

**A CRITICAL LITERATURE REVIEW OF BARRIERS TO THE PREVENTION OF  
MOTHER-TO-CHILD HIV/AIDS IN SOUTH AFRICA**

by

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University of Pittsburgh, 2011

HIV/AIDS is one of the most encompassing and highly recognized infectious pandemics in our world today. It contributes significantly to total overall deaths and to economic hardship in societies, particularly in underdeveloped and developing countries. Access to effective treatments for preventing mother-to-child HIV transmission (PMTCT) during pregnancy and birth remain challenging, especially in resources poor settings. South Africa has one of the highest prevalence rates of HIV/AIDS in the world, with 5.7 million people currently infected. The prevalence rate of South African women of childbearing age is almost 30%, and it is estimated that 40,000 children are born with HIV every year. PMTCT in South Africa could be nearly 100% because of ARV treatments like nevirapine; however, social, behavioral, and governmental factors inhibit access to preventative medication and adherence to medication schedules. This paper used a critical review of the literature on PMTCT in South Africa, specifically searching for barriers associated with specific interventions. The literature review found barriers to the PMTCT at various levels of the Social Ecologic Model: individual, interpersonal, community, institutional, and policy. The Individual level barriers included knowledge about HIV and PMTCT, knowledge of the HIV status of mother and infant, and knowledge, beliefs, and fear. The Interpersonal level barriers encompassed male involvement, the role of traditional health practitioners, and social support. The Organization level, few barriers were found in the literature review of the databases, but barriers were found through the review of history findings from the background sections. The Community level barriers were

internalized AIDS stigma and infrastructure. At the Policy level, the only current barrier was CD4 count level for eligibility of government treatment. Adherence factors were multilevel barriers. The public health significance of MTCT is that 40,000 infants in South Africa are infected each year with HIV, a largely preventable disease, resulting in an unnecessary added burden to an already resource poor country.

## TABLE OF CONTENTS

<b>PREFACE.....</b>	<b>X</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>2.0 BACKGROUND .....</b>	<b>5</b>
<b>2.1 HISTORY OF HIV/AIDS .....</b>	<b>5</b>
<b>2.1.1 History of HIV.....</b>	<b>5</b>
<b>2.1.2 History of HIV in South Africa.....</b>	<b>12</b>
<b>2.1.3 History of Prevention of Mother-to-Child Transmission of HIV/AIDS</b>	<b>16</b>
<b>3.0 METHODS .....</b>	<b>22</b>
<b>4.0 FINDINGS .....</b>	<b>24</b>
<b>4.1 INDIVIDUAL LEVEL .....</b>	<b>26</b>
<b>4.1.1 Knowledge about HIV and PMTCT .....</b>	<b>26</b>
<b>4.1.2 HIV status of mother and infant.....</b>	<b>26</b>
<b>4.1.3 Knowledge, beliefs, and fear .....</b>	<b>28</b>
<b>4.2 INTERPERSONAL LEVEL .....</b>	<b>29</b>
<b>4.2.1 Male involvement.....</b>	<b>29</b>
<b>4.2.2 Health practitioners .....</b>	<b>31</b>
<b>4.2.3 Social support.....</b>	<b>32</b>
<b>4.3 ORGANIZATIONAL LEVEL.....</b>	<b>32</b>

4.4	<b>COMMUNITY LEVEL .....</b>	<b>33</b>
4.4.1	<b>Internalized AIDS stigma.....</b>	<b>33</b>
4.4.2	<b>Infrastructure.....</b>	<b>34</b>
4.5	<b>POLICY LEVEL .....</b>	<b>36</b>
4.6	<b>OTHER: ADHERENCE FACTORS.....</b>	<b>37</b>
5.0	<b>DISCUSSION .....</b>	<b>38</b>
5.1	<b>IMPLICATIONS FOR POLICY .....</b>	<b>39</b>
5.2	<b>IMPLICATIONS FOR INTERVENTIONS.....</b>	<b>40</b>
5.3	<b>IMPLICATIONS FOR FUTURE RESEARCH.....</b>	<b>41</b>
5.4	<b>LIMITATIONS.....</b>	<b>42</b>
6.0	<b>CONCLUSION.....</b>	<b>43</b>
	<b>APPENDIX: LITERATURE FINDINGS AND HISTORICAL TIMELINE .....</b>	<b>44</b>
	<b>BIBLIOGRAPHY.....</b>	<b>57</b>

## LIST OF TABLES

Table 1. The Social Ecological Model of Barriers to the Prevention of Mother-to-Child Transmission of HIV/AIDS .....	44
Table 2. Table of Literature Review Results .....	45
Table 3. Table of Comparison of Articles .....	46
Table 4. Timeline of HIV/AIDS .....	51

## LIST OF FIGURES

Figure 1. The Social Ecological Model (Glanz et al., 2008). .....	4
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## PREFACE

### Acronyms and abbreviations

AIDS – acquired immunodeficiency syndrome  
ANC – antenatal clinic  
ARV – antiretroviral  
ART – antiretroviral therapy  
AZT – zidovudine  
CDC – Centers for Disease Control and Prevention  
ELIZA – enzyme linked immunosorbant assay  
HAART – highly active antiretroviral therapy  
HIV – human immunodeficiency virus  
FDA – United States Federal Drug Administration  
IOM – Institutes of Medicine  
IPV – intimate partner violence  
MMWR – Morbidity Mortality Weekly Report  
MTCT – mother-to-child transmission  
MDG – Millennium Development Goals  
NVP – nevirapine  
PCP – pneumocystic carinii pneumonia  
PCR – poly chain reaction  
PEP – pre-exposure prophylaxis  
PEPFAR – President’s Emergency Plan for AIDS Relief – US  
PLWHA – people living with HIV/AIDS  
PMTCT – prevention of mother-to-child transmission  
sdNVP – single dose nevirapine  
SEM – social ecological model  
SIV – simian immunodeficiency virus  
TAC – Treatment Action Campaign  
TB – tuberculosis  
TBA – traditional birth attendant  
THP – traditional health practitioner  
UN – United Nations  
UNAIDS – Joint United Nations Programme on HIV/AIDS  
UNGASS – United Nations General Assembly Special Session on HIV/AIDS  
UNICEF – United Nations Children’s Fund  
USAID – United States Agency for International Development  
XDR-TB – extremely drug resistant tuberculosis

WHO – World Health Organization

## 1.0 INTRODUCTION

Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) is one of the most encompassing and highly recognized infectious pandemics in our modern world today. Not only has it changed the face of the world in terms of total overall deaths (more than 25 million people have died from HIV since 1981) (Joint United Nations Programme on HIV/AIDS, 2010), but it also continues to contribute immensely to economic hardship, particularly in underdeveloped and developing countries. While HIV is transmitted through sexual intercourse, the sharing of infected needles and blood products, and through vertical mother-to-child transmission (MTCT) during birth, currently no vaccinations or medications exist to eradicate the disease or to cure the disease after infection. Treatment is available in the form of antiretroviral medications (ARVs) that help to increase patients' life expectancy while they are living with HIV/AIDS. Some ARVs (e.g. a cocktail of nevirapine or NVP and zidovudine or AZT) can prevent and eliminate the transmission of HIV from mother to child during pregnancy and birth. Unfortunately, access to those prenatal medicines is challenging, especially in resource-poor settings. According to the Millennium Development Goals (MDG) 2010 (MDG, 2010), over 90% of the 2.1 million children now living with HIV were infected while in the womb or while the mother was giving birth. With proper treatment and access to care, almost all vertical infections could have been prevented.

South Africa, an underdeveloped country, has one of the highest prevalence rates of HIV/AIDS in the world. In South Africa, 5.7 million people currently live with HIV/AIDS (Nicolay, 2008). Prevalence rates among the adult population (ages 20 years to 64 years) are as low as 9% in the Western Cape province, while the highest rate is at 28% in Kwazulu-Natal province for the same population (Nicolay, 2008). South African women between the ages of 25 to 30 years old have a prevalence rate of almost 30%. It is estimated that 40,000 children are born with HIV every year, contributing significantly to the overall rate of infant mortality in South Africa (Statistics South Africa, 2010). Prevention of mother-to-child transmission (PMTCT) of HIV in South Africa has the potential to be nearly 100% because of ARV treatments like NVP; however, social, behavioral, and governmental factors impact access to preventative medication and adherence to medication schedules.

In South Africa, multiple factors affect access and adherence to preventative treatment for mother-to-child transmission. Many of these factors can be identified using the Social Ecologic Model (SEM) of health as seen in Figure 1 (Glanz et al., 2008). The SEM is an approach used in health behavior models for identifying different factors related to health issues. These different levels include: individual, interpersonal, community, institutional, and policy (Glanz et al., 2008). It is important to keep in mind the various parts of the SEM in order to understand barriers to the PMTCT. Previous research has shown that barriers can include HIV knowledge, stigma, involvement of others, and disclosure. Having knowledge about HIV and PMTCT has been associated with more access and more testing (Peltzer et al., 2009; Futterman, Shea, Besser, Stafford, Desmond, Comulada, & Greco, 2010; and Mkwanzazi et al., 2008). Receiving or not receiving HIV test results (Urban & Chersich, 2004; Mkwanzazi, Patel, Newell, Rollins, Coutsoydis, Coovadia, & Bland, 2008; Peltzer & Mlambo, 2010; and Medley et al.,

2004) and various beliefs and fear (Igumbor, Pengpid, & Obi, 2006; Kaida, Laher, Strathdee, Money, Janssen, Hogg, & Gray, 2010; Buskens, Jaffe, & Mkhathshwa, 2010; Peltzer et al., 2009; Thorsen, Sundby, & Martinson, 2008; and Varga & Brookes, 2008) can also be barriers for getting HIV/AIDS preventative medications and services.

The degree of involvement and support of male partners (Auvinen, Suominen, & Valimaki, 2010; Visser, Neufeld, de Villiers, Makin, & Forsyth, 2008; Makin et al., 2008; Peltzer & Mosala, 2008; The Kesho Bora Study Group, 2010; and Peltzer et al., 2009), Chao, & Dana, 2009; Peltzer & Mlambo, 2010; Peltzer, Mosala, Dana, & Fomundam, 2008; and Varga & Brooks, 2010) are associated with barriers in receiving and adhering to PMTCT services by women. Other factors that also contribute to adherence of PMTCT include social support (Futterman et al., 2010; Peltzer & Mlambo, 2010; and Coutsooudis, 2005), client-counselor relationships (Auvinen, Suminen, and Valimaki, 2010), and disclosure of HIV status (Varga and Brookes, 2008; Auvinen, Suominen, and Valimaki, 2010). HIV stigma and premarital pregnancy stigma (Thorsen, Sundby, & Martinson, 2008; Varga & Brookes, 2008; and Peltzer & Mlambo, 2010) as well as infrastructure (McIntyre & Bland, 2002; The Kesho Boro Study Group, 2010; Meyers et al., 2007; Lungiswa et al., 2007; Mate et al., 2009; and Doherty, Chopera, Nsibande, & Mngoma, 2009), policy (McIntyre & Bland, 2002; The Kesho Boro Study Group, 2010; Meyers et al., 2007; Lungiswa et al., 2007; Mate et al., 2009; and Doherty, Chopera, Nsibande, & Mngoma, 2009), and non-adherence factors (Mlambo, Phaswana-Mafuyo, & Ladzani, 2009; and Ndirangu, Newell, Tanser, Herbst, & Bland, 2010) have been shown to be barriers to receiving PMTCT treatment.



Figure 1. The Social Ecological Model (Glanz et al., 2008).

The public health significance of MTCT of HIV is that 40,000 infants in South Africa are infected each year with HIV, a largely preventable disease, resulting in an unnecessary added burden to social service and health care systems in an already resource poor country. This paper addresses barriers to the prevention of MTCT of HIV/AIDS in South Africa. Specifically, it uses a literature search to answer the following questions: what are the barriers to PMTCT of HIV/AIDS? what strategies are working best to prevention MTCT of HIV/AIDS? and, what possible policy interventions could be implemented? In Chapter 2, the background of the disease is presented through the historical context of the HIV discovery in the United States and in South Africa. Chapter 3 discusses the research methods of the literature searches that were used. In Chapter 4, the literature search findings of the barriers to PMTCT in South Africa are presented within the structure of the SEM. The discussion in Chapter 5 describes implications for policy, interventions, recommendations, and research. Chapter 6 will reflect on the conclusion and the article results.

## **2.0 BACKGROUND**

Opportunistic infections very similar to those associated with HIV/AIDS started to appear more frequently in the early 1980s. Since then, reports have been inconclusive about the exact beginnings of the disease. HIV/AIDS has spread throughout the entire world, touching every continent and almost every population. More than three decades later, HIV had spread to all corners of the world. In this chapter the background of the HIV/AIDS disease is discussed with respect to its documented beginnings in the US and in South Africa.

## **2.1 HISTORY OF HIV/AIDS**

### **2.1.1 History of HIV**

According to an official Centers for Disease Control and Prevention (CDC) Morbidity Mortality Weekly Report (MMWR) (MMWR, 1981), the first reported cases of HIV/AIDS appeared in the United States in 1981. The first cases were in Los Angeles, CA and were of patients who were homosexual men. All had symptoms of pneumocystis carinii pneumonia (PCP). Diagnoses before this point in time were considered arbitrary with respect to HIV/AIDS in terms of reporting, as a dearth of diagnostic information existed about the disease. HIV was also difficult to diagnose because it is asymptomatic in its early stages of disease.

In the early 1980s, increases in Kaposi's sarcoma cancer, PCP, and other opportunistic infections were found in homosexual men in New York City and Los Angeles (MMWR, 1982). Under normal circumstances, these infections were found in older populations, and they were usually treatable when given prescriptions for two weeks. These newly infected patients did not respond well to prescriptions, and they continued to seek medical treatment beyond the normal period for these particular infections. In 1981, while HIV was still unnamed, it was said to infect people who have sexual contact with each other, specifically homosexual men (MMWR, 1982).

Within two years HIV acquired various diagnostic names including gay-related immune deficiency (GRID), Kaposi's Sarcoma Opportunistic Infection (KSOI), community-acquired immune dysfunction, "gay cancer" (Altman, 1982; MMWR Weekly, 1982; and Chibbaro, 1982), and other names associated with symptomatic infections (e.g. lymphadenopathy and cytomegalovirus). *The Lancet* published an opinion article in 1981 about the new infectious disease, calling it what many others at the time did, the "Gay Compromise Syndrome" (Brennan & Durack, 1981). *The New York Times* reflected widespread public opinion of the time when an article quoted a New York City physician, Dr. Lawrence D. Mass, as stating, "gay people whose life style consists of anonymous sexual encounters are going to have to do some serious rethinking" (Altman, 1982). In 1982, a new population of infected individuals emerged: injection drug users. During the summer of 1982, the CDC reported 425 cases of this „new' opportunistic infectious disease that was emerging in the US in 23 states and in eight countries (CDC, 1982). The US and the United Kingdom also sent out messages encouraging gay men to practice safer sex methods (The Lesbian & Gay Foundation, 2010; and Sexually Transmitted Infections Community Coalition of Metropolitan Washington, DC, 2010).

In 1982, the disease was officially named Acquired Immunodeficiency Syndrome (AIDS) in a meeting in Washington, D.C. (Time, 2003). By December of 1982, 3,064 people in the US were diagnosed with AIDS and another 1,292 had died from it (Acquired Immunodeficiency Syndrome Weekly Surveillance Report (1983). In 1982 scientists determined that HIV/AIDS could be transmitted through blood products, specifically blood transfusions (MMWR, 1982), as well as from mother-to-child during pregnancy, delivery, and breastfeeding (MMWR, 1982). The report confirmed that the “CDC has received reports of four infants (under two years of age) with unexplained cellular immunodeficiency and opportunistic infections” (MMWR, 1982). The report described six other children who had opportunistic infections and had actually died from these infections by the time the report was released. These were among the first published cases of MTCT of HIV.

In October of 1983, world leaders gathered together for the first time to assess the global surveillance of HIV/AIDS in a meeting with the World Health Organization (WHO). By the end of the year, the CDC confirmed that the US had 3,064 cases and 1,292 deaths and that Europe had 762 cases (AIDS Activity Center For Infectious Diseases - CDC, 1983). By 1984, Robert Gallo, a medical doctor with the National Institutes of Health (NIH), along with the United States Federal Drug Administration (FDA) isolated HIV and confirmed a retrovirus as the cause of AIDS (FDA, 2009). Since then, HIV has become one of the most well-known retroviruses, or viruses that replicate themselves and their DNA into the host cells. Researchers traveled to Rwanda and other African countries in 1984, finding some of the first records of HIV/AIDS on the continent (Van de Perre, Rouvroy, Lepage, Bogaerts, Kestelyn, Kayihigi, Hekker, et al., 1984). The next year, in 1985, newly developed HIV antibody tests were created to recognize HIV antibodies in blood (New York University Medical Center, 2010). The most common HIV

antibody test is the enzyme immunoassays (EIA). During this year, a study by Zeigler, Cooper, Johnson, and Gold (1985) found that HIV could be transmitted from mother to child through breastfeeding. Also in 1985, Ryan White, a 13-year-old hemophiliac, was banned from going to high school for being infected with HIV (Levin, Krueger, & Thorpe, 1986). This ruling made Ryan White the face of discrimination in the US for being HIV-positive. The following year (1986) school officials allowed him to return to school. By the end of 1986, 85 countries confirmed 38,401 cases to the WHO (Bureau of Hygiene & Tropical Diseases, 1986).

In 1987, the FDA approved the first diagnostic test for HIV/AIDS, the enzyme linked immunosorbant assay (ELISA), which finds HIV antibodies in blood samples. Because of the use of ELISA and two other tests, the enzyme immunoassays (EIAs) Western Blot Test (Branson, 2003) and the Poly Chain Reaction (PCR) test, prevalence rates of HIV almost doubled from the previous year, reaching an all-time high of 71,751 cases worldwide. In 1987 the WHO estimated that between five and 10 million people around the world were infected with HIV and that 150,000 new cases would occur in the next 12 months (WHO, 1987).

In October 1987, HIV/AIDS became the first disease debated on the United Nations (UN) General Assembly floor (Mann, 1989). Earlier that year, the patent rights to the first antibody tests were also a topic of debate between US scientists and the Pastuer Institute (Palca, 1987). In December 1, 1988, the first World AIDS Day was commemorated (WHO Global Programme on AIDS, 1990). The US introduced the first needle exchange sites in New York City and San Francisco in 1988 (American Civil Liberties Union, 2010). By the end of the 1980s, the drug trial ACTG019 verified that zidovudine (AZT) delayed the onset of symptoms in HIV-positive patients, even though the drug was too expensive for many patients to obtain at \$7,000 each year (Kolata, 1989).

In 1990 HIV/AIDS prevalence in the US was reported at 307,000 people living with HIV/AIDS (PLWHA), although this number appeared to be underreported (Chin, 1990). The CDC estimated that one million people in the US had HIV/AIDS in 1990 (Chin, 1990). Worldwide, HIV/AIDS prevalence rates were between eight and 10 million. Africa had the highest estimate at more than 5.5 million, followed by North America and South America, each with about one million people infected in each region. At the beginning of the 1990s the International AIDS Society ruled that no international AIDS conferences would be held in countries whose governments had banned HIV-positive immigrants to their country; the US was included on this list (Bureau of Hygiene & Tropical Diseases, 1991). In 1993, the CDC changed the definition of HIV/AIDS to include opportunistic infections and a CD4 count of less than 200 (European Centre for the Epidemiological Monitoring of AIDS, 1993). Scientists also found forms of HIV that were resistant to AZT, surprisingly occurring in people who were not currently taking the drug (Associated Press, 1993).

By 1995 HIV/AIDS was the leading cause of death in the US for 25- to 44-year-olds (Altman, 1995). During the 1990s, the first US White House HIV Strategy (San Francisco Chronicle, 1996), as well as the Joint UN Programme on AIDS (UNAIDS) were created (Garbus, 1996). By 1999 scientists discovered that chimpanzees were most likely the direct causes of the first cases of HIV through simian immunodeficiency virus (SIV) (Mitchell, 1999). At the end of 1999 HIV became the fourth leading cause of death in the world (WHO World Health Report, 1999), encompassing 33 million people who were living with HIV/AIDS (Perlman, 1999).

In the early 2000s, US President Clinton stated that HIV/AIDS had become a threat to the national security of many countries, specifically in countries where the disease could destroy

governments and create wars (United Press International, 2000; CNN, 2000). While the disease became a threat to national security in other countries, the US became involved in controversies over loan agreements between African countries and drug companies for the use of ARV therapy patents. US drug companies offered to finance small loans, to sub-Saharan African countries for the therapies and services (Kahn, 2000), but they rejected the loans expressing that supplying loans with interest rates, rather than the medications themselves, was insufficient (Swarns, 2000). Although this was a step backward in getting treatment to underdeveloped countries, in 2001 189 countries signed the Declaration of Commitment to HIV/AIDS, which stated specific aims and goals to reduce prevalence of HIV/AIDS (United Nations, 2001).

In 2001 the FDA approved the first rapid HIV test. Also in this year, the United States Agency for International Development (USAID) introduced the Abstinence, Be Faithful, and Use Condoms (ABC) program into its approaches for decreasing HIV around the world, starting with strategies and funding policies in Uganda (Green, 2003). Another 2001 strategy was set by Kofi Annan, UN Secretary General, when he called for nations to increase funding tenfold for HIV/AIDS in developing countries (United Nations, 2001).

Two years later, in 2003, the WHO declared “that the failure to deliver treatment to nearly six million people with HIV/AIDS in developing countries was a global public health emergency” (Fleck, 2003). Because of this, the WHO set a new “three by five” goal, such that by 2005 three million PLWHA would be on ARVs.

As part of the Bush Administration’s strategy against HIV/AIDS, the President’s Emergency Plan For AIDS Relief (PEPFAR) was introduced with 15 billion dollars to provide ARV treatment to 200,000 people in 15 developing countries (Office of the U.S. Global AIDS Coordinator, U.S. Department of State, 2004). In 2005, while disappointing news about the

inability of countries to reach the three by five goal was announced (UNAIDS/WHO, 2005), the G8 Summit leaders agreed to the creation of a new goal: to provide universal access to ARVs by 2010 (Outcome Document from the 2005 World Summit, 2010).

On a much more positive note, during the following year, in 2006, UNAIDS reported decreased prevalence rates in Kenya, Burkina Faso, and Haiti. UNAIDS also reported statistics on its funding over the past decade, from a mere 300 million dollars in 1996 up to 8.3 billion dollars in 2005 (UNAIDS/WHO, 2006). In the US, the introduction of a one-a-day pill for PLWHA was considered a major medical contribution (*The New York Times*, 2006). Elsewhere in 2005 another contribution was made in the form of an NIH study acknowledging that circumcision greatly reduced the transmission of HIV/AIDS in Africa by 50% (NIH, 2006).

A 2008 statement by Peter Piot, the Executive Director of UNAIDS, said that “The 2008 Report on the global AIDS epidemic confirms that the world is, at last, making some real progress in its response to AIDS” (UNAIDS pg 11, 2008), the UNAIDS report stated that the goal of universal access to ARVs by 2010 would not be met (UNAIDS, 2008). Although this goal was not met, by the end of 2008 four million people around the world were on highly active antiretroviral treatment (HAART); 73% of these people were in Africa, and there were 250,000 children were on HAART, 45% more than recorded in 2007 (Granich, 2010). Also in 2008, PEPFAR was renewed and increased its funding at 48 billion dollars for HIV/AIDS, Malaria, and Tuberculosis (TB) programs projected for the years of 2009-2013 (Office of US Global AIDS coordinator, 2009). Also by that year the HIV-1 genome had been mapped (BBC News, 2009). In 2009 the US lifted the travel ban on PLWHA from other countries immigrating and traveling to the US (United Nations News Centre, 2009). Beginning January 4, 2010, PLWHA would be allowed into the US for the first time since 1987 (Aidsmap, 2010).

Because of this historic event, the International AIDS Society (IAS) confirmed that the location of the 2012 International AIDS Conference would be held in Washington, DC (The White House, 2009). In 2010 the WHO changed the PMTCT guidelines for PLWHA. The previous guidelines said that PLWHA who had CD4 counts below 200 should be put on ARVs. The new guidelines said that PLWHA with a CD4 count of less than 350 were to be placed on ARVs. This change came after studies showed that ARVs could decrease viral load and prevent transmission much more effectively.

*Testing.* Over the past decade the most recently developed tests, the rapid tests, have become increasingly popular at testing sites. These rapid tests have shown to have sensitivities and specificities similar to the EIA-Western Blot without using specialized laboratory equipment for drawn blood. In order to use the rapid tests, samples of saliva are taken, and results are shown within minutes of collection. These rapid tests are especially important for testing pregnant women who do not know their HIV status during labor (Branson, 2003). Accurate testing has been especially important in calculating prevalence rates all over the world. With increased efficiency of testing methods, worldwide estimates show that 33 million people today are living with HIV/AIDS.

### **2.1.2 History of HIV in South Africa**

The history of HIV/AIDS in South Africa has been a topic of debate over a long period of time. Controversies still exist over the precise historical facts and figures for this country. That being said, the following historical perspective is presented based on findings in a literature search.

When the rest of the world was experiencing major surges of HIV prevalence, AIDS appeared in the mid 1980s on the continent of Africa. Through the early 1980s, the disease

moved into populations north of the Sahara Desert (UNAIDS and WHO, 2003). By 1985, the disease spread south of the desert, escalating in sub-Saharan Africa. In 1990 HIV was among the leading diseases making its way through southern African countries (UNAIDS and WHO, 2003).

Although controversies exist about historical facts and movement of the disease, some agree on the progression of disease and the state of disease today. Some historians have argued that transmission of HIV first occurred when African hunters were killing, dressing, and eating chimpanzees, and the SIV mutated into HIV. A study completed in 2005 stated that the best estimates of the origins of HIV came from SIV in the countries of Guinea Bissau and Cameroon in the early 1900s (Keele et al., 2006). In 1987 two flight attendants who had just traveled from the US were clinically diagnosed with HIV/AIDS in South Africa (Ras et al., 1983).

The first year that an AIDS conference was held in an African country was in 1995, when the conference of PLWHA was held in Cape Town (The Associated Press, 1995). In 1998, as spread of the disease increased dramatically, the first case of HIV/AIDS related abuse occurred. South African activist Gugu Dlamini was beaten, and South African President Thabo Mbeki took a public stance against the stigmatization of HIV/AIDS (Bareng-Batho & S'Thembiso, 1998). The next year, President Mbeki made public statements saying that AZT was a toxic substance that is really harmful to a person's health (Wakin, 1999). Although researchers had shown that AZT reduces symptoms of HIV/AIDS, this was the president's first spoken controversial message about the disease. Also in 1999, South Africa was in a debate with US drug companies over prices for AZTs and other ARVs (BBC, 1999).

During the first part of the 20<sup>th</sup> century, the South African Department of Health estimated that 2.65 million women (ages 15 years to 49 years) were infected with HIV, as well as 2.09 million men (ages 15 years to 49 years) and 83,581 infants infected via MTCT (Health

Systems Research, Research Coordination and Epidemiology, 2001). In 2000, President Mbeki publically stated that he believed HIV does not cause AIDS (Mbeki, 2000). In April he went on to say that African AIDS is different from AIDS in other countries and that they should deal with the disease on their own (Daley, 2000). In an uproar over this statement, 5,000 scientists came together by the end of the year to support and sign the Durban Declaration, named after one of South Africa's largest cities (*Mail and Guardian*, 2000). The Durban Declaration was an agreement saying that HIV does in fact cause and lead to AIDS. At the conference, Nkosi Johnson, an HIV-positive 12-year-old, spoke out against Mbeki's beliefs and urged President Mbeki to allow AZTs to be given to HIV-positive pregnant women as a means of preventing MTCT of HIV/AIDS (*Sunday Times*, 2000).

As the controversy over drug access continued, drug prices were offset around the world when India and Brasil created generic forms of the expensive medications (Kumar, 2001; Yamey, 2001). These new medications cost less than one dollar per day (Kumar, 2001). Also in 2001, South African AIDS activists took legal action against the South African Ministry of Health because of the government's refusal to distribute ARVs to prevent MTCT of HIV/AIDS (Sidley, 2001). Because of pressure, the government of South Africa promised that in 2002, it would start providing NVP to HIV-positive mothers and give AZT, a pre-exposure prophylaxis (PEP), to women who were raped (Sidley, 2002). As part of advertising and getting information out about HIV/AIDS in South Africa, a new HIV-positive Sesame Street character, Kami, created to show children what it is like to have HIV and what it is like to be in contact with a person who has the disease (Boyle, 2002).

Not only did the South African government promise to give out ARVs (NVP and AZT) to those women in 2002, it also promised to provide free ARVs in public hospitals in 2003, but

started with the richest province of Gauteng (Baleta, 2003a). In 2003 the Treatment Action Campaign (TAC) filed manslaughter charges against the South African Ministry of Health for its lack of response to the HIV/AIDS epidemic in the country (Baleta, 2003b). During this time, the South African government was said to have been responsible for 600 deaths each day for failing to respond to the epidemic (Baleta, 2003b). In 2005, Nelson Mandela announced that his oldest son died of AIDS that year (BBC News, 2005). A 2005 report found that the published death certificates between the years of 2000-2001 were misreported and that the actual estimate of HIV-related deaths was two-thirds greater than the reported number (Groenewald, Nannan, Bourne, Laubscher, & Bradshaw, 2005).

In 2006 South Africa had a rise of an extremely drug resistant form of tuberculosis (XDR-TB), and most if not all of the 25 cases were related to HIV (Boseley, 2006). At the 2006 XVI International AIDS Conference in Toronto, Stephen Lewis, Special Envoy to Africa for HIV/AIDS, responded to South Africa's attempt at responding to its HIV/AIDS epidemic by saying:

South Africa is the unkindest cut of all. It is the only country in Africa ... whose government is still obtuse, dilatory and negligent about rolling out treatment. It is the only country in Africa whose government continues to propound theories more worthy of a lunatic fringe than of a concerned and compassionate state... The government has a lot to atone for. I'm of the opinion that they can never achieve redemption (Lewis, 2006).

After Nozizwe Madlala-Routledge took over as the Ministry of Health, she and the Deputy President, Phumzile Mlambo-Ngcuka, released new goals for HIV/AIDS epidemic: 1-) to reduce new infections by 50%, and 2-) to bring treatment to more than 80% of HIV infected patients (Reuters, 2007). After just a few short months, the interim Minister of Health was fired, decreasing optimism that flowed through the country because of the new goals (*The Associated Press*, 2007). A report published by Polydex Pharmaceuticals in 2007 found that the drug trial of

an AIDS vaccine might have increased the risk of South Africans being infected with the disease more than the placebo (Polydex Pharmaceuticals, 2007). In 2007, Mbeki publically announced that he still did not believe that HIV was the cause of AIDS (Guardian Unlimited, 2007). The following year, South African scientists went to court over unauthorized trials of vitamins they used and promoted as HIV/AIDS medications and because of the implementation and distribution of the vitamins to PLWHA throughout the country (Rice, 2008). In 2008 Mbeki resigned as President of South Africa and Jacob Zuma took his place as President of the country. A Harvard University study was published emphasizing that 330,000 people lost their lives to HIV/AIDS between the years of 2000 and 2005 due to the failure of the South African government to distribute adequate ARVs (Chigwedere, Seage, Gruskin, Lee, & Essex, 2008). In 2010 a South Africa epidemiological team proposed that ARV treatment for HIV/AIDS could be used as PEP for transmission by decreasing viral load and diagnosing positive cases sooner (Williams, 2010).

### **2.1.3 History of Prevention of Mother-to-Child Transmission of HIV/AIDS**

MTCT has among the highest rates of HIV/AIDS transmission (The Kesho Boro Study, 2010). The natural rate of transmission between mother to child varies between 15% to 35% depending on multiple factors, such as breastfeeding practices and adherence to treatment (The Kesho Boro Study Group, 2010) (PEPFAR, 2010). According to DeCock et al., as cited in The Kesho Boro Study Group (2010) 5% of transmission occurs during pregnancy in utero, 15% during delivery, and 15% during breastfeeding.

The first cases of MTCT were reported in 1983, and infants became the newest population to be infected (MMWR, pg 309-311, 1983). Up until this point, HIV had infected

only the “4H club” populations: homosexuals, hemophiliacs, heroin addicts, and Haitians (Gallo, 2006). Two years later, in 1985, Zeiger et al. (1985) found that HIV was also transmitted through breastfeeding. The WHO did not officially recognize this mode of transmission until 1987 (WHO, 1987). By mid 1990, the WHO estimated that three million women who were HIV-positive gave birth to three million infants, of whom 700,000 infants were infected with the virus (Chin, 1990).

A 1991 study completed in Kigali, Rwanda, found that PMTCT might be more viable than previously thought (Van De Perre, Simonon, Msellati, Hitimana et al., 1991). The study found that infants were becoming infected with HIV after birth when the mothers breastfed them. An article published in *The Lancet* that year reported a major contribution to PMTCT that was discovered in a large European study. Researchers found that when HIV-positive pregnant women had cesarean sections (C-sections) the infection rate decreased by half (NIH News Alert, 1998). Another study, also from 1994, ACTG076, found that giving pregnant women AZT reduces MTCT by two-thirds (NIH News Release, 1996). In 1994, the WHO reported that there were 1.5 million children worldwide infected with HIV (Fletcher, 1994), while the South African Ministry of Health reported that 850,000 people living in South Africa were infected with the virus and that 8% of pregnant women were infected (Pope, 1995). This estimate said that seven to eight million pregnant women in South Africa were HIV-positive (Andriote, 1999).

The FDA officially approved NVP in 1996 as a reverse transcriptase inhibitor (AIDSInfo, 2010). Evidence from 1997 showed that overall AIDS deaths as well as the number of infected infants decreased (Altman, 1996), mostly due to the introduction of and access to NVP. Glaxo Wellcome, a drug company, reduced its ARV price by 75% when it was discovered that NVP reduces MTCT (CDC, 1998), although it was still considered too expensive for the developing

world (CNN, 1998). Another study by Mandelbrot (1998) found that MTCT could be reduced to less than 1% with AZT during C-sections. In 1998 the UN disseminated new recommendations on infant feeding practices because of some PMTCT studies. It recommended that women should decide how to feed their babies, even though the recommendations seemed to push for formula feeding among HIV-positive mothers, while pilot studies in 11 developing countries pushed more for PMTCT (Altman, 1998).

By the end of the twentieth century a myth about transmission spread throughout the Sub-Saharan African region. The myth was that men who were HIV-positive could cure the infections if they had sex with a virgin (Govender, 1999). Reported data show that 2000 was the first time in history that HIV-positive women living in Africa outnumbered their male counterparts (Altman, 1999). Also at the end of the century, the UK began offering HIV tests to all pregnant women in order to prevent MTCT (*The Associated Press*, 1999). In December 2001 the South African government agreed to provide free NVP to all HIV-positive pregnant women (Ashraf, 2001). In 2002, the country started to implement distribution, adding that raped victims also receive free PEP (Sidley, 2002). By the end of 2002 women accounted for 58% of the HIV population in Africa, and 50% of all HIV-positive cases worldwide were women (Farley, 2002).

The Institute of Medicine (IOM) published findings in 2005 from various studies stating that NVP was a safe and effective treatment for MTCT (NIAID, 2005). Even though NVP was proven to be very effective, an antenatal survey of clinics in South Africa found that 29.5% of pregnant women were HIV-positive by the end of 2004 (BBC News, 2005). On a more progressive note, Botswana was able to reduce its MTCT rate to less than 4% in 2007 (*The Boston Globe*, 2007).

By 2009 Sub-Saharan Africa reports stated that only 45% of HIV-positive pregnant women were receiving ARVs (UNAIDS, 2009). Even though researchers had discovered that antiretroviral treatment during and after pregnancy during breastfeeding was significantly associated with lower transmission rates of HIV between mother and child, there was not full uptake of ARVs in order to prevent MTCT of HIV. Without interventions and prophylaxis treatment, MTCT rate occurs at an average of 20% (The Kesho Boro Study Group, 2010). When mothers are on treatment, the rates of transmission are almost nonexistent (The Kesho Bora Study Group, 2010). Today WHO guidelines on prophylaxis treatment include a mixed ART cocktail of AZT and NVP, especially in underdeveloped countries, where these resources are more available (WHO, 2010).

*Breastfeeding.* In developing countries, much like developing regions of South Africa, breastfeeding increases the rate of transmission of HIV. In 2009 the WHO breastfeeding recommendations, “Guidelines on HIV and infant feeding, 2010,” were made more comprehensive regarding breastfeeding among women who are HIV positive and their babies status is either negative or unknown (WHO, 2010). The following are some of the recommendations from the report:

- 1- ) Integrating HIV interventions into maternal and child health services: National authorities should aim to integrate HIV testing, care and treatment interventions for all women.
- 2- ) Setting national or sub-national recommendations for infant feeding in the context of HIV: National or sub-national health authorities should decide whether health services will principally counsel and support mothers known to be HIV-infected to either:
  - a. Breastfeed and receive ARV interventions, or

- b. Avoid all breastfeeding, as the strategy that will most likely give infants the greatest chance of HIV-free survival.

This recommendation should be based on international recommendations and considerations of the: 1-) the socio-economic and cultural contexts of the populations served by maternal and child health services, 2-) availability and quality of health services, 3-) local epidemiology including HIV prevalence among pregnant women, and 4-) main causes of maternal and child under-nutrition and infant and child mortality.

By the end of 2000 in the US, only 200 cases of MTCT of HIV/AIDS had occurred, but there were over 600,000 MTCT cases of HIV/AIDS in the rest of the world (McIntyre & Gray, 2002). The latest data for the US show that in 2005 only 67 newborns were perinatally infected with HIV/AIDS (CDC- MTCT fact sheet). Unfortunately, for developing countries like South Africa, various issues with access to these drugs have been a hindrance to reducing the rate. In South Africa alone, the statistics show that MTCT was responsible for over 40,000 newborns being infected with HIV/AIDS in 2007 MTCT (Statistics South Africa, 2010).

In 2000, Zwi published an article in *The Lancet* stating that programs reducing MTCT of HIV in South Africa can save a minimum of 15,000 lives per year (Zwi, 2000). Questions are raised about the disparities in accessing medications, especially when the disease has been proven to be almost completely preventable in newborns, and the government of South Africa has developed a national health policy to include free distribution of medications for pregnant women who are HIV-positive.

Since the discovery of the HIV almost 30 years ago, some progress has been made to prevent the spread of the epidemic. Although prevention strategies are available, barriers exist to

accessing and successfully utilizing them. Prevention strategies that have proven to be effective include the use of antiretrovirals and nevirapine during pregnancy and the use of condoms.

The SEM is an ecological theory model created to understand how factors at different levels can have an influence on health issues, specifically health behavior. This model assumes that interventions, programs, and solutions that focus on a limited scope will not be fully effective and/or sustainable. In order to have a wide, effective scope on health issues and for the interventions to be sustainable, social ecological models use a multi-level approach in designating barriers and facilitators at each level. Social ecological models incorporate five levels: 1- Intrapersonal, 2- Interpersonal, 3- Organizational, 4- Community, and 5- Policy (see Figure 2). Throughout these levels there are factors that play roles in mediating or inhibiting effectiveness of interventions. These factors incorporate the physical environment and sociocultural issues, which influence areas in a variety of ways. Since a full list of prevention strategies does not exist in a single location for the prevention of MTCT, identification of barriers will help to discover where they take place. The SEM will be used to identify social barriers to the PMTCT in the different phases of society (Glanz et al., 2008). Looking through the lens of the SEM, many of the barriers that exist for prevention are mainly social, political, institutional, and interpersonal barriers.

### 3.0 METHODS

This paper is a critical review of the literature on PMTCT in South Africa, specifically the barriers that are associated with specific prevention interventions. In this chapter there will be a discussion on the methods that were used to conduct this literature review.

Information and peer-reviewed articles were collected using the Pub Med and Psych Info databases at the University of Pittsburgh. Four searches were completed. Since the author wanted to identify only barriers specific to the country of South Africa searches were restricted to the country of South Africa. The first search included the search terms “PMTCT” and “South Africa” because the author wanted to only look at the prevention of MTCT in South Africa and not other diseases or other countries. This search yielded 66 results. The first 40 articles were the only articles that were used from this search. After the first 40 were designated, limits were placed to receive only “Free Linked Text” articles. This option was chosen because it allowed the author access to the articles at no cost. A total of 29 articles were taken from this search. The second search used the terms “Prevention of Mother-to-Child Transmission of HIV” and “South Africa.” This search yielded 312 results. Limits were placed to include only “Full Text.” Fifty-seven articles were chosen from this search. Going through search results, articles dealing only with South Africa were included for this literature review. Article selection was based on these criteria: (a) articles published between 2000 to 2011, (b) articles that addressed barriers to interventions for PMTCT, (c) articles that addressed interventions for PMTCT, (d) articles that

analyzed and proposed interventions for PMTCT, (e) articles that were focused mostly on the country of South Africa, and (f) articles that were written in English. Articles that did not meet these criteria were not selected for review..

The third and fourth searches were completed in the Psych Info database. The third search used “PMTCT” and “South Africa.” Restrictions were placed on “links to full text” and English-only articles. This search yielded 12 results. In the fourth search the terms that were used include “Prevention of mother-to-child transmission HIV” and “South Africa.” Restrictions were placed on “links to full text” and English-only article. This search yielded 17 results. Other inclusion criteria were that it did not replicate what previous searches found and that the articles were specifically focused on the country of South Africa. Under these restrictions this search yielded eight unique articles.

## 4.0 FINDINGS

In this chapter, the findings from the literature review will be presented. This literature review found barriers to the PMTCT at various levels of the SEM.

At the Individual level, the barriers were found to be:

- Knowledge about HIV and PMTCT (Peltzer et al., 2009; Futterman, Shea, Besser, Stafford, Desmond, Comulada, & Greco, 2010; and Mkwanzazi et al., 2008),
- Knowledge of the HIV status of mother and infant (Urban & Chersich, 2004; Mkwanzazi, Patel, Newell, Rollins, Coutsoydis, Coovadia, & Bland, 2008; Peltzer & Mlambo, 2010; and Medley et al., 2004), and
- Knowledge, beliefs, and fear (Igumbor, Pengpid, & Obi, 2006; Kaida et al., 2010; Buskens, Jaffe, & Mkhathshwa, 2010; Peltzer et al., 2009; Thorsen, Sundby, & Martinson, 2008; and Varga & Brookes, 2008).

The individual level section contained 13 articles.

At the Interpersonal level the barriers were found to be:

- Male involvement (Auvinen, Suominen, & Valimaki, 2010; Visser, Neufeld, de Villiers, Makin, & Forsyth, 2008; Makin et al., 2008; Peltzer & Mosala, 2008; The Kesho Bora Study Group, 2010; and Peltzer et al., 2009),

- The role of traditional health practitioners (THPs) (Peltzer, Phaswana-Mafuya, & Treger, 2009; Peltzer, Chao, & Dana, 2009; Peltzer & Mlambo, 2010; Peltzer, Mosala, Dana, & Fomundam, 2008; and Varga & Brooks, 2010), and
- Social support (Futtermann et al., 2010; Peltzer & Mlambo, 2010; and Coutsoydis, 2005).

The interpersonal level included 14 articles.

At the Organization level, no barriers were found in the literature review of the databases, but barriers were found through the review of history findings from the background sections (Stinson et al., 2010; Urban & Chersich, 2004; and Sherman et al., 2004). The organizational level section contained three articles.

At the Community level barriers were found to be:

- Internalized AIDS stigma (Thorsen, Sundby, & Martinson, 2008; Varga & Brookes, 2008; and Peltzer & Mlambo, 2010) and
- Infrastructure (McIntyre & Bland, 2002; The Kesho Boro Study Group, 2010; Meyers et al., 2007; Lungiswa et al., 2007; Mate et al., 2009; and Doherty, Chopera, Nsibande, & Mngoma, 2009).

The community level included nine articles.

At the Policy level the only current policy barrier was found to be CD4 count (Barker and Venter, 2007). Other factors were adherence factors (Mlambo, Phaswana-Mafuyoy, & Ladzani, 2009; and Ndirangu, Newell, Tanser, Herbst, & Bland, 2010) and included two articles.

## **4.1 INDIVIDUAL LEVEL**

### **4.1.1 Knowledge about HIV and PMTCT**

South African studies have shown that when women have some knowledge about HIV and PMTCT is associated with better access to and acceptance of treatment outcomes. In a study by Peltzer et al. (2009), most pregnant women who were interviewed had knowledge of HIV and PMTCT, but one-third (37.6%) incorrectly believed that their child would definitely become HIV-positive when they were born. An intervention completed by Futterman, Shea, Besser, Stafford, Desmond, Comulada, and Greco (2010) raised knowledge of HIV through cognitive behavioral interventions and peer mentoring. This knowledge was then associated with positive PMTCT outcomes including more follow-up visits and positive coping.

Although education is an undisputed positive social commodity, more knowledge about HIV and PMTCT has been inversely associated with not getting tested for HIV (Mkwanazi et al., 2008). They also found that only 3.4% of their study participants wanted to receive their HIV test results on the same day that the rapid test was taken. In this instance, knowledge is not always equated with power; but the authors commented that when pregnant women know their HIV status, this piece of knowledge could be essential in accessing appropriate care for themselves, their partners, and their unborn.

### **4.1.2 HIV status of mother and infant**

Even though HIV testing and knowledge about HIV status could greatly influence uptake of PMTCT medications, not knowing can be a barrier to PMTCT. A study by Urban and Chersich

(2004) found that voluntary counseling and testing (VCT) and HIV testing are widely accepted by women who attend antenatal care services. Among women who did not receive antenatal care, HIV testing was low. A study by Mkwanazi, Patel, Newell, Rollins, Coutsoydis, Coovadia, and Bland (2008) found that women who were had more education about HIV were actually less likely to agree to HIV testing. Overall, rapid testing and knowledge of results was not accepted, and few women wanted to receive their results the same day as testing.

Peltzer and Mlambo (2010) investigated factors that determine whether infants are tested through PMTCT, hypothesizing that knowledge of an infant's status is vital to the survival of the infant. They found that participating in a PCR test was associated with the mother's HIV status disclosure and attendance at a support group. In this study, authors also found that mothers had general knowledge of PMTCT. A Peltzer et al. (2010) study identified nine general barriers for mothers refusing to get an infant tested for HIV. They include the following:

- 1- Mothers were not yet ready for their child to be tested;
- 2- Mothers did not know much about testing or its availability;
- 3- Mothers believed that their infant was healthy, therefore not needing testing;
- 4- Mothers gave reasons such as mental illness and no transportation to a testing facility;
- 5- PCR testing for HIV was not available at the testing site;
- 6- Mothers simply did not want their child to be tested for HIV;
- 7- Mothers did not think that testing was needed because they did not perceive a risk in HIV transmission;
- 8- Mothers were emotionally not ready to test their child;
- 9- Partners of mothers would abuse them if their infant were tested for HIV.

A report by Medley et al. (2004) described the barriers to women's disclosure of their HIV status to sexual partners. Some of the barriers to disclosure were fear of rejection, fear of discrimination, fear of verbal abuse, and concerns about public ignorance of the disease. In this study of South African women who did disclose their HIV status to their partner, 27% reported

at least one problem, 13% reported experiencing violence from partners, 9% reported that their partner left them, and 3% of the women were forced to move away from their home.

#### **4.1.3 Knowledge, beliefs, and fear**

Igumbor, Pengpid, and Obi (2006) surveyed pregnant women about their knowledge and beliefs surrounding PMTCT. They found that 85% of their participants had heard about PMTCT, and that belief about control of the disease contributed to behavioral intent. As the number of participants that were exposed more to health education information increased, so did the number of participants attending ANC and receiving NVP.

In an article by Kaida et al. (2010), the authors reported that preventing unintended pregnancies could reduce PMTCT. For this to happen, their suggestion is to increase the numbers of HIV and reproductive health services and amount of education on those topics. Women receiving HAART also had a lower chance of unintended pregnancy due to the association between HAART adherence and increased number of women using contraceptives. This article emphasized that education about PMTCT services could have an impact on reproductive health choices.

Mothers in South Africa know that HIV can be transmitted from mother to child through breast milk (Buskens, Jaffe, & Mkhathshwa, 2010; Peltzer et al., 2009; Thorsen, Sundby, & Martinson, 2008). The WHO recommends that women who are HIV-positive breastfeed exclusively for the first six months, then if economically possible, either switch to mixed methods, adding formula to breastfeeding or solely use formula (WHO, 2010). In a study by Busken et al. (2010) about breastfeeding practices, mothers were found to believe that breastfeeding was the optimal practice rather than using formula. Thorsen et al. (2008) also

found that most mothers in their study practiced breastfeeding until six months, but many mothers did not wean the babies after six months, as recommended to prevent future risk of HIV transmission.

Further studying beliefs and fear about HIV/AIDS, Varga and Brookes (2008) examined adherence to PMTCT in teens, ages 15 years to 18 years. They found that fear of a positive test result and concerns about confidentiality were important factors in uptake and participation in PMTCT services.

## **4.2 INTERPERSONAL LEVEL**

Women are often times influenced by the people close to them, particularly people in their close social groups (e.g. male partners), or by others who have high influence on them (e.g. traditional birth attendants). The role that others play in the pregnancy process affects pregnant women on an interpersonal level and can serve as barriers to prevention at that level. In South Africa the role of others in a woman's life often plays another role in being a barrier to PMTCT of HIV.

### **4.2.1 Male involvement**

Auvinen, Suominen, and Valimaki (2010) investigated how male partners' participation in pregnancy influences the pregnancy process and the prevention of HIV from mother-to-child transmission in Africa. The authors describe male partners as either supportive or non-supportive. Supportive males are willing to be tested for HIV and to communicate with their partner about reproductive issues, which help to increase the commitment of pregnant women to

PMTCT programs. Non-supportive males do not engage in open discussion with their partners. Having non-supportive male partners often times is associated with HIV-related intimate partner violence (IPV), abandonment or fear of abandonment. In another study, Visser, Neufeld, de Villiers, Makin, and Forsyth (2008) found that recently diagnosed HIV-positive women feared abandonment, discrimination, blame/anger, and violence upon disclosing information to their partners. When women did disclose their HIV status to their partner, the partners mostly reacted with disbelief and shock as forms of participation. Makin et al. (2008) found that being able to disclose HIV status was associated with previously discussing testing, being married, having a partner with higher education, and having experienced less violence.

Another study by Peltzer and Mosala (2008) found that while only 14.9% of male partners of pregnant women attended an antenatal clinic (ANC) visit, those women were significantly more likely to be tested for HIV and receive their results. This study also found that maternal uptake of NVP before birth was associated with telling their male partner about the medication treatment.

In a randomized control trial by The Kesho Bora Study Group (2010) about differences in types of antenatal HIV medication, clinicians encouraged women to talk with a partner or friend who supported their decision to adhere to the medication. They hypothesized that if the women had social support, they would adhere to the medication better. Peltzer et al. (2009) also recognized the importance of partner support. They discovered that when women told their partner about their decision to take NVP, adherence to the medication increased.

#### 4.2.2 Health practitioners

Traditional health practitioners (THPs), such as herbalists, diviners, and birth attendants (TBAs), have strong influence on acceptance of and adherence to PMTCT for mothers. Peltzer, Phaswana-Mafuya, and Treger (2009) found that THPs and TBAs were frequently contacted during pregnancy to check a baby's position, rub the stomach (for wind), check the baby, and get medicine (for wind). Post-natally, THPs and TBAs were contacted for physical check-ups, infant feeding advice, referral to a health facility, baby baths and cleaning the cord, advice on nutrition of the mother, family planning, and medicines for various ailments of mother and infant. Almost half (45.9%) of the mothers in the study did not contact a THP or TBA, while 34% used their services in postnatal care (Peltzer et al., 2009).

Other studies have found that social support influences PMTCT. Peltzer, Chao, and Dana (2009) found that male involvement (e.g. going with the women to the antenatal care, discussions about preventing pregnancy with condoms, and discussions about preventing STIs with condoms) was significantly positively associated with mothers getting an HIV test and knowing their HIV status. In this study, only 14.9% of HIV-positive women's partners and 15.3% of HIV-negative women's partners accompanied them to the antenatal clinic. A study by Peltzer and Mlambo (2010) found that having a support group of mothers significantly influenced HIV-positive mothers to participate in HIV testing of themselves and their infants. Similarly, women who had a partner accompany them to a clinic were significantly more likely to get tested for HIV (Peltzer, Mosala, Dana, & Fomundam, 2008). Client-counselor dynamics during a pre-test counseling session were also extremely important in the maternal uptake of PMTCT among teen mothers ages 15- to 19-year-olds (Varga & Brooks, 2010).

### **4.2.3 Social support**

Other means of social support were regarded as factors influencing adherence to PMTCT. In an intervention by Futterman et al. (2010) mothers were placed in a support group intervention with other mothers in similar situations, and they received services provided by midwives and counselors. Women who were part of the Mother2Mother Mamekhaya CBI intervention were more likely to improve their well-being and their adherence to follow-up appointments. Peltzer and Mlambo (2010)'s findings supported the importance of social support groups, such that a mother getting her infant tested was associated with being in a support group, as well as being older, experiencing less depression, having fewer PMTCT risk behaviors and higher PMTCT knowledge, and disclosing HIV status. Coutsooudis (2005) also found that social support was imperative for adherence to PMTCT programs. In her article about breastfeeding, she found that women who had better social support were able to wean earlier than they originally intended to, a practice advised by the Safer Breastfeeding Programme to reduce available time for MTCT to occur.

## **4.3 ORGANIZATIONAL LEVEL**

Stinson et al. (2010) looked at organizational barriers to the PMTCT. They found that there was a failure of organizations to prioritize eligible HIV-positive pregnant women and to initiate HAART to those eligible in government-sponsored treatment regimens. They found that only 51% of eligible pregnant women actually started HAART before delivery, and 22% did not receive any PMTCT intervention before delivery.

Urban and Chersich (2004) found that organizations such as hospitals have more capacity for VCT and HIV testing among their patients for PMTCT purposes than in other regions where hospitals are not available. Some of these rural areas included facilities and programs where staff was inadequate and health system infrastructure capacity in the area was also inadequate. In areas where pregnant women did not receive antenatal services, HIV testing was low.

An institution's organization and clarity of records have also been barriers to understanding effectiveness of PMTCT programs. Sherman et al. (2004) cited that better facilities, better record-keeping and continual monitoring them would inevitably help to reduce MTCT of HIV.

#### **4.4 COMMUNITY LEVEL**

##### **4.4.1 Internalized AIDS stigma**

HIV/AIDS stigmatization has historically had an influence on many societal issues in South Africa. PLWHA are vulnerable to verbal, physical, and emotional abuse from others who have negative feelings toward HIV. Such negativities around pregnancy and HIV (e.g. promiscuity, infidelity, prostitution) have an influence even on PMTCT (Thorsen, Sundby, & Martinson, 2008).

A study by Thorsen et al. (2008) has shown that AIDS stigma is associated with less disclosure of HIV status of women and their partners. This means that women do not disclose their status to others because of HIV/AIDS stigma associated with the disease. Women do not want their partners to perceive them as a prostitute or label them as an adulterer. Women fear

abandonment, abuse, and banishment from their family and community. There are times when HIV-positive mothers will not disclose their HIV status but show signs of the disease through other behaviors. Mothers will not take medications, resulting in flu-like symptoms, being chronically ill, and eventually leading to wasting. They will visit the clinic for PMTCT more frequently, wean their infant quicker than normal (i.e. after six months, as recommended by the WHO (2010), and will bottle-feed more often.

In a study by Varga and Brookes (2008), teen participants were less likely to have positive PMTCT outcomes because of the influence of HIV stigma. Adolescent mothers were given questionnaires asking about their participation in PMTCT services. They mentioned that often they were concerned about premarital pregnancy stigma and HIV-related stigmas. The teens were apprehensive about confidentiality of their status and poor treatment from health care providers. They also mentioned elaborate means of keeping their HIV status concealed from labor and delivery staff, even though they knew they would be omitted from tailored, necessary treatment. Also, in examining factors that determine HIV testing of infants, Peltzer and Mlambo (2010) found that internalized AIDS stigma did influence testing. Women who reported feeling the stigma of AIDS, measured by reflecting on self-abasement and negative self-perceptions relating to a person living with HIV, were tested and had their infants tested less often or not at all, than those who did not feel influence from stigma.

#### **4.4.2 Infrastructure**

Infrastructure of communities and health care facilities in those communities can enhance or curtail the implementation of PMTCT interventions. As McIntyre and Bland (2002) put it, “few places have antenatal care services sufficiently well established to introduce voluntary

counseling and testing without some additional resources.” They also went on to say that changing the infrastructure to provide counseling and testing will take many years and that if the government implements universal administration of PMTCT programs, it may compound problems with adherence.

During the randomized control trial of The Kesho Boro Study Group (2010), problems with infrastructure were identified. Even though the study was looking at differences between continuous triple-ARV combination therapy and single dose NVP (sdNVP), the report found challenges to PMTCT in the infrastructure of hospitals and clinics. The article noted that the high turnover of staff in the government and in the clinics was a hindrance to PMTCT as well as the paperwork that went into the study because of the amount of time and larger logistical problems.

The lack of sufficient healthcare staff and facilities was also a barrier to successful PMTCT programs in a Meyers et al. (2007) study as well as in a Lungiswa et al. (2007) study. A major problem from healthcare facilities in South Africa has been the lack of complete and accurate data collection (Mate et al., 2009). Another study by Doherty, Chopera, Nsibande, and Mngoma (2009) looked at strengths and weaknesses of the healthcare system. They found that the system had weaknesses in training and supervision. Doherty and colleagues also found that in order to increase treatment and testing among pregnant women, health facilities need use data-driven reports to prioritize their PMTCT programs and interventions. Lungiswa et al. (2007) acknowledged that a lack of counselors and testing equipment was a barrier in utilizing PMTCT interventions. They also noted that failures of the health system, including lack of HIV testing, lack of VCT, and lack of mothers receiving their test results contribute to health system barriers to PMTCT.

## 4.5 POLICY LEVEL

South Africa has had a difficult time getting over the stigma of HIV/AIDS with respect to the policy issues from influential political characters. People who have been in high governmental positions have influenced the way some South Africans view the disease. Reflecting on historical events that occurred in South Africa, the former president, Thabo Mbeki, provided public statements falsely believing that HIV was not the cause of AIDS and that AZT is a toxic substance that is harmful to a person's health. Other public figures have also been in the spotlight for their opinions and events with HIV/AIDS. Nelson Mandela, for example, admitted publically that his son had died of HIV/AIDS, which helped him to become an advocate against the disease in proactive ways.

Other issues in policy have stimulated or inhibited the progression of HIV/AIDS in South Africa. In 2010 the South African Department of Health introduced new PMTCT protocol changes to the healthcare system. With guidelines from the WHO, these two new policy changes were as follows:

- 1- Pregnant women with a CD4 cell count of more than 350 cells/ mm<sup>3</sup> and WHO stage 1 and 2 disease should receive antiretroviral prophylaxis with AZT to reduce mother-to-child transmission.
- 2- Pregnant women with a CD4 cell count of 350 cells/ mm<sup>3</sup> or less WHO clinical stage 3 or 4 should receive lifelong antiretroviral treatment, both for their own health and to reduce the likelihood of mother-to-child transmission.

In *the South African Medical Journal*, Barker and Venter (2007) emphasize the importance of the South African government to increase PMTCT by increasing HAART to pregnant women in order to decrease the MTCT rate of HIV as well as reducing the number of children needing

HAART. As more than 600,000 people are HAART eligible and fewer than 100,000 are receiving treatment, PMTCT would help to reduce the overall treatment gap. Even though the South African government increased the number of women eligible for ARVs during pregnancy, access and eligibility are barriers to receiving effective preventive care (South Africa Department of Health, 2010).

#### **4.6 OTHER: ADHERENCE FACTORS**

Adherence to PMTCT services (e.g. adherence to NVP for mother and child, attending follow-up appointments, medication uptake, and to HIV testing) is determined by multiple factors.

Peltzer published an article with Mlambo, Phaswana-Mafuyo, and Ladzani (2009) in which they found that factors affecting adherence to NVP included PMTCT knowledge, more than two ANC visits, consultation with a TBA during pregnancy, quality of post-test HIV counseling, disclosure of HIV test result, discussion with partner about NVP, victimization because of HIV status, confidentiality protocols regarding HIV status at health facility, health facility delivery, term delivery, infant HIV status, and maternal NVP adherence. Another investigation by Ndirangu, Newell, Tanser, Herbst, and Bland (2010) found that children who are born at home have a 35% higher risk of dying than children who were born in a clinic with single-dose NVP available. The availability of PMTCT and ARVs in public health programs could have explained 8% to 31% of the decline in the mortality rate of children under the age of two years from 2000 to 2005.

## 5.0 DISCUSSION

This chapter will focus on a discussion based on the findings of the literature review.

This review of literature looked at finding research that was published recently in addressing barriers that affect the prevention strategies of MTCT of HIV/AIDS. In doing this literature review, some of the relevant research articles might not have been included because they were most likely not found in the databases or they were costly. The databases that were included were chosen specifically for their variety and quality of articles to help address this PMTCT issue in South Africa. Some of the articles that were found in the searches addressed PMTCT issues of Sub-Saharan Africa or other African countries, but these articles were not included because the issues in South Africa are unique to the history of HIV in the area, to the country itself, and to the people who live in the country. The limitations that were placed on article selection were strategic in that they were to only cater to those in South Africa and to those that were readily accessible through the University of Pittsburgh's open databases. Barriers to PMTCT not only have various cultural implications in South Africa because of the heterogeneous population, but also throughout the entire continent of Africa. As the articles that looked at different countries could have been particularly relevant to this literature review for South Africa, they were still not included because they were irrelevant with regard to the actual people who are to be receiving services in the country.

## 5.1 IMPLICATIONS FOR POLICY

Within the past year, new policies have been put in place to help further reduce the MTCT of HIV in South Africa. The newest policy in South Africa has allowed for more PLWHA to be eligible for free ARVs through governmental programs. This policy states that for PLWHA and who have less than a 350 CD4 count, they can receive free ARVs from the government of South Africa. The other policy is a recommendation from the WHO and it addresses the issue of breastfeeding practices for underdeveloped and developing countries. In places where an adequate clean water supply is not available, the WHO recommends that mothers who are HIV positive, should continue to breastfeed their infant for at least six months in order to receive the immunity benefits that help prevent other widely spread infectious diseases that are commonplace in developing nations.

Through this literature review other issues for policy implications have been identified. HIV positive pregnant women who are unable to travel to the hospital in time for labor, may miss the opportunity to take sdNVP, HAART, or other PEP for PMTCT of HIV. It is recommended that women who are HIV positive be given sdNVP or HAART to take with them when they make a visit to an ANC or health clinic for prenatal care. This will ensure that they have the preventative medication readily available by the time of delivery, no matter where they are located.

It was also found that policies regarding THPs and TBAs should be implemented. It is recommended that THPs and TBAs be trained comprehensively in regard to understanding HIV transmission and PMTCT. The recommendation is that these professionals be trained about high HIV risk practices, optimizing their services, HIV prevention, infant feeding, and family planning. Although this specific recommendation is culturally sensitive to the people and

practitioners who are in the location using the services, it is recommended that THPs and TBAs receive adequate, full coverage of the topic so that they will have comprehensive, effective knowledge on the HIV and how to prevent MTCT.

## **5.2 IMPLICATIONS FOR INTERVENTIONS**

This literature review found and analyzed some interventions that have already been implicated in South Africa regarding PMTCT of HIV/AIDS. Some of the positive, effective programs have been the Mothers2Mothers program dealing with social support, a program that acknowledges the need for more testing, and the Keso Bora study providing information on safe breastfeeding. Some key priorities for interventions include: male involvement, social support, more testing, continuous training for medical personnel, voluntary counseling and testing, and attendance at ANCs. Interventions should focus on increasing testing of mothers and infants as well as mothers getting testing results back. When mothers know that they are HIV positive or that their infant is HIV positive, they can prevent further degradation of health by receiving ARV medications and knowledge about preventing further transmission. Interventions should also increase social support of HIV positive pregnant mothers with male/partner involvement in the pregnancy and with other mothers who are going through the same issues. Social support is incredibly important to the adherence of healthy practices and the prevention of transmission from mother to child during birth.

Other interventions could include continuous HIV training for health care staff, a push for ANC visits, and a renewal of the infrastructure of health care facilities. Since South Africa has the highest prevalence rate of PLWHA, health care staff at all levels, medical doctors to TBAs,

should be well versed in safe practices and preventative strategies in addressing HIV/AIDS in every situation. Although changing the atmosphere and infrastructure of the health care facilities and the health care system could be more difficult to address, it is important to mention them and consider them in all interventions. Health care facilities need to be better equipped to handle PLWHA and their medical issues while dealing with the disease. For pregnant women in South Africa, this means having an adequate supply of medications that prevent MTCT of HIV/AIDS and having adequate staff members to provide voluntary counseling and testing.

### **5.3 IMPLICATIONS FOR FUTURE RESEARCH**

It would be very beneficial for singular studies to address all of the barriers of PMTCT, but the question of feasibility and efficacy remains an obstacle. Looking through the research, some of the articles addressed single or multiple barriers, but none addressed all of the barriers that were identified in the literature review. Future research could use the SEM as a starting point to formulate research at different levels of society. This would be beneficial for structuring where there are gaps in research and where there are bigger gaps at different levels. Future research would also benefit from receiving input from community members in various villages across the country to see whether or not there are differences between different areas of South Africa itself as a country.

## **5.4 LIMITATIONS**

Since this analysis was a literature review, no new data was generated and the author was only able to read articles that were published in English.

## 6.0 CONCLUSION

In this chapter the conclusion will focus on the main parts of the historical perspective with emphasis on the important findings from the literature review.

The extremely high number of HIV positive South Africans has been an individual, interpersonal, community, institutional, and national issue for more than three decades. Decreasing the global burden of disease is possible through public health initiatives and interventions to prevent transmission. One of the most effective ways to prevent transmission is to focus on preventing MTCT, which accounts for an estimated 40,000 HIV-infected infants each year. With proper medication MTCT could be significantly eliminated in South Africa. Although HAART and NVP can reduce transmission to less than 1%, mothers have not been able to obtain treatments like these for various reasons. Barriers to getting treatments have been outlined in this thesis and include: intrapersonal (knowledge about HIV and PMTCT, knowledge about HIV status, fear and beliefs), interpersonal (involvement of males, THPs, and social support), organizational (capacity for staff, clear record keeping, and organization), community (stigma, beliefs, and infrastructure), and policy (eligibility in receiving treatment). If these barriers were decreased or eliminated, children would not have to live and suffer with HIV/AIDS from birth, major HIV-related national security issues could be averted, and South Africa could decrease its national burden of HIV/AIDS.

## APPENDIX

### LITERATURE FINDINGS AND HISTORICAL TIMELINE

**TABLE 1: The Social Ecological Model of Barriers to the Prevention of Mother-to-Child Transmission of HIV/AIDS**

Individual Level Barriers	
	Knowledge about HIV and PMTCT
	HIV status of mother and infant
	Knowledge, beliefs, and fear
Interpersonal Level Barriers	
	Male involvement
	Health practitioners
	Social support
Organizational Level Barriers	
Community Level Barriers	
	Internalized AIDS stigma
	Infrastructure
Policy Level Barriers	
Other Barriers: Adherence Factors	

**TABLE 2: Table of Literature Review Results**

<p><u>Literature Search 1: PubMed</u> Search Terms: “PMTCT” “South Africa” Results: 66 articles</p>	<p><u>Literature Search 2: PubMed</u> Search Terms: “Prevention of Mother-to-Child Transmission” “South Africa” Results: 312 articles</p>
<p><u>Literature Search 3: PsychInfo</u> Search Terms: “PMTCT” “South Africa” Results: 12 articles</p>	<p><u>Literature Search 4: PsychInfo</u> Search Terms: “Prevention of Mother-to-Child Transmission” “South Africa” Results: 17 articles</p>

**TABLE 3: Comparison of Articles: Showing Barriers to the Prevention of Mother-to-Child Transmission of HIV/AIDS in South Africa**

Author (Year)	Aim	Study Sample	Methods	Results: Barriers
Auvinen et al. (2010)	To summarize how male participation in HIV programs has been studied and to describe how male participation is identified and described in different studies	31 studies (29 articles and 2 abstracts)	Qualitative look at multiple articles identifying	Articles identified supportive males and non-supportive males. Supportive males increase pregnant women's commitment to PMTCT. Non-supportive males associated with intimacy violence, abandonment, fear, and lack discussion
Coutsoudis (2005)	To better understand how women respond to the Safer Breastfeeding Programme for HIV-positive women	315 mothers enrolled in the MTCT prevention program	Operational study design to understand the influence of promoting safer breast-feeding on feeding behaviors and HIV transmission in this program	Difficulty to stop breast-feeding earlier than the norm; breastfeeding knowledge and HIV transmission
Kaida et al. (2010)	To investigate whether the prevalence of contraceptive use and method preferences vary by HIV status and receipt of HAART among women in Soweto, South Africa	563 non-pregnant women, 171 were HIV-positive and on HAART, 178 HIV-positive and HAART naive, 214 HIV-negative	Cross-sectional survey data of HIV-positive and HIV-negative women receiving services at a prenatal unit. Logistic regression models estimated adjusted associations. ANOVA and Pearson's Chi-	HIV-status; adherence to HAART

Table 3 continued

			squared were used to determine significant differences and associations	
Kesho Bora Study Group (2010)	To evaluate strategies to reduce HIV-1 transmission through breastfeeding and to optimize use of ARVs during pregnancy	1140 HIV-positive women	Random control trial	Adherence to medication; financial constraints; time of ARV initiation; quality and commitment of health care workers; paperwork; stigma
McIntyre et al. (2001)	To examine whether the success of PMTCT treatment, and infant feeding practices, can be repeated in poor countries	Medline article search used 24 resources	Medline search for original articles	Adherence; breastfeeding; implementation of program progression; cost; infrastructure
Medley et al. (2004)	Review of available information on HIV status disclosure among women in developing countries, specifically synthesizing the rates, barriers, and outcomes of HIV-positive women	Journal articles and abstracts from January 1990 to December 2001, from 4 major databases	Synthesis and analysis of 17 peer-reviewed journal articles and international conference abstracts	Fear of rejection, discrimination, and verbal abuse; concerns about public ignorance of disease
Mkwanazi et al. (2008)	To report on the acceptability of HIV counseling and testing, and uptake of results, before and after the introduction of rapid testing in rural South Africa	12,323 pregnant women receiving counseling and testing at 8 antenatal clinics	Pregnant women were offered HIV voluntary counseling and testing before enrollment in a cohort study investigating infant feeding and HIV transmission	HIV test; acceptability of test result; knowledge of HIV status
Ndirangu et al.	To investigate temporal and	Birth records from January	A retrospective cohort analysis,	Availability of PMTCT and ART;

Table 3 continued

(2010)	spatial associations of infant mortality in high HIV-prevalent areas with a PMTCT program, an HIV treatment program, and maternal HIV	2000 to January 2007 in rural South Africa (the Umkhanyaku de district of KwaZulu-Natal)	using various statistical methods	maternal education; birth location
Peltzer et al. (2010)	To investigate factors determining HIV viral testing of infants in PMTCT context	311 women and mothers (18+ years old), infants (3-6 months), 28 PMTCT sites	Cross-sectional, private interviews, 12 interviews completed at each site	HIV testing of mother and infant; testing knowledge; perceived need to test; availability of test; desire to be tested; HIV disclosure; support group; risk behaviors; age; fear; partner support
Peltzer et al. (2010)	To identify factors that influence adherence to ARV prophylaxis by HIV+ mothers in PMTCT programs	815 HIV+ mothers (18+ years old), infants (3-6 months), 47 clinics	Interview with questionnaires	PMTCT and HIV transmission knowledge; availability of ANC services, and testing and counseling services; male involvement; ARV availability; HIV status of mother and infant; ANC visits
Peltzer et al. (2008)	To investigate implementation of a PMTCT program and to evaluate the uptake and adherence of sdNVP	758 mothers who received their test results, at 5 sites, resource-poor setting	Interviews with women at the sites. Statistical analysis included Chi-square, student t-test, logistic regression, and unadjusted odds	HIV status; HIV knowledge; test result; male involvement; safe delivery; infant feeding; ART; HIV status of infant and mother
Peltzer et al. (2009)	Part of a baseline assessment in PMTCT in traditional health sector: To determine views of a women who've	181 prenatal clients with infants (less than 2 months), from 20 primary care clinics,	Interview Questionnaires	Attitude about taking medications; home delivery; HIV/AIDS knowledge; infection control; herbalists/diviners

Table 3 continued

	used THP services (before, during, and after pregnancy), To conduct formative research with THPs	54 TBAs, 47 herbalists/diviners		
Reynolds et al. (2008)	To estimate the number of HIV+ births prevented by contraception use and find cost/savings benefits	Public data was taken from 15 PEPFAR countries	Main sources of data were collected from the Demographic and Health Survey, Joint United Nations Programme on HIV/AIDS, and the United States Census Bureau International Data Base	Contraceptive use; ARV availability and adherence
Sherman et al. (2004)	To assess the efficacy of a PMTCT program in a routine service setting in comparison to a research environment	Descriptive data on PMTCT service from labor ward, postnatal ward and paediatric PMTCT follow-up clinic records for 13 months (October 2001 to October 2002). 297 HIV-positive women enrolled for the infant diagnostic study	Descriptive study during a 13-month period using retrospective data from hospital records, in addition to prospective data on a sample of patients enrolled in a study	Adherence to ARVs; availability of breastfeeding alternatives; follow-up appointments; record keeping
Stinson et al. (2010)	To investigate HAART among pregnant women and to invest ideal model of service delivery for	13,208 pregnant women tested for HIV, 26% HIV+, 15% HAART	Retrospective record analysis identifying women who were HAART-eligible.	Initiation of HAART; adherence to PMTCT services and interventions; receiving services before delivery;

Table 3 continued

	integrating HAART to ANCs	eligible. 4 ANC clinics	Statistical analysis included proportions, bivariate analysis, Chi-square, one-way ANOVA, and multiple logistic regression	gestational age; prioritization of PMTCT interventions
Urban et al. (2004)	To assess the effect of regular audit and targeted interventions on the utilization of the PMTCT program at Coronation Women and Children's Hospital	965 records were assessed across three audits	Audits were conducted in October 2000, April 2001, and February 2002 comprising a retrospective review of hospital records and ANC cards	Initiation of prenatal care; HIV testing; availability and receipt of NVP; adherence to NVP
Varga et al. (2008)	To examine barriers to HIV testing uptake and participation in PMTCT services in adolescents	Adolescent mothers (ages 15 to 19 years old) in the rural and urban parts of the Limpopo Province	Focus groups, workshops, pre- and post-test counseling	Client-counselor dynamics; counselor profile; adherence to treatment and counseling; stigma; fear; treatment by health care provider; disclosure

**TABLE 4: Timeline of HIV/AIDS**

Timeline of HIV	
Before 1980	There is not much evidence of HIV statistics before 1980.
1981	<ul style="list-style-type: none"> <li>- Las Angeles and New York City see increases of PCP and Kaposi's Sarcoma</li> <li>- These rates are found among injection drug users, gay men, and increases were also found in the United Kingdom</li> </ul>
1982	<ul style="list-style-type: none"> <li>- Names for the new disease include: Gay Cancer Syndrome, GRID, Gay Cancer, and AIDS</li> <li>- First AIDS organization was founded: the Terry Higgins Trust</li> <li>- More European countries started reporting new cases</li> <li>- Uganda defined the fatal, wasting disease as "slim"</li> <li>- First cases of MTCT were reported</li> </ul>
1983	<ul style="list-style-type: none"> <li>- Reports were finding that cases were included in 4 areas: homosexuals, hemophiliacs, heroin addicts, and Haitians</li> <li>- These four areas were known as the 4H club</li> <li>- LAV was first isolated</li> <li>- MTCT became more prevalent</li> <li>- Global surveillance of the disease began</li> <li>- There were 3,064 US cases and 1,292 deaths</li> </ul>
1984	<ul style="list-style-type: none"> <li>- Dr. Gallo isolated HIV as the cause of AIDS</li> <li>- Researchers traveled to central Africa and found AIDS cases</li> <li>- There were 7,699 US cases, 3,665 deaths, and 762 cases in Europe</li> </ul>
1985	<ul style="list-style-type: none"> <li>- Tests were created to find antibodies of HIV, which no HIV-positive people were able to donate blood later</li> <li>- Ryan White was banned from school for being HIV-positive</li> <li>- UK started testing their blood supply</li> <li>- Bangui definition changed definition of HIV</li> <li>- MTCT was found to be transmissible through breastfeeding</li> <li>- There were 20,303 cases reported to the WHO, 15,948 in the US and 275 in the UK</li> </ul>
1986	<ul style="list-style-type: none"> <li>- The first needle exchange was established in the UK</li> <li>- HIV became the official name of the disease</li> <li>- AZT was shown to attack HIV</li> <li>- Speculation and reports of the first African people to get HIV symptoms occurred in the 1970s</li> <li>- WHO estimated that 85 countries had cases, that there were 38,401 confirmed cases, 31,741 of which were in the US and 2,323 were in Africa</li> </ul>
1987	<ul style="list-style-type: none"> <li>- FDA approved AZT for AIDS treatment</li> <li>- Advertisements became more prevalent, such as the "1 in 61 babies born positive in NYC" poster campaign in NYC</li> <li>- The Pasteur Institute ended arguments with the US Department of Health and Human</li> </ul>

Table 4 continued

	<p>Services over the first HIV antibody test patent</p> <ul style="list-style-type: none"> <li>-WHO confirms HIV MTCT through breastfeeding, but says that women should still breastfeed because of the benefits of it</li> <li>- In October, AIDS became the first disease to be debated on the UN floor of the General Assembly</li> <li>- The WHO reported 71,751 cases, where the US had the greatest number reported at 47,022 cases and Uganda had 2,369 cases, Brazil had 2,102, and France had 2,523</li> <li>- The WHO estimated that 5-10 million people were infected worldwide, with 150,000 new cases happening in the developing countries in next 12 months and up to 3 million new cases in the next 5 years</li> </ul>
1988	<ul style="list-style-type: none"> <li>- Delegates from 148 countries meet to focus on AIDS programmes</li> <li>- First World AIDS Day was December 1, 1988</li> <li>- “Understanding AIDS” pamphlet was created, with 107 million copies in print, where 87 million reported to have read it</li> <li>- The first needle exchanges were set up in the US in NYC and San Francisco</li> </ul>
1989	<ul style="list-style-type: none"> <li>- Drug trial ACTC091 confirmed that AZT delayed the onset of HIV symptoms in HIV-positive patients. While a one year supply would cost each patient over \$7,000, it would prove to be too expensive for most patients</li> <li>- Another drug was available (ddl- dideoxyinosine)</li> <li>- By March 145 countries reported 142,000 cases to the WHO where actual estimates should have been around 400,000; and an estimated 5-10 million people are HIV-positive</li> </ul>
1990	<ul style="list-style-type: none"> <li>- Jonathan Mann resigns as WHO AIDS Program Director</li> <li>- Ryan White died and the Ryan White Care Act was proposed by US Congress</li> <li>- IAS made a statement that future International AIDS Conferences would not be held in countries where HIV-positive immigration is illegal</li> <li>- 307,000+ cases were reported to the WHO, where they estimated that the actual number should have been closer to 1 million, and an estimated 8-10 million PLWHA</li> <li>- There was an estimated 3 million women that were said to have given birth to 3 million infants, estimating that 700,000 infants were likely to have been infected with HIV</li> </ul>
1991	<ul style="list-style-type: none"> <li>- ddc (dideoxycytidine) was a treatment for HIV patients but became intolerant of AZT</li> <li>- MTCT was more viable than previously thought</li> <li>- The red ribbon became a symbol in support of PLWHA</li> <li>- There were 450,000 estimates of reported cases to the WHO worldwide, with 9-11 million PLWHA, 5-7 million were men while 3-5 million were women</li> </ul>
1992	<ul style="list-style-type: none"> <li>- WHO recommended that people at risk for HIV/AIDS should live in communities where condoms were both readily available and affordable</li> <li>- CDC changed the definition of AIDS to include blood cell counts</li> <li>- France researchers were brought to trial because of accusations of allowing for HIV to be contaminated in the blood supply</li> <li>- India’s government allocated \$100 million to the National AIDS Control Project for the next 5 years</li> </ul>
1993	<ul style="list-style-type: none"> <li>- Resistant HIV forms to AZT was apparent and seemed to be transmissible</li> <li>- Romania had about 98,000 infected orphans</li> <li>- Russia started its large scale screening for HIV/AIDS, and the RIGA initiative was a</li> </ul>

Table 4 continued

	<p>move from mass testing to voluntary testing</p> <ul style="list-style-type: none"> <li>- WHO recognized that AIDS could impact health and economic development but the WHO did not want it to be the main agenda at meetings</li> <li>- US CDC changed the definition of AIDS to include: opportunistic infections and CD4 cell counts below 200</li> <li>- Worldwide estimates were at 2.5 million cases</li> </ul>
1994	<ul style="list-style-type: none"> <li>- Large movement toward HIV advertisements, especially in traveling places</li> <li>- Study found that MTCT was halved because of the use of C-Sections</li> <li>- Study ACTG076 found that AZT reduces MTCT by two-thirds</li> <li>- There were about 985,119 reported cases to the WHO</li> </ul>
1995	<ul style="list-style-type: none"> <li>- By January 1 WHO estimated PLWHA: 18 million adults, 1.5 million children, and 1,000,000 cases were reported to WHO</li> <li>- HIV/AIDS became leading cause of death in US for ages 25- to 44-year-olds</li> <li>- PLWHA Conference in Cape Town, South Africa was first African HIV Conference</li> <li>- South Africa Ministry of Health estimated that 850,000 people were HIV-positive in the country, accounting for 2.1% of the population and 8% of pregnant women</li> <li>- 7-8 million women pregnant in South Africa</li> <li>- The WHO spoke out about the inadequacy of the international HIV response</li> </ul>
1996	<ul style="list-style-type: none"> <li>- US introduced and conducted home sampling testing</li> <li>- NVP was approved by the FDA as a reverse transcriptase inhibitor</li> <li>- Scientists said that AIDS could now be treated as a chronic disease with many medications, or combination therapy</li> <li>- The first White House AIDS strategy was created</li> </ul>
1997	<ul style="list-style-type: none"> <li>- The number of AIDS deaths and the number of HIV-positive babies decreased</li> <li>- President Clinton set a 10-year target for the creation of the AIDS vaccine</li> <li>- NIH set up an HIV Research and Development center</li> <li>- United States Agency for International Development (USAID) said that 40 million children in developing nations would lose one or both parents to AIDS by 2010</li> </ul>
1998	<ul style="list-style-type: none"> <li>- Glaxo Wellcome, drug company, cut price of AZT by 75% after it found that it could prevent MTCT in Thailand study</li> <li>- Another study found that AZT could reduce MTCT to less than 1%</li> <li>- The first human trial of AIDSVax was conducted with 5,000 participants</li> <li>- UN new recommendations stated that women should decide how to feed their babies, but was seen as a push for formula feeding</li> <li>- South African AIDS activist, Gergu Dlamini was beaten</li> <li>- South African President, Mbeki, speaks out against HIV/AIDS silence and stigma</li> </ul>
1999	<ul style="list-style-type: none"> <li>- Scientists found that chimpanzees (SIV) most likely introduced HIV to the human population through African chimpanzee hunters</li> <li>- HIV became the fourth leading cause of death in the world</li> <li>- In South Africa, myths emerged about having sex with a virgin to cure HIV</li> <li>- President Mbeki said that AZT was toxic and bad for people's health</li> <li>- South Africa battled with the US on ARV prices</li> <li>- Single dose NVP became affordable and effective in PMTCT in Uganda</li> <li>- UK offers all pregnant women HIV test to prevent MTCT</li> <li>- First time in history that more women than men were infected in Africa</li> <li>- UNAIDS estimated that 33 million PLWHA, 2.6 million died in 1999, which was</li> </ul>

Table 4 continued

	higher than any other year
2000	<ul style="list-style-type: none"> <li>- President Mbeki claimed that HIV was not the cause of AIDS</li> <li>- In April, Mbeki stated that African AIDS is different</li> <li>- Gates Foundation contributed \$50 million for ART for HIV-positive pregnant women</li> <li>- President Clinton said HIV/AIDS is a threat to national security for some nations</li> <li>- Many African countries rejected an agreement for a loan from drug companies to purchase ARV therapies because the agreement would not help</li> <li>- Botswana found that 4 of every 10 pregnant women were HIV-positive</li> <li>- 5,000 scientists signed the Durban Declaration, stating that HIV caused AIDS</li> <li>- Nkosi Johnson, famous South Africa with HIV stated that the government should give AZT to all HIV-positive pregnant women</li> </ul>
2001	<ul style="list-style-type: none"> <li>- ARV prices were off-set in South Africa because India and Brasil companies made their own generic forms, at a price of less than \$1 per day</li> <li>- Kofi Annan, UN Secretary General, called for HIV/AIDS funds to increase tenfold in developing countries</li> <li>- 189 countries signed the Declaration of Commitment on HIV/AIDS</li> <li>- AIDS South Africa activists took legal action against the South African Ministry of Health for continuing to refuse ARVs to prevent MTCT</li> <li>- In December, the ruling was that South Africa gives out free NVP</li> </ul>
2002	<ul style="list-style-type: none"> <li>- Colin Powell advocates for condoms while the Bush Administration does not</li> <li>- WHO published guidelines on ARV treatment in resource-poor settings</li> <li>- South Africa government promised to start giving nevirapine to HIV-positive pregnant women and pre-exposure prophylaxis to rape victims</li> <li>- South African Sesame Street introduced HIV-positive character, Kami</li> <li>- FDA approved first rapid test</li> <li>- Reports stated that women make up 58% PLWHA in Africa and 50% of all cases worldwide</li> <li>- USAID introduced ABC program (Abstinence, Be Faithful, Wear Condoms)</li> </ul>
2003	<ul style="list-style-type: none"> <li>- US reports spending \$15 billion in next 5 years for HIV/AIDS</li> <li>- Expert group stresses unsafe sex as the primary transmission mode in Africa</li> <li>- AIDSvax not work</li> <li>- South Africa – Treatment Action Campaign (TAC) filed manslaughter charges against the South African Ministry of Health, also stating that South Africa is responsible for 600 deaths per day</li> <li>- WHO declared a global public health emergency for failure to deliver treatment to nearly 6 million PLWHA in developing countries</li> <li>- South Africa approves free ARVs in public hospitals in November</li> <li>- WHO introduced 3 by 5 plan, that 3 million PLWHA would be on ARVs by 2005</li> </ul>
2004	<ul style="list-style-type: none"> <li>- South Africa rolls out program to give free ARVs to PLWHA starting in 5 hospitals in the richest province, Gauteng</li> <li>- Bush Administration introduce PEPFAR to implement \$15 billion</li> <li>- South Africa TAC activists nominated for Nobel Peace Prize, but did not win</li> </ul>
2005	<ul style="list-style-type: none"> <li>- Nelson Mandela's oldest son died of AIDS</li> <li>- Publication of death certificates in South Africa found to be misreported between 2000-2001, such that two-thirds of them were underestimates of HIV-related deaths</li> <li>- IOM published that NVP was safe and effective for PMTCT</li> </ul>

Table 4 continued

	<ul style="list-style-type: none"> <li>- South Africa antenatal clinic survey found that 29.9% of pregnant women were HIV-positive at the end of 2004</li> <li>- G8 Summit leaders promised to provide universal access to ARVs by 2010</li> <li>- South Africa Democratic Alliance published</li> <li>- 3 by 5 goal was not reached</li> </ul>
2006	<ul style="list-style-type: none"> <li>- PEPFAR said that 401,000 people were on ARVs in 15 countries</li> <li>- UNAIDS 25 year anniversary report stated that HIV declined prevalence rates were found in Kenya, Burkina Faso, and Haiti</li> <li>- UNAIDS also reported increased funding figures from \$300 million in 1996 to \$8.3 billion in 2005</li> <li>- 5<sup>th</sup> anniversary of UNGASS where a declaration was set on standards and goals to guide the world on the global response to HIV/AIDS</li> <li>- Vatican started thinking about changing its policy on condoms to prevent HIV infection but they still opposed condom use</li> <li>- US introduced the major medical contribution of 1 pill per day for HIV medication</li> <li>- XDR-TB prevalence rise in South Africa, all 25 patients were also HIV-positive</li> <li>- Launch of Product RED</li> <li>- Major findings from 2 NIH studies in Africa found that male circumcision greatly reduced HIV transmission by 50%</li> </ul>
2007	<ul style="list-style-type: none"> <li>- International microbicide study shockingly did not help reduce HIV infection rates</li> <li>- Gambia President thought to have had cure for HIV/AIDS but it was not true, but he also took people off combination ART</li> <li>- In June, the new South Africa Ministry of Health plan was to: 1- reduce new infections by 50%, and 2- bring treatment to more than 80% PLWHA</li> <li>- G8 Summit reduced original goal to: have approximately 5 million people getting access to ARVs over the next few years, which saw much criticism</li> <li>- In August, South Africa Deputy Minister of Health was fired</li> <li>- Botswana reduced HIV infection rates and MTCT to less than 4%</li> <li>- Hundreds of South Africans involved in AIDS vaccine might have increased their risk as a result of the study</li> <li>- President Mbeki still did not believe that HIV causes AIDS</li> </ul>
2008	<ul style="list-style-type: none"> <li>- South African took scientists to court (Rath) for distributing and promoting vitamins as HIV remedies in unauthorized medical trials</li> <li>- PEPFAR was renewed and \$48 billion was funded for years 2009-2013</li> <li>- UNAIDS said it would not make 2010 goals</li> <li>- President Mbeki resigns</li> <li>- Harvard study found that 330,000 lives were lost between 2000-2005 as a result of the South African government's failure to distribute ARVs</li> <li>- US approves needle exchanges again</li> </ul>
2009	<ul style="list-style-type: none"> <li>- US travel ban lifted</li> <li>- Washington DC reported higher rates than West African countries</li> <li>- Catholic Pope made a statement that condoms increase risk for HIV</li> <li>- HIV-1 genome was mapped</li> <li>- UNAIDS and WHO stated that more PLWHA were receiving ARVs, a 36% increase from the previous year</li> <li>- Report stated that 45% of HIV-positive pregnant women were getting ARVs in Sub-</li> </ul>

Table 4 continued

	<p>Saharan Africa</p> <ul style="list-style-type: none"> <li>- UNAIDS report said that there by a decrease in HIV incidence by 17% in 2001</li> </ul>
2010	<ul style="list-style-type: none"> <li>- Beginning January 4, PLWHA could travel and immigrate to the US</li> <li>- Because the US travel ban was lifted, IAS announced that Washington DC would be the site of the 2012 International AIDS Conference</li> <li>- South Africa epidemiology team stated that ARVs could be used as a treatment or PEP for HIV transmission</li> <li>- WHO PMTCT guidelines changed</li> <li>- WHO PLWHA guidelines also changed from CD4 count of less than 200 to CD4 count of less than 350</li> <li>- Vienna International AIDS Conference theme was “Rights Here, Rights Now,” advocating a more human rights perspective toward HIV/AIDS response</li> <li>- Trial CAPRISA004 Microbicide study found effective</li> <li>- United Nations Children’s Fund (UNICEF) and UNAIDS reported the largest number of people starting ARVs ever, at 5.25 million people on ART at the end of 2009</li> <li>- Catholic Pope promoted use of condoms to reduce HIV/AIDS transmission</li> <li>- Phase III PEP trial: iPEX found that this PEP could reduce transmission by 44% in the population of men who have sex with men</li> </ul>

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