



# Causes of Infant Mortality in **Botswana**

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## Abstract

### Introduction

Infant mortality rate of Botswana has not reduced substantial in the last two decades (1990-2009); the HIV/AIDS epidemic has not helped the situation either. The aim of this project was to determine the major causes of infant death in Botswana and what the government is doing about it.

### Method

The statistical data used was from the Mortality and Morbidity report of 2006 from Department of Statistics at the Ministry of Health Botswana; literature review included several case report studies conducted by the CDC and ministry of health Botswana in early 2006 following a spike in reported infant death due to diarrhea. Several pamphlets and policy manuals in use in Botswana were also used to discuss the government efforts in reducing child death.

### Results

The study revealed that infant mortality is mainly caused by infectious diseases, taking account for over 67% of causes of infant death in Botswana. Pneumonia was responsible for 21.7%, while diarrhea was responsible for 27.7% of the deaths among infants.

The study also showed that the government of Botswana has introduced several programs that should reduce infant mortality, and indeed success is evident in reducing mother to child transmission of HIV through the Prevention of Mother to Child Transmission of HIV program.

### Conclusion

Clearly a lot more needs to be done to address the issue of infant mortality, since major causes in Botswana as well as other developing countries are preventable diseases. One of the ways is to educate the public about health and the health services available for them. Another important issue is to educate the primary health worker at all levels.

## Introduction

Infant mortality in Botswana has been high for the past 20 years; it has neither increased nor decreased on average from 1990 to 2009. According to UNICEF data, infant mortality rate in Botswana in 1990 was 46 per 1000 live births and in 2009 it was 43 per 1000 live births, that's a reduction of a mere 0,3% in 20 years. Something must be wrong; or rather someone is not doing his or her job. If the country is able to progress in every other area, including increased awareness and prevention of HIV, it should be able to reduce infant mortality drastically. The figure below (figure 1) shows that pneumonia is the major cause of infant mortality according to the Botswana Statistics office, followed closely by diarrhea, which was the leading cause of death among infants in 2006. Diarrhea in infants should not be a concern in Botswana considering the government has managed to supply 95% of the country with clean drinking water. Then, what is the problem? Why are so many babies still dying at this day and age? (1); (2).

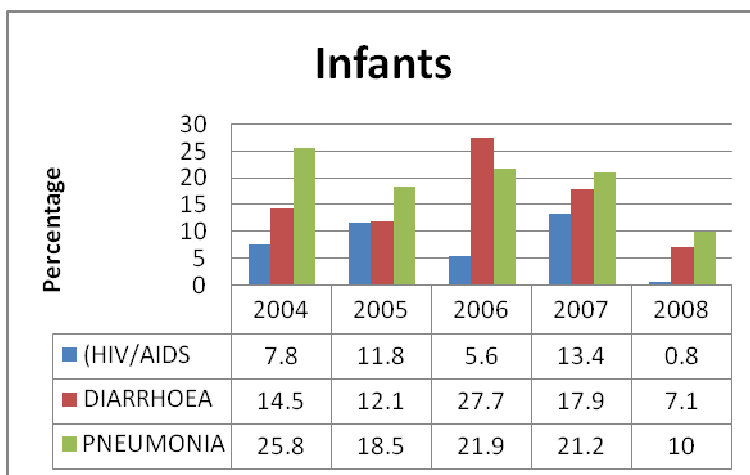


Figure 1: Trends in Infant Mortality in Botswana 2004-2008 (2)

In Norway, for example, infant mortality in 1990 was 7 per 1000 live births and in 2009 it was 3 per 1000 live births, the major cause of infant mortality being congenital

conditions (3). Though Botswana is a developing country, it is a far advanced country in terms of education, health care and economic growth as compared to other developing countries, therefore, infant mortality should have been tackled earlier on; it should not be an issue the healthcare system still needs to address.

### **About the Project**

The aim of this project is find out the major cause of infant mortality in Botswana using the Mortality and Morbidity Report of 2006. The hypothesis is that infectious diseases are the major causes of infant death in Botswana. The objective is to determine what the government of Botswana is doing to curb infant mortality and what improvements need to be made in the healthcare sector to reduce infant mortality and morbidity in Botswana.

### **About Botswana**

Botswana is a landlocked country in Southern Africa with an area of 581 730 km<sup>2</sup>, that is slightly smaller than the state of Texas, it is bordered by South Africa, Namibia, Zambia and Zimbabwe. The population is estimated to be 2,1 million by July 2012 and 34% of the population is below 15 years of age. The birthrate is 22 births per 1000 population, death rate is 12 deaths per 1000 population, and the population growth rate is approximately 1.5%. The government of Botswana spends about 10% of GDP (Government Development budget Plan) on health.

Botswana has an extensive network of health facilities such as hospitals, clinics, health posts, and mobile stops in the 27 health districts. In addition to an extensive network of 101 clinics with beds, there are 171 clinics without beds, 338 health posts and 844 mobile stops. Primary Health care (PHC) services in Botswana are integrated within overall hospital services being provided in the outpatient sections of all levels of hospitals (4), (5).

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**Figure 2:** Political map of the Republic of Botswana showing the 10 political districts (6)

Botswana being a developing country, has, since independence from Britain in 1966, managed to advance from being one of the poorest countries in the world to become one of the most successful stories of Africa. The principle of “Botho”—the concept of a person who has a well-rounded character, who is well-mannered, courteous and disciplined, and realizes his or her full potential both as an individual and as a part of the community to which he or she belongs—has helped shape the character and policies of Botswana. The government of Botswana has since independence taken the responsibility of providing for its people in all aspects, the familiar saying that “democracy is a governance of the people, for the people and by the people” in action. It provides free education from elementary all the way to tertiary education for all its citizens, healthcare services are available to all for a minimal fee, clean drinking water is provided in every community at a subsidized cost, even when there is drought, the government ensures clean drinking water is made available for everyone in the country.

Housing developments such as Self Help Housing Agency (SHAA) are available for assisting low and middle-income people as well as those in rural parts of the country to afford decent shelter. Food is provided for all public school children from elementary to senior secondary schools, and orphans and the elderly receive foodstuffs monthly from clinics and health posts (7).

The government of Botswana has and continues to provide and care for its citizens needs at all levels. Primary health care (PHC) has been under the Ministry of Local Government since the formation of the Republic of Botswana. All clinics, healthposts, mobile stops and emergency services, including ambulances, were run, funded and serviced by local governments in the different districts. Since 2009, there has been a shift of centralizing public services in the country, this shift caused PHC to fall under the Ministry of Health.

## Method

Infant mortality statistical data was collected from the Mortality and Morbidity report of 2006 from Department of Statistics at the Ministry of Health in Botswana. The Ministry of Health Botswana compiles a Mortality and Morbidity Report through the Central Statistics Office every few years. I used the data report from 2006, since the 2010 report was not ready when I started working on this research project.

Literature review from US National Library of Medicine “PubMed” included “Population-Based Study of a Widespread Outbreak of Diarrhea Associated with Increased Mortality and Malnutrition in Botswana, January–March, 2006” by Mach et al, “Case-control study to determine risk factors for diarrhea among children during a large outbreak in a country with a high prevalence of HIV infection” by Arvelo et al, “Neonatal, post neonatal, childhood, and under-5 mortality for 187 countries, 1970–2010: a systematic analysis of progress towards Millennium Development Goal 4” by Rajaratnam et al, and a research project by Moseja Depotelo titled “User Satisfaction with Child Survival Programmes in Kweneng East District, Botswana.”

Policies by the government of Botswana Ministry of Health were used to determine what the government has been and is doing to curb infant mortality. These included “National road map for accelerating the reduction of maternal and newborn morbidity and mortality in Botswana, Safe Motherhood Initiative”; “Integrated Management of Childhood Illness: A Bridged Course for Senior Health professionals “Counsel the Caretaker” and “Assess and Classify the Sick Child: Age 2 months up to 5 years””; and “Botswana National Guidelines: Prevention of Mother-to-Child Transmission (PMTCT) of HIV”.

Interview with Olebogeng Tsedi who is a matron (senior nurse) at Nkoyaphiri Clinic in Mogoditshane was instrumental in collecting the various policy documents as well as concrete information on current practices and advances in the public health sector. Since she has been working for the Botswana healthcare system since the mid-80s, she was the perfect source of information; she has seen the healthcare system before and after the HIV/AIDS epidemic, as well the shift of primary health from under Local Government to being under the Ministry of Health.



## Results

Table 1 shows that infectious diseases take the lead as causes of infant mortality in Botswana. Diarrhea and gastroenteritis (GE) was the leading cause of death among infants in 2006 having caused 319 (27.7%) deaths followed closely by pneumonia at 250 (21.7%), volume depletion (dehydration) lags behind at 135 (11.7%), Septicemia and HIV diseases are also among the causes of death at 67 (5.8%) and 64 (5.6%), respectively. Volume depletion is actually a secondary cause of death due to diarrhea, so increase in cases of diarrhea also causes an increase in cases of dehydration. It is evident that congenital malformations, malnutrition and other non-infective diseases are minor causes of death in Botswana.

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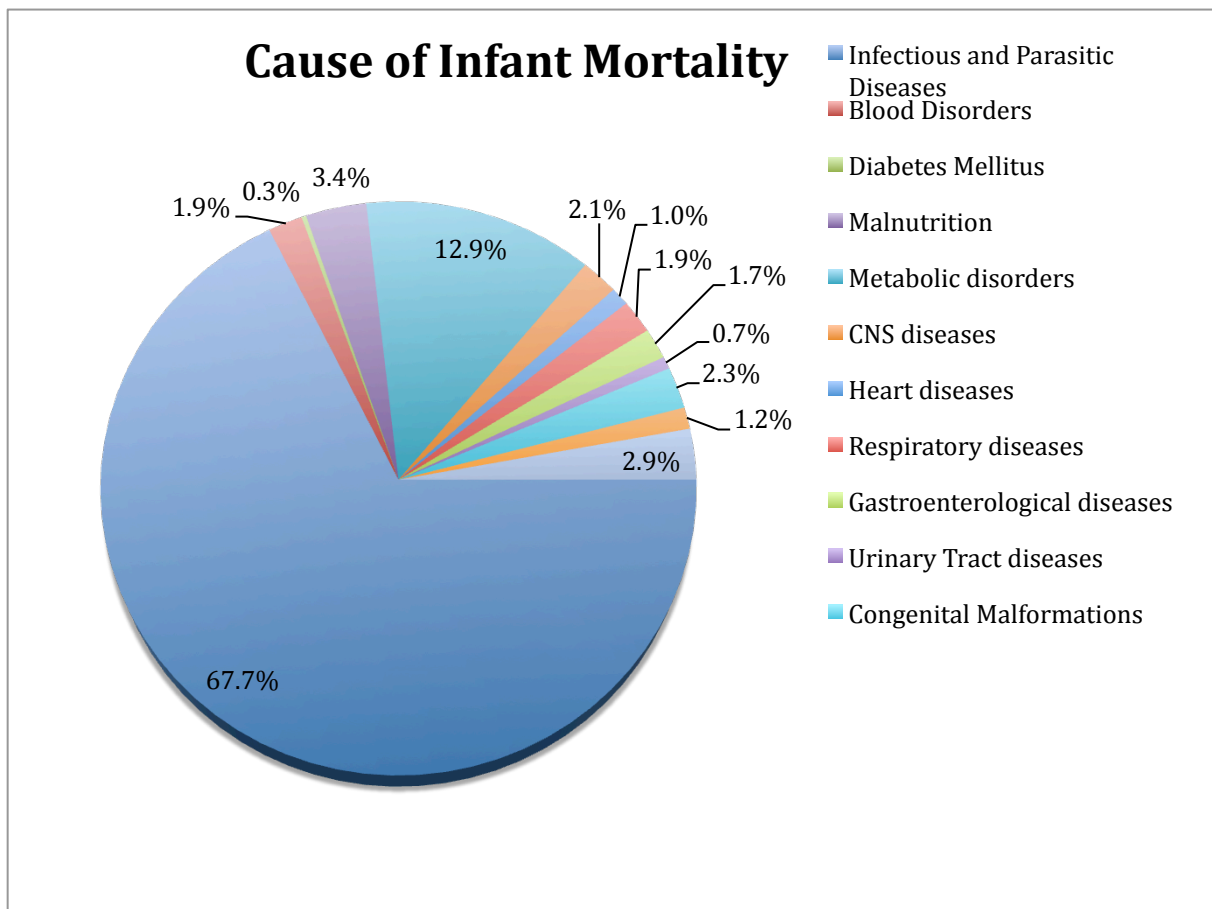
**Table 1:** Causes of Infant Mortality in Botswana, from the Mortality and Morbidity report of 2006 (8)

<b>Diagnosis</b>	<b>Male</b>	<b>Female</b>	<b>Subtotal</b>	<b>Percentage</b>
<u>Infectious and Parasitic Diseases</u>				
Diarrhea & GE <sup>1</sup>	166	153	319	27.7%
Tuberculosis	4	5	9	0.8%
Septicemia	32	35	67	5.8%
Unspec. <sup>2</sup> Bacterial inf.	1	2	3	0.3%
HIV <sup>3</sup> diseases	38	26	64	5.6%
Other Viral diseases	1	3	4	0.3%
Candidiasis	7	3	10	0.9%
Cerebral cryptococcosis	1	1	2	0.2%
Unspec. <sup>2</sup> Malaria	1	0	1	0.1%
Pneumocytosis	14	22	36	3.1%
Acute URI <sup>4</sup>	2	2	4	0.3%
Pneumonia	120	130	250	21.7%
Acute LRI <sup>5</sup>	6	1	7	0.6%
Machupo hemorrhagic fever	2	0	2	0.2%
<u>Blood Disorders</u>				
Anemias	9	10	19	1.7%
Coagulopathies	1	2	3	0.3%
<u>Diabetes Mellitus</u>				
DM <sup>6</sup>	2	0	2	0.2%
Hypoglycemia	1	0	1	0.1%
<u>Malnutrition</u>				
Kwashiorkor	3	5	8	0.7%
Nutritional Marasmus	5	6	11	1.0%
Marasmic Kwashiorkor	3	2	5	0.4%
Unspec. <sup>2</sup> Malnutrition	12	3	15	1.3%
<u>Metabolic disorders</u>				
Volume depletion	72	63	135	11.7%
Other disorders	8	5	13	1.1%
<u>CNS diseases</u>				
Meningitis	5	11	16	1.4%
Other CNS diseases	6	2	8	0.7%
<u>Heart diseases</u>				
Hypertensive	2	0	2	0.2%
Other heart diseases	2	8	10	0.9%
<u>Respiratory diseases</u>				
ARDS <sup>7</sup>	7	15	22	1.9%
<u>Gastroenterological diseases</u>				
Non-infective GE & colitis	6	8	14	1.2%
Others	2	4	6	0.5%
<u>Urinary Tract diseases</u>				
Renal failure	3	4	7	0.6%
Unspec. <sup>2</sup> UTI <sup>8</sup>	0	1	1	0.1%
<u>Congenital Malformations</u>				
Cardiac malformations	3	7	10	0.9%
Other congerital malform.	11	3	14	1.2%
Downs Syndrome	3	0	3	0.3%
Other signs & symptoms	9	5	14	1.2%
<u>Poisoning</u>				
	17	16	33	2.9%
<b>Total</b>	<b>587</b>	<b>563</b>	<b>1150</b>	<b>100.0%</b>

Reference to Table 1 abbreviations

GE<sup>1</sup> = Gastroenteris; Unspec.<sup>2</sup> =Unspecified; HIV<sup>3</sup> = Human Immunodeficiency Virus;  
 URI<sup>4</sup> = Upper respiratory tract infection; LRI<sup>5</sup> = Lower respiratory tract infection;  
 DM<sup>6</sup> = Diabetes mellitus; ARDS<sup>7</sup> = Acute respiratory distress syndrome;  
 UTI<sup>8</sup> = Urinary tract infection

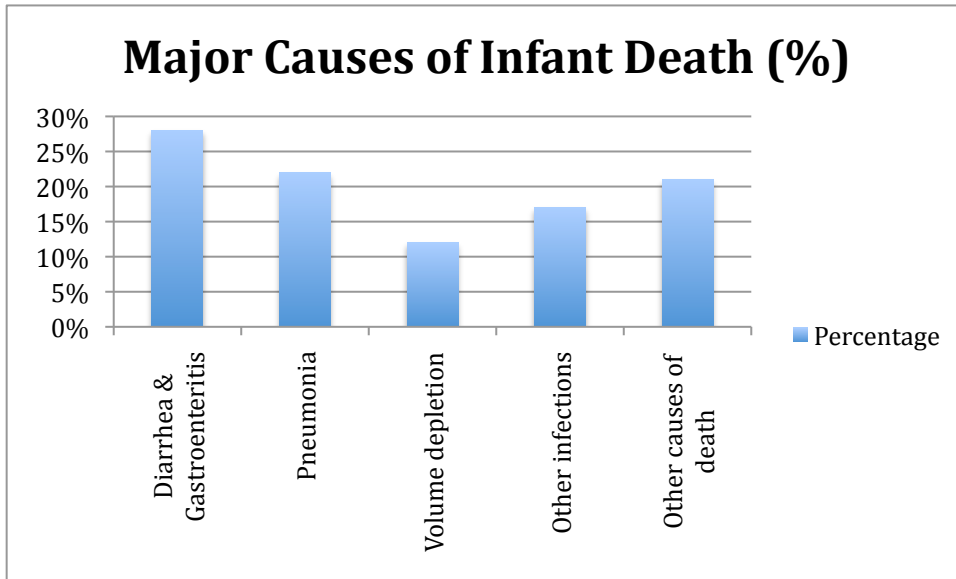
Figure 3 is a grouping of the different types of causes of death; infectious and parasitic diseases take account for 67.7% of deaths among infants, while metabolic disorders account for 12.9% of the deaths. This confirms the hypothesis that infectious diseases are the major causes of death among infants in Botswana. Though Botswana has advanced over the last 30 years in providing for all the needs of the nation—food, water, shelter, health, and education—it seems there is more that needs to be done. Since the HIV/AIDS epidemic, the country has increased national spending on health and with the help of global organizations like the BOTUSA project, UNAIDS, and Botswana-Baylor children’s clinic, there has been a lot advances in curbing the impact of HIV/AIDS on children.



**Figure 3:** Sector diagram showing overall causes of Infant Mortality. Infectious and parasitic diseases include: all viral, bacterial, fungus and parasites infections

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Figure 4 shows only the major causes of infant death in percentages in 2006, with diarrhea clearly the leading cause followed closely by pneumonia. End of 2005 marked record rains in the country that lead to sewage seepage into underground drinking water sources and that is one of the main suspects for the increase in cases of diarrhea in 2006 (9). Children are more vulnerable to the devastating effects of diarrhea in the body, they easily become dehydrated and lose their lives due to volume depletion much more quickly than adults.



**Figure 4:** The Main Causes of Infant Death.

## Discussion

The purpose of this study was to determine which is the most common causes of infant mortality in Botswana, what is or can be done to reduce infant mortality, what policies can be established and how parents can be educated and trained to help reduce the burden of infant mortality on the health system of Botswana.

The Mortality and Morbidity report of 2010 was not ready in Botswana at the time of the data collection for this project and it was not accessible online at the time of submission of the paper, and therefore the 2006 data was used.

### What are the most common causes of infant mortality in Botswana?

#### Diarrhea

Diarrhea describes loose, watery stools that occur frequently. More often signs and symptoms of diarrhea go away without need for treatment, but diarrhea leads to loss of a significant amount fluid and electrolytes from the body, and if it goes on long enough it can lead to acid-base imbalance and volume depletion. The body is about 60% water and the loss of water of 5% bodyweight is considered dehydration. Now if we consider a 6 month-old infant weighing 7kg, if the baby had diarrhea and lost about 5% of his body weight in fluid per day, that's 350g weight loss a day. If the diarrhea lasts 4 days before the child received health care, he would have lost 1.4kg in those 4 days. That is alarming and the reason that infants are more vulnerable to diarrhea, and tend to loose lives if not rehydrated sooner.

What causes diarrhea? In Botswana it is HIV related diseases, waterborne infections and hygiene that are the common culprits. Human immunodeficiency virus (HIV) causes a lapse in the immune system of the body, thus a myriad of opportunistic infections go on a spree in the defenseless small body of an infant.

Waterborne infections that cause diarrhea are extremely rare in Botswana. In the autumn (October-November) of 2005, there was an increase in rainfall, which lead to flooding and overflowing of latrines in some parts of the country. The heavy rains coincided with reports of increase in cases of diarrhea, malnutrition and mortality by the Ministry of Health (MOH) Botswana. The Centre for Disease Control and Prevention (CDC) conducted a study in conjunction with BOTUSA project and MOH, the study concluded that: "The number of reported deaths caused by diarrhea among young

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children was more than 25 times higher than in the previous two years. On the basis of Ministry of Health surveillance data, the area most heavily impacted by the outbreak appeared to be in the eastern and most densely populated part of the country. Stool samples were collected and tested for pathogens, *Cryptosporidium parvum*, *Cryptosporidium hominis*, and enteropathogenic *Escherichia coli* were the most common organisms identified. *Cryptosporidium* is usually found in sewage, thus it is most likely that ground water sources were contaminated during the heavy rains. “ (10)

Personal hygiene plays a vital role in causes of diarrhea in infants. Infants are cared for by others, therefore it goes without say that everything that comes in to an infants mouth is a responsibility of someone else. Breastfed infants have a much lower risk of having diarrhea for a number of reasons; breast milk contains antigens that boost the immune system and act to fight off infections as the baby’s immunity matures, breast milk is readily available, doesn’t require preparation, thus would eliminate the human factor in introducing pathogens to the baby. Poor personal hygiene, storage of drinking water and bottle-feeding exposes infants to diarrhea, according to the Case-control study by Arvelo et al. “Although providing replacement feeding to infants of HIV-positive mothers eliminates the risk of HIV transmission through breast milk, replacement feeding may expose the infant to pathogens that cause diarrhea.”(9, 11)

### HIV, Pneumonia and Tuberculosis

Pneumonia is inflammation of the lungs caused by bacteria or virus. In Botswana the major challenge is HIV infection. HIV infected infants are susceptible to all kinds of infections, because infants have small lungs and the airspaces have not yet developed fully, the slightest inflammation can be catastrophic if not treated immediately.

Botswana introduced the Prevention of Mother-to-Child Transmission (PMTCT) of HIV program and has seen a dramatic decrease in the number of HIV-infected babies born to HIV positive mothers. The challenge now is that there are still some pregnant women who do not register for Antenatal Care (ANC) and thus do not know their HIV statuses prior to delivery. This creates a major problem; babies born with HIV are prone to infections, especially pulmonary TB. Families who do not register for ANC, and thus do not participate in PMTCT program, one finds they can become pulmonary TB contacts—cause of primary TB infection—babies would get infected and present to the clinic with a cough. By the time pulmonary TB is diagnosed in the infant, they could have pneumonia and most have full-blown HIV, resulting in poor prognosis of the child. The

child ends up dying from complications of the infection, for example, dehydration (volume depletion) as the child is sick for long before they receive medical attention, food and liquids intake is insufficient causing malnutrition as well. Septicemia can be another cause of death, because the immune system is undeveloped, the HIV ravages through the body uncontrolled and causes sepsis eventually septic shock taking the life of the infant.

Care of the baby is another important factor, especially that in rural areas there are a lot of orphans who are cared for by their elderly grandmothers or siblings. The children come to clinics with malnutrition and unkempt, with poor personal hygiene. HIV/AIDS takes the lives of many in Botswana and majority of them are parents of young children from single parent homes. The orphans are often left to fend for themselves, those who are lucky to have extended relatives escape the unfortunate life of orphans. Most of them take care of their younger siblings, sometimes helped by their aging grandmothers; hygiene plays a major role because of poverty and lack of education (11).

### **What is the government doing in 2012?**

The government of Botswana has put in place programs and policies to reduce child mortality due to preventable and treatable diseases. These include Child Welfare Clinic (CWC), the Expanded Program on Immunizations (EPI), Prevention of Mother-to-child (PMTCT) of HIV, and Integrated Management of Childhood Illness (IMCI) strategy.

#### **Child Welfare Clinic**

Every newborn is given a Child Welfare Clinic (CWC) Card, which is filled out by the obstetrician and pediatrician on the day of delivery. HIV status of the mother and the newborn is filled in, including any medication, vitamin A supplements and/or antiretroviral therapy (ARV) prophylaxis given as well as all blood test taken or scheduled. The CWC card is to be taken with the child to every health center visit. The card has detailed information and schedule on immunization, growth and development controls, what to do when the child falls ill, and infant feeding protocols for those receiving free infant formula.

For a child with diarrhea who presents to a CWC there are very strict protocols that are to be followed. The child is given a dose of Zinc sulphate for a period of 2 weeks and packets of oral rehydration solution, the caregiver is given instruction how to mix the solution and the dosage for the zinc, they're advised to return to the clinic if the child

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does not recover and which symptoms to watch for if they child get worse or dehydrated. If the child is severely dehydrated, they are given intravenous fluids and referred to a hospital immediately.

Health workers hold talks and lectures on 'care of the baby' for new parents. The talks involve all aspects that come into play when it concerns taking care of a newborn child up to the time they're old enough to care for themselves. They're taught about needs of a baby, feeding and cleaning of feeding utensils, how to prepare infant formula and feeds, and how to introduce solid foods and which foods to start with, how to bathe, clothe and care for the infant. They are also taught about personal hygiene and nutrition (11).

### Extended Program on Immunization (EPI)

The extended program on immunization (EPI) has successfully protected the children of Botswana from vaccine preventable killer diseases of Tuberculosis, Polio, Diphtheria, Tetanus and Hepatitis B. 90% of children aged 12 – 23 months had received valid doses of all recommended vaccines according to the 2007 national EPI coverage survey, and this level of coverage has been maintained in Botswana for over a decade. Efforts to increase coverage are managed through the Reach Every District strategy (REDS). REDS contributes to MDG4 (millennium development goals 4) by training healthcare workers in all hospitals, clinics and health posts. A measles campaign is held every four years and vitamin A supplementation twice a year in May and November (11, 12).

Table 2 shows the vaccination schedule of children in Botswana from birth onwards.

**Table 2:** Botswana Immunization Schedule (12)

AGE	Vaccine
At Birth	BCG <sup>1</sup> , HBV <sup>2</sup> 0
2 Months	OPV <sup>3</sup> 1, Pentavalent <sup>4</sup> 1
3 Months	OPV 2, Pentavalent 2
4 Months	OPV 3, Pentavalent 3
9 Months	Measles 1,
18 Months	OPV booster, DT <sup>5</sup> , Measles 2

Reference to Table 2 abbreviations

<sup>1</sup>BCG: Bacillus Calmette-Guérin, an antituberculosis vaccine.

<sup>2</sup>HBV: Hepatitis B Virus

<sup>3</sup>OPV: Oral Polio Vaccine

<sup>4</sup>Pentavalent: Five vaccines in one comprising of DPT (Diphtheria, Pertussis, and Tetanus), HBV and HiB (Hemophilus influenza B)

<sup>5</sup>DT: Diphtheria and Tetanus

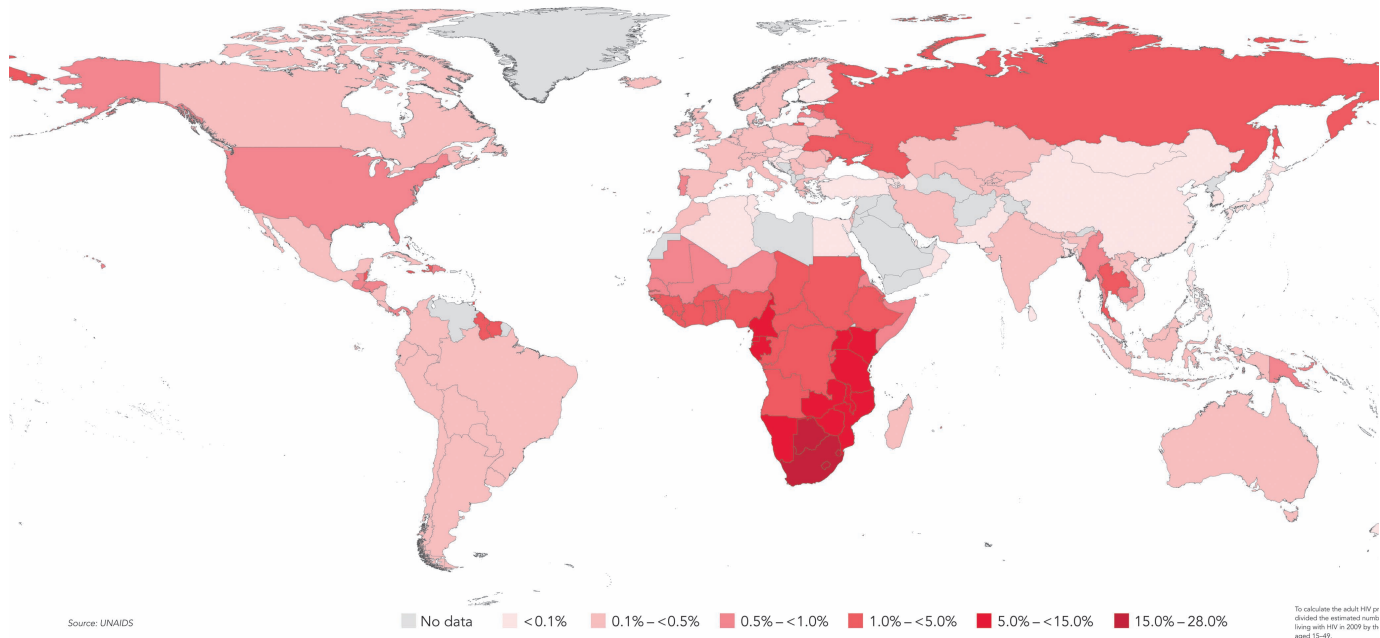


### Prevention of Mother-to-Child Transmission (PMTCT) of HIV

Southern Africa still bears the burden of HIV with 11.3 million people living with HIV in 2009. On a global scale, 34% of people living with HIV, 31% of the new infections and the 34% AIDS-related deaths all occur in the 10 southern African countries. Botswana is one of the countries that have been severely hit by the HIV-AIDS pandemic with a prevalence of 17.6%, the figure below shows the global prevalence of HIV as of 2009 (13).

## 2010: A global view of HIV infection

33.3 million people [31.4–35.3 million] living with HIV, 2009



**Figure 5:** Map showing global HIV infection in 2010 in percentages. From Global Report (13)

Nonetheless, progress is being made in trying to reduce the incidence and impact of HIV among children younger than 15 years in southern Africa. There were 32% fewer children newly infected and 26% fewer AIDS-related deaths in 2009 compared to 2004. In Botswana, 890 children became newly infected with HIV in 2007 as compared to the 4600 that were infected in 1999, an 80% decrease, this is due to antiretroviral (ARV) therapy and the PMTCT programs in Botswana. The Botswana National ARV Program

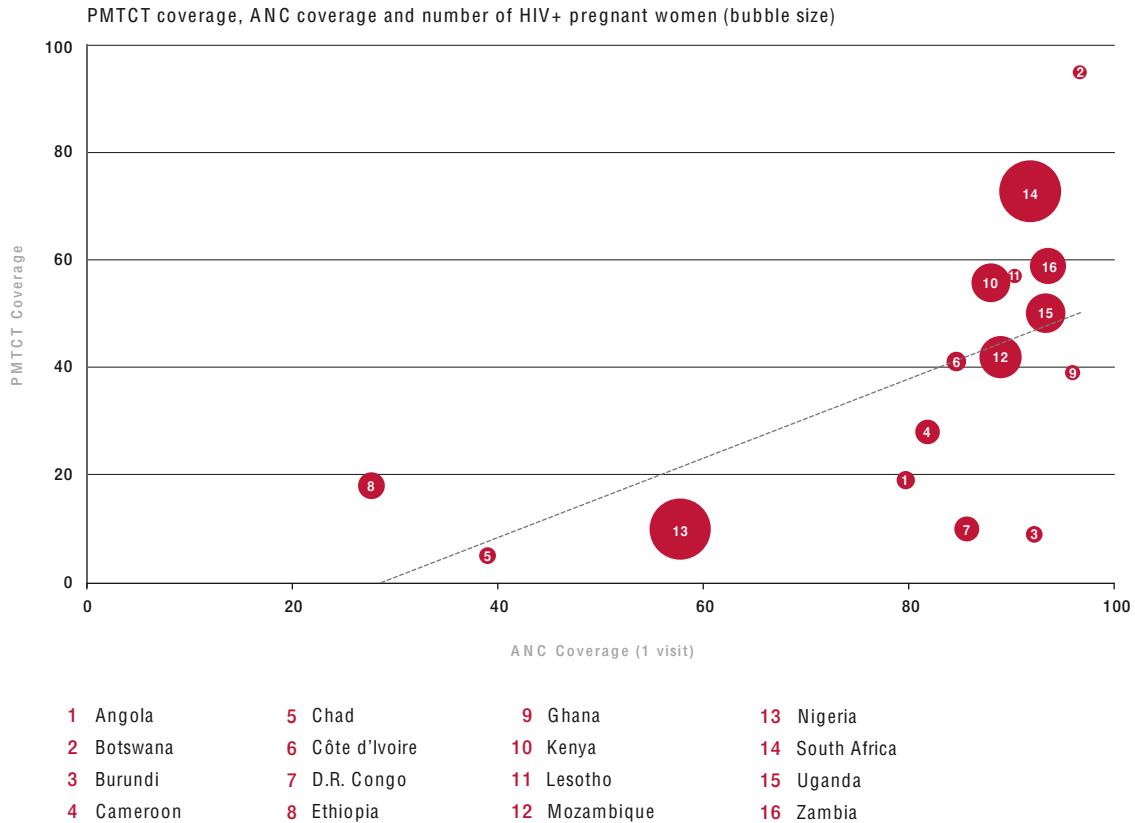
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began in 2002 and has since given access for HIV infected Botswana to highly active antiretroviral therapy (HAART) (13), (14).

The PMTCT program was piloted in the two cities of Gaborone and Francistown in April 1999 and by November 2001 the program was available in all public healthcare facilities nationwide. The program initially used voluntary HIV counseling and testing to identify HIV infected women but in 2004 HIV testing became routine. Botswana has about 43 000 deliveries per year; with an HIV prevalence of 31,8% among pregnant women, an estimated 13 674 HIV infected women deliver every year and thus with 40% mother to child transmission (MTCT) of HIV rate, 5470 infants would be born infected with HIV every year. The PMTCT services have proven successful with MTCT rates dropping dramatically from 40% to 4% in just 10 years. Women receiving HAART transmit HIV to their infants less than 1% of the time and as HAART and triple ARV prophylaxis become more accessible Botswana will see a further drop in MTCT rates. (14)

Over 95% of pregnant women in Botswana register for antenatal care (ANC), which gives healthcare workers the opportunity to ensure that nearly every woman is offered PMTCT services. During the antenatal period, all pregnant women are provided with pre-test education and HIV testing at the initial ANC visit, HIV testing in the third trimester, post-test counseling, infant and young child feeding recommendations and counseling. In accordance with the goals of Vision 2016 for an AIDS-free generation, the Government of Botswana recommends the following: HIV infected women for whom formula feeding is acceptable, feasible, affordable, sustainable and safe (AFASS) should exclusively formula feed for the first 6 months of life and continue formula feed until 12 months of age. For HIV infected women for whom formula feed is not AFASS should exclusively breastfeed for the first 6 months and at 6 months re-access using AFASS criteria. The government provides infant formula at healthcare facilities free of charge until infant is 12 months old (14).

Source: WHO and UN Statistics Division



**Figure 6:** Preventing mother-to-child transmission of HIV: Coverage of antenatal care services and services for preventing mother-to-child transmission among women living with HIV in high-prevalence countries, 2010. From Global Report 2010 (13)

Botswana has achieved the world’s highest coverage for HIV treatment, delivering ARV drugs in 2010 to more than 94% of the HIV infected in the country. The figure above shows that Botswana surpasses all other countries with high HIV-prevalence among women in antenatal care and PMTCT service provision. The success of Botswana’s PMTCT program “is a testament to a national-level political commitment to prevent HIV in infants and to a personal commitment by healthcare workers” (14).

**Integrated Management of Childhood Illness**

The Integrated Management of Childhood Illness (IMCI) strategy was introduced to Botswana in 1997 and the government has since been committed to implement and fund IMCI activities. The strategy aims to reduce child mortality and morbidity by providing adequate and specific management and care for preventable and curable childhood

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illness. IMCI addresses the problems of child morbidity and mortality through: improved case management; improved health system support; and improved family and community practices and this is achieved through frequent supervision, which includes observation of case management and ensuring the presence of basic drugs and equipment needed for child survival.

Healthcare workers are trained using the “Assess and classify the sick child” and “Counsel the caretaker” IMCI manuals. Training involves evaluation and management of common childhood illness like pneumonia, diarrhea, ear infection, malaria, measles and malnutrition as well as common symptoms like cough, difficulty in breathing, diarrhea, fever and ear infection. Training includes recognizing prodromal signs, asking and probing the caretaker for a detailed anamnesis, how to examine the child for malnutrition and anemia, determining immunization status, assessing other problems that might be evident during the consultation and checking the health of the caretaker. It also includes tactics of evaluating whether the child might have a serious illness, if further evaluation would be necessary, which treatment options are available and how to advice and teach caretakers to continue treatment at home. The “counsel the caretaker” manual, trains healthcare workers to assess feeding of sick children, advice HIV infected mothers about bottle-feeding, identifying and advising about feeding problems, advising caretaker when to return for follow-up visits, for further care and for immunizations and vitamin A supplementation.

The IMCI strategy utilizes the chart “Assess and classify the sick child age 2 months up to 5 years” which describes how to assess and classify sick children so that signs of disease are not overlooked; as well as the chart “Counsel the caretaker” which gives recommendations on food, fluid and when to return for follow-up. These charts enable healthcare workers to work efficiently and effectively with the little time they have for each consultation (15, 16).

## Conclusion

The main causes of infant mortality in Botswana are infectious diseases being diarrhea and pneumonia in 2006. Infections are preventable and treatable something that should not be a major problem for Botswana with regards to its level of health care provision. What I would recommend would be the change in approach to healthcare provision in Botswana.

The government of Botswana has done a lot over the past decade to reduce infant mortality rate but unfortunately the rate had not improved much between 1991 with infant mortality at 46 and 2009 infant mortality was 43, but in 2010 the rate had gone down to 36 per 1000 live births. The government has been successful in reducing HIV-infected infants through programs such as PMTCT (1).

There has to be a change in the approach of the government in dealing with causes of infant mortality. For a long time it has been in the hands of the government to ensure sufficient healthcare to the citizens, I think its time the government engages the public so to improve their capacity to be responsible for their own health. Health promotion programs should be instituted that focuses on patients' understanding of disease mechanism and therefore enhance prevention and treatment. This would enhance the patients' approach to receiving health care so much that their trust on modern healthcare would be increased instead of it being a last resort, as is common practice in many parts of Botswana. One of the causes of infant mortality is the delay by parents to seek medical assistance.

The government should also train health workers at all levels especially primary healthcare, on how to communicate diseases, signs and symptoms and effective home remedies to the public in a more understandable language that the public can relate to. The public has to view healthcare as their right, and the healthcare system should be accessible at all levels, this would improve on efforts to reduce child mortality and curbing morbidity in Botswana.

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