A Normative Analysis of Mandatory Childhood Vaccination for Measles.

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A research report submitted to the Faculty of Health Sciences, University of Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree Master of Science in Medicine (Bioethics and Health Law).

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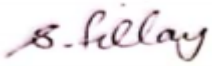
20 April 2021

Declaration

I, Subeshini Pillay, declare that this Research Report is my own, unaided work. It is being submitted for the Degree of Master of Science in Medicine (Bioethics and Health Law) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Signature: 

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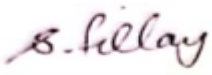
Signature: 

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Dedication

I dedicate this Masters degree to my husband, Mr Dhevan Pillay, for always believing in me and for helping me realise my aspirations.

"Thank you for being you, for sharing your love with me...for inspiring me to accept myself...for helping me see the unique beauty in imperfection…for showing me that love is something you do; something not just to be said, but also to be shown."

Steve Maraboli

Abstract

The arguments ‘for’ and ‘against’ compulsory childhood measles vaccinations have been a topic of interest recently following the multitude of measles outbreaks worldwide. While the large number of deaths accompanying these outbreaks is due to several reasons, vaccine hesitancy seems to be the biggest cause. Intentional failures to vaccinate stem predominantly from misinformation concerning the safety of measles vaccines and from religious convictions. The focus of this study is to determine whether it is ethically acceptable to restrict parental autonomy for the well-being of the greater population. In other words, should childhood measles vaccination be mandatory?

This is a purely normative study. The research method comprised a literature search on the primary sources and research articles on the causes of measles outbreaks and how they can be prevented were reviewed. From these sources I developed arguments in support of the thesis using ethical theories and legal principles.

This research defends main arguments grounded on utilitarianism, Mill’s harm principle, ubuntu and John Rawls’ theory of justice that support mandatory vaccination. Firstly, the state should oblige parents to vaccinate their children to protect them and others from the harmful effects of measles. Secondly, the state should secure herd immunity as a public good by ensuring mass cooperation. By providing an analysis of multiple moral frameworks and addressing obvious objections, this report results and concludes in a normative argument for policy makers to implement mandatory childhood measles vaccination to increase levels of herd immunity, and eventually lead to the eradication of measles.

Word count: 249

List of Acronyms

Acquired Immunodeficiency Syndrome: AIDS

American Academy of Paediatrics: AAP

Convention on the Rights of the Child: CRC

European Centre for Disease Prevention and Control: ECDC

Measles, Mumps and Rubella: MMR

National Institute for Communicable Diseases: NICD

Nuffield Council of Bioethics: NCOB

Principle of Least Restrictive Alternative: PLRA

Subacute Sclerosing Panencephalitis: SSPE

The Strategic Advisory Group of Experts: SAGE

United Nations Children's Fund: UNICEF

United States Centers for Disease Control and Prevention: CDC

United States Food and Drug Administration: FDA

United States of America: USA

World Health Organization: WHO

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"I wish we could have state-of-the-art hospitals in every corner of the earth... but realistically, it's going to be a while before that can happen. But we can immunise every kid on earth, and we can prevent these diseases. It's only a matter of political will, a little bit of money and some systems to do it". By Seth Berkley (Kelland, 2012).

Chapter One: Introduction and Overview of the Research Study

1.1. Background

"Measles is one of the most contagious diseases of humans, and in the absence of vaccination, about 95% of individuals would be infected with measles virus by 15 years of age" (World Health Organization [WHO], 2017).

Measles is an acute viral infection that is passed from person to person. It is passed through sneezing, coughing, or from contact with droplets from the nose, mouth, or throat of infected persons (WHO, 2019a). The droplets from infected persons can linger for up to 2 hours on surfaces and in the air (United Nations Children's Fund [UNICEF], 2019). Measles can therefore be spread in public areas without person-to-person contact. As such, it has been shown that the measles virus can be passed inside airports (Vega et al., 2014), aboard aircrafts (Sotir et al., 2016; Hoskins et al., 2011), as well as at venues like Disneyland theme parks (Zipprich et al., 2015). It is estimated that 90% of non-immune individuals will contract measles if exposed to it (European Centre for Disease Prevention and Control [ECDC], 2020), and that one person with measles can infect an average of 12 to 18 others (Guerra et al., 2017; Roberts, 2020), resulting in the exponential spread of the virus.

Measles infects the respiratory system first before spreading throughout the body (WHO, 2019a). Measles-related deaths result from serious complications, like pneumonia, severe diarrhoea and, thus dehydration, ear infections, or encephalitis (an infection that causes brain swelling) (ibid).

In 2015, there were an estimated 134 200 deaths from measles worldwide, a 79% decline since 2000 (ibid). But, instead of decreasing further, measles deaths have been on the rise. According to the WHO and the United States Centers for Disease Control and Prevention [CDC], there were more than 140 000 deaths from measles in 2018, most of whom were children under the age of five (WHO, 2019c). Interim reports demonstrate that there were 690 000 incidents of measles in the first eleven months of 2019, greater than 200% increase over the same period in 2018 (UNICEF, 2019).

Prior to the invention of measles vaccines, measles was responsible for approximately 2.6 million deaths annually (WHO, 2019a). Widespread use of the vaccine has drastically reduced the number of deaths per year. However, recent outbreaks suggest that this preventative intervention is lacking in many parts of the world. Outbreaks occur when less than 95% of a population has immunity to measles (UNICEF, 2019). Herd immunity or community immunity takes place when a sufficient number of people are immune to a disease [usually by immunisation], thereby protecting those who are not immune (Meissner, 2015). Herd immunity, therefore, protects infants who are too young to be vaccinated, immuno-compromised individuals, and those who choose not to be vaccinated. Those who refuse vaccination on the grounds of belonging to communities with good herd immunity are termed ‘free riders’. Hence, free riders are people who benefit from a collective action without contributing to it (Purdy & Siegel, 2012).

The action of free riders, unfortunately, contributes to a concept called ‘vaccine hesitancy’. Vaccine hesitancy is listed by the WHO as one of ten biggest health threats of 2019 (WHO, 2019b), and it occurs when individuals either refuse or delay vaccines in spite of available services (Macdonald, 2015). It is the reason behind the United States of America [USA] reporting its highest number of measles cases in 25 years in 2018, and for four countries in Europe, (Greece, Czech Republic, Albania, United Kingdom), losing their measles elimination status in the same year (UNICEF, 2019).

Promoting vaccination is an important goal in public health policy. According to Blacksher (2018), public health focuses on using state authority to promote the prevention of disease rather than its treatment. It also promotes the health of populations rather than of individuals (ibid). Thus, public health policies or mandates often rely on the ethical framework of utilitarianism in that they choose the best possible outcome for the greatest number of people, despite individual needs and preferences. Rule utilitarianism, in particular, justifies mandatory vaccination as vaccinating one’s child (as a rule), to contribute to community immunity despite small risks of injury from the vaccine, produces the best outcome for society. Hendrix et al. (2016) draw on rule utilitarianism when they call for urgent policy changes, surrounding autonomy and parental rights versus the greater good of community immunity, to curb outbreaks in the USA.

Other arguments in support of measles mandates rely on the moral principles of beneficence, including the best interests principle, non-maleficence, and justice. Dawson, in making his case for vaccination, uses all these principles (Dawson, 2011). Apart from assessing the benefits and harms of vaccination, Dawson states that an important moral consideration is the avoidance of harm to others, and he

uses John Stuart Mill's harm principle which states: "Individuals should be free to do as they wish unless their actions might cause harm to others" to justify his argument (ibid, p.1030). Concerning the best interests of the child, Dawson argues that the onus lies with the parents to show why vaccination should be refused when there is a significant risk of measles infection (ibid). Finally, Dawson uses the principle of justice to provide reasons to redress the issue of inequitable global health (ibid). Dawson states that vaccination is cheap and therefore an important instrument in preventing deaths globally (ibid). However, some poor countries still cannot afford to provide the measles vaccines to their population (ibid). Dawson suggests that mandating measles vaccination worldwide should encourage richer countries to help the poorer ones (ibid). Field and Caplan (2008); Giubilini (2019b); and Giubilini et al. (2018), also present compelling arguments for compulsory vaccination, by demonstrating the importance of certain ethical principles and theories (that is, nonmaleficence, beneficence, justice, utilitarianism, and contractualism) over the competing value of autonomy.

1.2. Research Question

Should childhood measles vaccination be mandatory?

1.3. Rationale for the Study

Non-vaccination of preventable diseases, like measles, is a major public health threat. As reflected in the preceding content:

- measles is very contagious and has serious ramifications (WHO, 2019a),
- there is a gradual increase in the number of cases and associated mortality (UNICEF, 2019),

- herd immunity is diminishing, resulting in nations losing their measles-free status (ibid), and,
- vaccine hesitancy is on an upward trend (WHO, 2019b), making the risk of infection greater.

There is no treatment for measles (WHO, 2019a). However, vaccines can be used to prevent it. Research justifying the need for increased vaccination rates is pertinent and must remain ongoing, for as long as is needed, to aid its application and to realise its long-term benefits.

There is a vast amount of literature available on the ethics surrounding immunisation and while many scholarly contributions to this discipline ethically debate 'for' or ‘against’ mandatory vaccination, this research undertaking reinforces the need for mandatory childhood measles vaccination based on both moral frameworks and scientific evidence. Additionally, applying ubuntu ethics to the notion of vaccine hesitancy provides a novel aspect to my research.

I decided not to base this study on a specific country as we live in an increasingly mobile world with diseases frequently crossing national borders. Thus, I would like the focus and outcome of this study to be broadly applicable globally in a combined effort to eradicate measles.

1.4. Thesis

I argue that childhood measles vaccination should be mandatory to prevent outbreaks and, eventually, to eradicate the disease.

1.5. Research Aim

To defend the thesis that childhood measles vaccination should be mandatory.

1.6. Research Objectives

1. To evaluate the morally relevant consequences of measles.

2. To analyse the ethical conflict between a parent and the state in the surrogate decision-making process.

3. To analyse the ethical conflict over the distribution of the benefits and burdens of vaccination.

1.7. Research Design

A purely normative research study was conducted to defend my thesis.

1.8. Research Method

Considering I chose to address a type of research question that is aimed at improving something based on evaluating the current situation, and given the time available, a review of normative literature was most appropriate for this analysis.

A search through Google Scholar, PubMed, and ResearchGate was performed to retrieve publications on the ethical frameworks used for vaccination policies, the safety of vaccines, the costs related to treating and preventing measles, and the reasons for low vaccination rates and measles outbreaks. Relevant findings, from journal articles as well as from books and book chapters, were evaluated and discussed. For example, the countries that were selected for the cost analysis in chapter two were based on the information available in the literature. Definitions and clarification of concepts are also provided.

Key words and phrases used in the literature search included: measles, measles outbreaks, safety of vaccines, consequences, mandatory measles vaccination, herd immunity, vaccine hesitancy, utilitarianism and measles, ethics in vaccines, moral

issues in vaccines, public health ethics and measles, vaccination and case law, ubuntu and vaccination, African ethics, and Rawls' social justice and vaccination.

1.9. Assumptions

For the purpose of this study, the following assumptions are made:

1. the term 'mandatory' shall refer to 'obligatory', 'compulsory' or 'that required by law', as defined in the Cambridge dictionary (Cambridge University Press, 2020).
2. vaccine hesitancy shall refer only to the parents who completely refuse measles vaccines for their children and not to individuals who refuse vaccination for themselves.
3. The term 'justice' shall refer to 'distributive justice', as distributive justice is concerned with the distribution of burdens and benefits in a society (Lamont & Favor, 2018).

1.10. Argumentative Strategy

To defend my thesis statement, I claim that:

1. measles is harmful and potentially life-threatening,
2. measles places a financial burden on livelihoods and the health resources of a country,
3. the state is justified to override a parent's decision to refuse vaccination on behalf of a child, and
4. that all members of a nation should bear the burdens of vaccination equally.

The three objectives and the emerging claims are examined and achieved using scientific findings, logic, and ethical frameworks that favour mandatory vaccination. I

conclude that mandatory childhood measles vaccination is the only effective method to maximise vaccination rates, affording society the best protection from the harms of measles. Subsequently, it should form part of global immunisation regimes and strategy to help eradicate the disease.

1.11. Limitations

A limitation of my study is that my analysis is not specific to one country. Thus, the recommendations resulting from the study are likely to be general and not context specific. However, in order to encourage global elimination and eventual eradication of measles and to improve awareness of the health and economic impact of measles to governments, individuals, industry, and health care professionals, the scope of the study has to be broad.

1.12. Overview of the Chapters

Chapter One: Introduction and Overview of the Research Study

The introductory chapter describes the severity of the recent measles outbreaks and it briefly considers the ethics surrounding vaccination. An outline of the study and the research method is provided.

Chapter Two: The Morally Relevant Consequences of Measles to Public Health Policy

In this chapter, I rely on the consequentialist theory of utilitarianism as utilitarianism deems an action morally correct if it produces good outcomes. I apply utilitarianism to evaluate the morally relevant consequences of measles, which can be divided into two: the health risk it poses, both to an individual and collectively to the greater public, and the financial burden it creates, in the short-term and in the long-term. I

demonstrate that mandatory vaccination programmes can prevent childhood deaths and disabilities, help to strengthen healthcare systems in the short-term and in the long-term, and improve economic stability.

Chapter Three: The ethical conflict between a parent and the state in the surrogate decision-making process

I begin this chapter by examining the rationale behind vaccine hesitancy. I then apply John Stuart Mill's harm principle to analyse one of the two ethical dilemmas arising from vaccine hesitancy. This is the conflict between a parent and the state in the surrogate decision-making process. I demonstrate that the state has a moral obligation to protect a child's right to healthcare. The counter-arguments to my position are contended with in this chapter as well.

Chapter Four: The ethical conflict over the distribution of the benefits and burdens of vaccination

Using ubuntu and John Rawls' theory of justice as fairness I analyse the second ethical dilemma resulting from vaccine hesitancy. This is the conflict over the distribution of the benefits and burdens of vaccination. I demonstrate that the harmonious relationship between individuals encourages co-operative engagement to support a shared responsibility for a measles free society.

Chapter Five: Conclusions and Recommendations

In the final chapter, I proceed to summarise the preceding discussions and conclusions, showing that my thesis holds true and that I have achieved the aim of the research. I also make recommendations to hasten the eradication process.

Chapter Two: The Morally Relevant Consequences of Measles to Public Health Policy

2.1. Introduction

In line with the first objective, I posit that the health-related and economic consequences of measles are morally relevant to public health officials when proposing strategies to include immunisation into a health system. I claim that measles is dangerous and potentially life-threatening. I also claim that it is more expensive to treat measles and its related sequelae than to prevent it with immunisation.

The moral theory of utilitarianism forms the foundation of my claims. I apply this theory to evaluate the morally relevant consequences of measles, which can be divided into two: the health risk it poses, both to an individual and collectively to the greater public, and the financial burden it creates, in the short-term and in the long-term. I demonstrate that mandatory vaccination programmes can prevent childhood deaths and disabilities, help to strengthen healthcare systems in the short-term and in the long-term, and can improve economic stability.

2.2. Utilitarianism

Utilitarianism emerged as a new ethical theory during the Industrial Revolution (Rachels & Rachels, 2019). Jeremy Bentham, in particular, expressed a new concept of morality: ‘to make the world as happy as possible’ (ibid). He believed in the “Principle of Utility”, that is, “to produce the greatest total balance of happiness over unhappiness, or of pleasure over suffering” (ibid, 9th edition, p.101).

The classical version of the theory or classical utilitarianism was developed further and defended by two other philosophers, John Stuart Mill and Henry Sidgwick, in addition to Jeremy Bentham (Rachels & Rachels, 2019). The three essential elements of classical utilitarianism comprise: a) the goodness of an action is determined by the consequences of the action; b) the right action is that which brings about the greatest happiness for the largest number of individuals; and, c) when assessing the net utility, everyone's happiness counts equally (ibid).

A problem arose with the classical theory. If only the consequences of an action mattered, then a wrong or harmful action could be justified if it produced the greatest good at that moment, for example, stealing from the rich to feed the poor. Thus, a new version of utilitarianism emerged, called rule utilitarianism and the classical theory was referred to as act utilitarianism (Rachels & Rachels, 2019). In rule utilitarianism, individual actions are not judged according to the 'Principle of Utility'. Instead, individual actions are gauged depending on if they follow the rules that lead to maximum happiness (ibid).

According to Savulescu et al. (2020), there are seven 'rules of thumb' for a utilitarian: The first is to save the largest number of beings. A utilitarian considers the number of lives that will be saved by evaluating an action or inaction. Secondly, the length of time that a benefit is enjoyed matters to a utilitarian. For example, utilitarianism is more likely to approve saving a young person because an older person usually dies sooner. The third rule deals with the quality of life. A utilitarian favours the well-being of someone and not just how long the person lives for. Fourthly, actions (commissions) and inactions (omissions) are considered equally. Policy makers are held accountable for the things they do as well as the things they neglect. An example is when policy makers fail to implement a policy to avoid preventable

deaths, it is seen as murder to a utilitarian. Fifthly, all the outcomes, including the direct and indirect or short-term and long-term, are relevant. Therefore, consideration is given to others as well as to the person directly affected by an action. This is referred to as a 'social benefit'. The sixth rule of thumb concerns responsibility. A utilitarian holds a person morally responsible for implementing a flawed policy that produces an unsatisfactory outcome. Lastly, a utilitarian strives to bring about the greatest good without bias of any sort. For example, a utilitarian may disagree with a politician's psychologically easier decision to impose a severe lockdown during the COVID-19 pandemic. Lives threatened by the pandemic are saved whilst the reduced access to health care and the economic downturn caused by the lockdown can result in a larger loss of lives in the future (Savulescu et al., 2020).

Applying utilitarianism to the morality of measles

A utilitarian considers how measles impacts the well-being and happiness of individuals. There are many ways in which measles affects people. Therefore, a utilitarian usually evaluates a recommended action by weighing its advantages and disadvantages. The action that increases the advantages, or net utility or happiness, is judged to be the right action. I will apply this technique to two questions relating to measles. The first question concerns well-being: how does measles affect individuals? The second question concerns financial implications: is it cheaper to treat measles or to prevent measles?

I will consider these concerns separately.

1) **How does measles affect the well-being of individuals?**

The main harms caused by measles are sickness and death.

About 30% of people with confirmed measles experience at least one complication arising from measles (CDC, 2019a). Medical complications occur mainly in young children under the age of five and in adults older than twenty (ibid). Complications of measles include, ear infection (about 1 in 12 people), diarrhoea (about 1 in 12 people), encephalitis (1 in every 1000-2000 cases of measles), and, pneumonia (up to 1 in 16 people) (University of Oxford, 2019). Encephalitis can result in brain damage, and, very rarely, measles can cause SSPE [subacute sclerosing panencephalitis], which is a persistent viral infection (ibid). SSPE affects 1 in every 100 000 people and it progressively destroys the central nervous system (ECDC, 2020). It causes epilepsy, loss of motor control, dementia, and, eventually, death (University of Oxford, 2019). The onset of SSPE is on average seven years after the measles episode (ECDC, 2020).

Measles in immunocompromised individuals, like with acquired immunodeficiency syndrome [AIDS], lymphomas and certain leukaemias, can be prolonged and severe (CDC, 2015). Measles can also be severe in malnourished children especially in those with a vitamin A deficiency, and it is the primary cause of blindness in children living in Africa (ibid). Pregnant women who contract measles are at a higher risk of having spontaneous abortions, premature deliveries, and low birth-weight babies (ibid). There are no congenital malformations associated with measles in pregnancy, but the pregnant women themselves are at risk of complications like encephalitis and pneumonia (Rosa, 1998).

Measles-related deaths occur mainly due to secondary bacterial infections (ibid). Approximately 60% of deaths is attributed to pneumonia (CDC, 2015). It is also believed that the measles virus suppresses and damages the immune system response and immune memory of individuals, making them more susceptible to

other communicable diseases as well as to infectious pathogens they have encountered in the past (University of Oxford, 2019). This effect can last for as many as 3 years after the recovery from measles (ibid). Recently, Mina et al. (2019) found that the measles virus destroyed 11 to 73% of the antibody stores of 77 children who were unvaccinated and had contracted measles naturally. In contrast, this effect was not found in children who were vaccinated with the MMR [Measles, Mumps, Rubella] vaccine (ibid).

According to the CDC and the WHO, more than 140 000 measles-related deaths occurred in *all* regions of the world in 2018 (WHO, 2019c). In the first quarter of 2019, 112 163 measles cases were reported by 170 countries (WHO, 2019d). This was an increase of almost 300% as compared to the first three months of 2018 (ibid). The death rate is approximately between 3 and 6%, increasing up to 30% during severe outbreaks, in developing countries (Roberts, 2020).

Does measles offer any benefits? Natural measles infection is said to confer lifelong immunity (CDC, 2019a). As a result, once individuals contract measles, there is no risk of contracting the disease again.

What can be concluded about the effects of measles on the health of individuals? Considering the harms and benefits of measles, a utilitarian would agree that the long-term health risks and life-threatening risks from contracting measles outweigh the lifelong immunity it offers. In addition, a utilitarian would recognise that measles carries health risks to both individual persons and to society at large. As mentioned in the previous chapter, measles is highly contagious. Subsequently measles outbreaks are avoided when the level of herd immunity is sufficient to prevent transmission if exposure occurs. Thus, the greatest good

(protection from measles) for the greatest number of individuals can only be achieved if everybody, or almost everybody (95%), in a community has adequate immunity. Mandatory measles vaccination, which would be advocated by rule utilitarianism, would guarantee high levels of immunity because only a small number of people (the immunocompromised and babies up to 15 months, since this is the age range for the administration of the first dose of a measles vaccine) will be permitted to forfeit vaccination.

How would a mandatory vaccination programme be of benefit? If childhood immunisation against measles is made mandatory, it would satisfy all seven rules of utilitarianism (Savulescu et al., 2020) mentioned earlier, in that it would make certain that a greater number of individuals are protected; it would ensure that the benefit is enjoyed over a long period, from childhood into adulthood; it would render a better quality of life by avoiding the long-term complications of measles and by not compromising immunity to previously encountered infectious diseases; it would provide a social benefit by increasing the level of herd immunity and, hence, increase protection; and it would evade bias by affording protection to identifiable and statistical lives alike. This social outcome of vaccination, a healthier society, would indicate that the decision makers embraced a moral responsibility to enact or implement a policy that maximises good.

Further, mandatory measles vaccination, by guaranteeing high levels of herd immunity and affording maximum protection, prevents measles outbreaks from occurring. Subsequently, if there are no outbreaks, there are no deaths.

2) Is it cheaper to treat or to prevent measles?

How is measles treated and what are the costs? There is no specific treatment [or cure] for measles (WHO, 2019a). Only supportive care with antipyretics and adequate fluid intake will assist recoveries (ECDC, 2020). Bacterial infections, like pneumonia, are treated with antibiotics, while blindness and eye damage can be mitigated with vitamin A supplements (WHO, 2019a).

Recent studies in some parts of the world have shown that the cost of treating measles has an economic impact:

- In 2006, a measles outbreak in Germany cost on average US$ 680 per case (WHO Europe, 2013). It also caused 311 scholars to miss 2 854 days at school while 30 adults missed 301 days from work (ibid).

- Between the years 2002 to 2003, the national health service in Italy spent approximately US$ 22.9 to US$ 29 million treating measles, with hospital admissions amounting to US$ 11.5 million for 5 154 individuals (ibid). Up to 1.9 million children could have been immunised against 3 infectious diseases (measles, mumps and rubella) with the same funds (ibid).

- A study comparing costs in the Netherlands, United Kingdom and Canada found that the average cost of a measles case was US$ 276, US$ 307 and US$ 254 respectively (Carabin et al., 2002).

- During the 2011-2012 outbreak in Romania, US$ 439 was spent on each of the 12 427 measles cases (Njau et al., 2019). Households spent an average of US$ 133.84 per child with measles, while the health sector incurred the 70% remaining cost (ibid). Approximately 36% of families had to take loans to pay for medicines and

transport-related costs, and this accounted for 3% of the household annual income (ibid).

- In Ethiopia, a study revealed a similar situation to that in Romania, where the health department incurred most (80%) of the measles outbreak cost compared to the household (ibid).

- A Latin American study showed that on average a measles case cost US$ 190 (ibid).

These are substantial amounts of money, and in addition to the treatment costs, financial implications of the complications arising from measles were also analysed. It was found that, on average, each case of encephalitis, including sequelae, cost US$ 50 500 in the Netherlands, US$ 70 059 in the United Kingdom, and US$ 132 487 in Canada, while the average cost of an associated febrile convulsion, including sequelae, was US$ 6 535, US$ 9 173, and US$ 9 544 in the same countries respectively (Carabin et al., 2002). These costs to society (which comprise of days off from work, the costs of over-the-counter medicines, doctor visits, and social costs for the long-term effects) are comparatively higher to that of adverse effects resulting from immunisation (ibid). The average cost of an adverse reaction from vaccination was US$ 1.55 in the Netherlands, US$ 2.08 in the United Kingdom, and US$ 1.58 in Canada, with the most common adverse effect being a fever (approximately 85% in each of these three countries) (ibid). This is 150 times less than the average cost of one measles episode (ibid).

How is measles prevented and what are the costs? Vaccination is the only effective tool to prevent measles (ECDC, 2020). Routine childhood measles vaccination, and mass immunisation campaigns, are important methods to decrease

global mortality rates (ECDC, 2020). It is recommended that two doses of vaccines be given to guarantee immunity and avoid outbreaks, as approximately 1 in 7 vaccinated children do not acquire immunity from the first dose (ibid).

According to the WHO, the cost to vaccinate a child against measles is as little as US$ 1 and costs slightly more if incorporated into a rubella vaccine (WHO, 2019a). A US study, cited in Remy et al (2015), found that vaccinating a child with a measles vaccine cost 23 times less than treating a child with measles; and that 21 US dollars is saved through medical costs for every US dollar spent on an MMR vaccine (Remy et al., 2015).

Research shows that prevention systems in Europe account for less than 3% of the total health expenditure (Carroll et al., 2015). The total spending on vaccines in France in 2013, for example, constituted approximately 0.3% of the total healthcare costs, while a study in 2014 found that the costs per person to be fully immunised according to the national guidelines in France ranged from US$ 982 to US$ 3 762, covering 12 to 16 diseases (ibid). Additionally, research showed that these vaccination costs were considerably lower than that associated with the treatment of chronic illnesses like diabetes or hypertension (ibid).

What can be concluded about the cost to treat measles compared to the cost to prevent measles? Considering the cost analysis of both interventions, a utilitarian would choose to prevent measles rather than to treat it. Being concerned with the greatest net utility of an action, a utilitarian would argue that treating measles negatively impacts individual households, society, and the national health resources, and therefore fails to provide the greatest happiness for the greatest number. The cost of prevention through immunisation, on the other hand, would

satisfy a utilitarian's viewpoint. Further, there are long-term and short-term financial implications associated with treating measles. A measles infection or outbreak requires an immediate monetary response, while the complications from measles need a continuous supply of funds to sustain the treatment. These repercussions would cause distress instead of enjoyment to a utilitarian and, therefore, a utilitarian would rather choose prevention of measles over treatment. Furthermore, enforcing mandatory measles vaccination would ensure that prevention strategies are executed leaving a minimal possibility for a measles outbreak to arise.

2.3. The moral relevance of the consequences of measles

According to Emmons, "The moral relevance of a given fact to a choice among a range of alternatives is a function of one's ultimate standards for right or wrong" (Emmons, 1967, p.225). He also states that "questions of relevance in ethics are moral quandaries which cannot be resolved by appealing to canons of logical consistency alone" (ibid, p.224). This means that governments, when dealing with the consequences of measles, must appeal not only to the facts presented, but also to their moral judgements. They must determine whether their subsequent course of action is right or wrong. Or, rather, they should ask, 'what ought to be done?'. Emmons uses an example, "To assert that distributive justice is morally relevant is to say that we have a prima facie obligation to allocate goods and/or evils equitably" (ibid, p.228). Likewise, in this context, to assert that the health risk or danger of measles is morally relevant is to say that governments have a prima facie obligation to prevent measles; or, to assert that the financial burden on the health system is morally relevant is to say that governments have a prima facie obligation to reduce the costs.

From the preceding deliberations, it is evident that measles has detrimental effects on the health of society, and on the resources of a country's healthcare system. Each year thousands of deaths occur worldwide, and millions of US dollars is spent to treat and control measles. Is this justified when a preventative intervention is available? According to a utilitarian, this is not justified. Utilitarianism knows no national boundaries (Savulescu et al., 2020). Every life in the world matters. Every death is ethically relevant (Savulescu et al., 2020).

Vaccines have vividly displayed their benefits. They helped to rid the world of smallpox and rinderpest, two powerful and destructive pathogens, already. Globally, vaccines prevent approximately 300 000 cases of diphtheria, 600 000 cases of paralytic poliomyelitis, one million cases of pertussis, 2 million cases of neonatal tetanus, and 2.7 million cases of measles every year (Remy et al., 2015). Vaccination has decreased childhood deaths and prevented numerous birth defects and disabilities (Bustreo & Kieny, 2016). Vaccines can also safeguard those with certain comorbidities. Older people with diminishing immunity and chronic conditions, like those emanating as a result of an unhealthy lifestyle, are more at risk of contracting infectious diseases (Quilici et al., 2015). Two recent studies deduced that measles vaccination can offer protection by not compromising immunity against other infectious organisms previously encountered, like Influenza virus, Adenovirus C, Enterovirus A, B, C, and D, and S. aureus for example, too (Mina et al., 2019; Petrova et al., 2019). This reinforces the significance of measles vaccination in childhood, as comorbidities usually develop later in one's life.

Despite this valuable health endeavour (Andre et al., 2008; Doherty et al., 2016; Bloom et al., 2005; Wilder-Smith et al., 2017), however, measles coverage is

dropping, and the resultant measles outbreaks are a health threat to the population, and a financial burden to governments worldwide.

Evidence shows that improved childhood health can positively influence economies. Bloom et al. (2005, p.33) found that immunisation aids the “educational attainment, labour productivity, income, savings, investment, and fertility” of individuals. For example, a study in South Africa found that the educational achievements obtained were greater if immunised against measles at 12 months of age (Anekwe et al. 2015). Anekwe et al. (2015) believe that their finding is plausible because measles vaccination prevents blindness, which critically hampers learning, especially in communities where schools for the blind are not available (ibid). Brain damage from encephalitis, hearing loss from middle ear infections, and malnourishment from diarrhoea, all of which affect learning abilities, are also prevented through measles vaccination (ibid). Furthermore, disease and malnourishment in children aged 5 years and under cause tiredness and lack of enthusiasm for play, exercise, and learning, culminating in poor physical and intellectual development (ibid).

Good health outcomes and subsequent educational benefits are, therefore, significant advantages of vaccination and represent key prospects of measles immunisation. Education, like health, is a basic civil right (United Nations General Assembly, articles 26 and 25 respectively, 1948), and is important for the advancement of society. These two social investments empower people to improve their lives, which in turn enhances economic development. Hence, governments have a moral duty to ensure that an enabling environment is created for the attainment of good health and education.

However, governments, and their advisors, find themselves in a predicament. They must decide how best to allocate limited financial resources, given to the health sector, for the maximum benefit of their people. One proposal is to avoid or prevent the onset of disease.

Hundreds of years ago, Desiderius Erasmus recognised the value of prevention by saying, ‘Prevention is better than cure’ (Quilici et al., 2015). Prevention has two purposes, to avoid illness and to slow down or halt a progressing condition (ibid). However, prevention initiatives [like improved nutrition, smoking cessation, weight reduction, and vaccination] are often considered cost-saving [that is, they ‘pay’ for themselves (Remy et al., 2015)] in the long term (Quilici et al., 2015). Thus, when governments must curtail spending, they may choose to invest in short-term solutions, [like treating heart disease and injuries from road accidents], rather than vaccination programmes (ibid).

Measles, however, can have massive short-term financial implications. An unexpected measles outbreak requires the government to immediately release financial resources to mount an appropriate public health response. Whereas a vaccination prevention programme can be incorporated and adhered to in a healthcare budget, an outbreak due to an infectious disease largely offsets the budget. According to Carroll et al. (2015), policy makers can confidently predict the upfront costs associated with vaccination, yet it is harder to properly foresee and determine the diverse costs associated with the treatment of an infectious disease. Thus, vaccination schemes help to strengthen healthcare systems in the interim as well as in the long-term.

Loss of productivity due to days off work for parents looking after their sick children also has short-term implications. As stated earlier, a case of measles places a high financial burden on the household income (Njau et al., 2019). These two factors have subsequent effects on the economy as consumer expenditure and investment become reduced. Thus, vaccination programmes secure household income and mitigate employee absenteeism, thereby improving economic stability.

2.4. Conclusion

As mentioned previously, there are two morally relevant consequences of measles: the harmful health effects, to an individual and to the public, and the short-term and long-term economic burden. These consequences are significant in the decision-making process in utilitarianism.

The end point of measles is death and economic loss. A vital responsibility of public health is to prevent deaths and protect people. Measles vaccines can achieve these. However, mandatory childhood measles vaccines will guarantee these. Mandatory measles vaccination will also secure the sustainability of health systems by keeping costs low. This can facilitate other medical uses of limited resources (Largeron et al., 2015). Policy makers can correlate the economic benefits, health benefits, and the strengthening of public healthcare systems to the cost of prevention through vaccination (Bonanni et al., 2015), especially if vaccination is made compulsory.

Utilitarianism depends on science or accurate information about the world to determine the means that provides the best outcomes (Savulescu et al., 2020). Using a utilitarian approach, I have analysed the science and logic behind the health and economic effects of measles. As a result, I have demonstrated that both my claims hold true: measles is dangerous and potentially life-threatening, and it is more

expensive to treat measles and its related sequelae than to prevent it with immunisation. Thus, I have evaluated the morally relevant consequences of measles for policy makers and, subsequently, met the first objective of this research report.

3. Chapter Three: The Ethical Conflict Between a Parent and the State in the Surrogate Decision-making Process

3.1. Introduction

"Are you feeling all right?" I asked her.

"I feel all sleepy," she said.

"In an hour, she was unconscious. In twelve hours she was dead.

The measles had turned into a terrible thing called measles encephalitis and there was nothing the doctors could do to save her.

That was twenty-four years ago in 1962, but even now, if a child with measles happens to develop the same deadly reaction from measles as Olivia did, there would still be nothing the doctors could do to help her.

On the other hand, there is today something that parents can do to make sure that this sort of tragedy does not happen to a child of theirs. They can insist that their child is immunised against measles. I was unable to do that for Olivia in 1962 because in those days a reliable measles vaccine had not been discovered….

Excerpt from, ***Measles: a dangerous illness, by Roald Dahl****"* (Dahl, 1986).

Not vaccinating against measles is death-defying. One would think that every parent would try their utmost to prevent this terrifying disease from harming their child. Unfortunately, however, many parents are hesitant to vaccinate or choose not to vaccinate their child against measles despite a safe, effective vaccine being available.

In line with the second objective of this research study, I advance that the ethical conflict between a parent and the state in the surrogate decision-making process is of moral concern to public health ethics when policies must be formulated to increase measles vaccination rates. I claim that the state is justified to override a parent's decision to refuse vaccination on behalf of a child because vaccine refusal jeopardises the health of the child and that of society. I apply John Stuart Mill's Harm

Principle to form the basis of my claim. This chapter also addresses counter-arguments to my position.

I begin the chapter with some contextual information, from empirical evidence and reference to literature, to decipher the rationale behind vaccine hesitancy.

3.2. Context

3.2.1. Science of measles vaccines

Measles vaccines are highly effective at protecting against measles and its complications. There are two types available, the combination MMR vaccine and the single component one (CDC, 2019b; National Institute for Communicable Diseases [NICD], 2017). Both confer between 93-99% immunity after the recommended two doses (ibid). However, 3 out of 100 individuals who receive the MMR vaccines can still contract measles if exposed to it but will experience milder symptoms (CDC, 2019b). Side-effects of the vaccines include a fever, pain at the site of injection and a rash (CDC, 2019b; NICD, 2017). The more rare and serious adverse effects include febrile seizures (1 in 3000), low blood platelets (1 in 30 000), and severe allergic reaction (1 in one million) (CDC, 2019b; NICD, 2017). In addition, there was a case of encephalitis linked to the measles vaccine strain (CDC, 2020).

These few, and often rare, side-effects of vaccines create doubts about its safety, and this results in many parents becoming concerned about whether to vaccinate their children.

3.2.2. Definition of vaccine hesitancy

The Strategic Advisory Group of Experts [SAGE] Working Group on Vaccine Hesitancy states that vaccine hesitancy occurs when individuals delay or refuse

vaccination in spite of available services and “is complex and context specific, varying across time, place, and vaccines” (Macdonald, 2015, p.4163). It is also defined as “a behaviour, influenced by a number of factors including issues of confidence (do not trust vaccine or provider), complacency (do not perceive a need for a vaccine, do not value the vaccine), and convenience (access)” (The SAGE Vaccine Hesitancy Working Group, 2013, p.1). [Accessibility of vaccines, albeit a significant consideration in increasing vaccination uptake levels, will not be discussed in detail in this report. Perhaps, it could be the focus in a corollary study.]

As mentioned in chapter one, for the purpose of this report, vaccine hesitancy shall refer only to the parents who completely refuse measles vaccines for their children.

3.2.3. A brief background to the anti-vaccine movement

Opposition to vaccination is not new. Strong condemnation from the public, based on hygiene, religion, science, and legislation, was seen with universal vaccination against smallpox in the early 19th century (The College of Physicians of Philadelphia, 2020). Resistance was witnessed again to The Vaccination Act of 1867 in England, which introduced mandatory vaccination against smallpox, with penalties in place for rejection (ibid). Parents argued that their rights to bodily integrity and those of their children were subsequently violated, and this gave rise to anti-vaccine protests and movements (ibid). Thus, The Vaccination Act of 1898 removed penalties for vaccine refusal and allowed exemptions to compulsory vaccination (ibid).

A similar state of affairs occurred in the USA in the late 19th century, and, in 1905, it resulted in the first U.S. Supreme Court case justifying the state’s power to protect its citizens via mandatory smallpox vaccination (ibid).

Anti-vaccine attitudes still exist in the current 21st century, and findings show that the concept of vaccine hesitancy exists worldwide, not in a specific region or continent, and across all socioeconomic groups (Dube, et al., 2014). According to the UNICEF, low vaccination rates is causing the recent measles outbreaks worldwide and the reasons for the low vaccination rates range from poor health services, low awareness, political conflict, and misinformation surrounding vaccination (UNICEF, 2019).

3.2.4. Arguments for vaccine hesitancy

Misinformation about the safety of vaccines is one of the main reasons contributing to vaccine hesitancy (McKee & Bohannon, 2016).

Several studies demonstrate that parents' concerns regarding safety evolve from the internet, radio and television reports claiming that vaccines cause behavioural problems and autism, and that they contain harmful toxins (Fredrickson et al., 2004; Dube et al., 2014; Harmsen et al., 2013; Kennedy et al., 2011).

In 1998, Andrew Wakefield and 12 other authors' paper, retracted by the Lancet on the 6th February 2010 (The Editors of the Lancet, 2010), created a worldwide controversy linking autism to the MMR vaccine (Godlee et al., 2011). This led to dramatic drops in vaccination rates in the United Kingdom, other parts of Europe and the USA manifesting in outbreaks of measles and mumps (ibid).

Links of autism to the thimerosal found in vaccines also created controversy (Roberts & Harford, 2002), and heightened fears among parents.

Another safety concern relates to a parent's perception that too many childhood vaccines overstimulate a child's immune system, causing it to weaken (Saada et al., 2015; Harmsen et al., 2013).

The next reason parents offer for vaccine hesitancy is personal or philosophical beliefs. Fredrickson et al. (2004), from their study, reveal that many parents believe that natural immunity from a disease is superior to that acquired from vaccines; while Harmsen et al. (2013) found that parents do not feel that vaccine-preventable diseases are harmful or life-threatening and that they can be easily treated. Further, parents believe that these diseases can be prevented with a healthy lifestyle and diet (Harmsen et al., 2013). According to a study conducted in France, numerous parents do not recognise measles as a serious illness and are not aware that it could lead to hospitalisation, complications, or death (Toure et al., 2014). Studies also show that some health care providers are vaccine hesitant and are less likely to vaccinate their own children or to recommend them to their patients (Dube et al., 2013; Karlsson et al., 2019).

Intentional free riding on herd immunity also gives parents a reason to opt out of vaccination (Montopoli et al., 2009). According to Van Den Hoven, one study found that free riding was offered as a motive to refuse vaccination, while another study found that 94% of its participants would refuse vaccination for their child if all the other children were vaccinated (Van Den Hoven, 2012).

A third reason for vaccine hesitant attitudes is a yearning for reliable information. It was found that parents' concerns about vaccines stem mainly from media reports and word of mouth (Fredrickson et al., 2004). Public figures, like celebrities (for example, model Jenny McCarty) and political leaders (for example, Donald Trump and Tony Blair), also contribute to vaccine controversy and, subsequently, vaccine hesitancy among parents (Zhang et al., 2019; Hussain et al., 2018; Benecke & DeYoung, 2019). Many parents are also influenced by misleading vaccine information appearing on social media sites, like YouTube and Twitter (Hussain et

al., 2018; Benecke & DeYoung, 2019), and trust the opinions of friends and family, and the emotional internet stories of parents who claim that their children were harmed by vaccines (Freed et al., 2011).

Religious beliefs form the fourth argument for vaccine hesitancy. These are usually associated with the fundamental convictions of parents and it may prove difficult to persuade them to change their views. These parents often refuse all vaccines (Dube et al., 2014).

In addition, Wombwell et al. (2015) found that the tissue from human foetuses and animal-derived gelatine used in producing some vaccines are the concerns raised by certain religious groups.

3.2.5. Implications of vaccine hesitancy

When a parent chooses not to vaccinate a child, a danger to that child and the neighbouring community emerges. Vaccine hesitancy leads to decreased vaccination rates, which lowers the level of herd immunity. When herd immunity falls below the required 95% for measles, outbreaks can occur. Vulnerable individuals, like babies that are too young to be immunised, unvaccinated pregnant women, and immunocompromised persons, are then at risk of both contracting measles and of becoming a source of transmission to others.

Harmsen et al. (2013) found that most vaccination refusals are due to the intentional decision-making of parents. Similarly, Phadke et al. (2016) found that a significant number of measles cases occurring in the USA after achieving elimination was a result of intentionally unvaccinated individuals. More than 70% of the unvaccinated individuals who contributed to the measles outbreaks in the USA possessed a nonmedical exemption to immunisation (Phadke et al., 2016). One study showed

that children with exemptions were 35 times more likely to contract measles compared to immunised children (ibid). Parents who opt for personal or religious exemptions from vaccination, and those who share the same beliefs about vaccination, tend to cluster in the same neighbourhood and send their children to the same schools (Buttenheim et al., 2012; Domachowske & Suryadevara, 2013; Benecke & DeYoung, 2019;). This leads to a higher prevalence of measles in that neighbourhood or district (Phadke et al., 2013). It is argued that vaccine hesitant parents do not rationally evaluate the vaccine risk, but rather base their refusal to vaccinate on feelings of uncertainty (Sato, 2018), thereby jeopardising a child's health and quality of life. As such, vaccine hesitancy is linked to increased hospitalisation, increased emergency room visits, increased morbidity, and death (McClure et al., 2017).

3.3. John Stuart Mill's Harm Principle

This section addresses whether the state should limit a parent's autonomy to protect individuals from harm. I propound that the harm principle provides adequate ethical justification and, therefore, the state *should* limit a parent's autonomy to protect individuals from the dangers of measles.

John Stuart Mill was one of the most popular and inspirational philosophers of the western world in the19th century (Cranston, 1987). Mill is nowadays most widely known for his contribution to political and ethical philosophy with his formulation of utilitarian and liberal principles (Brink, 2018). His work on liberty facilitated many recent disputes on the moral rights of women, revolutionaries, and minorities (Cranston, 1987).

On Liberty, one of Mill's most famous texts, provides insight on Mill's idea of liberalism (Brink, 2018). It also addresses the restrictions on liberty with the harm principle forming the bedrock of the restrictions (ibid).

According to Upshur (2002, p.102), in a democratic community, Mill's harm principle, "That the only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others. His own good, either physical or moral, is not a sufficient warrant", forms the foundation of public health ethics. It permits the government to impose limits on the freedoms of individuals to protect others from harm (ibid).

Similarly, Diekema (2004) states that Mill's harm principle forms the ethical basis for establishing the threshold for government intervention. Diekema goes on to assert that the government is entitled to override parental decision-making regarding healthcare if it inflicts a harm to the child, or if it poses a risk of harm to others (Diekema, 2004). Diekema proposes eight conditions that must be satisfied before state or government intervention is justified over parental refusal of medical treatment (ibid). The eight conditions are straight-forward and self-explanatory:

1. "By refusing to consent are the parents placing their child at significant risk of serious harm?
2. Is the harm imminent, requiring immediate action to prevent it?
3. Is the intervention that has been refused necessary to prevent the serious harm?
4. Is the intervention that has been refused of proven efficacy, and therefore, likely to prevent the harm?

5. Does the intervention that has been refused by the parents not also place the child at significant risk of serious harm, and do its projected benefits outweigh its projected burdens significantly more favourably than the option chosen by the parents?
6. Would any other option prevent serious harm to the child in a way that is less intrusive to parental autonomy and more acceptable to the parents?
7. Can the state intervention be generalized to all other similar situations?
8. Would most parents agree that the state intervention was reasonable?" (Diekema, 2004, p.252).

Applying Diekema's conditions to vaccine hesitancy

The answers to questions 1, 3, 4, and 5 are yes as the risks and benefits of measles infection and measles vaccines have been identified and discussed already. The answer to question 6 is no, because vaccination is the only method to prevent measles, and furthermore, there is no treatment or cure for measles, as outlined in the previous chapter.

In response to question 7, case law is considered. The USA courts of justice in *Jacobson v Massachusetts*, 1905, and in *Zucht v King*, 1922, maintained immunisation requisites for protection against smallpox and for entrance to school respectively (Gostin, 2015). Similarly, according to Jeffery (2015), there were many international court cases involving vaccination of behalf of a child and in all cases, the relevant child was compelled to be vaccinated. The courts deemed vaccination to be in the child's best interests and relied upon scientific proof to support its decision (ibid). Thus, the answer to question 7 is yes because state intervention can be applied across all similar scenarios.

With regards to question 8, I will consider Kopelman's and Kopelman's 'minimum threshold for acceptable care' (Kopelman & Kopelman, 2007, Kopelman, 2007). According to Kopelman and Kopelman, the best interests principle serves as a guide to decision-makers when making choices for children and others who lack decision-making capacity (ibid). The best interests principle must be used to promote what is best or ideal or it can be used to make 'good or reasonable' choices in medical, legal, or moral conflicts and proxies must make decisions based on a 'minimum threshold of acceptable care' (ibid). According to Kopelman, 'acceptable care' is examined with reference to what the majority of 'reasonable and informed' individuals would do in the same situation (ibid).

In light of vaccination behaviour, a study in 2009 in the USA found that the majority of parents (60.2%) vaccinated their children according to the recommended schedule, while the remaining 39.8% either delayed or refused one or more of the recommended childhood vaccines (Smith et al., 2011). In 2011, the American Academy of Paediatrics [AAP] found that only 13% of parents did not follow the national immunisation schedule for their children but chose an alternative programme instead (AAP, 2013). In Australia, a study found that a minority of 7% of parents either delayed or completely refused the recommended vaccines for their children (Rhodes, 2017). Further, 7 out of 10 Australian parents think that children who are not up to date with the recommended vaccines should be barred from educational and childcare facilities (ibid). Most of these parents also indicated that they would base their decision to send their children to such a facility on the vaccination status of the other children enrolled at the same facility (ibid). Similarly, a public opinion poll in Canada in 2019 showed that most parents (83%) willingly

support the childhood vaccination programme, with as many as 70% of them believing that vaccination should be mandatory for scholars (Elflein, 2020).

These findings indicate that most parents would not oppose vaccination if enforced by the state. Further, these parents would agree that the state is morally justified in objecting to parental refusals of measles vaccination to protect the population from harm. Therefore, the answer to question 8 is yes.

Question 2 of Diekema's conditions deserves a closer ethical analysis. In his paper, Diekema looks at the example of a parent refusing immunisation on behalf of a child (Diekema, 2004). Diekema states that most medical practitioners appeal to the best interests standard when requesting the state's intervention regarding a parent's refusal of vaccination (ibid). In addition, Diekema affirms that a parent could appeal to the same standard when refusing vaccination because, while most compulsory vaccines are safe and effective, there is a small risk of harm from the side-effects of a vaccine (ibid). Diekema argues further that a child belonging to a community with a high level of herd immunity is not at harm of falling victim to measles and therefore is permitted to avoid the possible risk of harm from the vaccine (ibid). Additionally, the author maintains that the obligation to vaccinate is not urgent and that the unimmunised child is not at a substantial risk of sizable harm (ibid). Finally, the author argues that quarantine is a possible alternative to vaccination and concludes by positing that the harm principle does not justify a government's decision to overturn a parent's refusal of vaccination on behalf of a child (ibid).

I disagree with Diekema's moral reasoning. I believe that the main purpose of herd immunity is to protect those most vulnerable to measles, like the very young or immunocompromised, and not the healthy individuals who opt to free ride on the

goodwill of others. Being part of a community entails taking collective responsibility for the burdens that produce the benefits. [This will be examined in more detail in the following chapter.] If every parent decided to free ride on a community's high herd immunity, then their actions would eventually be self-defeating. Additionally, an unimmunised child is always at risk of contracting a vaccine preventable disease, like measles, because measles is highly contagious and easily transmitted without the need for person-to-person contact. An unimmunised child may not be in danger of contracting measles in the surrounding community, but an imminent risk may present itself as soon as the child has to leave his or her protected community from time-to-time to go on school trips or holidays, or to visit grandparents and cousins, as these places may be located in communities without adequate herd immunity. An imminent risk also develops if an unimmunised individual enters the unimmunised child's 'protected community'. It is morally wrong not to protect the child from harm on these occasions. In a similar manner, it is morally unjust to consider quarantine as an alternative to vaccination, as it disrupts a child's social and educational activities every time an outbreak occurs. The possible health, emotional and social harms associated with infections and, thus, quarantine, cannot be justified when there is an option to circumvent measles infection. For these reasons, I think that the answer to question 2 is yes, there is an imminent harm that warrants prompt preventative measures.

On these grounds, all eight of Diekema's conditions are satisfied. This means that the state is ethically justified in overriding parental refusals regarding measles vaccination by appealing to the harm principle, and, as a result, the state ought to enforce mandatory measles vaccination to protect all children and the greater population from harm.

The harm principle also comes to mind when interpreting Giubilini's and Savulescu's 'seat belt' analogy and Flanigan's 'random gunfire' analogy. I discuss these two papers briefly:

In *Vaccination, Risks, and Freedom: The Seat Belt Analogy,* Giubilini and Savulescu argue that some vaccines should be made mandatory for the same reason that wearing a seat belt in a motor vehicle is mandatory (Giubilini & Savulescu, 2019). The authors claim that wearing a seat belt can sometimes, albeit seldom, cause harm if a person, for example, becomes trapped by the seat belt in a car accident or if a person develops internal organ damage from 'seat belt syndrome' (ibid). Likewise, some vaccines, like the MMR vaccine, carry a small risk of inflicting harms such as febrile seizures, but, at the same time, the authors acknowledge that the vaccine preventable disease itself, in this case, measles, carries a greater risk of inflicting febrile seizures (ibid). In addition, measles can cause as high as 1 in 5000 deaths in infected individuals in developed nations and 1 in 100 deaths in infected individuals in developing countries and can cause severe complications, like permanent brain damage, in 1 in every 1000 to 2000 infected individuals in the United Kingdom, for example (ibid). On the contrary, both the prevention of measles through vaccination and the wearing of seat belts have reduced deaths by huge numbers (ibid). Subsequently, Giubilini and Savulescu state that vaccination becomes the reasonable choice when a risk evaluation of the benefits and harms is considered (ibid). Giubilini and Savulescu state further that individuals who refuse vaccination do so based on safety fears emanating from an irrational evaluation of risks (ibid).

According to the authors, paternalism, when used by the state, relies on the harm principle as its main concerns are to protect individuals, especially the vulnerable,

and to prevent harm, directly to the individuals (who wear a seat belt or are vaccinated) and indirectly to others (unbuckled rear passengers in a vehicle cause harm to those in the front seat in a collision and non-vaccination leads to the loss of herd immunity) and to society (harms caused by not wearing seat belts or by contracting measles require public health resources) (ibid). The best interests principle is also called upon in this analogy as an incompetent child must rely on a proxy to choose the appropriate action for his or her welfare (ibid).

The two objections raised in the analogy are the infringement of autonomy and the associated potential risks (ibid). The authors refute these objections by stating that the state is ethically justified in implementing coercive policies, based on scientific assessments of risks and benefits, in the interests of harm prevention and protection of the population (ibid). The authors argue further by saying that if the compulsory wearing of seat belts is accepted legally and socially then coercive vaccination should be accepted on the same grounds, as both interventions are equally effective at preventing harm to oneself and others (ibid).

In *A Defense of Compulsory Vaccination,* Flanigan argues that the prohibition of non-vaccination is ethically justified in the same manner that other kinds of harmful behaviour, like firing a gun in the air, is forbidden, and, therefore, compulsory vaccination can be justified (Flanigan, 2014). Flanigan uses the harm principle to formulate her argument as she asserts that non-vaccinators do not have a moral right to inflict harm on the innocent and vulnerable (ibid). In addition, Flanigan states that the only exception to her argument would be on medical grounds (ibid). The author goes on to suggest that people who are not vaccinated, against a harmful and highly contagious infectious disease like measles, should not be permitted to enter public institutions and should be banned from working in certain occupations (ibid).

Moreover, these individuals must be held financially liable for failure to comply with mandatory vaccination and for compensation to their victims (ibid). Thus, the author, by stipulating these conditions, makes it difficult for individuals to adopt vaccine hesitant attitudes.

After analysing these and other similar positions in the literature, I think that Mill's harm principle is pertinent to the defence of mandatory measles vaccination.

3.4. Discussion

Unfortunately, the safety concerns of measles vaccines receive a greater limelight than its effectiveness, and in the absence of conspicuous measles nowadays many parents disregard measles as a health hazard. As a result, the delay in measles immunisation increases the risk of acquiring measles (Anekwe et al., 2015), and vaccine refusal has been associated with outbreaks, causing high rates of morbidity and mortality amongst young children, and a great expenditure of limited public health resources (Salmon et al., 2015).

The WHO and other experts have demonstrated that vaccines are safer than drug treatment (Andre et al., 2008), and while a drug benefits only the person who consumes it, vaccines have more extensive benefits (Wilder-Smith et al., 2017). Further, according to the U.S. Food and Drug Administration [FDA], there is overwhelming scientific evidence to prove that vaccines are effective and safe to protect the public as well as individuals from infectious diseases (FDA, 2019). Systems are also in place to regularly oversee the use and potential side-effects of vaccines (CDC, 2019c). Additionally, the risks from vaccines are lower than those from natural infection (ibid). For example, measles vaccine strains have not been detected in SSPE (Coughlin et al., 2017), although there was one case of

encephalitis found to be linked to the measles vaccine strain recently (CDC, 2020). Another example shows that when children contract measles naturally, there is a 1 in 1000-2000 chance of encephalitis (University of Oxford, 2019), whereas if a child is vaccinated, the chances of acquiring encephalitis from the vaccination decreases to 1 in 1 000 000 (Encephalitis Society, 2017). These are substantial differences in terms of health risks. Refusal to vaccinate a child can lead to other consequences described in chapter 2 as well, and apart from endangering a child's health and quality of life, it endangers that of the community too. The arguments offered for the vaccine hesitant attitudes do not justify the risks that the child and the community are exposed to.

Parental decision-making concerning vaccination therefore is of great consequence. Issuing consent, especially in health-related matters, is particularly challenging as the benefits must be weighed against the risks.

Informed consent is "a process of information sharing and decision making based on mutual respect and participation" (Dhai & McQuoid-Mason, 2011, p.70), and is the expected standard nowadays. Informed consent is based on the moral principle of 'respect for autonomy' (Beauchamp & Childress, 2013). It allows patients to possess opinions, and to make and participate in decisions regarding their health and what is in their best interests, as it acknowledges the patient as an autonomous agent capable of rational thought (ibid).

When making decisions on behalf of an individual with reduced rational thought, ''a surrogate decision maker must determine the highest net benefit among the available options, assigning different weights to interests the patient has in each

option and discounting or subtracting inherent risks or costs'' (Beauchamp & Childress, 2013, 7th ed. p.228).

Thus, the best interests principle, like the harm principle, acts as a tool for surrogate decision-making and most often parents are given discretion in choosing what is in the best interests of their children.

The best interests principle is also a legal requirement. According to article 3 of the Convention on the Rights of the Child [CRC], "In all actions concerning children… the best interests of the child shall be a primary consideration" (United Nations General Assembly, 1989). Since, the CRC is an international legal instrument, it influences decision-making concerning children globally, and is binding to the states that are party to the CRC.

Although parents can depend on their parental autonomy to prevent their decisions being reversed by the state, a child, as an individual, has a fundamental right to his or her best interests being considered paramount. Similarly, although the state is disinclined to meddle with parental duties, it can protect a child's health from harm resulting from a parent's decision, ensuring that the best interests of the child are preserved.

Mill's harm principle relies on proving that vaccination or non-vaccination considers the child's well-being as paramount with no contributing risks of harm. In addition, it is important for the parents to illustrate that non-vaccination poses no harm to their children nor to the community. The morally relevant health-related consequences of measles are therefore crucial when applying these principles to the surrogate decision-making process. Apart from considering the extent and the possibility of the risk of harm, a rational assessment of any pertinent empirical data is also required

(Dawson, 2005). According to Beauchamp and Childress, other competing moral values can sometimes override 'respect for autonomy' (Beauchamp & Childress, 2013). Thus, a state's infringement of a parent's autonomy to refuse or delay vaccination for his or her child is further ethically justified for the sake of benefitting the health of the public as well as of the child concerned.

3.5. Obvious counter-arguments

a) Mandatory vaccination infringes individual rights and promotes paternalism.

I will consider Mill's theory of liberties regarding reasoning and response to refute this argument.

Mill does not defend all liberties but only those basic liberties that affect the progressiveness and goals of an individual (Brink, 2018). Mill's categories of basic liberty are: "1) liberties of conscience and expression, 2) liberties of tastes, pursuits, and life-plans, and 3) liberties of association" (ibid). Thus, liberties of expression, religious beliefs, and choice of occupation, for example, are deemed more important than liberties not to strap on a seat belt whilst driving, because the former have a more direct bearing on a person's progressiveness and goals (ibid). However, Mill points out that even these basic liberties are subject to restriction if they cause harm to others (ibid).

In this context, infringement of parental rights or liberties to refuse mandatory vaccination on behalf of a child, other than on medical grounds, constitutes a harm and is therefore morally unjustified. It would also suffice to say that according to Mill's defence of liberties, being forcibly vaccinated against measles is not deemed as important as infringing on one's basic categories of liberty because it does not

interfere with one's progressiveness or goals. Conversely though, it can, to a greater extent, assist one to lead a healthy and successful life, as described in chapter two.

Further, according to Mill's value of basic liberties, he declares that his principles of liberty are not relevant to individuals who are mentally incompetent or who do not possess appropriately developed normative faculties (Brink, 2018). Thus, it seems reasonable then that the paternalistic action of the state in this situation, to defend the health of a child, is morally acceptable.

b) Mandatory vaccination is not the only method to achieve the required level of herd immunity. Other methods of increasing vaccination rates also work.

I rebut this objection by referring to the 'intervention ladder' proposed by the Nuffield Council of Bioethics [NCOB] in its report to guide public health policy decision-making.

When proposing a policy that may infringe on autonomy, Childress et al. (2002) state that public health officials ought to find and justify the least restrictive alternative. This is known as the "principle of least restrictive alternative [PLRA]" (Childress et al., 2002, p.173). Thus, the PLRA is usually interpreted as: "if two interventions can both efficaciously and effectively address a public health or health policy issue and are equal in all other morally relevant respects, the intervention least restrictive of personal liberties ought to be preferred" (Saghai, 2014, p.350). Thus, "the function of the [intervention] ladder is to compare alternative approaches in terms of their intrusiveness and likely acceptability, and not [as] a means of allowing judgements in absolute terms" (NCOB, 2007, p.42).

The first step on the intervention ladder is “to do nothing or simply monitor the situation” (NCOB, 2007, p.42). This is problematic as state authorities cannot just observe sickness and death resulting from measles outbreaks. Taking no action to prevent such from occurring is harmful and therefore ethically unjustifiable.

The next rung involves furnishing information (NCOB, 2007). A study conducted by Nyhan et al. shows that information provided to parents to advise on the dangers associated with measles and to rectify misleading claims regarding the MMR vaccines and autism were not effective and caused no increase in vaccination rates (Nyhan et al., 2014). Likewise, evidence shows that vaccination schedules are more closely adhered to by parents with a lower level of education while the more educated parents *merely seek advice* on the use of vaccines (Mora & Trapero-Bertran, 2018).

The third and fourth strategies of the intervention ladder are to “enable choice” and to “guide choices through changing the default policy” respectively (NCOB, 2007, p.42). An example of enabling choices used by the NCOB is that of encouraging involvement in ‘stop smoking’ programmes, while an example of guiding choices is to change menu options to include healthier options alongside chips in a restaurant (ibid). Both of these strategies on the intervention ladder are comparable since they influence behaviour to make healthier choices. According to Thaler & Sunstein (2008, p.6) “alter[ing] people’s behaviour in a predictable way without forbidding any option or significantly changing their economic incentives” constitutes nudging. Therefore, ‘enabling choice’ and ‘guiding choice’ on the intervention ladder function as nudges to positively influence an individual’s choices. Nudges are effective at promoting choices for a healthier life (Li & Chapman, 2013; Thaler & Sunstein, 2008), but their effectiveness in childhood vaccination in the long term is yet to be

determined, as they may jeopardise the health provider-parent relationship (Navin, 2016). This is due to nudges “exploit[ing] decision biases and harness[ing] them in the name of encouraging healthy behaviour”, as claimed by Loewenstein, Brennan & Volpp (2007) in Li & Chapman (2013, p.188). In addition, Ploug & Holm (2015) in Navin (2016) state that nudges are regarded as manipulative strategies. As a result, nudges call for moral deliberation before implementation.

In a similar way to ‘enabling and guiding choices’, the fifth and sixth courses of action on the intervention ladder also influence human behaviour toward a specified public health goal. These courses of action are “to guide choices through incentives”, and “to guide choice through disincentives”, respectively (NCOB, 2007, p.42).

With regards to incentives, studies show that the cost-effectiveness and sustainability of incentives must be investigated (Owusu-Addo, Renzaho & Smith, 2018; Ranganathan & Lagarde, 2012; Lagarde, Haines & Palmer, 2007), and that financial incentives must be coordinated with other interventions for maximum effect (Langendorf et al., 2014; Ranganathan & Lagarde, 2012). For example, it was found that the supply of healthy food supplements to young children in Niger in combination with financial incentives to the household income was more effective than either intervention on its own to prevent acute malnutrition (Langendorf et al., 2014). Additionally, some studies demonstrate that there is insufficient evidence to determine if the effectiveness and acceptability of financial incentives to increase vaccination rates is successful (Wigham et al., 2014; Giles et al., 2015).

Disincentives refer to the penalties imposed upon individuals for non-vaccination (Giubilini, 2019a). According to Giubilini, there are three types of disincentives:

withholding of financial incentives, tax, and denying enrolment in school or childcare facilities (ibid).

Australia's 'no jab, no pay' policy is an example of withholding financial incentives as a family tax benefit or childcare assistance is only given if a child is up to date with the recommended vaccines (National Centre for Immunisation Research and Surveillance, 2020). Although "the Australian Government's No Jab, No Pay policy, and No Jab, No Play policies implemented in some states have supported vaccination uptake and improved immunisation coverage rates" (Department of Health, Australian Government, 2019, p.19), the effectiveness of such an intervention rests on the economic and social status of the targeted society (Giubilini, 2019a).

Taxes or financial penalties and denial of enrolment in school or childcare facilities for non-vaccination are also currently practised, in Italy for example. Vaccine hesitancy is a problem in Italy (D'Ancona et al., 2019). Following a large measles outbreak in early 2017, six other vaccines, including the MMR vaccine, were made mandatory by the Italian national government in July of the same year (ibid). Parents must now immunise their children, aged six to sixteen years, with ten vaccines before admitting them into schools or childcare facilities, otherwise they face a fine (Holzmann & Wiedermann, 2019).

Execution of the new law led to almost a 3% increase in measles vaccination coverage by October 2017 (Gualano et al., 2019), and between a 3% and 7% rise in coverage for all vaccines within two years (Holzmann & Wiedermann, 2019). The required 95% coverage for measles herd immunity was also achieved in some regions of Italy (D'Ancona et al., 2019). Further, a study quoted in D'Ancona et al.

(2019) found that there was a 4% drop in the number of vaccine hesitant parents in Italy following the new legislation (ibid).

Although these are notable advancements in the quest for establishing the required level of herd immunity, the success of these two disincentives, like in the case of withholding financial incentives, also rely, to an extent, on the socio-economic status of the targeted society, as affluent parents may be willing to home-school their children.

“To restrict choice”, the seventh step on the intervention ladder, means to protect individuals by restricting options to them, for example, by removing unhealthy foods from supermarkets (NCOB, 2007, p.42). This ban would limit a consumer’s choices, but ultimately the consumer could buy junk food from a movie theatre confectionary stand or a fast-food outlet. The consumer would probably pay a higher price though, which would constitute another disincentive.

In the case of measles, the denial of admittance into school and childcare facilities is also an example of ‘restricting choice’. Deprivation of an education or the exorbitant costs combined with the logistics of home-schooling leaves parents with no practical nor reasonable option, other than to vaccinate their children. Comparably, restricting choices in this manner, like disincentives, is somewhat dependent on the social and economic circumstances of the targeted individuals.

Imposing onerous conditions to obtaining non-medical exemptions to vaccination can be another approach to ‘restrict choice’. Navin & Largent (2017) argue that increasing the difficulty to obtain non-medical exemptions decreases the exemption rates and may improve vaccination rates. However, it was found that this

‘inconvenience approach’ was met with resentment and resistance from anti-vaccine parents (ibid). Its effectiveness can therefore be questioned.

“To eliminate choice” is the eight, and last rung on the intervention ladder (NCOB, 2007, p.42). It refers to regulating in a manner that completely eliminates choice (ibid). Thus, in the case of measles, it would mean that parents have a legal duty to vaccinate their children otherwise they face punishment set out by the law. For example, parents in Belgium are fined and arrested for failure to vaccinate a child against polio (Stafford, 2008). According to the president of the Belgian Medical Association, polio is a serious contagion that warrants protection through vaccination (ibid).

Likewise, I argue that measles has serious implications for individual and population health, as previously discussed, and, for this reason, world leaders should collectively strive to eradicate it. The only effective way to accomplish this is to ensure that *all* parents cooperate in establishing herd immunity (Giubilini, 2019b), [as will be discussed in the following chapter]. This suggests that state authorities ought to urge *each* parent to vaccinate his or her medically eligible child in the interests of achieving a public good (ibid). Equal participation of all parents is vital to ensure that failure of such a policy is prevented. It was found that the smallpox vaccine mandate was not fairly and uniformly implemented across all sectors of the community in the United Kingdom, and was therefore repealed (El Amin et al., 2012). Fair elimination of choice also ensures that the state is liable to assist its citizens to comply with the mandate. The state would be jointly responsible for providing access to vaccination services, educating its people about the dangers of measles and the importance of vaccination, addressing vaccine safety concerns, and making measles vaccines affordable to all.

Some say that the mandate solution does not actually address the core of the vaccine hesitancy problem and completely disregards the notions of democracy in a consent and autonomy-oriented society (Drew, 2019). Vaccine hesitancy has several causes (UNICEF, 2019), as mentioned earlier in this chapter. One of the main concerns in low-income countries is the accessibility to services (ibid). However, the outright refusal of measles vaccines, despite the availability of services, is seen in both low- and high-income countries (Dube et al., 2014), and these parents are the target of policies that entail eliminating choice. The concept of democracy usually refers to circumstances that permit individuals to exercise free choice (Letseka, 2012). However, Ake (1987) in Letseka (2012, p.49) states “At the same time there is no democracy where there is no equality for inequality reduces human relations to subordination and domination”. This resonates with the failure of the smallpox vaccine mandate in the United Kingdom, as previously mentioned. A policy that comprises eliminating choice will be met with some resistance, but I believe that most individuals in a democratic society rely on equality or fairness, and mutual co-operation, rather than autonomy, to live together amiably.

Eliminating choice is the most intrusive option for policy making because it dismisses parental objections (Pierik, 2020), but it is the only fair option available, permitting only the vulnerable to benefit from free riding.

3.6. Conclusion

While parents are concerned mainly with the well-being of their children, public health has a national interest and must consider the well-being and potential hazards to all individuals in a population, especially the vulnerable. With respect to vaccine-preventable diseases, public health officials are concerned about possible outbreaks

and their consequences. Thus, their function is to maximise vaccine coverage and maintain high levels of herd immunity.

Using Mill's harm principle, I have demonstrated that vaccine refusal is unethical because it endangers the innocent lives of both the healthy and the vulnerable. As a result, my claim remains unchanged: the state is justified to override a parent's decision to refuse vaccination on behalf of a child because vaccine refusal jeopardises the health of the child and that of society.

Chapter Four: The Ethical Conflict over the Distribution of the Benefits and Burdens of Vaccination

4.1. Introduction

In the last chapter, I discussed the first ethical dilemma resulting from vaccine hesitancy. In this chapter and in keeping with the third objective of this research report, I analyse the second ethical dilemma resulting from vaccine hesitancy. This is the ethical dispute over the distribution of the benefits and burdens of vaccination. I claim that all members of a nation should bear the burdens of vaccination equally, or, in communitarian terms, share the duty to vaccinate equally to enjoy its collective benefits.

I rely upon ubuntu ethics and John Rawls' theory of justice as fairness to form the foundation of my claim. I chose these moral theories because I believe that the distribution of burdens and benefits is embedded in relationships, which, ultimately, decide whether members of a society cooperate with each other for a mutual benefit. In other words, harmonious relationships or solidarity is the common theme underlying these two moral frameworks.

4.2. Ubuntu ethics

According to Jegede, 'African ethics', is depicted 'by communal or social autonomy' (Ogunrin et al., 2018). It is characterised by solidarity, togetherness, brotherhood, and overall good for the community and these are the values that form the basis for decision-making in the African community (ibid). This is in contrast to decision-making in Western cultures, where individual liberty is considered more important (ibid), or where 'proof' and 'certainties', for example, are required (Tangwa, 1996).

African communitarianism believes that people are socially connected and that support from others is the only way for a person to flourish (Ogunrin et al., 2018). Further, communal good is prioritised over individual interests, and decisions are taken after consideration is given to cultural beliefs, community norms and family members (ibid). It is also common practice for the chief and his team of advisors to make decisions for the community (ibid).

However, critics argued that this form of communitarianism was authoritarian in nature as communities used their moral judgements to force individuals to comply (Etzioni, 2015). This, in turn, led to the development of 'responsive communitarianism', founded by Amitai Etzioni in 1990, which ensured a balance between social responsibility and individual rights (ibid). Responsive communitarianism proposed a "new golden rule": "Respect and uphold society's moral order as you would have society respect and uphold your autonomy to live a full life" (Etzioni, 1996 in Etzioni, 2015, p.2). This means that ethics must identify with the notion of solidarity as only then are individuals inclined to shoulder personal burdens to help others (Etzioni, 2015).

Ubuntu seems to resonate with responsive communitarianism, as is demonstrated by the various definitions offered by authors in the following paragraphs. The general meaning of ubuntu, however, is: "humaneness, personhood and morality" (Letseka, 2012, p.48).

Mokgoro (1998, p.16-17) claims that "ubuntu is a humanistic orientation towards fellow beings", with important values of human dignity, compassion, solidarity, and respect. Further, Mokgoro states that ubuntu is responsible for reconciliation or forgiveness as opposed to confrontation (ibid). Letseka claims that ubuntu is

concerned with ‘justice and fairness’ because it encompasses moral values like “altruism, kindness, generosity, compassion, benevolence, courtesy, and respect and concern for others” (Letseka, 2012, p.48). Similarly, Ujomudike (2016) posits that ubuntu is determined by a set of values which comprise “reciprocity, common good, peaceful relations, emphasis on human dignity and the value of human life, as well as consensus, tolerance, and mutual respect”.

Dolamo (2013) adds that a community assumes the responsibility to nurture a person with the moral values of ‘ubuntu’. Further, Dolamo proposes that “for the community to be strong and successful, individuals need to work together as a team” (ibid, p.8). This emphasis on communal relationships is rightly expressed in Mbiti’s maxim: “I am, because we are, and since we are, therefore I am” (Gyekye, 2002, p.298). Metz states that this maxim has a normative element as it asks an individual to realise his or her ‘true self’ by relating to others through appropriate conduct (Metz, 2019). A communal relationship is, therefore, seen as a combination of two joint interactions: ‘identifying with others and exhibiting solidarity with them’ (ibid).

Another definition of ubuntu is that from a philosopher, Shutte, “our deepest moral obligation is to become more fully human. And this means entering more and more deeply into community with others. So, although the goal is personal fulfilment, selfishness is excluded” (Metz, 2011, p.537). Mkhize (2008) expresses a similar idea about the interactive nature of a human being when he states that the ethics of ubuntu depends on the notion of balance or harmony. According to Mkhize (2008, p.39), “health does not simply mean the absence of disease; it incorporates balance and harmony between the individual and his or her social surroundings, including harmony with the self. Disease results from the breakdown in relatedness, including disharmony between the individual and the rest of the universe”. Further, Mkhize

states that unethical behaviour results in a disorderly cosmos (ibid). Mkhize draws a parallel to Karenga's "Maat", an ancient Egyptian concept similar to ubuntu in its emphasis on "harmony, righteousness, and the need to locate and understand one's actions with reference to a large whole" (ibid, p.36). Therefore, for Mkhize, ubuntu ethics is based on pragmatism and human activity as opposed to individual law designed by theoretical, independent minds (ibid).

From the various definitions, ubuntu is seen to promote "our communal inter-connectedness, our common humanity, our interdependence and our common membership to a community" (Letseka, 2013, p.339). According to Metz and Gaie in Letseka (2013), this interdependence is especially important for a child, as her survival and existence rests on others. This suggests that ubuntu has normative characteristics (ibid). Masolo observes that this awareness, that the self exists amongst others, seeks to embrace the community's value systems during moral contemplation (ibid). Likewise, Metz (2007) discerns that ubuntu is concerned with the preservation of life, the well-being, the self-realisation and the rights of its community members. Subsequently, Metz proposes that ubuntu is grounded on the assumption that, "an action is right just insofar as it produces harmony and reduces discord; an act is wrong to the extent that it fails to develop community" (ibid, p.334), or that, "actions are right roughly insofar as they are a matter of living harmoniously with others or honouring communal relationships" (Metz & Gaie, 2010).

Applying ubuntu to the morality of measles vaccination

The ethical dilemma under consideration in this section is: should the duty to vaccinate against measles be shared equally among community members? I propose that the duty to vaccinate *should* be shared equally among all to ensure

herd immunity and to eliminate free-riding behaviour, thereby promoting solidarity and harmony within communities.

In this setting, a leader governed by ubuntu values would be concerned mainly with the well-being, preservation of life, and rights of his community members. This is similar to the ethical model proposed by Mabvurira. Mabvurira's model states that social workers [referred to as public health workers, including policy makers, in this report] must possess ubuntu virtues to be able to consider the following given an ethical dilemma:

1) community good must be promoted over individual interests,
2) each person must be treated equally or fairly,
3) the vulnerable, as well as others, must be shown compassion and respect, and,
4) little or no harm must be experienced by any party (Mabvurira, 2020).

Thus, decisions concerning consent to measles vaccination on behalf of the children in a community would be taken seriously so as not to impose any untoward risk to the community, as well as not to infringe on individual freedom. A decision that considers all views and to which everyone in the community must agree has to be taken. I utilise Mabvurira's model of ubuntu values as a basis to determine the right course of action in this moral dilemma.

1) Community good must be promoted over individual interests.

According to Broodryk as cited in Mabvurira (2020, p.74), "Ubuntu is a comprehensive ancient African world-view based on the values of intense humanness, caring, sharing, respect, compassion and associated values, ensuring a happy and qualitative community life in the spirit of family". Hence, as stated earlier,

communal relationships are determined by two factors, ‘identifying with others and exhibiting solidarity with them’ (Metz, 2019), where ‘identifying with others’ means viewing oneself as part of a group, taking responsibility for group actions, participating in group pursuits, supporting shared goals, and synchronising behaviour to reach these goals (Ewuoso & Hall, 2019). ‘Exhibiting solidarity with others’ means being empathetic to others’ circumstances, displaying positive sentiments and attitudes to others, and helping others with no expectations in return (ibid).

In this situation, ‘identifying with others’ would ensure that herd immunity is seen as the common goal to protect the community from the harmful health-related and economic effects of measles. This would require each person to synchronise or modify his or her behaviour to support herd immunity.

‘Exhibiting solidarity with others’ would encompass protecting the vulnerable groups of members of the community who cannot be vaccinated or are immunocompromised.

2) Each person must be treated equally or fairly.

This factor suggests that that there is an element of justice in the concept of ubuntu. This sentiment is echoed by Letseka in Mabvurira (2020, p.74) when she claims that “indeed in Southern Africa justice is perceived as Ubuntu fairness”.

In this situation, there are two groups of individuals who must be protected, namely, the parents who oppose vaccination on behalf of their children and the individuals (especially the vulnerable) who do not want to be infected by a dangerous disease. This results in a conflict between the autonomy of parents in the upbringing of their children and the inherent rights of others to health and life. However, this ‘conflict’ only appears when examined through a western lens. In an African setting, this

‘conflict’ would not be raised as it goes against ubuntu values to place one’s interests before that of the community.

As noted by Muchanyerei, African communalism pays particular attention to the concept and value of family (Muchanyerei, 2020). The proverb “blood is thicker than water” is widely practised in African tradition as these communities believe that it is vital to nurture and support fellow kinsman, family members and relatives (ibid, p.59). Mushunje, cited in Muchanyerei (2020), further recognises the crucial role that family members, relatives and the community play in the lives of children who are orphaned, handicapped or vulnerable, and whose parents are migrant workers. Tangwa also recognises the value of children in African tradition (Tangwa, 1996). Tangwa states that one of the main roles in life is to procreate and that African parents would rather die than witness their child’s death (ibid).

Thus, parents in this context would altruistically choose to put aside their personal, religious, or other convictions about vaccination to protect their children and others, especially other people’s children.

3) The vulnerable and others must be shown compassion and respect.

In this setting, the vulnerable represents individuals who cannot be vaccinated against measles. These include children who are too young, immunocompromised persons, and pregnant women who were not previously vaccinated. The potential life-threatening consequences of measles would be augmented in these groups of individuals if infected.

Others in the community, who have not been vaccinated previously, are also at risk of being infected as measles is highly contagious. The reproduction number for measles stands at 12-18 (Roberts, 2020). This means that one infected person can

infect twelve to eighteen others, making it the most notorious contagious infectious disease around (ibid). This has drastic implications for individuals in a community who tend to live, work, and socialise within the same communal setting.

The values of compassion and respect can be described as empathy and understanding. If members of the community are at risk of ill health and financial strain due to a measles infection, then the entire community will be off-balance and will share in their suffering. According to Mkhize (2008), a community exists if its members are sensitive to each other's needs, and the quality of an individual's participation in a community defines that individual's character. Mkhize adds that the social equilibrium of a community depends on individuals executing their moral duties and responsibilities to others (ibid). Thus, to ignore the plight of the vulnerable with regards to measles defies one's social obligations to others and to the community. Verhoef & Michel (1997) in Mkhize (2008, p.41) believe that a community is "strengthened if people fulfil their mutual obligations, [and] moral transgressions weaken the community by causing separation between people". Therefore, an individual's main purpose is to preserve the community by exhibiting solidarity (ibid).

The ubuntu values of compassion and respect for each other therefore call for measures to help to maintain the social balance in a community, "because an ethical being cannot look on the suffering of another and remain unaffected" (Mkhize, 2008, p.43).

4) No or the least harm must be experienced by any party.

According to Mungai as cited in Mabvurira (2020), ubuntu promotes that which provides benefits for humanity while anything that endangers humanity is not ubuntu.

Another well-known premise of ubuntu ethics, “If and when one is faced with a choice between wealth and the preservation of the life of another human being, one should opt for the preservation of life”, by Samkange and Samkange, as cited in Mabvurira (2020, p.74), also promotes humanity (ibid).

Globally, thousands of lives are lost to measles every year (WHO, 2019a). Therefore, an infectious disease like measles, which is easily transmitted and potentially fatal, is a threat to the preservation of life and, consequently, humanity. However, the few and rare side-effects of the measles vaccines must be weighed against the harms caused by the naturally occurring measles virus. When considering a new intervention, the community members would enquire about the benefits and the risks (Ogunrin et al., 2018), associated with both the vaccines and the wild-type virus, before deciding on its implementation.

Well-being is another priority in African communities (Tangwa, 1996). Pain and suffering are considered misfortunes (ibid). “*A si ngeh bong kpu”* is a saying that means “death is preferable to suffering” (ibid, p.194). Thus, a good death is “defined as a relatively painless one that is neither premature nor overdue” (ibid, p.195). Accordingly, an old person’s death is marked by elaborate celebrations, whereas a child’s death is hastily dismissed with no ceremonial rituals (ibid).

Thus, in the context of measles, death and suffering caused by an infectious disease would be regarded as premature and a gross misfortune.

The other morally relevant consequence of measles, the economic burden, as established in chapter two, also affects the well-being of the community. Monetary resources for food, land, cattle, and other essentials, for example, would probably have to be diverted to sustain the short-term and long-term economic costs

associated with treating measles and its complications. Further, permanent brain damage, deafness and blindness all lead to cognitive disabilities, resulting in the loss of present and future employment opportunities.

What can be concluded about ubuntu ethics in measles? It is clear that ubuntu ethics urges shared communal and individual interests. This implies that each person in the community would realise the benefits of herd immunity, and, thus, the harms of free riding behaviour, and therefore would choose vaccination over non-vaccination to minimise the spread of measles to others, especially to the vulnerable. Helping the vulnerable as well as others in the community shows the 'connectedness' between individuals (Muchanyerei, 2020). This is echoed in Tutu's connotation, as cited in Muchanyerei (2020, p.60), "A person is a person through other persons. None of us comes into the world fully formed. We would not know how to think, or walk, or speak, or behave as human beings unless we learned it from other human beings. We need other human beings in order to be human". Thus, in ubuntu terms all individuals, vulnerable or healthy, are equally important.

With regards to the ethical conflict in this situation, parents would wholeheartedly set aside their rights of autonomy to protect others' rights to health and life. Further, mandatory childhood vaccination would be seen as a communal good, prompting parents to unanimously agree to take the risks or equally share the duty associated with vaccination to protect the larger community.

4.3. John Rawls' theory of justice as fairness

In this section, I consider the following ethical conflict: should the distribution of burdens be equal? I posit that the burdens of measles vaccination *should* be equally

distributed among all members of society to ensure that the most vulnerable are protected.

John Rawls was an American philosopher, with interests mainly in politics, during the 20th century (Wenar, 2017). Rawls' theory of justice is based on the principle of fairness, from a common equal starting point regardless of position in society (Rawls, 2001). Rawls insists that a country's 'basic structure', which consists of the national constitution and economy for example, be fair when distributing burdens and benefits to its inhabitants as these can profoundly affect one's goals and relationships (ibid). The negotiators are therefore asked to be behind a 'veil of ignorance' so that the fairest and most equal goods for everyone can be determined (Rawls, 2001). These goods refer to the 'primary social goods' such as liberty, income, self-respect, freedom of movement, and so on (Wenar, 2017). Additionally, there are two principles of justice that must be satisfied for the most reasonable choice to be accepted: the first one entitles each citizen to the same basic rights and freedoms, while the second principle ensures equal opportunities for all citizens regardless of background and ensures that the most disadvantaged citizens receive the greatest benefit should societal and financial inequalities exist (Rawls, 2001). The second principle is referred to as 'the difference principle' by Rawls (ibid).

Applying the theory of justice as fairness

Justice as fairness requires that all members of society have the *same basic human rights* with *equal opportunities* to prosper. In addition, where societal or economic inequalities already exist then the *most vulnerable members of society must benefit the most*. These three conditions must be satisfied before a new policy or law is enforced.

When considering the implications of vaccine hesitancy, the need for increased measles vaccination rates becomes fundamental and of great consequence. One way to guarantee increased vaccination rates is to ensure that every child be vaccinated against measles. However, changing a policy from one that recommends vaccination to one that mandates vaccination must comply with the premises of Rawls's theory of justice. I consider each of these separately.

1) ***Equal basic human rights.***

Equal basic human rights and freedoms is the first principle of Rawls' theory of justice (Rawls, 2001). The basic human rights pertaining to the theory of justice in this context have been identified and discussed in the preceding content already.

According to Rawls, granting equal rights and freedoms to every inhabitant supports cooperation and fellowship among inhabitants (Rawls, 2001). This, in turn, encourages mutual respect and promotes peaceful negotiations when compromises must be made to satisfy every wish (ibid).

In this setting, the arguments offered by parents for vaccine hesitancy are refuted amicably when negotiations from the 'original position' occur. The vaccine hesitant parents realise the importance of vaccination, especially for the vulnerable groups of individuals, and are willing to sacrifice some of their liberties, like freedom of choice and religious beliefs, for the well-being of the greater population.

2) Fair equality of opportunities.

Individuals should not be deprived of health and education as these two basic human rights (United Nations General Assembly, articles 25 and 26 respectively, 1948) are pertinent to achieve opportunities for an economically sustainable life.

These sentiments are echoed by Rawls when he explains his rationales for ‘a fair equality of opportunity’ and for ‘the difference principle’ (Wenar, 2017).

As mentioned in chapter two, improved childhood health leads to better educational outcomes and, ultimately, leads to a better economic status of a country. Childhood measles vaccination prevents debilitating effects like brain damage from encephalitis, which severely impedes academic intellect (Anekwe et al. 2015). Subsequently, if a nation is resource abundant in terms of a professional workforce, the economy will be positively affected resulting in fewer inequalities between individuals.

While the current social and economic inequalities deter some individuals from accessing preventative healthcare like immunisation, all efforts to curb this must be persistent for the present population and for future generations. Furthermore, other social and economic factors can contribute to the negative outcomes of measles infected individuals. These include household crowding, poor nutrition, and inadequate education surrounding vaccine-preventable diseases.

To balance out these inequalities in favour of equal opportunities for all, policymakers must strongly consider safeguarding good health. One way of guaranteeing good health is to prevent the onset of infectious diseases like measles, which is highly transmissible with morally relevant consequences.

3) ***The most vulnerable members of society must benefit the most.***

While international instruments like the International Covenant on Economic, Social and Cultural Rights and the International Covenant on Civil and Political Rights are in place to protect the basic human rights, such as ‘the right to life’ (United Nations General Assembly, article 6, 1966a) and the ‘right to the best standard of health’

(United Nations General Assembly, article 12, 1966b), of all individuals, economic and societal inequalities are still prevalent. According to Rawls' theory of justice as fairness, under these circumstances, the most vulnerable members of society must benefit the most if a change in policy were to be implemented. In the case of measles vaccination, the most vulnerable members of society refer to children whose parents cannot afford to pay for vaccination services, children who are too young to be immunised, unvaccinated pregnant women, and the immunocompromised. These groups of individuals are identified as the most vulnerable because they cannot be vaccinated and, therefore, they are at highest risk of becoming victims of the deadly disease.

Additionally, with reference to Rawls' theory, the policymakers must act behind 'the veil of ignorance' so that "the race, ethnicity, gender, age, income, wealth, natural endowments, comprehensive doctrine, etc. of any of the citizens in society, or to which generation in the history of the society these citizens belong; [and], the political system of the society, its class structure, economic system, or level of economic development" (Wenar, 2017) are not known. A new intervention must be formulated from the 'original starting point' to be accepted as the most reasonable choice or what most in the same situation would choose. [This premise is similar to Kopelman's and Kopelman's 'minimum threshold for acceptable care', discussed in the previous chapter.] Thus, arguments offered for vaccine hesitancy, such as religious or ethnic beliefs and philosophical reasons, like a healthy lifestyle prevents measles infection, cannot be considered. Likewise, misinformation regarding safety concerns stemming from the media and other unreliable sources will not be considered, as it is controversial with only a minority of parents believing it to be true.

Thus, a new intervention, comprising mandatory childhood vaccination to increase measles vaccination rates, must adopt two principles: 1) only those with a medical exemption can refuse vaccination, and 2) wealthier individuals and nations must help disadvantaged individuals and nations with funding for vaccination services. [This principle would also be consistent with solidarity.] In compliance with Rawls' theory, therefore, the most vulnerable would receive cooperation from those who can be vaccinated so that herd immunity can confer protection and from the more affluent who can share the financial burden regarding vaccine provision.

What can be concluded about Rawls' theory of justice with regards to vaccination? On fulfilling the three conditions of Rawls' theory of justice as fairness, mandatory childhood measles vaccination is supported, and, therefore, ought to be implemented.

Can measles be eradicated? According to Steve Cochi, an advocate for global eradication, measles can be eradicated because it cannot reside in animals and because an effective, cheap vaccine exists (Roberts, 2020). Further, some countries have already achieved interruption of measles transmission (UNICEF, 2019; Hopkins et al., 1982), making it easier to realise the goal of eradication.

Do these moral theories support mandatory vaccination? If fundamental moral theories, like ubuntu and Rawls' theory of justice as fairness, justify the enforcement of mandatory vaccination, then it can be concluded that mandating vaccination is the right choice. The actions of espousing the well-being of communities by supporting shared responsibility, and encouraging the equitable distribution of benefits and burdens, especially for the sake of the vulnerable, determine whether mandatory vaccination is preferred over other alternatives to avoid disease and death.

Thus, it has been suggested that “to curb the spread of this vaccine-preventable disease, states should consider the threat to public health paramount to individual liberty infringement by restricting access to nonmedical exemptions” (Fadel, 2019). A further suggestion is that governments must ignore challenges, based on constitutional rights, to mandatory vaccination “to safeguard against the persistence of this potentially fatal disease” (ibid).

4.4. Conclusion

Solidarity, as endorsed by ubuntu, and fairness, advocated by Rawls’ theory, emphasise equal respect and consideration for all humans. It requires an unbiased contribution from each individual in decisions that impact the distribution of burdens associated with achieving herd immunity. “Voluntarily generated herd immunity is a precious collective good that should be cherished and actively protected” (Pierik, 2020, p.9). Ubuntu and Rawls’ theory of justice as fairness both encourage voluntary herd immunity, but at the same time, they justify the enforcement of mandatory vaccination for the benefit of the common good.

Using a combination of key moral theories, I have demonstrated that all members of a nation should bear the burdens of vaccination equally, or, in communitarian terms, share the duty to vaccinate equally to enjoy its collective benefits. I recommend that this notion of reciprocal participation and compassion ought to be considered in eliminating free riding behaviour and, eventually, in eradicating measles.

Chapter Five: Conclusions and Recommendations

5.1. Introduction

Measles vaccination can lead to ethical and legal challenges because it has consequences to individuals as well as to vulnerable others in society. Using moral principles and theories, the previous chapters provided an overview justifying the need to prevent measles and to increase vaccination rates. The preceding content also highlighted the need for caring relationships between individuals in the communal response to measles. This chapter presents a recap of the research study and concludes it. Recommendations to hasten the eradication process are also suggested.

5.2. Summary of the research study

Measles is re-emerging in the western world and is responsible for an increasing number of child-related deaths (UNICEF, 2019). Apart from other contextual factors, there exists a growing number of anti-vaccine behaviours that contribute to the re-emergence of measles (WHO, 2019a). These vaccine hesitant behaviours result in decreased vaccination rates which result in measles outbreaks, causing morbidities and mortalities. An increasing mortality rate from a vaccine-preventable disease becomes a public health issue that warrants attention and prompt action.

Consequently, this research study sought to determine whether childhood measles vaccination should be made mandatory. Using moral frameworks, ethical justification for enforcing measles vaccination by the state was examined. The results demonstrate that multiple moral frameworks support a mandatory measles policy as an effective method to increase immunisation rates. Further, the results indicate that

the state is justified in making childhood measles vaccination mandatory to protect society from the harms of measles.

Chapter two established the two morally relevant consequences of measles for policy makers. These consequences are the harmful health-related sequelae to an individual and to the public, and the short-term and long-term economic burden. These outcomes negatively affect the healthcare resources and the well-being of a nation. Conversely, through a utilitarian framework, it was found that the prevention of measles through vaccination avoids deaths, improves economic stability, and strengthens healthcare systems. It can be deduced that the moral theory of utilitarianism can be used to elicit ethical obligations and decision-making *from state authorities in a public health response to vaccine refusal*.

In chapter three, I demonstrated how the ethical conflict between a parent and the state in the surrogate decision-making process, resulting from vaccine hesitancy, could be resolved by applying Mill's harm principle. I illustrated that Mill's harm principle, and to an extent, the best interests standard, can be used to elicit ethical obligations and decision-making *from the state in isolated cases of vaccine refusal*.

In chapter four, I showed that the moral theories of ubuntu and Rawls' justice as fairness can be used to elicit ethical obligations and decision-making *from an impartial society in a collective response to vaccine refusal*.

Thus, these multiple moral frameworks serve as instruments for decision-making in the relevant settings worldwide: utilitarianism can be employed universally in a number of settings, for example, in an emergency situation like an outbreak, or where other moral frameworks fail to accomplish the required outcome, or in conjunction with other moral frameworks to hasten the outcome; the harm and the

best interests principles can be called upon in countries where individual autonomy is paramount and where legal action is sought in isolated cases; ubuntu and Rawls' theory can be applied in communities that focus on solidarity to achieve a common good, with Rawls' theory also forming the basis for action in countries where social and economic inequalities exist. Individually or in combination, these moral frameworks promote mandatory vaccination to guarantee increased vaccination rates and endeavour to fulfil a universal goal: a measles-free world.

5.3. Recommendations

Based on the moral frameworks called upon in this study, the following recommendations come to mind:

- According to Savulescu et al., utilitarianism depends on science or accurate information about the world to determine the means that provides the best outcomes (Savulescu et al., 2020). Likewise, according to Dawson, the action or inaction that maximises an individual's best interests relies on scientific evidence, independent of individual beliefs (Dawson, 2005). This implies that personal, philosophical, and religious beliefs should be set aside and that information regarding the benefits and risks of measles vaccines should be sought from reliable sources like healthcare providers. Therefore, it is vital to support health providers with the necessary tools to enhance the promotion of vaccines in the fast-paced unfolding vaccine environment. Further, anti-vaccine sentiments in the media must be responded to promptly and misinformation on internet sources must be continuously scanned for removal. Many public figures, like celebrities and politicians, are not medically trained (Zhang et al., 2019, Freed et al., 2011) and should not be allowed to offer

their opinions without scientific evidence to prove their claims. Techniques to promote vaccination, like social marketing campaigns and the use of social media platforms, should be considered (Freed et al., 2011). Perhaps, society should be taught how to evaluate information ensuring that incorrect data is discarded.

- Within the context of this study, ubuntu ethics and Rawls' theory of justice as fairness advocate and obligate individuals to cooperate with each other to protect the vulnerable. Family relationships are important as they impact well-being and health over the length of life of the individual members (Thomas et al., 2017). Thus, campaigns or messages to 'protect your family and your neighbour's family' can be effective. Encouraging altruistic behaviour can motivate parents to increase vaccination coverage and, consequently, decrease the disease burden (Shim et al., 2012).
- In keeping with the preceding moral theories, it is important for society to recognise the state's commitment to protect the preservation of life. Thus, compensation programmes can be put in place to recompense the few who are injured by vaccines (CDC, 2019c). This can also help gain the public's trust in vaccination. Moreover, to encourage fairness on the side of the state, it is recommended that individual beliefs be considered where feasible. For example, there are suggestions that halaal versions of vaccines be manufactured to aid vaccination uptake rates among the Muslim communities (Padmawati et al., 2019). Similarly, there are new studies being conducted to determine whether a 3rd dose of measles vaccine (Anichini et al., 2020) or a change in formulation or delivery systems would slow down the immunity waning process (Gu et al., 2017). By the same token, if conscientious

objections to mandatory vaccination are permitted for some deservedly legitimate reason, these parents should be compelled to contribute to public health in a manner analogous to the advantages of vaccination, for example, by assisting to assemble healthy lunches for school-going children (Giubilini et al, 2017).

5.4. Conclusion

Complying with the recommended immunisation schedule is essential to maintain an adequate level of herd immunity to prevent transmission and outbreaks of measles. If every parent adhered to the schedule on behalf of his or her child, then there would be no need to enforce mandatory vaccination.

In this research report, I have defended the need for mandatory childhood measles vaccination to eventually eradicate measles. I have provided four arguments to uphold my research aim: measles is harmful and potentially life-threatening, measles places a financial burden on livelihoods and the health resources of a country, the state is justified to override a parent's decision to refuse vaccination on behalf of a child, and that all members of a nation should bear the burdens of vaccination equally. Given the large safety profile of measles vaccines and considering the immense danger measles poses to a young child and others who are unable to receive vaccination, parental refusal of vaccination can be questioned. Effectively, childhood measles vaccination becomes an issue of public health and not of parental choice. When non-vaccination threatens the herd immunity of a society, like it has with the many recent outbreaks, the state cannot merely encourage voluntary immunisation. Instead, it ought to take a bold step to protect its citizens against the anticipated and preventable harms of measles by enforcing mandatory vaccination.

Word count: 18783

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Appendix A: Ethics Declaration Form

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

FACULTY OF HEALTH SCIENCES

University of the Witwatersrand Student Ethics Declaration Form

(To be completed during the protocol assessor meeting)

Background

All Research conducted by a University of the Witwatersrand student, with human subjects or animals, requires approval by the Wits Human Research Ethics Committee or Animal Research Ethics Committee, respectively.

If research has been undertaken without the necessary ethics approvals, this is considered an ethics violation. This will be reported to the relevant structures, the data will have to be discarded, and in the case of students, they cannot use the data towards their degree.

To prevent any ethics violations, the ethics requirements for the proposed project will be discussed with you at the protocol assessment.

Declaration

Based on the current protocol assessment (and any proposed changes suggested by the assessor committee), we, the undersigned, understand that the proposed research requires:

1. Human Research Ethics clearance certificate — Yes / No ✓
   a. Covered under existing supervisor ethics — Yes / No ✓
   b. Requires a new HREC application — Yes / No ✓
2. Animal Research Ethics clearance certificate — Yes / No ✓
3. No Human or Animal Ethics Clearance — Yes ✓ / No
4. Unclear, will seek appropriate guidance from the HREC/AREC committees (whichever relevant) — Yes / No ✓

Signatures

Supervisor/s: LAS Tandwa

Student: B Sibanyoni

Date: 12 May 2020

11 March 2019/MP

Appendix B: Turnitin Report Summary

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