PharmAccess Risk Factor Percentages for Males and Females

Risk Factor	Decimal Percentage for Males	Decimal Percentage for Females
High Blood Pressure	0.104	0.008
High BMI	0.214	0.295
Hypoglycemic	0.4155	0.6783
Hyperglycemic	1.0173	0.6783

We determined the number or annual unproductive days for the risk factors included in the model by referring to a study done on presenteeism in the United States. The estimates are listed in Table F.3.

Table F.3: Annual Unproductive Days for Males and Females

Risk Factor	Annual Unproductive Days for Males	Annual Unproductive Days for Females
Raised Cholesterol	0.730	0.880
Raised Blood Pressure	0.730	0.880
Alcohol Consumption	1.340	1.650
Overweight BMI	0.730	0.880
Daily Tobacco Use	1.340	1.65
Abnormal Glucose Levels	0.730	0.880
Underweight BMI	0.730	0.880

Appendix G: WHO-CHOICE Interventions

Table G.1: WHO-CHOICE Interventions for HIV/AIDS

Code	Interventions	% Coverage	Cost per person N$
HIV-7	Mass Media (MED)	100%	0.45
HIV-13	Treatment of sexually transmitted Infections (STI)	95%	5.89
HIV-14	Voluntary counseling & testing (VCT)	95%	10.54
HIV-15	Prevention of Mother to Child Transmission (PMTCT)	Antenatal Care Coverage	4.20
HIV-16	Highly Active Anti-Retroviral Therapy (HAART), simple	Antenatal Care Coverage	34.92
HIV-18	HAART Plus (interleukin 2)	Antenatal Care Coverage	166.28

Table G.2: WHO-CHOICE Interventions for Tuberculosis

Code	Interventions	% Coverage	Cost per person N$
TB-9	SmearPos: Treatment of new smear-positive cases only under DOTS	95%	9.55
TB-10	SmearPosNeg: As for SmearPos, plus treatment of smear-negative cases under DOTS	95%	15.98
TB-11	SmearPosMDR: As for SmearPos, plust DOTS-plus treatment	95%	12.86
TB-12	Combination: As SmearPos, plus DOTS treatment of smear-negative cases plus DOTS-plus standardized second-time drug re-treatment	95%	19.20

Table G.3: WHO-CHOICE Interventions for HIV/AIDS and Tuberculosis Combination

Code	Interventions	% Coverage	Cost per person N$
HIV-17	HAART (simple) & DOTS for TB	n/a	38.93
HIV-19	HAART Plus and DOTS for TB	n/a	179.49

Table G.4: WHO-CHOICE Interventions for Alcohol Consumption

Code	Interventions	% Coverage	Cost per person N$
ALC-2	Brief PHC Advice	50%	3.48
ALC-3	Random Breath Testing	80%	1.79
ALC-9	Combination (ALC2 + ALC3)	n/a	5.00

Table G.5: WHO-CHOICE Interventions for Tobacco Use

Code	Interventions	% Coverage	Cost per person N$
TOB-5	Clean indoor air law enforcement	n/a	2.32
TOB-6	Comprehensive advertise banning	n/a	0.98
TOB-7	Information dissemination	n/a	1.87
TOB-8	Nicotice replacement therapy	n/a	15.72

Table G.6: WHO-CHOICE Interventions for Schizophrenia

Code	Interventions	Coverage	Cost per person N$
SCZ-1	Older "neuroleptic" anti-psychotic drug	80%	7.23
SCZ-2	Newer "atypical" anti-psychotic drug	80%	27.32
SCZ-3	Older anti-psychotic + psychosocial treatment	80%	7.86
SCZ-4	Newer anti-psychotic + psychosocial treatment	80%	28.04

Appendix H: Data Request Form for the Epidemiological Profile

Data Request Form

The following data is being collected to develop NABCOA's cost-benefit projection model. The data must be gender-specific and age-specific.

1. Top 30 causes of mortality
   - Number of deaths reported in a year for:
     - Males 18-59
     - Females 18-59

2. Top 50 causes of morbidity
   - Number of new cases reported in a year for:
     - Outpatient cases
       - Males 18-59
       - Females 18-59
     - Inpatient Cases
       - Males 18-59
       - Females 18-59
   - Length of hospital stay in days for inpatient cases

3. Top 10 risk factors
   - Percentages for:
     - Males 18-59
     - Women 18-59
   - Annual unproductive days for each risk factor