

INTERNET-BASED ANTI-VACCINATION LOBBYING IN SOUTH AFRICA

A RESEARCH DISSERTATION

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DECLARATION

I, Molelekeng Hildegard Mloi, hereby declare that the work on which this dissertation is based, is original (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree at this or any other university or tertiary education institution or examining body.

.....

Signature of candidate

.....day of2011

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ABSTRACT

Background and aim: The development of vaccines is considered one of the greatest achievements of biomedical science and public health, because it has led to the reduction of the global burden of infectious diseases. However, vaccination has become a victim of its own success, since most parents have not been exposed to epidemics of vaccine-preventable diseases, and now some fear the vaccines more than the diseases that they prevent. Globally, there is a growing number of parents who use the internet to seek advice on vaccination, and unfortunately some of this advice is anti-vaccination (AV). Some studies have analyzed vaccine criticism on the internet, but none have focused on South Africa (SA). The purpose of this study was to identify the characteristics of the anti-vaccination lobby on SA internet sites including blogs using search terms that were specifically aimed at increasing the retrieval of AV sites.

Methods: A structured internet search was conducted on SA web pages using Google, Yahoo, and MSN search engines, for keywords “don’t vaccinate”, “vaccination is harmful”, “should not vaccinate”, “not vaccinating”, “vaccination causes harm”, “against vaccines”, etc. The words “immunization” and “immunisation” were also substituted for the word “vaccination” in these searches. These AV sites were then extracted for analysis of content and authors.

Results: The overall coverage of SA AV websites was 30.2% (19/63), with Google identifying the most AV sites (59.3% [16/27]), compared to 33.3% (9/27) for Yahoo and 7.4% (2/27) for MSN. Of these AV sites 42.1% (8/19) were identified to be blogging sites. The AV advocates included 36% (5/14) mothers / parents, 26% (4/14) business people, and 21% (3/14) journalists. The main concerns identified included vaccine safety and efficacy, ethical concerns, and claimed financial profit motives. There were 32% (6/19) of the authors who referenced or posted articles written by other AV lobbyists from the USA.

Conclusion: The AV advocates on SA internet are individuals who are independently lobbying against child vaccination and not a cohesive AVL group. The concerns they raised are similar to those raised by AVL from the USA. The SA population is therefore exposed to influences on the internet both from local and international views. The internet blogs and forums are an important platform for sharing AV views in an informal manner.

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LIST OF ABBREVIATIONS, ACRONYMS,

AV	- anti-vaccination
AVL	- anti-vaccination lobby
CDC	- Centre for Disease Control
DOH	- Department of Health
EPI	- Expanded Programme on Immunization
IMAC	- Immunisation Advisory Centre
MMR	- Measles, Mumps, and Rubella vaccine
NHS	- National Health Service
NICD	- National Institute of Communicable Diseases
SA	- South Africa
SAVIC	- South African Vaccination and Immunisation Council
TBVC	- Transkei, Bophuthatswana, Venda, and Ciskei
URL	- Uniform Resource Locator
VACFA	- Vaccines for Africa
VPD	- Vaccine-Preventable Diseases
WHO	- World Health Organization

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

The discovery of vaccines is considered one of the greatest achievements of biomedical science and public health. Vaccination helps to reduce the global burden of diseases and is a key building block for health systems in the developing world (Waisbord and Larson, 2005). As a result of the introduction of the World Health Organization's (WHO) Expanded Programme on Immunization (EPI) in 1974 in many countries, vaccination coverage accelerated over the past 3 decades and the burden of vaccine-preventable diseases (VPDs) decreased dramatically over time (Vaccines for Africa [VACFA], 2009). However, more recently, stagnation in vaccination coverage has resulted in around 2 million unnecessary deaths from VPDs (Waisbord & Larson, 2005).

While the majority of the public throughout the world still accepts vaccination, it appears that increasing numbers of parents do not. In the United States of America (USA) where infant vaccination is mandatory, many parents seek philosophical exemptions from vaccination for their children. For example, in Colorado, USA, the rate of philosophical exemptions from vaccination rose from 0.87% in 1988 to 1.87% in 1998 (Feikin et al., 2000). Campaigns by those opposed to vaccination, referred to as the anti-vaccination lobby (AVL), have been followed by falling vaccination rates and outbreaks of VPDs throughout the world. A flawed and later discredited publication on the supposed link between the MMR vaccine (a trivalent vaccine covering measles, mumps, and rubella) and autism (Wakefield et al, 1998) had a devastating impact on MMR vaccination coverage which later resulted in measles outbreaks in the United Kingdom (UK) (Deer, 2006).

In 2009, Wakefield was found to have falsified his results (Deer, 2009), with earlier reports suggesting that he had a vested interest in doing so as he stood to gain from discrediting the MMR, since his clinic was making money out of testing babies whose parents were suing the vaccine manufacturers and he was a chief witness in the court case (Deer, 2007). Wakefield was also found to have applied for a patent on a measles-only vaccine (Deer, 2004) which is a clear demonstration of conflict of interest. Although his claims were discredited by leading scientists, and we now know the truth about his motives in discrediting the MMR, and he has been erased from the medical register by the UK General Medical Council (GMC, 2010), he caused irreparable damage to vaccination uptake, not only of the MMR, but of all vaccinations made available through the EPI throughout the world.

1.2 STUDY RATIONALE

Previous content analyses of mass media articles on the MMR vaccine scare revealed the themes and content of the articles, however, it has been suggested that these should also be viewed within the political context, affiliation of the source, and the extent to which this affiliation influenced the way in which the MMR vaccine scare was reported (Guillaume and Bath, 2004). This has been identified as the missing link important for seekers of the truth. Also, with the growing accessibility of internet-based information and misinformation, it is important for parents to know if they can trust certain websites for vaccine information.

Even though the MMR vaccine is not used in the South African EPI (which uses the measles-only vaccine), the MMR is used in the private sector in SA, and, parents may still be concerned about the safety of vaccines in general on hearing negative reports of the MMR vaccine. Also, anecdotal reports from South African public sector health care workers suggest that parents have been refusing to have their children vaccinated with the measles only vaccine during the recent measles outbreak, believing that it causes autism. The internet, like all mass media, reaches a very large audience in a very short time, and therefore any published negative vaccine message can generate panic and do a great deal of harm.

AV lobbying using the internet is an added threat to public health especially in sub-Saharan Africa where access to the internet is becoming widespread. In SA there are pockets of sub-optimal vaccination coverage, but we do not know how much the AVL contributes to this low coverage. This is because although it is known that the AVL exists in SA; currently there are no studies on the AVL in SA and other African countries. What is known about the AVL in SA is that they make use of the mass media, particularly the internet, to communicate their AV messages. Before we can do studies on the contribution of the AVL to sub-optimal vaccination coverage in SA, we need to characterise it. Thus this study seeks to investigate the characteristics of the internet-based AVL in SA.

1.3 PURPOSE OF THE STUDY

1.3.1 Research questions

- The purpose of the study was to answer the following research questions:
- Who are the AV advocates using SA internet-based media?
- How much coverage does the AVL get from SA internet sites and blogs?
- Which SA websites are mostly used for AV lobbying?
- Who sponsors the SA internet-based AVL?
- What are the concerns raised by the SA internet-based AVL?

1.3.2 Research Aim and Objectives

This study investigated the characteristics of the AVL on SA internet websites and blogs. The specific objectives of this study have been summarised as follows:

- To identify the individuals/groups/organisations who make up the SA internet-based AVL
- To quantify internet coverage of AVL views.
- To identify the most utilised websites and blogs by the AVL.
- To identify sponsors of the internet-based SA AVL.
- To describe the main concerns raised by the SA internet-based AVL.

CHAPTER 2: LITERATURE REVIEW

2.1 History of Vaccination

Early vaccines consisted only of the weakened pathogen (the very organism, e.g. virus or bacteria, which produces the disease) used to stimulate the immune system to produce antibodies without one becoming infected with the actual disease (National Health Service [NHS], 2008). The first documented use of vaccination was during the 1774 smallpox epidemic in Europe, when Benjamin Jesty successfully inoculated his family with cowpox to avoid infection with the smallpox virus (South African Vaccination and Immunisation Council (South African Vaccination and Immunisation Centre [SAVIC], 2010). This method was later used with success in 1798 by Edward Jenner who developed the first recognised vaccine against variola virus, a virus that causes smallpox disease (Riedel, 2005).

Louis Pasteur built on Jenner's work by extending the technique (Kling, 2009) and introduced chicken cholera vaccine which was introduced 5 years before the first administration of the rabies vaccine in 1885 (Le Fanu, 1973; Schwartz, 2001). Maurice Hilleman was involved in the basic science or mass production of 9 major vaccines including measles, mumps, hepatitis A, hepatitis B, chickenpox, meningitis, pneumonia and *Haemophilus influenzae* type b (Hib) bacteria (Slifka and Amanna, 2007). In 1963 Hilleman isolated a strain of mumps from his daughter, Jeryl Lynn, which he used as the starting material for a mumps vaccine that was licensed in 1967. He also partnered with other scientists to develop a measles vaccine in 1968, and a vaccine against rubella in 1969 (Slifka and Amanna 2007).

Vaccines against hepatitis B and hepatitis A followed in 1981 and 1995 during which the vaccines against pneumococcal bacteria and chickenpox were developed. Hilleman originated the idea of combining the measles, mumps, and rubella vaccines into a single injection (i.e., the current MMR vaccine) to reduce the number of injections faced by young children (Slifka and Amanna, 2007). Today there are hexavalent vaccines where one injection delivers vaccines against polio, diphtheria, tetanus, pertussis, hepatitis B, and *haemophilus influenzae* type b (SAVIC, 2011). Medical science has developed vaccines to reduce the spread of infectious diseases, but other infectious diseases for which there are no effective vaccines, such as human immunodeficiency virus (HIV) and malaria continue to cause illness, disability, and death. Scientists are working hard to develop vaccines to protect people from these diseases as well.

2.2 Vaccination success stories

Vaccination has been repeatedly demonstrated in both research trials and in the field, to be one of the most effective medical interventions we have to prevent disease (MacIntyre and Leask, 2003). It is estimated to prevent more than 3 million deaths a year and is expected to prevent even more as more children are protected with newly introduced vaccines (SAVIC, 2010)

2.2.1 Smallpox

Smallpox, a disease caused by the variola virus, used to kill five million people per year, cause blindness and disfigures millions more, with an average case fatality rate of 30% (Ellner, 1998). For more than three thousand years, smallpox was a major scourge of mankind, spreading across the world. The development of the world's first vaccine by Jenner, an English country doctor, and the global immunisation drive by the WHO, resulted in naturally occurring smallpox being eradicated worldwide in 1978 (Fenner et al, 1988). The last naturally occurring case of smallpox occurred in Somalia in 1977 (WHO, 2001). In SA the intensive smallpox vaccination campaign in the endemic areas commenced in the early 1970s, which resulted in 121 smallpox cases in 1970 to 1 case in 1972 being the last reported case in SA (Fenner et al, 1988).

2.2.2 Diphtheria

Diphtheria is an acute infectious disease that spreads by coughing or sneezing. It primarily affects the upper respiratory tract, and is caused by *Corynebacterium diphtheriae*. In the past, diphtheria was considered one of the most serious childhood diseases because it took a heavy toll on health and life among preschool-aged children with ten percent of children with diphtheria dying. Today, diphtheria is responsible for approximately 5,000 deaths per year worldwide (Kane and Lasher, 2002). The introduction of vaccination in 1923 led to a dramatic drop in the number of cases in the industrialised countries where vaccination coverage rates were high (SAVIC).

Due to the decrease in vaccination coverage, major epidemics occurred in Eastern Europe and Central Asia in the late 1980s and early 1990s. In Russia, an epidemic that began in 1990 had by 1995 resulted in approximately 125 000 cases and 4 000 deaths due to a drop in vaccination coverage (Kane and

Lasher, 2002). A defining characteristic of the epidemic was that more than half of all cases occurred in those 15 years of age or older, suggesting that the older generation had either not been vaccinated, or that their protective antibody levels had waned in the absence of booster vaccinations (Galazka and Robertson, 1995).

In developing countries, vaccination of infants with diphtheria vaccine was introduced within the EPI in 1974 leading to coverage of 46% in 1985 to 79% in 1992 (Galazka and Robertson, 1995). In Africa and the rest of the developing world, there were 30 000 cases of diphtheria in the year 2000, with 3 000 fatalities.

2.2.3 Polio

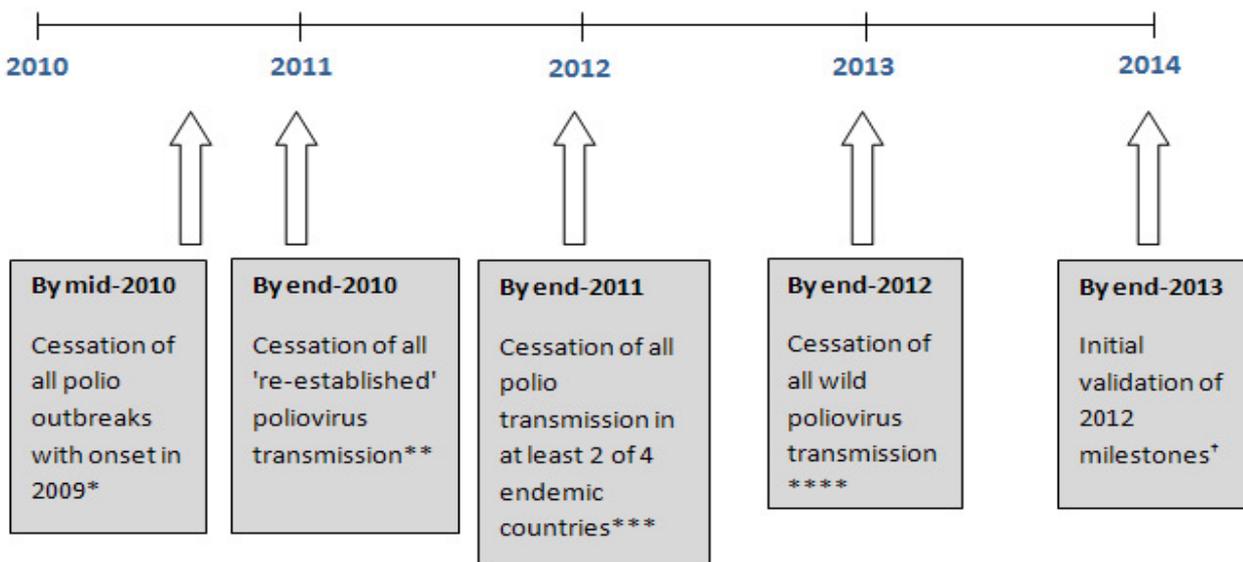
Poliomyelitis, caused by the polio virus, was the leading cause of paralysis in the world, permanently crippling hundreds of thousands of children and adults in the 1940s and 1950s (Kane and Lasher, 2002). The virus is transmitted through contaminated food and water, and multiplies in the intestine, from where it can invade the nervous system. The development of the polio vaccine, and the accelerated global vaccination coverage has dramatically reduced the polio incidence which is expected to be totally eradicated in the near future.

In 1996, polio was uncontrolled in at least 41 African countries resulting in as many as 75 000 African children being paralyzed every year. Since then tremendous progress was made until 2002 in Nigeria where many states were largely polio-free (WHO, 2006). This success of the global effort to eradicate polio was negatively affected when planned polio campaigns for October 2003 were cancelled in a number of key northern states, including the critical state of Kano. This was due in part to local questions and concerns regarding the safety of oral polio vaccine (OPV) used in Nigeria (WHO, 2004). This led to the re-emergence of polio in several of Nigeria's neighboring countries which were previously polio free (WHO, 2010a). Although the target was missed, eradication is very close, with most countries in the world being certified polio-free, except for Afghanistan, India, Nigeria, and Pakistan where polio continues to be endemic, and 19 other countries that were previously polio-free reporting importations from these 4 countries (WHO, 2010).

The last polio case in South Africa was in 1989, and in October 2006 SA was declared Polio Free by the Africa Regional Certification Commission which is a sub-committee of the Global Certification

Commission (DOH, 2007). This does not mean the country is free from the risk of importation of wild polio as there are still cases of polio being reported in the Southern African region (WHO, 2006).

With vaccination, the ultimate objective is the eradication of the disease, and in the short term, to prevent infection. Global efforts toward polio eradication include the establishment of The Global Polio Eradication Initiative by WHO with timelines as outlined in figure 1.



* validated when >6 months without a case genetically linked to a 2009 importation (i.e. by end-2010).
 ** validated when > 12 months without a case genetically linked to the re-established virus (by end-2011).
 *** validated when > 12 months without a case genetically linked to an indigenous virus (by end-2012).
 **** validated when ≥ 12 months without a case genetically linked to an indigenous virus (by end-2013).
 † 'certification will require at least 3 years of zero polio cases in the presence of appropriate surveillance across an entire epidemiologic region.

Figure 1: Polio eradication targets 2010–2013 by The Global Polio Eradication Initiative

(source: Global Polio Eradication Initiative, 2010)

2.2.4 Measles

Measles is an acute, highly infectious disease caused by the measles virus that is transmitted from person to person through large respiratory droplets (Miller and Sentz, 2006). Before the introduction of the measles vaccine the global burden of measles accounted for about 200 million deaths in the past 150 years, taking almost a million lives of children under the age of five each year (WHO, 1994). In 1954, the measles virus was isolated from an 11-year old boy from the USA, and adapted and propagated on chick embryo tissue culture (Miller and Sentz, 2006).

Licensed vaccines to prevent the disease became available in 1963 reducing measles mortality to 250,000–500,000 deaths per year, most of which still occur in sub-Saharan Africa (Miller and Sentz, 2006). In the industrialised world the virus was almost eliminated until 1998, when sub-optimal coverage was brought about by the vaccine scare that was caused by the publication of Wakefield's flawed findings linking MMR vaccine with autism (Godlee et al., 2011). This study was later discredited and disproved, but its effects are still felt throughout the world with vaccination coverage still below the 95% level recommended by the World Health Organization to ensure herd immunity (BMJ Editorial, 2011).

In SA, routine measles vaccination and mass immunization campaigns had achieved much in controlling the disease to the extent that measles was rarely seen. In 2009 there was a major outbreak resulting in 1135 cases increasing from beginning of 2009 to October 2009 (NICD, 2009). The laboratory confirmed cases reached 12082 in 2010 with additional 82 cases in 2011 (NICD, 2011). This is a major setback for measles elimination targets in South Africa.

2.3 Expanded Program on Immunization (EPI)

The EPI was launched in 1974 by the WHO with the goal of making safe and effective vaccines available to all children throughout the world. They established a standardized vaccination schedule for the original EPI vaccines against 6 diseases: BCG (Bacillus Calmette-Guerin, the vaccine against tuberculosis [TB]), DTP (a trivalent vaccine against diphtheria, tetanus, and pertussis), oral polio, and measles. The program has been a phenomenal success - increasing immunisation coverage from less than 5% of all children to about 80% in a span of thirty years (WHO, 2006).

In the last decade a number of countries have included additional vaccines like hepatitis B (Hep B), Hib and yellow fever (in countries where the disease is endemic) into the routine schedule. By the end of 2007 immunization against hepatitis B was offered to infants in 171 of 193 WHO Member States (WHO, 2009). In SA, prior to 1995, the TBVC states, homelands and SA each had their own EPI programme that was not nationally coordinated (Ngcobo, 2008). In 1995 the EPI-SA was formalised, and by April of that same year it included polio, tuberculosis, DTP, HepB, and measles (Baker, 2010). Hib was added in 1999, and in 2009 3 new vaccines were added, namely: the pneumococcal conjugate vaccine, rotavirus vaccine, and the pentavalent vaccine (DTaP-IPV/Hib) which includes the injected

inactivated polio vaccine (SADoH, 2009). The use of these vaccines is expected to significantly reduce child morbidity and mortality throughout the country, with the WHO declaring that (1) neonatal tetanus had been eliminated in SA in 2002, and the country was polio-free in 2006 (Baker, 2010).

2.3.1 EPI vaccination coverage

The current vaccination coverage of 1 year-olds at provincial level is at least 80%; however, the vaccination coverage remains sub-optimal in several districts and sub-districts (Health Systems Trust, 2010). The required level of immunity in populations to prevent epidemics of infectious diseases has been estimated at about 95% and 85% for measles and polio, respectively, with the unvaccinated being protected by the so-called “herd immunity” (Anderson, 1985). However, when a sufficient number of members of a community do not vaccinate, the percentage of immunized individuals can fall below the threshold for herd immunity, which gives the infectious organism a chance to reestablish itself (Field, 2008). For example, recently sub-optimal vaccination coverage in South Africa led to a measles outbreak, with 2510 confirmed cases in 2009, and 24 393 in 2010 (WHO, 2011).

Not vaccinating ones child puts not only the individual child but the entire community at grave risk, including those who have been vaccinated. The risk of disease in vaccinated individuals is because no vaccine (or any other treatment or preventive strategy) is 100% effective, so there will always be a small proportion of the vaccinated population that remains at risk (MacIntyre and Leask, 2003). A number of reasons have been cited for low immunization coverage in SA, especially in rural areas. The reasons vary from poor access to health facilities, poor service delivery and attitudes of health care workers (Madisha, 2007; Ravhengani et al, 2007; Dube and Burnett, 2008; Malatsi et al, 2008; Menziwa and Lewis, 2008). Other major limitations to maximal uptake may include exposure of better educated parents to the global AV messages through the internet and mass media (Saloojee and Bamford, 2006).

These limitations undermine the main objective of the EPI, which is to decrease childhood morbidity and mortality from VPDs. Not ignoring the fact that no vaccination is completely without risk, but certain vaccinations are required in order to prevent outbreaks of contagious diseases, whose costs and risks would be far greater than the costs and risks incurred by vaccinating. In an attempt to support and ensure high EPI vaccination coverage the South African government introduced the Admission Policy For Ordinary Schools as part of the National Education Policy Act, 1996 (No 27 of 1996) Section 16, notice 2432 of 1998, which states: “On application for admission, a parent must show proof that the

learner has been immunized against the following communicable diseases: polio, measles, tuberculosis, diphtheria, tetanus and hepatitis B. If the parent is unable to show proof of immunisation, the principal must advise the parent on having the learner immunised as part of the free primary health care programme” (South African Government Gazette, 1998). Note, however that access to education is not denied if the parent does not comply – all that is required is that the parent must be advised.

2.4 The risks and benefits of vaccination

As the frequency of VPDs has decreased, fewer persons have ever witnessed a child who is severely ill with a VPD. As a result, parents today might perceive a greater risk in having their children vaccinated than in not having them vaccinated (Feikin et al., 2000). In more recent years, there has been a strong focus on the adverse side-effects of vaccinations, particularly in the mass media, and this has led to a drop in the number of people immunising their children (Feikin et al., 2000). This is a contentious issue and one in which the benefit of serious disease prevention has to be weighed up against the possible negative side-effects that some people may experience as a result of some vaccines.

Like most medical treatments, vaccination has benefits and risks. After vaccination, some people experience reactions ranging from mild local reactions to (rare) life-threatening illnesses. In some cases, these reactions are caused by the vaccine; in others, they are caused by an error in the administration of the vaccine; and in others, there is no causal relationship. These medical incidents that take place after vaccination and believed to be caused by the vaccine are commonly referred to as adverse event following immunisation (AEFI). Although modern vaccines are extremely safe, no vaccine is entirely without risk. Parents have to consider the considerable risks of catching the disease not only for the individual child but also for the community. There are often possible serious and permanent complications from the disease, including severe disability and death, and these risks need to be weighed against the possible side effects (which are normally very mild and very rarely serious) and effectiveness of the vaccines (IMAC, 2002).

Whatever the cause, an AEFI may upset the public and lead to refusal of (further) immunization and may lead to some of the misconceptions discussed in section 2.4.1. Thus, each AEFI requires a thorough investigation to establish whether it is caused by the vaccine itself or not related to the vaccine or its administration, whether its occurrence merely coincided with vaccine administration

Table 2.1 An outline of the risks and benefits of vaccination (IMAC, 2002).

IMMUNISATION BENEFITS	IMMUNISATION RISKS
<ul style="list-style-type: none"> • It achieves a similar effect in the immune system (as having the disease) without the suffering and in some cases the risk of long-term damage or death • The so-called 'Natural' process of having the disease involves the painful disease-causing viruses or bacteria, whereas the vaccine uses a harmless form or only part of the harmful form • The immune system cannot be weakened by the disease • The rates of death and complications are much lower than with the disease • If the child does unfortunately contract the disease after vaccination - it will usually be in a milder form • If overall immunisation levels are high enough, epidemics can be prevented - protecting the community as well as the individual • Immunisations are free and designed to be part of a Well Child Check 	<ul style="list-style-type: none"> • Common to most vaccines are 'local reactions' of redness at the injection site and sometimes swelling as well • Possible crying and unsettled behaviour (much less likely now with the newer acellular pertussis vaccine) • Mild fever • 'Fainting' episodes - very rare and always temporary • Anaphylaxis - an extremely rare allergic reaction <p>NB: Well equipped medical centres and trained vaccinators can safely and effectively deal with emergencies like this</p>

2.5 The History of the anti-vaccination lobby

Opposition to vaccination has existed as long as vaccination itself, since the 18th century (Wolfe and Sharp, 2002). Critics of vaccination have taken a variety of positions, including opposition to the smallpox vaccine in Stockholm, Sweden in the mid to late 1800s which led to a drop in vaccination uptake, leading to a major smallpox epidemic (Nelson and Rogers, 1992). In the 1970's claims questioning the efficacy of the pertussis vaccine covered by the media (press and television) caused a scare which led to the pertussis epidemic resulting in some children's deaths. Persistent television and press coverage of Kulenkampf et al article of 1974 ascribing 36 neurological reactions to whole-cell pertussis vaccine interrupted a successful vaccination programme in countries with pertussis-control programmes.

In Sweden, DTP coverage decreased rapidly from 90% in 1974 to 12% in 1979 resulting in the increase of reported cases in subsequent years (Gangarosa et al, 1998). Japan's coverage for infants fell from nearly 80% in 1974 to 10% in 1976 (Gangarosa et al, 1998). In the UK decreasing coverage from 81% in 1974 to 31% in the late 1970's which was followed by Pertussis epidemic (Gangarosa et al, 1998). Ireland Vaccine coverage fell from more than 60% in the early 1970s to 30% after 1976, resulting in epidemics occurring in 1985 and 1989. In the 1980's DTP coverage fell by 30% in the Russian Federation setting the stage for diphtheria and pertussis epidemics (Gangarosa et al, 1998). In Italy Binkin reported that the factors that gave rise to Italy's pertussis dilemma during this period were the attitudes, knowledge, and practices of physician providers (Gangarosa et al, 1998). In most of these studies a striking fall in pertussis incidence followed after the coverage of pertussis vaccine increased (Gangarosa et al, 1998).

The inverse relation between the incidence of vaccine preventable diseases and the coverage of the vaccine against the disease after news reports was also evidenced in the late 1990's. Since the previously discussed publication of the 1998 article by Wakefield et al on the alleged link between the MMR vaccine and autism (Wakefield et al., 1998), sporadic and sustained measles outbreaks have occurred throughout industrialised and non-industrialised countries because of negative mass media coverage of the vaccine . In the UK MMR vaccine uptake fell from over 90% to about 60% leading to 300 cases and three deaths by the end of year 2000 (Amanna and Slifka, 2005; CDC, 2000). In contrast, in the USA the media only began widely reporting on the Wakefield article towards the end of 1999 and during 2000, and most media reports thereafter focused on an Institute of Medicine report that refuted Wakefield's claim (Smith et al., 2008). Consequently

MMR coverage decreased from 92% in 1998 to 90% in 2000, but by 2003 and 2004 it was back to 93% (Smith et al., 2008). This shows that if the mass media publishes information supportive of childhood vaccination the coverage will not be affected as much.

2.5.1 Some common misconceptions about vaccination

Debates in vaccination safety and efficacy have fuelled a wave of criticism of vaccination by different groups of people around the world, so-called anti-vaccination lobbyists (AVLs). AV advocates have argued that vaccines do not work (Howenstine, 2003), that they are or may be dangerous, that individuals should rely on personal hygiene instead, or that mandatory vaccinations violate individual rights or religious principles (Davies et al, 2002, Beattle, 1997). Some of these misconceptions are discussed below.

Vaccines were not responsible for the decline in death rates from infectious disease and offer no protection whatsoever. The claim is made that diseases had already begun to disappear before vaccines because of improved nutrition, sanitation, housing etc. (Wolfe et al, 2002). It is certainly true to say that many infectious diseases started to disappear long before the advent of either vaccines or antibiotics, as a direct result of improved living conditions. However, those illnesses targeted by vaccination continued to show peaks of incidence, with the real sustained drop in incidence only occurring after the introduction and widespread use of vaccination. Smallpox, for example, was eliminated by a sustained and intensive vaccination program (Fenner et al, 1998).

Most people who get diseases are those who have been vaccinated. This applies mainly to industrialised populations and is certainly true, since most people in these populations have been vaccinated. However, if you develop a vaccine-preventable disease and you have been immunised, the severity of the disease and its long-term complications are greatly reduced (Miller and Sentz, 2006). Most vaccines are not 100% effective, so there will always be a small percentage of those who are vaccinated who may develop the disease if exposed to the causative agent. For example, the hepatitis B vaccine is 90% effective, so 10% of the population are still at risk for HBV infection despite being vaccinated.

Then there are some vaccines which do not prevent one getting the infection, but prevent severe disease – the TB vaccine is a case in point. Some vaccines need one to have booster shots after several years

to remain protected. For example tetanus vaccine has efficacy ranging between 80% and 100%, and to maintain these protective levels a booster dose is needed every 10 ten years (MacIntyre and Leask, 2003).

Vaccines are unnecessary and are simply a way for pharmaceutical companies to make money. This statement originates from conspiracy theorists who are convinced of the bad intentions of the pharmaceutical industry (Wolfe et al, 2002). However, logic suggests that pharmaceutical companies stand to earn far more money if people fall ill, not if they are prevented from doing so (Bloom et al., 2005).

Vaccines are biological poisons, harmful to health, and a contributing factor in childhood illness. One of the biggest myths that the AVL use to instill fear of vaccines, is the concept that they are full of “toxins” that cause harm (MacIntyre and Leask, 2003). The myth that mercury in the thimerosal preservative commonly used in vaccines until early 2002 was a major cause of autism is not based on any scientific evidence, but is simply the most recent ploy used by AVLs to argue that vaccines do more harm than good. However there is currently no evidence of toxicity from mercury contained in vaccines with thimerosal neither any link between thimerosal and autism (Offit et al, 2003; Gerber and Offit 2009).

There are several forms of mercury occurring in the environment, with the most common organic mercury compound being methyl mercury. Methyl mercury accumulates in the body and remains there for a long time as a toxin. However the form of mercury found in thimerosal is ethyl mercury which does not accumulate and is metabolized and removed from the body much faster than is methyl mercury. As most humans are exposed to mercury in some form (infants are exposed to methyl mercury in water, infant formula, and breast milk [Offit et al., 2003]) , the WHO and some national regulatory authorities defined safe levels for exposure to mercury and the values reflect exposure mainly to methyl mercury. As a precaution since most of the infant vaccines contained thimerosal in the 1990s, and there was concern that 6 month-old infants could already have received as much as 187.5 µg of mercury through vaccinations (Gerber and Offit, 2009), WHO decided to discontinue the use of thimerosal in single dose vaccines. In the EPI-SA, only the multidose Hep B vaccine (Engerix) may contain traces of thimerosal (referred as Thiomersal in SA) low enough to claim free (DOH, 2008).

MMR vaccine causes autism. The 1998 study of Andrew Wakefield published in the Lancet journal as fully discussed above, caused a massive drop in the number of parents taking their children for their MMR shot (Guillaume and Bath, 2004). Since then, the WHO and various other authors have conducted a variety of studies and have been unable to establish a link between autism and MMR. These studies have been conducted on large samples consisting of thousands of children, compared to the Wakefield study which was conducted on a sample of only 12 children (Zimmerman et al, 2005). In one large-scale study conducted in Sweden, incidence of autism was actually found to be higher in the non-vaccinated group (Gerber and Offit, 2009). It was these studies that disproved Wakefield's study, subsequently leading to the Lancet retracting this paper (Lancet, 2010).

Towards the end of the 20th century, a wave of AV activity sparked by the MMR controversy led to an increase in media interest in the arguments attacking childhood vaccinations. Differences between vaccine criticism of today and the past are principally a matter of degree (Zimmerman et al, 2005). There are now more vaccines and therefore more available to criticize. Secondly, there are many more resources for dissemination of health information and misinformation, including television (TV), radio, and the internet.

2.5.2 Mass media and the AVL

A number of AV views have been published in the mass media, suggesting the great importance of mass media in the dissemination of AVL messages (Guillaume and Bath, 2004). Mass media denotes a section of the media specifically designed to reach a very large audience such as the population of a nation. Mass media, which comprises radio, TV, newspapers, magazines, and the internet, is already being used as an important vehicle for dissemination of health information to the public, and can be of great benefit to the public (Guillaume and Bath, 2004). However, negative mass media messages can also do a great deal of harm. For example, a recent study on internet-based vaccine criticism revealed that those countries with concerted AV campaigns published in contemporary news stories had significantly higher incidence of pertussis (whooping cough) compared with countries with few or no media reports on alleged vaccine adverse events (Zimmerman et al, 2005).

Mass media messages are often not consistent. However, it has been shown that parents consider the trustworthiness of the information source to be an important factor, which would help in decision making (Guillaume and Bath, 2004), thus there is a need to evaluate these vaccination sites to determine

if their information is valid. For example, a content analysis of mass media coverage of the MMR vaccine scare, showed that the content and the format of articles varied widely between sources, which presented a challenge to parents using these information sources to make decisions on whether to vaccinate their children or not (Guillaume and Bath, 2008). Recent studies on the Great Britain and North America indicate that there is a wide range of antivaccinationists using mass media ranging from a few who express conspiracy theories, to educated, well informed consumers of health care, and people with deeply held beliefs, often of a spiritual or philosophical nature, but presenting arguments similar to those of the 19th century (Wolfe and Sharp, 2002).

2.5.3 Anti-vaccination lobbying on the worldwide web

AVLs are highly visible on the internet, presenting arguments remarkably similar to those of the 19th century (Davies et al., 2002). The internet, as the newest electronic news medium, has the potential to influence perceptions about vaccines because it is the fastest growing source of consumer health information (Fox, 2006). Recent studies indicate that 66% of US adults (137 million) are now online and that 80% of all adults online use the internet to look for health information (Fox, 2006). In SA, Statistics SA (STATSA) indicated that in 2009 only 11.1% of homes/households had access to the internet (STATSA, 2010). However, this figure may have increased rapidly with the introduction of mobile internet access on mobile phones. The increase in mobile phone subscriptions was estimated at 364% from 2001 to 2007 (STATSA, 2010) in the SA population, which is evidence of the vulnerability of the population to internet misinformation dissemination.

The AVL has already taken advantage of the internet and its ability to reach parents seeking information on vaccines and vaccine safety. Parents can find this misinformation with just a few key strokes. Two studies, conducted from 1999 to 2001, provide some insight into the AVL on the internet, describing the content and design attributes of AV websites, and AV philosophies. Their findings indicate that the most common content is the claims that vaccines cause idiopathic illness and erode immunity, and vaccination policies are motivated by profit. The most common design attributes were the presence of links to other AV sites, information for legally avoiding immunizations in the USA, and the use of emotionally charged stories of children who had allegedly been injured or killed by vaccines (Wolfe et al, 2002; Davies et al, 2002). Many of the websites have been set up by parents of children with autism, but there are also websites set up by people with vested interests in discrediting the vaccine industry for monetary gain. These include websites that promote alternative medicine or private clinics selling separate

vaccines for cash as alternatives to MMR vaccine. In his book “MMR and Autism” Fitzpatrick states that a range of private doctors and entrepreneurs who eagerly met the demand for separate vaccines resulting from the MMR scare profited handsomely from the anti-MMR campaign, with the proprietors of these clinics emerging as some of the most ardent supporters of Dr Wakefield's crusade (Fitzpatrick, 2005).

While several studies have been conducted on internet-based AV lobbying in the past 11 years (Nasir, 2000; Davies et al, 2002; Wolfe et al, 2002; Zimmerman et al, 2005; Kata, 2010; Bean, 2011), none of them identified South African-based AV websites. Thus clearly SA is still in the process of catching up with global trends regarding internet-based AV lobbying. While the internet has provided the AVL with unprecedented opportunities for exposure, studies that analyse these AVL sites to determine the basis of their claims can be used to develop interventions to counter the AVL, and provide the public with trustworthy information.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter addresses resources and materials used to achieve the objectives of the study. The sections of this chapter include the study design, sampling and methods used to analyse data collected.

3.2 Research Design

This was a retrospective exploratory and descriptive study, seeking to characterise the internet-based AVL in SA. It explored using qualitative methods, and described using quantitative methods.

3.3 Study Setting

South Africa is a country with an estimated population of 49.99 million. The number of Internet users per 1000 inhabitants increased from 83 in 2007 to 11.1 in 2009 (STATS SA, 2010). Although there are about 120 internet service providers in South Africa, access to the internet is still restricted to some geographic locations and segments of society (STATS SA, 2007). Estimation on the number of people accessing the internet to seek health related information is not available yet.

3.3.1 Pilot phase to select search terms for sampling websites

The aim of the pilot study was to identify common search terms that would be most appropriate to use in the search for AV websites, blogs, proponents, sponsors and messages on the web. A structured internet search was conducted using the top 3 most popular search engines according to Search Engine Watch (SEW, 2009), namely Google, Yahoo and MSN, limiting the search only to SA pages. The search was limited to SA web pages by specifying “limit to country South Africa” in the search criteria of each search engine using specific search terms.

Specific search terms were determined during the pilot phase, where an initial search was done using ‘vaccination’, ‘immunisation’ and ‘immunization’ to identify common terms used in websites containing messages or articles against childhood vaccination. Initial data from the pilot phase for each search engine were collected and saved as web page previews. The content of these initial search web page previews was scanned for AV messages. Within these messages specific common terms were identified as keywords that could be used to limit the search results to sites with AV messages and fewer sites with pro-vaccination messages.

The identified keywords were then used for the main study search. These included but were not limited to “don’t vaccinate”, "vaccination is harmful", "should not vaccinate", “not vaccinating”, “vaccination causes harm”, “against vaccine”, etc. The words “immunization” and “immunisation” were also substituted for the word “vaccination”, and “immunize” and “immunise” were substituted for the word “vaccinate” in these searches. The common search terms identified were captured on Microsoft Excel 2007 (Microsoft Office).

3.4 Inclusion / exclusion criteria

Inclusion criteria: Search results using the keywords listed in table 4.1 containing content specifically on human childhood vaccination were included. The study was limited to English language websites, and only SA websites with content referring to childhood vaccination were included. Exclusion criteria: All other language content other than English was excluded. Search results of websites last updated prior to 1998 were also excluded. Websites with content on vaccines outside of childhood vaccination were excluded. Using the advanced search the word ‘Animal’ was marked as an unwanted word, thus excluding any pages that contain the word ‘Animal’. In addition to this any other website referring to non-human vaccinations were discarded.

3.5 Data Collection

The identified search terms listed in table 4.1 were used for the main study to search for AV messages from SA websites last updated from 1998 to 2009. Data collection was done per search term across the three search engines namely Google, Yahoo, and MSN on dates as depicted in table 3.1. The content of each website was accessed from the MHTML files using the ‘cached’ prompt where available or the original web page. The unique resource locator (URL) which is the web address of the article was copied and entered into an Excel spreadsheet against its related search engine and search term. This data was exported from Excel spreadsheet into Access database for further analysis.

These web addresses were accessed and the content was evaluated to determine those that meet the inclusion criteria. Each website was tagged for inclusion or exclusion based on the article content evaluated according to the inclusion and exclusion criteria. Articles from web pages identified as meeting the inclusion criteria and containing AV messages were saved and downloaded as HTML file formats for further content analysis, categorization and coding for each objective, as detailed below.

Table 3.1: Search dates per search term for Google, Yahoo, and MSN search engines

Keyword search	Search Date
“don’t vaccinate”	20/02/2010
“do not vaccinate”	20/02/2010
“vaccine scare”	20/02/2010
“vaccination is harmful”	20/02/2010
“should not vaccinate”	22/03/2010
“reasons for not vaccinating”	23/02/2010
“vaccination causes harm”	23/02/2010
“vaccines are a danger”	23/02/2010
“vaccine injured”	27/01/2010
“vaccines are toxic”	23/02/2010
“don’t immunise”	23/02/2010
“don’t immunize”	23/02/2010
“do not immunise”	23/02/2010
“do not immunize”	23/02/2010
“immunisation is harmful”	20/02/2010
“not immunising”	23/02/2010
“not immunizing”	23/02/2010

3.5.1 To quantify internet coverage of AVL views

The web search results for each search engine per search term were saved as MHTML file types for further analysis. The exclusion and inclusion criteria were applied to ensure that only data specific to vaccinations forming part of childhood vaccinations were collected. The websites with AV message articles were identified and downloaded as HTML file formats. The URL of each of the AV websites identified was entered into an Excel spreadsheet and saved as a table.

3.5.2 To identify the most utilised website and blog by the AVL

Where the number of hits was not displayed on the web page an email enquiry was sent to the website administrators, requesting them to provide the number of hits to each of the identified AV websites (Appendix A). Blog sites and forum sites (group messaging) were identified amongst the AVL websites. Within each posted AV topic in a blog or forum contributors were classified according to their views towards childhood immunization. Contributors whose views were anti-vaccination were classified as ‘against’, and those pro-vaccination ‘in favour’, and those who neither are for or against as ‘not sure’.

3.5.3 To identify sponsors of the internet-based SA AVL

Each identified AV website was perused for any indication of sponsorship of the website (links to retail outlets, advertisements on site, etc). The website owners and article authors on these sites were assessed by using the ‘about us’ option on the websites, searching on Google, and sending enquiry emails to the website emails as displayed on ‘contact us’ link to ascertain if they belonged to any organizations. Data on promotion of products displayed on the AV websites were collected by recording the products being advertised, the name of the company and the online shop web address. The names of the sponsor, company name, and the products being sold on online shop were recorded in a table alongside the website name.

3.5.4 To identify the individuals / groups / organisations who make up the SA internet-based AVL

The names and categories (parent, naturopath, homeopath, entrepreneur, etc) of contributors to AV messages were collected from websites where these were available. Where not available these were searched on Google to determine who they were and also by using the “about the author”, “about us” or “contact us” links on the websites. People who make up the AVL groups using the SA internet were identified using the personal descriptions displayed in the article. For the blogs and forums, data on self-identification was collected. For example if a blogger identified herself as a mother of a newborn, this was taken to be true.

3.5.5 To describe the main concerns raised by the SA internet-based AVL

The collection of the concerns involved verbatim quotes of statements expressed in the articles and topics. For each concern a typical verbatim statement was recorded and the specific website was recorded.

3.6 Data analysis

Quantitative data analysis was done hierarchically within each search engine. This was done by initially eliminating websites appearing more than ones within search terms per search engine, and then removing these within a search engine as a whole. Web pages with exact web address (URL) referring to the same article, appearing more than once within each search engine were identified. These were discarded to allow for the web page to be counted once. This process of elimination at different levels is explained in section 4.3.

Qualitative data analysis was done once all the duplicates were eliminated within all levels of the hierarchy. All data was captured on a Microsoft Excel spreadsheet and imported into MS Access database.

3.6.1 To quantify internet coverage of AVL views

The number of hits per search term on each search engine meeting the inclusion criteria were counted using Ms Excel Pivot tables and saved on an Excel spreadsheet. Each website content was analysed for anti-vaccination messages and those identified to have anti-vaccination messages were counted per search engine. The percentage of vaccination sites that were AV were calculated using the following:

- The denominator was based on the number of website included as described under the inclusion criteria section 3.5.
- The numerator was based on the number of AV websites identified as described under section 3.6.1.

The coverage of AVL views was determined at search engine level first using data in table 4.3. Each of the included websites per search engine were analysed for AV messages and those identified to contain AV messages were counted per search engine.

To determine the overall AVL coverage, the overlapping websites across search engines from table 4.3 where some websites were found in more than one search engine were discarded. The identified AVL

websites and the name of the article/topic posted were recorded on Microsoft Excel 2007. The search terms that yielded the most AVL websites were identified.

3.6.2 To identify the most utilised website and blog by the AVL

To determine the most utilized AV websites we measured the frequency of AVL websites usage in two ways.

3.6.2.1 To identify the most utilized website

The website with the most number of hits as determined through email responses as described in section 3.6.2 would give the most utilized website.

3.6.2.2 To identify the most utilized blog and forum

For each blog and forum data as collected in section 3.6.2 the numbers of AV contributions were determined, and these figures were compared to ascertain which one had the greatest number of AV contributors. Within each blog and forum topic posted the number of contributors was counted and recorded on Excel. The number of contributors against childhood immunization versus those supporting childhood immunization within each blog and forum AVL topic posted were determined.

3.6.3 To identify sponsors of the internet-based SA AVL

Since data on the sponsors of the identified AVL sites was not available, this objective was not met. However, one may assume that the sites having an online shopping option are being sponsored by the manufacturers or suppliers of the products, or the owners of the online shops. Therefore AV websites with online shopping were counted and the types of products being sold were identified.

3.6.4 To identify the individuals/groups/organisations who make up the SA internet-based AVL

The AV advocates as described in section 3.6.4 were divided into parents, physicians, journalists, and business people. The frequency distribution and total number of identified AV advocates were counted across all websites, blogs, and forums. The findings about the authors were grouped and counted using Ms Excel 2007.

3.6.5 To describe the main concerns raised by the SA internet-based AVL

Content analysis of text on AVL websites / blogs / fora was done to extract the concerns raised by the identified anti-vaccination advocates. Verbatim comments against child immunization were collected and placed into one of the 7 identified categories identified (refer to section 4.2.4 in Chapter 4). Each verbatim comment quoted may fall into more than one of the categories. The categorization was done by two readers and the % agreement between the two readers was calculated using the kappa statistic. To rank the concerns raised the frequency distribution of all categories of concerns was counted and recorded into an Excel spreadsheet.

3.7 Limitations

Non-English data was not reviewed, which will limit the ability to generalize the results to all South Africans. The website results are not all reproducible as the websites are continuously changing and updated with new information and blogs are generated and added to continuously. Identification of the AVs and individuals may not be a true reflection as it was not possible to verify these.

3.8 Reliability and Validity

To ensure reliability and validity of data, collection methods were piloted using different search engines and search words in order to determine which search engine and search terms are the best. More than one search engine was used to ensure that most AV content was found.

To ensure reliability, 60% (38/63) of the articles from the websites originally selected before categorization, were subjected to reliability testing. An independent expert categorised the articles as well as the researcher to determine which of the included sites contained AV views, and the results were then entered into a 2x2 table (shown in Table 4.1 in Chapter 4) and compared using the kappa statistic. A consensus was reached between the two readers for any discrepancies.

3.9 Ethical considerations

Ethical approval was sought with the Medunsa Research Ethics Committee (MREC) and was received on November 26, 2009 (MREC/PH/176/2009: PG) See Annexure A.

CHAPTER 4: RESULTS

4.1 Introduction

The characteristics of internet based AVL in SA were investigated through a systematic internet search of websites and blogs. This section first presents the results of the pilot phase, which aimed to identify common search terms to be used during the main study as outlined in section 3.4. Following this, the main study results are presented to directly address each objective as outlined in section 1.3.2.

4.2 Pilot study

The common search terms identified are depicted in Table 4.1.

Table 4.1: A List of Common Search terms identified during the Pilot phase

Keyword search
“don’t vaccinate”
“do not vaccinate”
“vaccine scare”
“vaccination is harmful”
“should not vaccinate”
“reasons for not vaccinating”
“vaccination causes harm”
“vaccines are a danger”
“vaccine injured”
“vaccines are toxic”
“don’t immunise”
“don’t immunize”
“do not immunise”
“do not immunize”
“immunisation is harmful”
“not immunising”
“not immunizing”

4.3 Main Study

This section presents internet search results of the main study using common search terms that were established during the pilot phase as listed in Table 4.1. The search was done across the three search engines namely Google, Yahoo, and MSN on the same dates for each search term as depicted in Table 3.1. The outcome of the elimination of duplicate websites per search engine is presented, followed by the presentation of AVL website analysis for each study objective.

4.3.1 Process of elimination

The number of hits for all search terms before excluding websites being identified more than once and irrelevant websites was 238 as displayed in Table 4.2. Some of the search terms did not return any results for specific search engines. For example, “don’t immunize” returned 7 and 2 hits for Google and Yahoo respectively, and no results for MSN (Table 4.2). Out of 238 hits 129 of the website articles were irrelevant since they referred to immunization of non-humans, or vaccinations that are not part of the SA EPI. Eliminating these and identifying website articles referring to childhood immunization forming part of the SA EPI , the inclusions column for each search engine per search term shows the total number of websites eligible for further analysis (see Table 4.2).

Some website articles contained more than 1 of the search terms, thus resulting in the same website being identified more than once. Note that the total (N=109) in Table 4.2 includes these websites that were counted more than once under different search terms. To determine the total per search engine, the search term results were combined and duplicates discarded within each search engine reducing the included websites to 90 websites (Table 4.5). Appendix B is a list of all website addresses per search engine displaying some websites being identified more than once remaining across search engines.

Discarding the overlapping websites across search engines from Table 4.5 resulted in the overall inclusions being reduced from 90 to 63 websites (Table 4.6).

4.3.2 Identification of AV sites

To ensure reliability, the first 60% (38/63) of the websites were independently categorised into AV / not AV by both the researcher and an independent expert. These results are shown in Table 4.3. The kappa statistic was 0.74, which is interpreted as very good agreement (Dawson and Trapp, 2004). The 5

articles that were in disagreement were then reviewed jointly by the two readers and a consensus was reached to give a 100% agreement ($\kappa = 1$) (see Table 4.4). Thereafter the researcher categorised the rest of the articles on her own, and identified 3 more AV websites. These were sent to the independent expert who confirmed that they were AV.

Table 4.2: Number of hits per search term for each search engine

Search Term	GOOGLE		MSN-Bing		YAHOO		Total	
	All	Inclusions*	All	Inclusions*	All	Inclusions*	All	Inclusions*
do not immunise	11	6	7	4	6	4	24	14
do not immunize	3	1	3	2	2	1	8	4
do not vaccinate	20	4	8	1	30	7	58	12
don't immunise	2	0	0	0	0	0	2	0
don't immunize	7	0	0	0	2	1	9	1
don't vaccinate	14	11	6	6	11	5	31	22
immunisation is harmful	2	1	0	0	0	0	2	1
not immunising	12	9	7	6	9	7	28	22
not immunizing	1	1	0	0	1	1	2	2
reasons for not vaccinating	3	3	3	2	3	2	9	7
should not vaccinate	10	0	0	0	6	1	16	1
vaccination is harmful	2	0	0	0	3	0	5	0
vaccine injured	15	10	2	0	8	4	25	14
vaccine scare	6	1	4	2	6	5	16	8
vaccines are toxic	2	0	1	1	0	0	3	1
Total	110	47	41	24	87	38	238	109

* All sites meeting the inclusion criteria including duplicates within each search engine

Table 4.3: Inter-rater agreement before consensus was reached

	Researcher		Total
	AV	Not AV	
Independent expert			
AV	16	1	17
Not AV	4	17	21
Total	20	18	38

Table 4.4: Inter-rater agreement after consensus was reached

	Researcher		Total
	AV	Not AV	
Independent expert	17	0	17
AV	17	0	17
Not AV	0	21	21
Total	17	21	38

Table 4.5: Search engine website count

Search Engine	Inclusions	Inclusions (duplicates discarded)*	AV sites
GOOGLE	47	41	16
MSN-Bing	24	19	2
YAHOO	38	30	9
Total	109	90	27

*Unique URLs per search engine

(i.e. Duplicates discarded within search engine but some duplicate websites still exists across search engines)

4.3.3 The internet coverage of AV views in SA websites

The total number of AV websites per search engine is presented in column ‘AV site’ in Table 4.5. The search engine that identified the most AV sites was Google followed by Yahoo and MSN respectively (see fig2).

After discarding the overlapping websites across search engines from Table 4.3, the AV sites reduced from 27 to 19 (see Table 4.6) giving the overall AV coverage (based on search keywords) of 30.2% (19/63). The identified AV websites and the name of the article/topic posted are found in Table 4.7.

The keywords that identified most of the AV sites were “vaccine injured” which identified 42.1% (8/19) AV sites, and “don’t vaccinate” which identified 31.6% (6/19) of the AV sites.

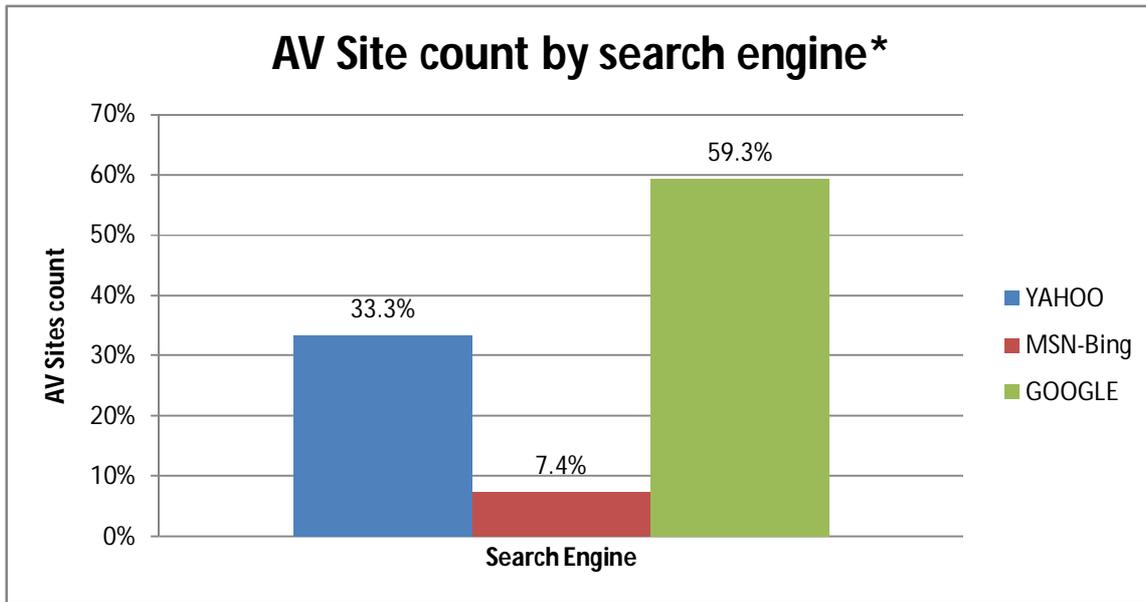


Figure 2: AV site count per search engine

Table 4.6: Search Engine overlap of AV sites

Search Engine Overlap	Website count	AV site Count
GOOGLE/YAHOO	7	5
GOOGLE	20	9
MSN-Bing/GOOGLE	6	0
YAHOO	17	3
MSN-Bing	6	0
GOOGLE/MSN-Bing/YAHOO	7	2
Grand Total	63	19

4.3.4 The most utilised website and blog / forum by the AVL

4.3.4.1 Websites (n=11)

Only one website had the number of hits available on the website, displaying 303 hits as of the 20th January 2011 from 29 October 2009, for the article 'Harms of Vaccine-Time to start talking!!'

(http://samuslims.co.za/index.php?option=com_content&view=article&id=67:harms-of-vaccine-time-to-start-talking&catid=53:vaccine-dangers&Itemid=72). Seven of the other 10 AV websites had contact details, and enquiries about the number of hits were sent to these sites. Only one (1) response was received, giving 57 hits as of the 28th January 2011 for the article ‘and still more on the vaccination’ (www.hayesfamily.co.za/blog/?p=1187) which was published on 11 March 2008. All the other website enquiries were not successful, and therefore it was not possible to establish the most utilized AV website.

4.3.4.2 Blogs and forums (n=8)

Of the 19 AVL websites, 8 (42.1%) were identified to be journal entries or discussion sites where comments on the posted article were entered as contributions to the topic referred to as blog or forum (Table 4.7). In determining the most utilized blog both the blog and forum sites were classified as blogs. Each blog site displaying an AV topic is presented in Table 4.7. A total number of contributors who made comments against childhood vaccination were counted against those who did not for each AV topic of the 8 blogs as presented in Table 4.8. Of the identified blog sites 50% (4/8) did not attract discussions on the posted AV topic, only the original author of the AV topic is the contributor on the topic giving total contributor of 1 (see Table 4.8).

Other blogs had a number of replies and comments from 4 to 47 contributors as compared to those that had only one contributor. AV views in blogs with more than one contributor ranged between 11% (5/44) to 25% (1/4), with an average of 20% (13/64), compared to 36% (23/64) who support vaccination, with the rest (44% [28/64]) being undecided. The most popular topic was “Much ado about measles News24 MyNews24 Letters” (<http://www.news24.com/MyNews24/Letters/Much-ado-about-measles-20091016>). The 4 blogs that only had the author of the topic being the contributor were posted a long time before data collection, with the oldest topic posted on the 16 November 2007 and the most current posted on the 27 January 2009. The AV topic that attracted most contributors was posted on the 16 October 2009, while the latest one was posted on the 30 January 2009 (Table 4.8).

Table 4.7: AV Web URLs with article name

Web Category	Website (N=19)	Article name
Blog1	www.hayesfamily.co.za/blog/?p=1187	and still more on vaccinations
Blog2	http://forum.pampers.co.za/viewtopic.php?p=374549&sid=12adadd4e652f0a472690920abae5b04	Anyone here not vaccinate?
Article	en.wikipedia.org/wiki/Barbara_Loe_Fisher	Barbara Loe Fisher
Online shop	http://www.wantitall.co.za/Don-t-Vaccinate-Before-You-Educate__0967044421	Don't Vaccinate Before You Educate - - WantItAll_co_za
Article	http://samuslims.co.za/index.php?option=com_content&view=article&id=67:harms-of-vaccine-time-to-start-talking&catid=53:vaccine-dangers&Itemid=72	Harms of Vaccine-Time to start talking!!
Blog3	health.groups.yahoo.com/group/ffabsa/message/299?...&l=1	Compulsory Vaccination - November 16, 2005
Blog4	http://www.cornesmith.com/content/blog-comment-re-mercury-vaccines-was-replaced-something-even-more-toxic	Mercury In Vaccines Was Replaced With Something Even MORE Toxic
Blog5	http://www.news24.com/MyNews24/Letters/Much-ado-about-measles-20091016	Much ado about measles News24 MyNews24 Letters
Article	http://www.biobaba.co.za/index.php?route=information/information&information_id=10	Natural Pregnancy - Vaccination choices
Article	http://www.womenattalk.co.za/index.php?option=com_content&task=view&id=24&Itemid=24	Previous topic: Immunisations: do I or don't I?
Article	http://yoursmile.co.za/mercury-toxicity-mainmenu-76/63-thimerosal-and-autism-goes-to-court.html	Thimerosal and Autism goes to court
Blog6	http://www.mg.co.za/article/2008-08-05-to-vaccinate-or	To vaccinate or ___ - Mail & Guardian Online
Article	http://winning.co.za/vaccination.htm	Vaccination Myths
Article	http://www.themercury.co.za/index.php?fSectionId=284&fArticleId=3250813	Vaccinations: friend or foe?
Blog7	http://www.boerevryheid.co.za/forums/showthread.php?t=10512	Vaccine Awakening
Blog8	http://www.cheeseslave.com/vaccines-responsible-for-the-decline-of-mortality/	Vaccines — responsible for the decline of mortality?
Online shop	http://www.wantitall.co.za/Vaccine-Update-2009-Are-Vaccines-Safe__B002ON3EOA	Vaccine-Update-2009-Are-Vaccines-Safe
Online shop	http://www2.loot.co.za/shop/product.jsp?lsn=0979020514	White Lies - A Tale of Babies, Vaccines, and Deception
Article	http://www.healthycells.co.za/articles.asp?id=35	Who Decides What Drugs Are Forced on Children?

Table 4.8: Distribution of comments per Blog

Topic	Date of Topic	Coding	Against (n)	In Favour (n)	Neither (n)	Total Contributors	%AV (Against/Total Contributors) X 100
and still more on vaccinations	11 March 2008	Blog1	1	2	1	4	25%
Anyone here not vaccinate?	30 Jan 2009	Blog2	2	8	0	10	20%
Compulsory Vaccination - November 16, 2005	16 November 2005	Blog3	1	0	1	2	50%
Mercury In Vaccines Was Replaced With Something Even MORE Toxic	27 January 2009	Blog4	1	0	0	1	100%
Much ado about measles News24 MyNews24 Letters	16 October 2009	Blog5	5	13	26	44	11%
To vaccinate or ___ - Mail & Guardian Online	05 August 2008	Blog6	1	0	0	1	100%
Vaccine Awakening	20 November 2007	Blog7	1	0	0	1	100%
Vaccines — responsible for the decline of mortality?	16 November 2007	Blog8	1	0	0	1	100%
		Total	13	23	28	64	20%
		%	20%	36%	44%	100%	

4.3.5 Sponsors of the internet-based SA AVL

Only one out of 19 identified AV sites responded to the enquiry about sponsorship. All other internet searches failed to yield any results to answer the question ‘who are the sponsors of the internet-based AVL in SA?’ Since data on the sponsors of the identified AV sites were not available, this objective was not met. However, one may assume that the sites having an online shopping option are being sponsored by the manufacturers or suppliers of the products, or the owners of the online shops. Of the 19 AV websites 26% (5/19) displayed links to products to be sold online. Table 4.9 is an account of links and products being advertised and sold on the AV sites.

The links and the data in Table 4.9 presents websites with online shopping, with 4 of the 5 promoting what they refer to as natural products as alternatives to vaccination. An extract from one of the websites is quoted below:

- “There are homeopathic kits available for disease prevention. [43] Homeopathic remedies can also be taken only during times of increased risk (outbreaks, traveling, etc.), and have proven highly effective in such instances. And since these remedies have no toxic components, they have no side effects. In addition, homeopathy has been effective in reversing some of the disability caused by vaccine reactions, as well as many other chronic conditions with which allopathic medicine has had little success.” (<http://winning.co.za/vaccination.htm>).
- The 5th site (<http://yoursmile.co.za/mercury-toxicity-mainmenu-76/63-thimerosal-and-autism-goes-to-court.html>) is a link from the home page of “Cape Town Smile Studios” (<http://yoursmile.co.za/home-mainmenu-1.html>), which advertises a dental clinic and promotes a book on the dangers of mercury in dentistry, authored by Dr Visser, the dentist at this clinic. The link from the home page is entitled “Thimerosal and autism goes to court”, where the MMR vaccine is being blamed for causing autism, and this site has links to online shopping for natural products. For example, there is a hyperlink via the words “nutritional type” to <http://products.mercola.com/nutritional-typing/>, which sells a diet programme based on “nutritional typing” developed by the same Dr Mercola who sponsors a number of other AV websites identified in this study.

Table 4.9: AV Website with Online Shopping

AV Website URL	Products	Name of Company/Shop	Company/Shop Web Address
http://www.cornesmith.com/content/blog-comment-re-mercury-vaccines-was-replaced-something-even-more-toxic	Dr Mercola site with online shopping. Natural Health Products	Mercola.com	www.mercola.com
http://www.biobaba.co.za/index.php?route=information/information&information_id=10	Bio-Baba Super-Slim Bio-Broek - nappies for those with special needs Mattress & Cot Protectors Booster Packs Natural Baby Products Moltex Nappies	Bio-Baba	http://www.biobaba.co.za
http://yoursmile.co.za/mercury-toxicity-mainmenu-76/63-thimerosal-and-autism-goes-to-court.html	Book - The big dental lie Dental clinic	Cape Town Smile Studios	http://yoursmile.co.za/home-mainmenu-1.html
	Nutritional Type products	Mercola.com	http://products.mercola.com/nutritional-typing/
http://winning.co.za/vaccination.htm	Natures Healing power. Detoxing products (CitraDetox); All natural alternative to antibiotics (Colloidal Silver)	Winning Performance	http://www.winning.co.za/herbs/products.htm
http://www.healthycells.co.za/articles.asp?id=35	Alternative, Natural healing and glyconutrients e.g Immuno Xcell	Healthy Cells	http://www.healthycells.co.za/

4.3.6 AV advocates using SA internet-based media

The study identified two types of vaccine advocates: those opposed to all vaccination, and those who are not entirely AV but avoid some aspects of vaccination. For example, some advocate avoiding what they perceive as too much vaccination by considering delaying vaccination of their children as an option, whereas some are totally opposed to vaccinating their children. The two statements below demonstrate this:

- “Yes, Please Do send me information about vaccinations. We have a 6 month old, and have not vaccinated him yet. We are going to wait until hes 2 before we do so. And even then go very slowly, make sure hes not sick on the days of the vaccinations, etc...thanks for the info” (www.hayesfamily.co.za/blog/?p=1187). This is a statement by a contributor identified as Dave requesting more information about the dangers of vaccination.
- “Yup, ladies! That is why we don't vaccinate! We'd rather be safe than sorry!” is a statement by contributor identified as Anelle_R. The same contributor also declares that she is “not anti-vaccinations, BUT I am for INFORMED choice” within the same AV classified topic. <http://forum.pampers.co.za/viewtopic.php?p=374549&sid=12adadd4e652f0a472690920abae5b04>)

There were 32% (6/19) of the authors who referenced or posted articles written by other AV lobbyists from other non-SA links (see Table 4.10).

Two (2) AV site article authors were unknown, with one being an article from Wikipedia, and the other a blogger named Henry with no further identifier. There were 16% (3/19) online shopping sites displaying books with AV content and reviews of the books posted on the site (http://www.wantitall.co.za/Don-t-Vaccinate-Before-You-Educate__0967044421;
http://www.wantitall.co.za/Vaccine-Update-2009-Are-Vaccines-Safe__B002ON3EOA;

<http://www2.loot.co.za/shop/product.jsp?lsn=0979020514>). The book reviewer was not identified for all the 3 online shop sites.

Thus out of 19 AV websites a total of 5 authors were not identified and therefore excluded in the further classification of authors below.

Thus 74% (14/19) of site authors could be identified in Table 4.10 and grouped into 5 classes as follows:

4.3.6.1 Mothers and parents

Parents and mothers of children made up 36% (5/14) of the authors of AV articles (see Table 4.10). Typical quotes that identified the author as a parent are:

“I am not happy, at all, about giving my kids vaccinations cultured from aborted human foetuses. I want to investigate studies that claim that vaccinations have not worked as successfully as we are wont to believe. There is still a lot of work to be done.” (www.hayesfamily.co.za/blog/?p=1187).

4.3.6.2 Mothers and parents in blog sites

The AV blog contributors in Table 4.8 identified as parents and/or mothers made up 31% (4/13) of the blog contributors presenting views against childhood immunization. Parents and mothers were identified by statements referring to my son, my daughter, my children, my kid, etc.

For example, “I refuse to have my children vaccinated again - I do not trust the Dept of Health or their ability. Also, who knows what exactly they are injecting? With the state of public health - I will rather take my chances” (<http://www.news24.com/MyNews24/Letters/Much-ado-about-measles-20091016>)

4.3.6.3 Business people

There was 26% (4/14) of business people, of whom 50% (2/4) identified themselves as mothers as well. The information on these authors was available on the website as presented in Table 4.10 and others were googled to determine the type of business they are involved in. People in this class run their own business supplying goods or services to parents with children. For example, one mother is running her own photography business specializing in children’s picture portraits, and has a website advertising her business. The other business person is a managing director of a company that sells eco-friendly baby nappies using online shopping on their

company website, where the AV views were also posted. (http://www.biobaba.co.za/index.php?route=information/information&information_id=10).

4.3.6.4 Journalists

Another 21% (3/14) of the AV authors were journalists reporting on activities against childhood vaccination. The published articles on online newspapers included links to other non-SA articles, including referencing non-SA AV lobbyists and their views. For example, in his report “Vaccinations: friend or foe”, Tony Carnie reports that “Lynn Redwood, the mother of an autistic child and President of the Coalition of Safeminds organisation, has also spoken out strongly against the response of American government agencies on the Thimerosal issue.” (<http://www.themercury.co.za/index.php?fSectionId=284&fArticleId=3250813>).

In the Mail and Guardian article by Nechama Brodie called ‘To vaccinate or...’, the views expressed by vaccination critics, including homeopaths, dominate the article. A small section of the report presents information on studies that dismiss any causal link between the MMR vaccine and autism. For example, homeopath Dr Vicki Compere’s views dominate the second part of the article revealing her skepticism on child vaccination as quoted “‘It’s a big decision,” says Dr Vicki Compere, a homeopath and the mother of two small children. “Every parent wants what’s best for their child. We know that children will be exposed to diseases; but do I think my child is better off with the vaccine in their body? No. ”. (<http://www.mg.co.za/article/2008-08-05-to-vaccinate-or>).

4.3.6.5 Medical professionals who believe in alternative medicine

There was 14% (2/14) of medical professionals who promote natural medicine over conventional medicine. One is a dentist who has authored a book on mercury used in dentistry, and has also posted articles on his company website about thimerosal and autism. This article presents a case of parents who believe that their children developed autism due to vaccines. On the same article, Dr Mercola’s comments are presented, and there is a link to Dr Mercola’s website and links to other websites warning about mercury in vaccines. The dentist states that “There’s no more scientific proof of the safety and effectiveness of drugs and vaccinations than there is for natural

treatment methods against the same ailments.” (<http://yoursmile.co.za/mercury-toxicity-mainmenu-76/63-thimerosal-and-autism-goes-to-court.html>)

Alternative medicine is not presented as an alternative to vaccines in IMVA’s (International Medical Veritas Association) article ‘Compulsory Vaccination’ by Mark Sircus, OMD, but in his website Mark Sircus identifies himself as holding an honorary title of doctor of Oriental medicine. In his article posted on Yahoo FFABSA (Families For Active Birth South Africa) chat group site of the 16th November 2005 he graphically presents issues on compulsory vaccination legislation in the US. For example this extract from the article, “That means when they kill children with their vaccines, which they have been doing for decades, they will legally be able to get away with murder. Death by injection is not something that only happens to those on death row, it happens all the time to kids and the government keeps records, though incomplete, that tell the dirty tale. Some have acknowledged that the Eli Lilly Company is a company that kills babies for they are the ones who have been pumping in the most lethal neurological poison (mercury based thimerosal) into vaccines for over 70 years.” (health.groups.yahoo.com/group/ffabsa/message/299?...&l=1)

Table 4.10: SA website AVL Article Authors

Website	About the Author
www.hayesfamily.co.za/blog/?p=1187	Taryn Hayes:Homeschooling parent
http://forum.pampers.co.za/viewtopic.php?p=374549&sid=12adadd4e652f0a472690920abae5b04	Annele Richardson: Mother and photographer specialising in kids custom picture portraits
en.wikipedia.org/wiki/Barbara_Loe_Fisher	Unknown
http://www.wantitall.co.za/Don-t-Vaccinate-Before-You-Educate__0967044421	Online Shopping site referencing a book by Dr Mayer Eisenstein: Physcian,director of Homefirst Health Services,Assistant Medical Director AMI (Alternative Medicine Integration)
http://samuslims.co.za/index.php?option=com_content&view=article&id=67:harms-of-vaccine-time-to-start-talking&catid=53:vaccine-dangers&Itemid=72	Dr A Majid Katme: Spokesman: Islamic Medical Association/UK
health.groups.yahoo.com/group/ffabsa/message/299?...&l=1	Mark Sircus Ac., OMD: Director International Medical Veritas Association. Doctor of Oriental medicine. “prolific writer, poet, medical researcher, doctor, psychologist, musician, devoted husband and family man”
http://www.cornesmith.com/content/blog-comment-re-mercury-vaccines-was-replaced-something-even-more-toxic	Corne Smith: “Metallurgy engineer. Owns a Wellness Community Business, provides professional Life Coaching on request.” Referencing Dr Mercola
http://www.news24.com/MyNews24/Letters/Much-ado-about-measles-20091016	Ginger – Mother to a pre-schooler son who caught measles.
http://www.biobaba.co.za/index.php?route=information/information&information_id=10_nancy.htm	Vicki Penfold: Managing Director Bio-Baba Eco-friendly nappies
http://www.womenattalk.co.za/index.php?option=com_content&task=view&id=24&Itemid=24	Mother of a 4 year old and 7 year old who left SA because of crime to UK.
http://yoursmile.co.za/our-services-mainmenu-75/mercury-toxicity-mainmenu-76/thimerosal-and-autism.html	Dr Visser: Dentist and author of the Big dental Lie. Referencing Dr Mercola’s comments
http://www.mg.co.za/article/2008-08-05-to-vaccinate-or	Nechama Brodie: journalist and writer. Referencing Jenny McCarthy a Celebrity (whose five-year-old son is autistic), has been an outspoken critic of childhood immunisation schedules for some years. Referencing Dr Vicki Compere a homeopath.
http://winning.co.za/vaccination.htm	Alan Phillips: “Independent investigator and writer on vaccine risks and alternatives. Founder of Human Development Services,Inc., the designer of a national children’s literacy program and materials; and a singer-songwriter and composer.”
http://www.themercury.co.za/index.php?fSectionId=284&fArticleId=3250813	Tony Carnie: Journalist. Referencing Lynn Redwood and Barbara Fisher
http://www.boerevryheid.co.za/forums/showthread.php?t=10512	Henry Redakteur - Koerier – Volksregister Referencing Barbara Loe Fisher article
http://www.cheeseslave.com/vaccines-responsible-for-the-decline-of-mortality/	Ann Marie is a Mother who is a cheesemaker, and posts cooking recipes.
http://www.wantitall.co.za/Vaccine-Update-2009-Are-Vaccines-Safe__B002ON3EOA	Online Shopping site referencing a book by Dr. Stanley "Stan" Monteith,Dr. Russell Blaylock, Barbara Loe Fisher, Neil Miller
http://www2.loot.co.za/shop/product.jsp?lsn=0979020514	Online Shopping site referencing a book by Sarah Collins Honenberger: “storyteller, a master of nuance who knows how to move you deeply; how to lift your heart; how to grab your attention ...”
http://www.healthycells.co.za/articles.asp?id=35	Phyllis Schlafly: Conservative columnist. Interested in human rights. Referencing Dr Mercola

4.3.7 The main concerns raised by the SA internet-based AVL

Categorising the articles consisted of reading through the AV articles and blogs, highlighting important concepts and concerns raised. The highlighted concerns were grouped into the identified categories (see Table 4.11). These were counted to determine the number of times each concern was raised giving the weighting for each category (see figure 3). Many of the concerns are stories and reports of personal experiences or have been compiled by parents who have been moved by their own powerful experiences to share information with others.

Vaccine safety was the concern most raised by 74% (14/19) of the AVL websites. A typical quote is: “Each vaccine is a complex brew of chemicals: thimerosal, derived from mercury; formalin, a dilution of formaldehyde, a known carcinogen; aluminium sulphate, a toxic heavy metal; phenol, a disinfectant; ethylene glycol, the main ingredient in antifreeze; benzethonium chloride, an antiseptic; and methylparaben, a preservative and antifungal which help preserve, purify and stabilise and nudge the jabs into working harder.” (http://www.biobaba.co.za/index.php?route=information/information&information_id=10).

Issues raised under the ethical concerns category by 53% (10/19) were all based on the United States health policies , a typical quote being: “Meanwhile, pharmaceutical companies have a captive market: vaccines are legally mandated in all 50 U.S. states..., yet these same companies are "immune" from accountability for the consequences of their products. Furthermore, they have been allowed to use "gag orders" as a leverage tool in vaccine damage legal settlements to prevent disclosure of information to the public about vaccination dangers.” (<http://winning.co.za/vaccination.htm>)

Vaccine efficacy (42% [8/19]) and financial motives (37% [7/19]) were raised interlinked, questioning the scientific proof of vaccine effectiveness versus conflict of interest. One mother’s statement presents these concerns saying, “Now the medical teams are running around giving out vaccinations - and I am wondering what for. They obviously don't work. I am feeling that to the medical world we are nothing more than cash cows to make money from. None of these

vaccines, anti-virals or flu injections work.” (<http://www.news24.com/MyNews24/Letters/Much-ado-about-measles-20091016>).

The least-raised concern was religious beliefs presented by 11% (2/19) of the websites. One author concluded that there is no need for vaccination because, “ALLAH (THE GOD) the Creator, the Designer has organised for many germs/virus to be destroyed through the natural process of entries and defence (skin, mucous, stomach, blood etc.. and not to be put all directly inside the blood/body without crossing the different natural defence barriers ...” (http://samuslims.co.za/index.php?option=com_content&view=article&id=67:harms-of-vaccine-time-to-start-talking&catid=53:vaccine-dangers&Itemid=72).

The other author’s book description explains that the author advocates that religious convictions should be the directive for parents to determine whether they vaccinate or not, “He comes to the conclusion that scientific studies alone will not be enough to decide the benefit vs. the risks of vaccine programs. Therefore, he concludes that personal religious convictions, not scientific studies, are the main reasons, upon which to base your vaccination decision.” (http://www.wantitall.co.za/Don-t-Vaccinate-Before-You-Educate__0967044421).

Table 4.11: Categories of concerns raised within blogs

Concerns Raised	Category Name	Category Code
Vaccines contain heavy metals harmful to humans Vaccines are not safe Vaccines are toxic	Vaccine safety	A
Vaccine causes autism Increased cases of children regressing after vaccination	Vaccines cause developmental disorders.	B
Disease decline happened even before vaccines were introduced. Vaccines are not reliable to prevent disease - Vaccines don't work	Vaccine efficacy	C
Pharmaceutical companies want to make money (money making plot) Alternative medicine best and cheaper.	Financial motives	D
Vaccines are immunosuppressive. Kids getting sick is part of growing up Too many vaccines given to babies too early	Vaccines are immunosuppressive	E
Non-disclosure about vaccine danger to the public Restricted access to reported vaccine reactions database Mandatory vaccination	Ethical concerns	F
No trust in the department of Health and government	Lack of trust in Health Care Authorities	G
God designed germs/virus to be destroyed through natural processes.	Religious belief	H

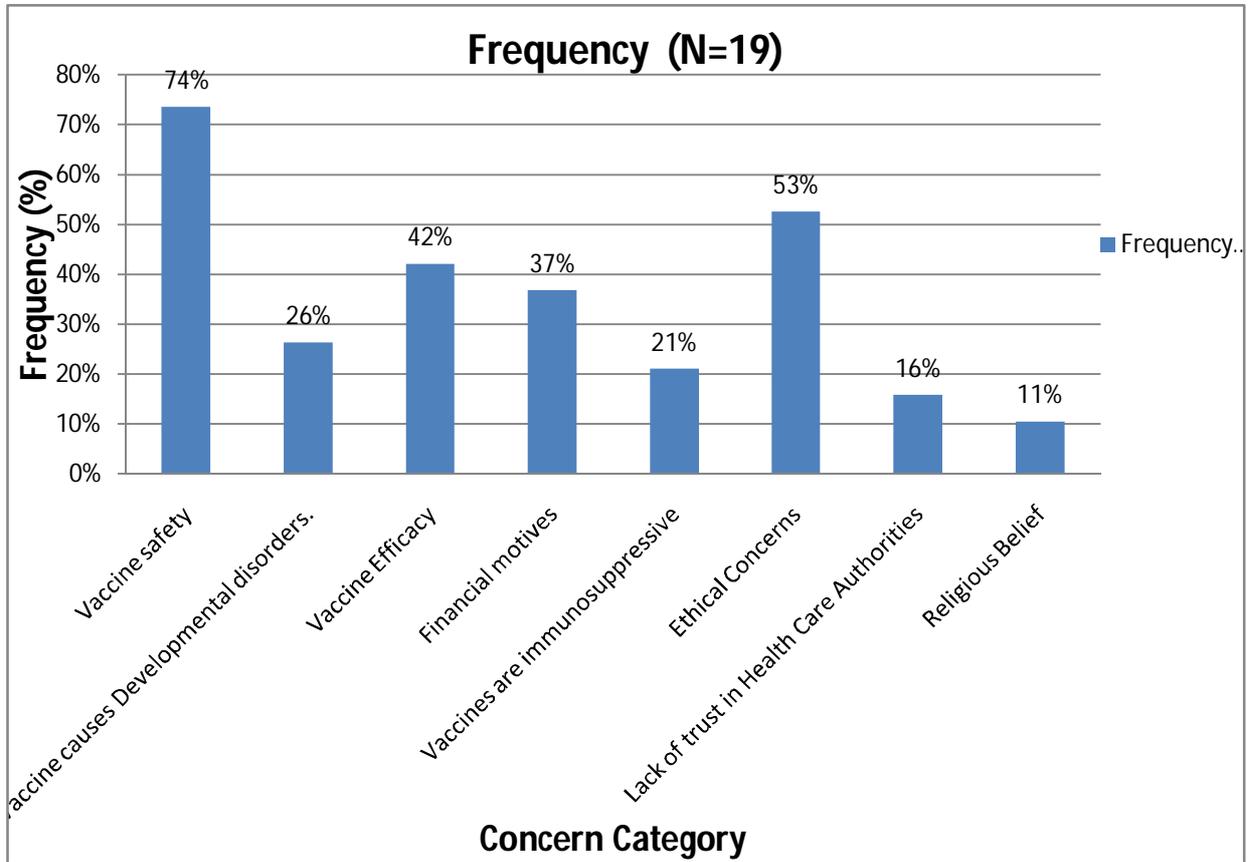


Figure 3: Frequency of concerns per category

Table 4.12: Concern categories and example quotes of AV views on SA websites

Category Name	Example Quote
Vaccine safety	“One thing is clear; things are very different from when we were children as far as chemical toxicity is concerned. . . Today’s baby is exposed to live or killed ‘weakened’ pathogens virtually as soon as they are born. Each vaccine is a complex brew of chemicals: thimerosal, derived from mercury; formalin, a dilution of formaldehyde, a known carcinogen; aluminium sulphate, a toxic heavy metal; phenol, a disinfectant; ethylene glycol, the main ingredient in antifreeze; benzethonium chloride, an antiseptic; and methylparaben, a preservative and antifungal which help preserve, purify and stabilise and nudge the jabs into working harder” (http://www.biobaba.co.za/index.php?route=information/information&information_id=10)
Vaccine causes Developmental disorders.	“ Did you know that China had no Autism until 1999 when the DPT vaccine arrived from America? Now they have 1.8 million autistic children.” (http://www.cheeseslave.com/vaccines-responsible-for-the-decline-of-mortality/) “I still don’t know where to put the increasing cases of families whose children are absolutely fine one day and minutes, hours or days after being vaccinated regress into a world of medical danger and a lifetime of mental and physical hardship.” (www.hayesfamily.co.za/blog/?p=1187)
Vaccine Efficacy	“Evidence suggests that vaccination is an unreliable means of preventing disease.” (http://winning.co.za/vaccination.htm)
Financial motives	“So WHY does the medical establishment care so much about whether or not we get our children vaccinated? Why are we being harassed by our doctors? Because the pharmaceutical companies brainwash the doctors into pushing these drugs. Because the pharmaceutical companies want to make money” (http://www.cheeseslave.com/vaccines-responsible-for-the-decline-of-mortality/) “We know that attacks on the religious and philosophical exemptions to vaccination in America are on the increase and are being led by vaccine patent holders like Paul Offit, M.D. and others who want to force vaccination. http://vaccineawakening.blogspot.com/search?q=attacks+on+vaccine+exemptions. ” (http://www.boerevryheid.co.za/forum/showthread.php?p=142657)
Vaccines are immunosuppressive	"I feel that vaccines are immunosuppressive over the long term and by vaccinating a child we don't give the body's natural defence system the opportunity to be activated. They're called childhood illnesses because it's better if you get them when you're a kid -- the symptoms are much worse for adults. I also believe childhood illnesses play a developmental role. If a child develops German measles, parents should all get together and have a party -- then everyone gets it. The results of a vaccine wear off over time, but if you have the disease as a child you get immunity for life." (http://www.mg.co.za/article/2008-08-05-to-vaccinate-or) To demonstrate this concern one parent protests ‘If you adhere to the complete vaccination schedule, you will be vaccinating your child up to 30 times before his/her fifth birthday; a good number of these before they are two months old. . .’ (http://www.biobaba.co.za/index.php?route=information/information&information_id=10).
Ethical Concerns	“Furthermore, they have been allowed to use "gag orders" as a leverage tool in vaccine damage legal settlements to prevent disclosure of information to the public about vaccination dangers. Such arrangements are clearly unethical; they force a non-consenting American public to pay for vaccine manufacturer's liabilities, while attempting to ensure that this same public will remain ignorant of the dangers of their products.” (http://winning.co.za/vaccination.htm)
Lack of trust in Health Care Authorities	“I refuse to have my children vaccinated again - I do not trust the Dept of Health or their ability. Also, who knows what exactly they are injecting? With the state of public health - I will rather take my chances” (http://www.news24.com/MyNews24/Letters/Much-ado-about-measles-20091016) “Doctors cannot warn you about what they themselves do not know, and with little time for further education once they begin practice, they are, in a sense, held captive by a system which discourages them from acquiring information independently and forming their own opinions. Those few that dare to question the status quo are frequently ostracized, and in any case, they are still legally bound to adhere to the system's legal mandates.” (http://winning.co.za/vaccination.htm)
Religious Belief	“ All these Haram ingredients are not given in a state of emergency to save life... they are given ,just in case an infection did occur in the future???
	It is very wrong that our Muslim doctors have adopted it all..with the many harams in it???
	It is forbidden in Islam to have any of these HARAM/NAJIS substances in our bodies (the place of the soul)?” (http://samuslims.co.za/index.php?option=com_content&view=article&id=67:harms-of-vaccine-time-to-start-talking&catid=53:vaccine-dangers&Itemid=72)

CHAPTER 5: DISCUSSION

5.1 Introduction

This study investigated the characteristics of the AVL on SA internet websites including blogs using search terms that were specifically aimed at increasing the retrieval of AV sites. This chapter discusses the results presented and analysed in chapter 4, and how they relate to the global view.

5.2 The internet coverage of AV views

While overall 30.2% of the websites were AV, the analysis of coverage by search engine found that, Google identified the most AV websites (59.3%). This indicates that information seekers searching for childhood vaccination articles on the internet are more likely to retrieve AV websites when using the Google search engine. With such a wide network of data available on the internet, for research purposes it is important to define the best search criteria that will return relevant information without delay. Thus the combined finding that the Google search engine retrieved the most AV sites, and that the search terms “vaccine injured” and “don’t vaccinate” yielded the most AVL sites is useful for studies aiming at identifying and characterizing AV sites or similar studies.

It is interesting to compare these results to a study conducted by Davies et al (2002), which also found that Google identifies the most AV sites. That study found that 43% of the first 10 sites displayed using 7 different search engines were AV when searching using the term “vaccination”, ranging from 100% on Google to 10% on Altavista. However, when using the term “immunization OR immunisation”, only 6% of the first 10 websites were AV, none of these being on Google. The term “vaccination” was then used on Google only, which returned 845 sites, only 44 (5.2%) of which were AV (Davies et al, 2002). This is a much lower proportion of AV websites than that found in the current study, which is probably because the search terms used were specifically aimed at finding AV content (eg: “don’t vaccinate”), whereas the term “vaccination” used by Davies et al (2002) was just as likely to find either pro- or AV content.

The overall coverage of AV websites of 30.2% (19/63) demonstrates a significant presence of the AVL on SA web pages. The number of AV websites found in global studies were 51 in 1999 (Nasir, 2000), 22 in 2000 (Wolfe et al, 2002), and 78 in 2004 (Zimmerman et al, 2005). Finding 19 based in South Africa alone in 2011 suggests that the number of AV websites seems to be increasing at an alarming rate, especially since in 1999 and 2000 no SA AV sites were identified (Nasir, 2000; Wolfe et al 2002). Unfortunately the most recent study did not give a breakdown of websites per country (Zimmerman et al, 2005). A similar study to determine the trend in SA websites will be useful to observe if there is an increase or decrease in this number once interventions have been launched to counter the AVL in SA. Most of the SA AV articles reviewed and reported information from other non-SA websites, thus indicating that South Africans are following global trends and are influenced by what is being said and done in other countries especially the USA.

5.3 The most utilised website and blog by the AVL

Finding out which are the most utilised AV websites would have given an indication of how many internet users are being reached, and what to target for detailed content analysis in future studies. Unfortunately this objective was not reached because the information on the number of hits per site was lacking. Both sites where hit statistics were available had relatively few hits, and the fact that all the other sites did not have the capability to count hits at the time of the study perhaps gives an indication that these sites are not being run by professionals who are interested in marketing their messages or their products. This view is supported by the finding that only 26% of the sites appeared to be sponsored, having links to on-line shopping sites.

The blogs were a more evident place to determine the level of utilization, as the contributors interact with the article author submitting comments and discussing amongst each other, and these contributions could be counted. However, it must be borne in mind that many internet users may only read a blog and not contribute, thus the number of contributors is not a true reflection of actual hits. The most popular AV topic blog that attracted 44 contributors was “Much ado about measles News24 MyNews24 Letters” a topic that was posted on the 16th October 2009. Attraction to this topic may be attributed to the provincial vaccination campaign

in October 2009 in the Gauteng province (Chopra et al., 2009). The campaign was in response to the recent outbreak of measles where 1135 cases from the beginning of 2009 to October 2009 were increasing (National Institute of Communicable Diseases [NICD], 2009). In support of this assumption, the study by Corley et al (2010) found a strong positive correlation between the presentation of influenza-like illnesses in the community and the number of blog posts about influenza. Determining the number of contributors for each of the AV blogs showed that not all blogs attracted discussions even after a considerable time after the posting of the AV topic .

There are no previous studies that have presented the utilisation of blogs by the AVL, thus these findings are unique and useful to understanding the trend and level of AV lobbying on the South African websites.

5.4 Sponsors of the internet-based SA AVL

The assumption that the links to online shopping may be linked to sponsorship is based on the patent method developed by James Dixon, which outlines a method for promoting interest in a website (Dixon, 2003). Thus it is not unreasonable to suggest that the owners of the 5 websites with on-line shopping links have a vested interest in discrediting vaccination as they are selling products that are either about how bad vaccination is (books), or using the “natural” products instead of vaccination. In support of this assumption, the association between AV views and promoters of unconventional therapies like alternative medicine has been reported previously by Nasir (2000). It is therefore important to not only look at the credentials of those who have AV views, but also to consider the motivations behind their recommendations. Being able to identify any vested interests or conflicts of interest will give a broader understanding about which material to trust and not to trust.

5.5 AV advocates using SA internet-based media

This study found that there are two types of AV advocates on the SA internet: those who are opposed to all vaccination and those who are not entirely AV but avoid some aspects of vaccination within the EPI. One study found that some sites presented themselves as neither anti- nor pro vaccination, but have found less than 15% of them presenting information supportive of vaccination (Davies et al, 2002).

The finding that 36% of AV advocates were mothers / parents is supported by a number of USA based studies (Zimmerman et al, 2005; Wolfe et al, 2002; Nasir, 2000) and a study based in Australia (Davies et al, 2002) which documented parental concerns about vaccine safety. Parents who seek information about vaccination on the internet will have come across misinformation (especially if they have searched using Google) that may be of great concern to them. Those who have had bad experiences with their children which they have assumed to be linked to vaccines based on this misinformation, may become very AV and share these sentiments on the internet.

It was interesting to find that of the 26% (4/14 websites where authors could be identified) of websites that were run by business people, 50% (2/4) claimed to be parents. These AV advocates may indeed be concerned parents who want to supply solutions to other parents with the same sentiment, at the same time having a vested interest in gaining support for their products or service that they offer to other parents, even if they are not linked to child vaccination. However, any topic on their websites that may draw attention to them being concerned AV parents themselves, may simply be a marketing strategy for their business. One can thus not conclude that these AV advocates are indeed concerned AV parents; they may be branding themselves as concerned parents in order to sell their products to concerned parents, who will identify with them and buy their products even though these products may have nothing to do with AV (Klein, 2001). For example the one author was a dentist and author of the book 'The big dental lie' being promoted on the same website where an AV topic was posted.

Other studies have found different kinds of business people being AV advocates, including lawyers, homeopaths, and physicians offering alternates to vaccination (Kerr, 2009; Nasir, 2000). The current study did not find any AV advocates who were lawyers, but found a journalist who is interested in human rights. This is probably because SA is not a very litigious society, whereas in the USA lawyers offer their services to parents who want to sue the vaccine industry for supposed injury to their children. The news media are an important source of public health information and have an important role in communicating health interventions. Previous studies have identified overstatement of adverse effects and risks of vaccines published by journalists on different news media (Guillame and Bath, 2008; Zimmerman et al, 2005).

Journalists made up 21% (3/14) of the AV authors identified in this study, with all 3 presenting AV views from the USA. Out of the 3 journalists one also presented information on the dismissal of the link between autism and MMR vaccine, but at the same time had more links to AV views. Creating a vaccine scare via publishing misinformation in the mass media has been one of the tactics used by other AVLs (Guillaume and Bath, 2008). The impact of the media in spreading misinformation about vaccines has been reported in a number of studies, where it was found that after the media had publicised this misinformation there was a decline in the uptake of childhood immunization in countries like the USA, UK, France and Australia (Guillaume and Bath, 2008; Andre, 2001). For example, the media played a very prominent role in spreading the study findings of Wakefield et al (1998) linking the MMR vaccine to autism, which were later found to be fraudulent, but the impact was irreversible, resulting in a measles epidemic in the UK (Guillaume and Bath, 2008).

In conclusion, the AV advocates identified on South African websites are individuals expressing their views on their own websites or on blog sites, either to sell products or to share their experiences. From this one may deduce that SA does not currently have organized AV advocacy groups using the internet, thus the term AVL is perhaps a misnomer for the AV movement in SA.

5.6 The main concerns raised by the SA internet-based AVL

Most of the AV advocates' concerns were based on information they have come across on the internet which prompted them to be skeptical about and oppose vaccinating children.

Common categories of the concerns raised included worries over safety, violation of individual rights (ethics), distrust of health providers, questioning vaccine effectiveness, religious beliefs and alleging profit as the driving force behind child vaccination.

Vaccine Safety

It was found that 74% (14/19) of the websites critical of vaccines claim that vaccines are not safe; they contain toxic materials like mercury and heavy metals. Several earlier studies have found similar claims being made by AV websites (Zimmerman et al, 2005). More recent data also confirms this finding, with an overwhelming 80% of all websites being found to include

content that expressed concerns about vaccines' ingredients, additives, and that they are poisonous (Bean, 2011). Concerned uninformed parents that read this piece of "information" may not only question the safety of vaccines but may panic and be scared to vaccinate their children and may even result in them not vaccinating their children. The vaccine scare pattern on the internet has been previously observed and its impact evaluated, and it was found that there is a correlation between vaccine scare misinformation on the internet and the reduced or delayed vaccination of infants (Andre, 2001).

Vaccines are Immunosuppressive

Vaccine overload is the notion that giving many vaccines at once may overwhelm or weaken a child's immune system and lead to adverse effects, an argument presented by 21 % of AV websites in this study. The finding that parents avoid what they perceive as too much vaccination by considering delaying vaccination of their children as an option is linked to the information they have read on the internet about the vaccines not being safe and the claim that they suppress the child natural immune system development. Although scientific evidence does not support this idea, many parents of autistic children firmly believe that vaccine overload causes autism, and it has caused many parents to delay or avoid vaccinating their children (Gerber and Offit, 2009). Such parental misperceptions are major obstacles towards child immunization.

Vaccine Efficacy

The effectiveness of vaccines was questioned in 42% of the identified AV sites, with authors raising the concern that vaccination does not offer effective and lasting cover. The scientific proof of the effectiveness of vaccines has been repeatedly denounced by various AVs as documented by several studies (Kata, 2010; Zimmerman et al, 2005; Davies et al, 2002). The AV community claim that there is no scientific proof that vaccines are effective, attributing the decline in VPDs to other public health interventions such as improved hygiene and sanitation, and also to natural medicine (Wolfe et al, 2002). These findings are supported by this study, where authors claim that natural medicine is more effective and safer than vaccines.

Ethical concerns

Vaccination touches on all fundamental ethical principles: autonomy, beneficence, non-maleficence, and distributive justice. It is therefore not surprising that 53% of the AV websites raised ethical concerns. However, these were found to be based on the USA health policies, indicating that South African internet users are susceptible to information and misinformation from other first world countries. The influence of the views against the health policies of the USA also sensitizes the reader on the issues of AV.

Even though in SA vaccination is not mandatory, this issue is raised as if it is relevant to SA. The issue about non-disclosure to parents of possible vaccine reactions may incite decisions to withhold vaccination. When parents read about the possible danger of vaccines which were never shared with them by the health providers, they may interpret this as some kind of a deception or conspiracy, thus it is important for health providers to be aware of issues that are raised on the internet and address these with their patients.

Financial profit motives

Critics have accused the vaccine industry of misrepresenting the safety and effectiveness of vaccines, covering up and suppressing information, and influencing health policy decisions for financial gain (Wolfe and Sharp, 2002). This relates to the current study where 37% of the AV websites raised financial profit concerns, of which all also questioned the effectiveness of the vaccines. There seems to be a belief that the vaccines are being promoted without verifying their efficacy due to financial interests by pharmaceutical companies and some government agencies.

The current study found the AV argument that Dr Paul Offit has a conflict of interest in promoting child vaccination, since he stands to gain financially from the practice of child vaccination as they claim he holds a patent on a rotavirus vaccine. Conversely, many groups profit by promoting the controversy about vaccines, such as lawyers who receive fees often totaling in the millions of dollars, expert witnesses paid to provide testimony, and practitioners of alternative medicine offering expensive medications and supplements (Kerr, 2009). In addition many individuals make a profit out of advocating alternatives to vaccination, or sell books promoting AV, or attract parents with fears about vaccination to their websites in order to sell

unrelated products. This is evidenced in this study by 26% (5/19) of SA AV websites having links to online shopping, or promoting homeopathy or other alternative services, and is supported by the findings of other international studies (Nasir, 2000; Davies et al, 2002; Wolfe et al, 2002; Kata, 2010; Bean, 2011).

Lack of trust in Health Care Authorities

Of the 19 AV websites 16% were about the lack of trust in the health care authorities. Raised along with this concern was the alleged lack of knowledge of health care providers, and their supposed unwillingness to discuss the possible vaccine reactions with caregivers. This finding resonates with the finding on ethical issues where providers are alleged to not disclose possible side effects on vaccination, leaving parents to find conflicting messages on the internet and other media.

This alleged non-disclosure may be due to a lack of knowledge of health care providers, or insufficient time spent with caregivers, but may be misinterpreted as a plan to hide the truth. This is supported by allegations of conspiracies and cover-ups to hide the truth about vaccine safety that have been documented in recent studies (Zimmerman, et al, 2005; Wolfe, et al, 2002). This finding is valuable in that it displays the importance of communicating and addressing the parents' concerns on vaccine safety. Good communication skills as identified by Waisbord and Larson (2005) are important in order to earn trust, deepen understanding and motivate action.

5.7 Limitations of this study

This study suffers from selection bias for various reasons. The complexity and size of websites are factors that may have caused the study to be biased, as the exact keyword search may have excluded many more sites that would be very useful in giving a clear picture of the characteristics of the South African internet-based AVL. This selection bias also may have caused an over-representation of AVL content, because the keywords were aimed at picking up AV sentiment. There was also further selection bias as this study was limited to content in the English language. Whether this bias impacts negatively on the study or not is unknown, as there are no data on the demographics of the AVL in South Africa.

A correlation analysis was not performed to determine the way in which the concern categories were related. Further studies will be important to determine how each concern category is related to the others within the SA AV web users. There are associated risks with using open source data obtained through the internet, primarily truthfulness of blogger statements. The findings in this study are limited to views presented by people who can afford access to computers and the internet who are usually educated and literate, and thus cannot be considered as representative of all AV views in SA. However, the ubiquity of wireless internet access in public places such as libraries, restaurants, cafes, and most recently on mobile phones, enables users from a variety of social and educational levels to engage with and contribute to internet health topics.

The availability of the websites after data collection and analysis is not guaranteed as some of the websites are removed or become inactive, and some URL's may not point to the specified topic as it is determined by the number of comments added to the website after the study data collection. Thus the study findings are limited to the time period when the data was collected.

5.8 Conclusion and recommendations

The topic of vaccination is clearly a topic of interest and debate on South African websites and blogs. This study's findings indicate that there is no clear organised internet-based AVL group in SA, but there are individuals who are independently lobbying against vaccination and therefore one cannot refer to this community as a cohesive AVL group. The presence and influence of blog contributors (bloggers) supporting AV views should be considered a very important indicator for health promotion targets and strategies. There is a need for scientific survey studies to determine their prevalence, trends and the impact of AV views by bloggers. A successful public health campaign should have a presence and influence in each of the reported blog sites to ensure wide coverage and dissemination of scientifically proven information.

As primary health care practitioners now encounter an increasing number of parents and patients who have searched the Internet for vaccine information, they need to be aware of the medical and ethical allegations being made against child vaccinations. Strengthening and supervising communication skills of health providers should be integral to child vaccination plans and

training. This should include determining first the knowledge on childhood vaccines and their side effects and then draw up a program to update knowledge on vaccines and the concerns raised by AVL groups. This should be a review which will be an opportunity to point the way to fill in those gaps in knowledge and the need for additional research that could become part of a national vaccine safety research agenda.

This can be possible when the health care providers increase their knowledge about concerns raised by AVL and sharing that knowledge including the scientific facts with the community and their patients. Proactive communication actions are needed to curtail and prevent negative publicity and resistance to child vaccination, and to build continuous trust in vaccination programs by working with opinion leaders who influence caregivers' perceptions and behaviours. The media plays a pivotal role in disseminating health information, thus the need to establish collaborative work with the media and training journalists to write about scientific matters objectively. The body of research is not large on the internet examining the anti-vaccination views as observed by Kata (2009), thus making it necessary for the establishment of permanent online research to inform new trends and health promotion targets.

In summary, websites critical of vaccines allege serious adverse reactions, vaccine failure, and serious ethical violations, including cover-up, and conspiracy. The qualitative analysis revealed that websites, blog pages, and forums critical of vaccines, encourage alternative medicine, claim conventional medicine is wrong, and cover-up in the name of making money by pharmaceutical companies and government. Many of these stories and reports are personal or have been compiled by parents who have been moved by their own powerful experiences to share information with others.

Strategies such as encouraging parents to take the child's perspective, sharing the health care provider's experience of treating patients with VPDs, and providing pictures and testimonials of persons affected by VPDs may be useful. Allowing participation of parents who have experienced the benefits of vaccination or the consequences of VPD to play a more prominent role in health programmes promoting child vaccination on the internet will secure the trust and increase the knowledge on the benefits of vaccination.

Public confidence is being eroded by reports in the free media like the internet about conflicts of interest, secrecy, and questionable data which may lead to the reduced uptake of childhood vaccination. On the other hand, the public also needs to understand that many in the AVL make a profit out of advocating alternatives to vaccination, or sell books promoting AV, or attract parents with fears about vaccination to their websites in order to sell unrelated products. This is evidenced by many AV websites having links to online shopping, or promoting homeopathy or other alternative services. The SA public health fraternity must have strategies to allay the opposing effect by increasing the presence of understandable communication material on the internet, and cultivating a more informed and collective decision making on child vaccination.

The concerns raised by the AVL against vaccination are valuable pointers as to where interventions should be focused. Further studies are needed to determine the link between AVL and the promotion of natural or alternative medicine. It is the responsibility of the public health sector to ensure that the web users know which material to trust, always bearing in mind that SA internet users cannot be separated from the rest of the world. The presence of credible websites like SAVIC should be communicated and links to these websites made available in websites providing information on vaccination. This will increase the chance of discovering these sites when vaccination information seekers search the internet. It is therefore vital that there are monitoring strategies in place to continuously survey the AVL views by bloggers, as this may correlate with the uptake of child vaccination.

References

Amanna I, Slifka MK. Public fear of vaccination: separating fact from fiction. *Viral Immunol.* 2005;18(2):307-15.

Anderson RM, May RM. Vaccination and herd immunity to infectious diseases. *Nature.* 1985 Nov 28-Dec 4;318(6044):323-9.

André FE. The future of vaccines, immunisation concepts and practice. *Vaccine.* 2001 Mar 21;19(17-19):2206-9.

Baker L. The face of South Africa's Expanded Programme on Immunisation (EPI) schedule – A Review. *SAPJ.* 2010 Jan-Feb:48-49.

Bean SJ. Emerging and continuing trends in vaccine opposition website content. *Vaccine.* 2011 Feb 24;29(10):1874-80.

Beattle G. 1997. Vaccination, A Parents Dilemma. Oracle Press, p. 36-57.

<http://www.cheeseslave.com/2007/11/16/vaccines-responsible-for-the-decline-of-mortality/>

[accessed 12 February 2012].

Bloom, D.E., Canning, D., Weston, M., 2005. The Value of Vaccination. *World Economics.* 2005 July–September:6(3):15-39.

Centers for Disease Control and Prevention (CDC). Measles outbreak--Netherlands, April 1999-January 2000. *MMWR Morb Mortal Wkly Rep.* 2000 Apr 14;49(14):299-303.

Chopra M, Lawn JE, Sanders D, Barron P, Abdool Karim SS, Bradshaw D, Jewkes R, Abdool Karim Q, Flisher AJ, Mayosi BM, Tollman SM, Churchyard GJ, Coovadia H; Lancet South Africa team. Achieving the health Millennium Development Goals for South Africa: challenges and priorities. *Lancet.* 2009 Sep 19;374(9694):1023-31.

Corley CD, Cook DJ, Mikler AR, Singh KP. Text and structural data mining of influenza mentions in Web and social media. *Int J Environ Res Public Health*. 2010 Feb;7(2):596-615.

Davies P, Chapman S, Leask J. Antivaccination activists on the world wide web. *Arch Dis Child*. 2002 Jul;87(1):22-5.

Dawson B & Trapp RG. 2004. *Basic & Clinical Biostatistics*. 4th Ed. USA: McGraw Hill companies.

Deer B. 2009. MMR doctor Andrew Wakefield fixed data on autism, [Online]. Available at: <http://briandeer.com/solved/st-fixed-data.htm>. [accessed 12 February 2012].

Deer B. 2007. Andrew Wakefield & the MMR scare: part 2, [Online]. Available at: <http://briandeer.com/wakefield-deer.htm>. [accessed October 2011].

Deer B. 2006. Schoolboy, 13, dies as measles makes a comeback, *Times Online*, [Online]. Available at: <http://briandeer.com/wakefield/measles-death.htm> [accessed 12 February 2012].

Deer B. 2004. MMR scare Exposed. MMR Scare doctor planned rival vaccine. *The Sunday Times* (London), [Online]. 14 Nov. Available at: <http://briandeer.com/mmr/st-wakefield-vaccine.htm>. [accessed 12 February 2012].

Department of Health. 2003. *NHS Immunisation Statistics, England: 2001–2002*. [Online]. Available at: http://www.dh.gov.uk/en/Publicationsandstatistics/Statistics/StatisticalWorkAreas/Statisticalhealthcare/DH_4016231, [accessed 12 February 2012].

Department of Health. *NHS Vaccinations: How does it work*. [Online]. Available at: <http://www.nhs.uk/Planners/vaccinations/Pages/sciencevaccinations.aspx>. [accessed 12 February 2012].

Department of Health South African. *National Immunisation 2007*. Pretoria, Republic of South Africa.

Department of Health South African. *EPI 2009*. Pretoria, Republic of South Africa.

Dube S & Burnett RJ. The extent of missed vaccination opportunities and factors that contribute to them, in Orange Farm Gauteng. [Online].

Proceedings of the SADC Regional EPI Symposium, Centurion, South Africa, February 2008. <http://www.savic.ac.za/backend/docs/Missed%20Vaccination%20Opportunities.pdf> [accessed 12 February 2012].

Ellner PD. Smallpox: gone but not forgotten. *Infection*. 1998 Sep-Oct;26(5):263-9.

Feikin DR, Lezotte DC, Hamman RF, Salmon DA, Chen RT, Hoffman RE. Individual and community risks of measles and pertussis associated with personal exemptions to immunization. *JAMA*. 2000 Dec 27;284(24):3145-50.

Fenner F, Henderson DA, Arita I, Jezek Z, Ladnyi ID. 1988. Smallpox and its Eradication Geneva: World Health Organization. Available at: <http://whqlibdoc.who.int/smallpox/9241561106.pdf>. [accessed 12 February 2012].

Field RI. Vaccine declinations present new challenges for public health. *P T*. 2008 Sep;33(9):542-3.

Fitzpatrick M. MMR and Autism: What parents need to know. Kindle Edition. New York (NY): Taylor & Francis Group; 2005. p27.

Fox, S., 2009. Online health search 2006. [Online].

Available at: <http://www.pewinternet.org/Reports/2006/Online-Health-Search-2006.aspx> [accessed 12 February 2012].

Galazka AM, Robertson SE. Diphtheria: changing patterns in the developing world and the industrialized world. *Eur J Epidemiol*. 1995 Feb;11(1):107-17.

- Gangarosa EJ, Galazka AM, Wolfe CR, Phillips LM, Gangarosa RE, Miller E, Chen RT. Impact of anti-vaccine movements on pertussis control: the untold story. *Lancet*. 1998 Jan 31;351(9099):356-61.
- General Medical Council. Dr Andrew Jeremy Wakefield. Determination on Serious Professional Misconduct (SPM) and sanction. May 24, 2010. Available at: http://www.gmc-uk.org/Wakefield_SPM_and_SANCTION.pdf 32595267.pdf [accessed 12 February 2012].
- Gerber JS, Offit PA. Vaccines and autism: a tale of shifting hypotheses. *Clin Infect Dis*. 2009 Feb 15;48(4):456-61.
- Global Polio Eradication Initiative, 2010. Polio eradication targets. Available at: <http://www.polioeradication.org/Dataandmonitoring/Polioeradicationtargets.aspx> [accessed 12 February 2012]
- Godlee F, Smith J, Marcovitch H. Wakefield's article linking MMR vaccine and autism was fraudulent. *BMJ*. 2011 Jan 5;342:c7452.
- Guillaume L, Bath PA. A content analysis of mass media sources in relation to the MMR vaccine scare. *Health Informatics J*. 2008 Dec;14(4):323-34.
- Guillaume L, Bath PA. The Impact of Health Scares on Parents' Information Needs and Preferred Information Sources: A Case Study of the MMR Vaccine Scare. *Health Informatics J*. 2004 Mar;10(1): 5-22.
- Health Systems Trust (2010). The District Health Barometer 2008/09. Part A: Indicator comparison by districts. Chapter 3. Output indicators: Immunisation. Available at: http://www.healthlink.org.za/uploads/files/dhb0809_31.pdf [accessed 12 February 2012].
- Howenstine J. 2003. Why you should avoid taking vaccines. NewsWithViews.com, [Online]. Available at: <http://www.newswithviews.com/Howenstine/james.htm> [accessed 12 February 2012].

Immunisation Advisory Centre, 2002. Immunisation – Benefits and Risks. [Online].

Available at: http://www.immune.org.nz/site_resources/Parents/FAQs%20PDFS/IMMUNISATION-Benefits_vs_Risks.pdf [accessed 12 February 2012]

Kane M & Lasher H. The Case for Childhood Immunization: Children's Vaccine Program at PATH. Occasional Paper #5 March 2002. Washington 98107 USA.

Kata A. A postmodern Pandora's box: anti-vaccination misinformation on the Internet. *Vaccine*. 2010 Feb 17;28(7):1709-16.

Kerr MA. 2009. "Movement impact". The Autism Spectrum Disorders / vaccine link debate: a health social movement. Ph.D thesis. University of Pittsburgh. pp. 194–203. Available at: <http://challenger.library.pitt.edu/ETD/available/etd-04302009-115908/unrestricted/main-file-etd-04302009-115908.pdf>. [accessed 12 February 2012].

Kling S. Vaccination and ethical issues. *Current Allergy & Clinical Immunology*. 2009 Nov;22(4):178-180.

Le Fanu WR. Edward Jenner. *Proc R Soc Med*. 1973 Jul;66(7):664-8.

Lehohla PJ. 2010. Millennium Development Goals: Country Report 2010. Statistics South Africa. Pretoria, SA.

MacIntyre CR, Leask J. Immunization myths and realities: responding to arguments against immunization. *J Paediatr Child Health*. 2003 Sep-Oct;39(7):487-91.

Madisha L. Review of road to health chart for immunisation services in SA: Is it a cause for concern? In Proceedings of the North West EPI Symposium, Rustenburg, South Africa, August 2007. Available at: http://www.savic.ac.za/backend/docs/Road_To_Health_Cards.pdf [accessed 12 February 2012].

Malatsi I, Makwela M, Mokwena K. Factors associated with infant immunisation coverage in the Capricorn District of Limpopo Province, South Africa. In Proceedings of the SADC Regional EPI Symposium, Centurion, South Africa, February 2008. Available at: <http://www.savic.ac.za/backend/docs/Barriers%20and%20Enabling%20Factors%20to%20Immunisation.pdf> [accessed 12 February 2012].

Menziwa ME & Lewis HA. Knowledge, attitudes and practices of caregivers towards the uptake of immunisation in the Odi Health Region. In Proceedings of the SADC Regional EPI Symposium, Centurion, South Africa, February 2008. www.savic.ac.za [accessed 12 February 2012].

Mercola JM. 2010. <http://naturalhealthcenter.mercola.com/>. [accessed 12 February 2012].

Mercola MJ. 2010. About Dr Mercola. <http://www.mercola.com/forms/background.htm#pub>. [accessed 12 February 2012].

Miller MA, Sentz JT. 2006. Disease and Mortality in Sub-Saharan Africa 2006 : Vaccine-Preventable Diseases. Chapter 12. The World Bank Bookshelf.

Murch SH, Anthony A, Casson DH, Malik M, Berelowitz M, Dhillon AP, Thomson MA, Valentine A, Davies SE, Walker-Smith JA. Retraction of an interpretation. *Lancet*. 2004 Mar 6;363(9411):750.

Nasir L. Reconnoitering the antivaccination web sites: news from the front. *J Fam Pract*. 2000 Aug;49(8):731-3.

National Institute for Communicable Diseases, 2009. Communicable Diseases Communiqué. Volume 8, No. 10, October 2009. [Online]. Available at: http://www.nicd.ac.za/assets/files/NICDCommOct09Vol08_10.pdf [accessed 12 February 2012].

National Institute for Communicable Diseases, 2011. Communicable Diseases Surveillance Bulletin. Volume 9, No. 4, November 2011. [Online]. Available at:
<http://www.nicd.ac.za/assets/files/Bulletin%20November%202011.pdf> [accessed 12 February 2012].

National Education Policy Act, 1996 (No 27 of 1996) Section 16, notice 2432 of 1998. Gov Gazette, Volume 400, No 19377, 19 October 1998. [Online]. Available at:
<http://www.education.gov.za/LinkClick.aspx?fileticket=WTGxHzBEbiQ%3D&tabid=390&mid=1124> [accessed 12 February 2012].

Nelson MC, Rogers J. The right to die? Anti-vaccination activity and the 1874 smallpox epidemic in Stockholm. *Soc Hist Med.* 1992 Dec;5(3):369-88.

Ngcobo NJ. The impact of the immunisation programme on vaccine-preventable diseases in South Africa: A review of progress over a 10- to 15-year period. *The Southern African Journal of Epidemiology and Infection.* 2008;23(1):9-13.

Offit PA, Davis RL, Gust D. Vaccine safety. *In: Vaccines.* Fourth edition. Eds Plotkin S, Orenstein W. Chapter 74, 1629-1644. Saunders, 2003.

Parker AA, Staggs W, Dayan GH, Ortega-Sánchez IR, Rota PA, Lowe L, Boardman P, Teclaw R, Graves C, LeBaron CW. Implications of a 2005 measles outbreak in Indiana for sustained elimination of measles in the United States. *N Engl J Med.* 2006 Aug 3;355(5):447-55.

Ravhengani M, Manfe M, Makinta J, Teffo LS, Masekoa NO, Ntuli-Ngobo B. Immunization Knowledge, Practice and Coverage Survey: Gauteng Provin, ce. In Proceedings of the North West EPI Symposium, Rustenburg, South Africa, August 2007. Available at:
<http://www.savic.ac.za/backend/docs/Immunization%20Knowledge,%20Practice%20and%20Coverage%20Survey.pdf> [accessed 12 February 2012].

Riedel S. Edward Jenner and the history of smallpox and vaccination. *Proc (Bayl Univ Med Cent).* 2005 Jan;18(1):21-5.

Salmon DA, Haber M, Gangarosa EJ, Phillips L, Smith NJ, Chen RT. Health consequences of religious and philosophical exemptions from immunization laws: individual and societal risk of measles. JAMA. 1999 Jul 7;282(1):47-53.

Saloojee H & Bamford, L. Key childhood health promotion and disease prevention programmes. South African Health Review. Durban: Health Systems Trust; 2006. Available at: http://www.hst.org.za/uploads/files/begining_06.pdf. [accessed 12 February 2012].

Schoub, P., 2003. Debunking the MMR-Autism Myth. *Aventis Pasteur*, 5(1).

Schwartz M. The life and works of Louis Pasteur. J Appl Microbiol. 2001 Oct;91(4):597-601.

SEW Staff, Top Search Providers for August 2009. Search Engine Watch, Sep 15, 2009.

<http://searchenginewatch.com/3634991> [accessed 12 February 2012].

Siegfried N, Wiysonge CS, Pienaar D. Too little, too late: measles epidemic in South Africa. Lancet. 2010 Jul 17;376(9736):160.

Slifka MK, Amanna IJ. Book and Media Reviews Vaccinated: One Man's Quest to Defeat the World's Deadliest Diseases by Paul A. Offit. JAMA. 2007;298(16):1946-47.

Smith MJ, Ellenberg SS, Bell LM, Rubin DM. Media coverage of the measles-mumps-rubella vaccine and autism controversy and its relationship to MMR immunization rates in the United States. Pediatrics. 2008 Apr;121(4):e836-43.

Available at: <http://www.pediatrics.org/cgi/content/full/121/4/e836> [accessed 12 February 2012].

South African Vaccination and Immunisation Centre. 2010. Immunisation that works – The Vaccinator's Manual: Module 9: Social Mobilisation, Advocacy and Communication for EPI. [Online].

Available at: <http://www.savic.ac.za/backend/docs/Vaccinators%20Manual%20-%202005%20part4.pdf> [accessed 12 February 2012].

South African Vaccination and Immunisation Centre. 2010. DISEASES AND VACCINES. <http://www.savic.ac.za/disease.php?main=3> [Accessed 12 February 2012].

South African Vaccination and Immunisation Centre. Vaccine: Diphtheria. <http://www.savic.ac.za/disease.php?sub3=82> [accessed 12 February 2012].

The Editors. Retraction--Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *Lancet*. 2010 Feb 6;375(9713):445.

Vaccines for Africa. Vaccines: The Expanded Program on Immunization. 2009 Feb, 10. [Online]. Available at: http://www.vacfa.com/index.php?option=com_content&view=article&id=29&Itemid=24 [accessed 12 February 2012].

Waisbord, S. & Larson, H., 2005. Why Invest in Communication for Immunization: Evidence and Lessons Learned. A joint publication of the Health Communication Partnership based at Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs (Baltimore) and the United Nations Children's Fund, New York.

Wakefield AJ, Murch SH, Anthony A, Linnell J, Casson DM, Malik M, Berelowitz M, Dhillon AP, Thomson MA, Harvey P, Valentine A, Davies SE, Walker-Smith JA. Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *Lancet*. 1998 Feb 28;351(9103):637-41.

Wallach JD. 2009. Anti-vaccination movement (AVM) Available at: <http://www.skeptdic.com/antivaccination.html> [accessed 12 February 2012].

World Health Organization (2001). Factsheets: Smallpox. Available at: <http://www.who.int/mediacentre/factsheets/smallpox/en/> [accessed 12 February 2012].

World Health Organization, UNICEF, World Bank. State of the world's vaccines and immunization, 3rd ed. Geneva, World Health Organization, 2009.

World Health Organization. Polio vaccines and polio immunization in the pre-eradication era: WHO position paper. Wkly Epidemiol Rec. 2010 Jun 4;85(23):213-28.

Available at: <http://www.who.int/wer/2010/wer8523.pdf> [accessed 12 February 2012].

World Health Organization (2010b). Six common misperceptions about immunization. Available at: http://www.who.int/immunization_safety/aefi/immunization_misconceptions/en/index.html [accessed 12 February 2012].

World Health Organization (2011). Measles outbreaks and progress towards meeting measles pre-elimination goals: WHO African Region, 2009–2010. Wkly Epidemiol Rec. 2011 Apr 1;86(14):129-36.

Wolfe RM, Sharp LK. Vaccination or immunization? The impact of search terms on the internet. J Health Commun. 2005 Sep;10(6):537-51.

Wolfe RM, Sharp LK, Lipsky MS. Content and design attributes of antivaccination web sites. JAMA. 2002 Jun 26;287(24):3245-8.

Wolfe RM, Sharp LK. Anti-vaccinationists past and present. BMJ. 2002 Aug 24;325(7361):430-2.

Zimmerman RK, Wolfe RM, Fox DE, Fox JR, Nowalk MP, Troy JA, Sharp LK. Vaccine criticism on the World Wide Web. J Med Internet Res. 2005 Jun 29;7(2):e17.

APPENDIX A

Pilot Phase Search results numbers (excluding the word 'Animal')

Search engine	Keyword search	Search results	Search engine	Keyword search	Search results	Search engine	Keyword search	Search results
Google	don't vaccinate (vaccinate don't)	220	Yahoo	don't vaccinate	95	MSN-BING	don't vaccinate	270
	do not vaccinate	269		do not vaccinate	188		do not vaccinate	13700
	vaccine scare	182		vaccine scare	11		vaccine scare	275
	vaccination is harmful	394		vaccination is harmful	4		vaccination is harmful	1090
	why you should not vaccinate your children	531		why you should not vaccinate your children	48		why you should not vaccinate your children	150
	reasons for not vaccinating	155		reasons for not vaccinating	20		reasons for not vaccinating	140
	vaccination causes harm	448		vaccination causes harm	15		vaccination causes harm	295
	vaccines are a danger	270		vaccines are a danger	16		vaccines are a danger	630
	vaccine injured	15		vaccine injured	14		vaccine injured	525
	vaccines are toxic	293		vaccines are toxic	64		vaccines are toxic	605
	dangers childhood immunizations	388		dangers childhood immunizations	0		dangers childhood immunizations	14
	don't immunise	528		don't immunise	28		don't immunise	240
	don't immunize	92		don't immunize	28		don't immunize	145
	do not immunise	527		do not immunise	53		do not immunise	345
	do not immunize	578		do not immunize	53		do not immunize	235
	immunization is harmful	195		immunization is harmful	2		immunization is harmful	245
	immunisation is harmful	221		immunisation is harmful	2		immunisation is harmful	410
	not immunising	150		not immunising	0		not immunising	205
	not immunizing	150		not immunizing	55		not immunizing	115
	immunisation causes harm	262		immunisation causes harm	8		immunisation causes harm	180
	immunization causes harm	407		immunization causes harm	8		immunization causes harm	130

APPENDIX B

A List of Included Websites for GOOGLE

GOOGLE	
http://6000.co.za/2009/10/11/harper-i-didnt-say-that/	http://www.samj.org.za/index.php/samj/article/view/8/410
http://familymedicine.ukzn.ac.za/Uploads/4815814a-6ff8-455b-80e8-d9481f7160cb/EPI%20SA.pdf	http://www.savic.ac.za/backend/docs/A%20case%20for%20childhood%20immunisation.pdf
http://forum.pampers.co.za/viewtopic.php?p=374549&sid=12adadd4e652f0a472690920aba5e5b04	http://www.savic.ac.za/backend/docs/First%20do%20no%20harm.pdf
http://forum.pampers.co.za/viewtopic.php?p=561442&sid=bfd17cfabed13005	http://www.savic.ac.za/backend/docs/Vaccinators%20Manual%20-%202005%20part2.pdf
http://search.sabinet.co.za/images/ejour/m_samj/m_samj_v98_n1_a13.pdf	http://www.savic.ac.za/backend/docs/Vaccinators%20Manual%20-%202005%20part3.pdf
http://www.atlanta.sundaypaper.com/More/Archives/tabid/98/articleType/ArticleView/articleId/4736/Whooping-cough-makes-a-comeback.aspx	http://www.savic.ac.za/news/newsarticle.php?neseqn=53&p=3&search=
http://www.biobaba.co.za/index.php?route=information/information&information_id=10	http://www.sundaypaper.com/Blogs/TheOldStaffBlog/tabid/138/articleType/ArticleView/articleId/4736/Whooping-cough-makes-a-comeback.aspx
http://www.boerevryheid.co.za/forum/showthread.php?p=142657	http://www.themercury.co.za/index.php?fSectionId=284&fArticleId=3250813
http://www.capegateway.gov.za/Text/2003/intradermal_bcg_immunisation.pdf	http://www.trudonwiki.co.za/wiki/result.htm?txtSearch=&offset=0&hits=10&navigatorStr=wikilocationsnavigator~California%23wikilocations%23%5ECalifornia%24%7Ccategorynavigator~Living+people%23wikicategories%23%5E%22Living+people%22%24%7Ccategorynavigator~People+in+alternative+medicine%23wikicategories%23%5E%22People+in+alternative+medicine%22%24&removeNavigator=&portalSearch=healthAndFitness
http://www.capetimes.co.za/index.php?fSectionId=3531&fArticleId=qw988087021538L520	http://www.twhl.co.za/journals.php?id=6226
http://www.cornesmith.com/content/blog-comment-re-mercury-vaccines-was-replaced-something-even-more-toxic	http://www.pampers.co.za/en_ZA/forumHome?t=39240&start=15&sid=72195461563859c851c39c3a42f7da48
http://yoursmile.co.za/mercury-toxicity-mainmenu-76/63-thimerosal-and-autism-goes-to-court.html	http://www.parent24.com/Content/School_7-12/care_nutrition/184/a13e01ed5a2f436d87c476ead5cf1bde/14-10-2009-12-03/When_should_I_register_my_child
http://www.dis-chem.co.za/article.asp?articleID=743	http://www.news24.com/MyNews24/Letters/Much-ado-about-measles-20091016
http://www.doh.gov.za/docs/factsheets/pharma/primary/phc08_222-261.pdf	www.sastm.org.za/.../New%20look%20at%20pertussis%20epidemiology.pdf
http://www.doh.gov.za/docs/misc/chap11.doc	http://www.vocfm.co.za/index.php?&section=news&category=&vocnews=&article=28739
http://www.edoc.co.za/modules.php?name=News&file=article&sid=1660	http://www.wantitall.co.za/Don-t-Vaccinate-Before-You-Educate__0967044421
http://www.etv.co.za/forum/comments.php?DiscussionID=3613	http://www.wantitall.co.za/Vaccine-Update-2009-Are-Vaccines-Safe__B002ON3EOA
http://www.hayesfamily.co.za/blog/?p=1187	http://www.womenattalk.co.za/index.php?option=com_content&task=view&id=24&Itemid=24
http://www.health24.com/news/Columns/1-4411,53111.asp	http://www2.loot.co.za/shop/product.jsp?lsn=0979020514
http://www.healthycells.co.za/articles.asp?id=35	winning.co.za/vaccination.htm
http://www.magazines.co.za/issue/2008100114.html	
http://www.mg.co.za/article/2008-08-05-to-vaccinate-or	

APPENDIX C

A List of Included Websites for MSN-Bing

MSN-Bing
http://twhl.co.za/journals.php?id=6226
http://www.biobaba.co.za/index.php?route=information/information&information_id=10
http://www.capetimes.co.za/index.php?fSectionId=3531&fArticleId=qw988087021538L520
http://www.dischem.co.za/article.asp?articleID=743
http://www.doh.gov.za/docs/factsheets/pharma/primary/phc08_222-261.pdf
http://www.doh.gov.za/docs/misc/chap11.doc
http://www.durban.gov.za/durban/government/media/gazette/2008/03-october-2008/Metro8Eng.pdf
http://www.health24.com/news/Columns/1-4411,53111.asp
http://www.health24.com/news/General_health/1-915,41168.asp
http://www.medunsa.ac.za/candw/conf02/background/WHOHQG_Injection%20Safety.ppt
http://www.mg.co.za/article/2008-08-05-to-vaccinate-or
http://www.news24.com/Content/Africa/News/965/1c04b88fb5434d33a5ddc5208bba3bee/08-10-2007-03-20/Polio_outbreak_hits_Nigeria
http://www.parent24.com/Content/School_7-12/care_nutrition/184/a13e01ed5a2f436d87c476ead5cf1bde/14-10-2009-12-03/When_should_I_register_my_child
http://www.samj.org.za/index.php/samj/article/viewFile/8/410
http://www.savic.ac.za/backend/docs/AustImmMyths.pdf
http://www.savic.ac.za/backend/docs/How%20to%20gather%20information.pdf
http://www.savic.ac.za/backend/docs/Vaccinators%20Manual%20-%202005%20part2.pdf
http://www.savic.ac.za/backend/docs/Vaccinators%20Manual%20-%202005%20part3.pdf
http://www.savic.ac.za/backend/docs/Vaccinators%20Manual%20-%202005%20part4.pdf
http://www.savic.ac.za/news/newsarticle.php?neseqn=53&p=3&search=

APPENDIX D

A List of Included Websites for YAHOO

YAHOO	
http://www.cheeseslave.com/vaccines-responsible-for-the-decline-of-mortality/	www.savic.ac.za/news/newsarticle.php?neseqn=53&p=3&search=
en.wikipedia.org/wiki/Barbara_Loe_Fisher	www.twhl.co.za/journals.php?id=6226
health.groups.yahoo.com/group/ffabsa/message/299?...&l=1	www.winning.co.za/vaccination.htm
http://6000.co.za/2009/10/11/harper-i-didnt-say-that/	www.savic.ac.za/backend/docs/Vaccinators%20Manual%20...
iol.co.za/general/avant_newsview.php?click_id=31&...	www.savic.ac.za/backend/docs/How to gather information.pdf
parent24.com/Content/School_7-12/care_nutrition/184/...	www.savic.ac.za/news/newsarticle.php?neseqn=53&p=3&search=
samuslims.co.za/index.php?... &view=category&id=35&Itemid=18	
savic.ac.za/backend/docs/A case for childhood immunisatio...	
savic.ac.za/backend/docs/Vaccinators Manual - 2005 part3.pdf	
savic.ac.za/backend/docs/Vaccinators Manual - 2005 part4.pdf	
www.africanewssearch.com/index.php?archive=1&...&year=2006	
http://www.biobaba.co.za/index.php?route=information/information&information_id=10	
www.birthworks.co.za/talk/general/topic-6/page-1/?recent=63	
www.boerevryheid.co.za/forums/showthread.php?t=10512 - 82k	
www.doh.gov.za/docs/factsheets/pharma/primary/phc08_222...	
www.doh.gov.za/docs/misc/chap11.doc	
www.edoc.co.za/modules.php?name=News&file=article&sid=1660	
www.etv.co.za/forum/comments.php?DiscussionID=1907	
www.etv.co.za/forum/comments.php?DiscussionID=4844	
www.hayesfamily.co.za/blog/?p=1187	
www.health24.com/news/General_health/1-915,36158.asp	
www.iol.co.za/index.php?set_id=1&click_id=86&... -	
www.mg.co.za/article/2008-08-05-to-vaccinate-or -	
www.news24.com/Content/Africa/News/965/1c04b88fb5434d33a5ddc5	
www.news24.com/SciTech/News/Autism-has-complex-roots	
www.samj.org.za/index.php/samj/article/viewFile/8/410	

Annexure A

UNIVERSITY OF LIMPOPO
Medunsa Campus



MEDUNSA RESEARCH & ETHICS COMMITTEE
CLEARANCE CERTIFICATE

P O Medunsa
Medunsa
0204
SOUTH AFRICA

MEETING: 09/2009
PROJECT NUMBER: MREC/PH/176/2009: PG

Tel: 012 - 521 4000
Fax: 012 - 560 0086

PROJECT :

Title: Internet-based anti-vaccination lobbying in South Africa

Researcher: Ms M Moloi
Supervisor: R.J Burnett
Department: Epidemiology
School: Public Health
Degree: MPH

DECISION OF THE COMMITTEE:

MREC approved the project.

DATE: 26 November 2009



Nbrahim
PROF N EBRAHIM
DEPUTY CHAIRPERSON MREC

Note:

- i) Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee.
- ii) The budget for the research will be considered separately from the protocol. PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

African Excellence - Global Leadership