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Immunization in Mali

- inequities between rural and urban areas

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ABSTRACT

Vaccine-preventable diseases cause millions of deaths every year in the developing world. Despite the fact that vaccination is one of the most cost-effective health interventions available today governments in developing countries fail to keep up with routine immunization and many parents fail to immunize their children. This essay examines the underlying reasons for routine immunization failure and determines the inequities between developing and developed countries. A case study of Mali, where infectious diseases are the main cause of death, is presented. The aim is to examine the inequities between urban and rural areas in the country and the reasons behind them and to find out on which grounds parents fail to vaccinate their children.

The conclusions are that there are large inequities both between and within countries. Rural areas in Mali are much worse off compared to urban zones and the reasons are multiple. More extensive poverty and lower education levels are two examples. Parents fail to vaccinate their children in a variety of reasons. The author have found that improving accessibility for health care service for rural areas is one of the most important measures that can be implemented to scale up routine immunization. Further, it is essential that both the government and international organizations commit to funding for vaccines and vaccination.

Key words: immunization, inequities, Mali, urban/rural and child health.

LIST OF ABBREVIATION

BI	Bamako Initiative
CEA	Cost-effectiveness analysis
DALY	Disability-adjusted life year
DTP1	One dose of diphtheria tetanus toxoid and pertussis
DTP3	Three doses of diphtheria tetanus toxoid and pertussis
EPI	Expanded Programme on Immunization
GAVI	Global Alliance for Vaccines and Immunisation
HIPC	Highly In-debt Poorest Countries Initiative
HDI	Human Development Index
NGO	Non-Governmental Organisation
QALY	Quality-adjusted life year
TRIPS	Agreement on Trade Related Aspects of Intellectual Rights
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WB	World Bank
WHO	World Health Organisation

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MAP OF MALI

(Map available at: http://hypo.ge-dip.etat-ge.ch/www/cvlt/mali/mali_map3.html)

1 INTRODUCTION

In this chapter a background of the thesis, among with purpose, thesis questions, limitations and method are presented. An outline of the essay is also given.

1.1 BACKGROUND

"Only about 10% of research and development funds for medicines and vaccines go into diseases that account for 90% of the global disease burden".[1]

Diseases that caused millions of deaths some decades ago are now eradicated or controlled in the developed world with routine vaccination. Immunization against childhood diseases is perceived to be one of the most important reasons to the decrease of child mortality in the world (www.ne.se) However; millions of lives are still lost each year due to vaccine-preventable diseases in the developing world. Immunization schemes are inadequate and lack of surveillance in these countries. The reasons behind this failure are multiple; stating one of them is the quotation above. Other barriers for success are shortage of health staff, inaccessible health care and lack of funding. Yet, the problem is not only a cause of inequities between developed and developing countries or shortage of money. Parents fail to vaccinate their children for a range of reasons.

Vaccination is assumed to be one of the most cost-effective health interventions available today. (Ehreth, 2003, p. 4105) When poor children grow up they usually do that in terms of missed schooling, lack of safe water and ill health. They are caught in a vicious cycle which is likely to be passed on to the next generation. Immunization can help break that vicious cycle. (SOWVI, 2003) As children become healthier they can participate in school enrolment in a greater extent and they will become more productive as adults. This, among other things, can boost the economy by improving economic growth.

Mali is one of the world's poorest countries in the world; rated 174 of 177 according to the United Nations Development Programmes (UNDPs) Human Development Index (HDI) in

[1] See ARHR, 2006, Introduction, p. xxv

2004. (Hjalte, 2006, p. 7) Also, it is stated that over 90 percent of the Malian population live on less than US$ 2 per day. (Truedson, 2004) Both the economic and health situation is in general very poor in the country, but inequities between urban and rural areas are particularly alarming. Several health projects and strategies have been implemented during the last decade, the Bamako Initiative being one of them. The aim in the Bamako Initiative (BI) was to scale up health access to the poor first and foremost by decentralizing the health sector and building more community health care centres. Yet, rural populations in Mali still suffer from inadequate health care, accessibility and poverty.

The health situation in Mali, including immunization coverage, varies among households according to where they live. The problem consists of both internal and external issues. In general, developing countries are much worse off compared to developed countries and in Mali households in rural areas face many inequities, all due to a wide range of reasons. Possible explanations to these inequities are explored in this thesis.

1.2 PURPOSE AND THESIS QUESTIONS

The purpose of this thesis is to examine what positive effects immunization encloses and the problem with low immunization coverage in developing countries. In the thesis I study the case of Mali with an urban versus rural perspective and aim to determine the reasons for inequities between the areas. Questions of particular interests are:

- On which grounds do parents fail to vaccinate their children?
- Why is immunization coverage lower in rural areas in Mali?
- What can be done to improve immunization coverage?

1.3 LIMITATIONS

The aim of this thesis is to study inequities between urban and rural areas in Mali. This was chosen due to lack of statistics regarding the districts, which was my first idea. One must bear in mind that inequities between those areas will be studied in general and that local differences may occur. Further, due to the extent of this bachelor thesis, I have not taken any vaccine safety discussion into account. This is an issue which could be decisive when parents make the choice to vaccinate their children or not. However, I have assumed that it is more likely to be a concern for parents in industrialized countries than for those in developing ones.

To get an idea of what previous health development strategies successes and failures have been I decided to include this as a part of the study. Because of a wide range of different health projects and strategies in Mali, it was essential to focus on one of them to keep this part to a lesser extent of the essay. My choice to include the BI is based on the purpose of the strategy which was to scale up health services for the poor (rural populations often being poorer than urban ones). I found this very interesting and valuable for my essay since the aim is to determine inequities between urban and rural areas.

1.4 METHODOLOGICAL APPROACH

1.4.1 Material

I have mainly extracted both my theoretical and empirical findings from other studies. Using other researchers' papers will put me in a position where I am never able to fully escape from their partiality at the time of writing. Therefore, I have put much energy on searching for material to avoid falsification due to having used one-sided material. I have intentionally tried to gather information from large and well respected organisations such as the World Health Organisation (WHO) and the World Bank (WB). However, some of the material is also extracted from smaller Non-Governmental Organisations (NGOs) such as the Global Alliance for Vaccines and Immunisation (GAVI) which is more oriented on immunization questions. To strengthen the study's reliability I have perhaps even more so during the latter type of source, been very critical in my approach to my sources. The material in this study has a variety of different authors and publishers which I feel has given me a relatively objective platform to work from. I believe this will contribute to a higher level of reliability.

1.4.2 Degree of generalization

As a large part of the theoretical framework concerns immunization problems in developing countries in general, it is important to bear in mind that some differences exists between countries in the developing world. However, the problems introduced in chapter three are problems most poor countries are facing more or less. Further, there are not many writings specifically oriented on Mali. A certain degree of generalization has therefore been made to be able to complete the study.

1.5 OUTLINE OF THE THESIS

The second chapter is a summary of how vaccines work and why they are used. A starting point is set by connecting immunization to economic theory. I will also investigate the cost-effectiveness and enclosed effects of immunization. Chapter three describes and elucidates the complex of problems with low immunization coverage in the developing world. Chapter four contains the case study of Mali and the factors contributing inequities between urban and rural areas and what can be done to improve immunization coverage. The grounds of which parents choose not to vaccinate their children are also described. A brief overview of the health situation is given and a historical background of the health sector. I also account the success and failures of the BI. The thesis is concluded with a discussion in chapter five.

2 IMMUNIZATION

In this chapter I introduce immunization technique, describe the reasons to why vaccination is important, and go through the positive effects of immunization as well as the cost-effectiveness.

2.1 IMMUNIZATION TECHNIQUE

When vaccinating an individual the body is provided with parts of the infectious matter that causes the disease or the whole infectious matter in weakened form. This way the body will learn to recognize the bacterium or the virus and slowly build up a protection against the disease. If the individual later would be contagious, the immune system is active and can render the infectious matter harmlessly before the person gets sick. To get a long-term good protection most vaccines must be given more than once, but thanks to combination vaccines the number of pricks can be decreased. Children have from birth a certain protection against different infections by transference of the mothers' antibodies. However, the protection decreases with time and stops in principle after six months. It is never too late to continue a started vaccination even if it has been a long time since the child got its first injection. (Bornholm, 2005)

There are two basic mechanisms for obtaining immunity – active and passive. Active immunity is produced by an individual's own immune system and is usually long-lasting. According to the Green Book (2006) "Such immunity generally involves cellular responses, serum antibodies or a combination acting against one or more antigens on the infecting organism". One can obtain active immunity by natural disease or by vaccination. The latter type being without the disease or its complications. Passive immunity is protection provided from immune individuals by the transfer of antibodies. It can be obtained by transfusion of blood or blood products including immunoglobulin, but more commonly by the cross-placental[2] transfer of antibodies from mother to child. The latter type is more effective against diseases such as tetanus and measles than for others like polio. This is only a temporary protection. (Green Book, 2006)

[2] Definition of placenta according to the Encarta Dictionary: organ in uterus of pregnant mammal. A vascular organ that develops inside the uterus of most pregnant mammals to supply food and oxygen to the fetus through the umbilical cord. It is expelled after birth.

There is no vaccine that can offer a 100 percent protection against a disease; some individuals can get infected in spite of immunization. Vaccines can fail in two main ways – primary or secondary. When a person fails to make an initial immunological response to the vaccine primary failure occurs. Hence, the individual can get infected at any point after vaccination. Secondary failure occurs when an individual responds in the beginning but then protection wanes over time. The occurrence of secondary vaccine failure consequently increases with time. (Green Book, 2006)

2.2 WHY VACCINATE?

The purpose with immunization is to as risk free as possible give an individual a protection against certain infections. However, immunization does not just protect the individual itself; it can also contribute to stop the spread of infection in the population. The effects from immunization are depending on various factors; how big part of the population that is vaccinated, how much the vaccination decreases the spread of the disease even among the unvaccinated, how infectious the disease is and the vaccines grade of protection against the infection. (Bornholm, 2005)

Every year vaccine-preventable diseases cause millions of deaths, mainly among children in developing countries. One-quarter of the world's children still have no protection from common preventable diseases. Poor children are least likely to be immunized and most likely to die before the age of five. If they do survive they grow up in extreme poverty with lack of access to safe water, ill health and also in some cases missed schooling. They are caught in a vicious cycle and are likely to pass this on to the next generation. Immunization can help break that vicious cycle. (SOWVI, 2003)

In the article "*The Value of Vaccination*" the authors write that "the effects of vaccines tend to underplay the benefits, disregarding the broad economic impacts of immunization in favour of a predominant and narrow focus on the adverted costs of medical treatment and health care". (Bloom et al., 2005, p. 16) If policy makers had taken all benefits of immunization into account then they might put more weight on vaccination. Further, the authors state that "The benefits of a push for increased immunization are likely to heavily outweigh the costs, and

policy makers who neglect immunization will be missing a great opportunity for promoting development". (Bloom et al., 2005, p. 39)

Vaccination can be used to establish a basis for other health care activities where these are lacking. In countries or areas where malnutrition is a problem vaccination programmes can be used to spur vitamin A supplementation, hence; the programme can be an opportunity for supplementation. (Ehreth, 2003, p.4112)

2.3 "HERD IMMUNITY"

The primary aim of vaccination is to protect the individual itself. Communicable diseases are easily spread through air, fluids, water and social interaction from individual to individual and community to community. An individual's risk of contracting the disease is a function of contact with other infected individuals. The probability for an uninfected person to become ill is smaller the fewer carriers in the population. The probability for an individual to catch a disease also depends on his or hers susceptibility to the infection. There are different factors which can affect the individuals susceptibility, such as health status, behaviour and, particularly, if the person is vaccinated against the disease or not. (William, 1999, p. 181ff) Immunization benefits the individual itself, but also unvaccinated individuals by reducing the number of infected carriers and therefore the risk that they come into contact with an infected person. The latter benefit is not captured by the vaccinated individual; hence it represents an externality, which generally only to some extent is included into an individual's decision to be vaccinated. (Ibid) The externality represents the stage when only a few susceptible individuals are left in the population and those people get an indirect protection. This collected protection is called "herd immunity". (Skånberg & Ekholm, 2007)

It is important to remember that in developing countries with high fertility rates many new susceptible babies are born each day which contributes to the infectious matters ability to live on. If high vaccination coverage is not maintained, it is possible for the disease to return. To maintain herd immunity it is regarded that a big part of the population is vaccinated. For example, when it comes to polio it is recommended that 80-85 percent of the population must be vaccinated. For measles one needs to immunize 90-95 percent of the population. (Skånberg & Ekholm, 2007) It is therefore important to encourage vaccination even among populations with a high coverage rate. One must also recollect that high immunization rates in one generation can benefit the next so disease eradication can be achieved. It should therefore be

the general aim of those involved in public health to establish herd immunity in most populations.

2.3.1 An economic perspective

Good health contributes to economic growth in various ways. Children who are healthy can perform better in school and immunization can keep children healthy. As adults they will be more productive at work. Healthy families are also more likely to save for the future as a greater incentive to save occurs when they expect to live longer. Families are also able to fulfil their roles in society better with healthier children, since they do not need to stay at home taking care of ill children. In other words immunization prevents suffering and illness from occurring in the first place. As a result of this, immunization includes other benefits as well, such as improved worker productivity, greater access to education, larger lifetime earnings and less treatment costs related to preventable diseases. Healthy societies can also work as a trigger for tourism and foreign direct investment. (Bloom et al., 2005, p. 17)

Improved health status in families can also be a set off for lower fertility rates which can lead to a change in the age structure which in turn can lead to significant economic benefits. Lower fertility rates are contributed by lower rates of mortality because families realize they need fewer children to attain their ideal family size. This transition has been accounted for as much as one third of East Asia's "economic miracle". (Bloom et al., 2005, p. 32f) As a population is getting healthier there are also bigger opportunities to enable larger investments in other areas, such as education.

As discussed in pieces above, investments in health contribute to improved economic growth in various ways. This becomes even clearer when studying figure 2.1 below. When policymakers decide to invest in health it will directly lead to improved health status in the population. As the population is healthier, they are able to contribute to economic growth to a greater extent. Factors behind this are enhanced labour productivity, improved educational attainment, increased savings and investments and demographic dividend: lower dependency ratio. When the economy grows people become richer and as a result they will spend more money on improving their health status. This implies that not only does health provide economic benefits; it works in the opposite way as well. When people are better-off the health increases. Though, the increase is also an effect of the fact that health care becomes more

affordable. It is possible that individuals' preferences have changed over time, and that, for a given level of income, individuals have become more concerned about health. (William, 1999, p. 33) However, poor households cannot afford adequate nutrition which can cause ill health. Poor households are more susceptible to illness which makes them vulnerable to morbidity, disability and premature death. Some households that could be over the poverty line could be pushed under it due to ill health. When prices for vaccines and other health services are too high, households can be forced into poverty. This is also seen where households suffer loss of work time due to illness or disability, caring for children or relatives in poor health or when income earners face a premature death. (Fairbank et al., 2000, p. 3) Out-of-pocket expenses for health care are often high in proportion to household incomes and is a factor driving poverty. (ARHR, 2006, p. 3)

With improved, broadened and more financially self-sufficient vaccination programmes developing countries could directly improve the lives of their populations and indirectly contribute to their ability to participate in economic growth. (Fairbank et al., 2000, p. 2)

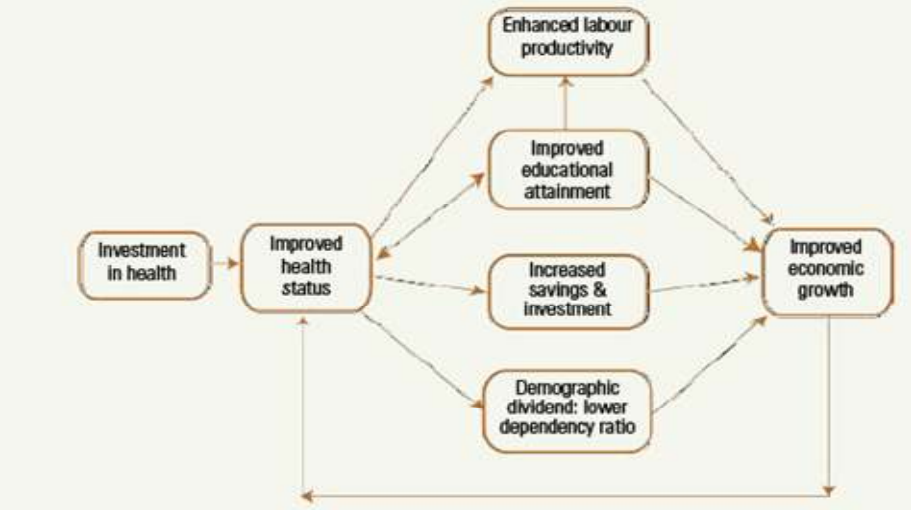

Figure 2.1: Investments in health contribute to economic development

(Source: ARHR, 2006, chapter 1, p. 7)

2.4 OTHER ENCLOSED EFFECTS OF IMMUNIZATION

Vaccination doesn't only protect the child against diseases, but also against the long-term effects of that illness on their physical, emotional and cognitive development. Physical handicaps are particularly harmful in developing countries where manual work often is the only alternative. Diseases, for example measles, can cause brain damage or impair learning

abilities, which has severe effects on a child's capacity for schooling and work in its adult life. (Bloom et al., 2005, p. 31)

2.5 THE COST-EFFECTIVENESS OF IMMUNIZATION

With cost-effectiveness analysis (CEA) one can determine the cost of an intervention in relationship to a particular outcome. Cost-effectiveness ratios are often used to set health priorities. For example, one can examine how much it costs to save a certain number of children from a vaccine-preventable disease. Childhood immunization is said to be one of the most cost-effective of all health interventions. (Ehreth, 2003, p. 4105) To fully immunize a child with the Expanded Programme on Immunization (EPI) vaccines has an average cost of US$ 25 whereas the cost of treating children that suffer from these diseases is much higher (SOWVI, 2003, p. 82) Thus, spending on children's vaccination has among the greatest regains in terms of morbidity and mortality per dollar spent of any health intervention. Despite the fact that immunization is highly cost-effective, in many developing countries it may seem as an impossible luxury. Hard-pressed governments with tight budgets are forced to make cautious decisions about how and where to spend their money. In addition, health interventions are often complex and competing with each other and policy makers might not always have all the information needed to make the most profitable decision. If governments in low-income countries had more knowledge about the cost-effectiveness of immunization they might not neglect the opportunities in the same extent. According to the WHO Commission on Macroeconomics and Health cost-effective interventions in health is a significant driver of economic growth. The African region has the highest potential in the world to benefit from such investment in health. (ARHR, 2006, p. 5)

There are different measurements for health interventions. A disability-adjusted life year (DALY) is a measure for the overall burden of disease. Traditionally health interventions were measured by premature death, disregarding the impact of disability. DALY combines the impact of the two. The measurement was initially developed by WHO and is becoming increasingly more common. (Wikipedia, 2007, "DALY")

Quality-adjusted life year (QALY) is another measurement, which measures the benefit of a medical intervention based on the number of years of life that would be added by the intervention. Every year is assigned a value on a scale from 0 to 1, where 0 is death and 1

represent one year lived in full health. Values between 0 and 1 correspond to years lived without perfect health. (Wikipedia, 2007, “QALY”)

3 IMMUNIZATION IN DEVELOPING COUNTRIES

This chapter contains the reasons that underlie low immunization coverage in the developing world. Factors that are assumed to be important underlying issues are described deeper.

3.1 INTRODUCTION

The developing world lags behind the developed world with immunization coverage. In 2003, 62 percent of countries had still not achieved full immunization routine. (Bloom et al., 2005, p. 21) Children in developing countries are ten times more likely to die of a vaccine-preventable disease than children in the industrialized world. A child in a developing country is fortunate to receive half the number of vaccines that a child in an developed country receives. (Ehreth, 2003, p. 4107) There are several factors behind this failure. Problems with hard-to-reach populations, vaccine delivery systems and lack of interest from health workers and international donors exist. There is also a lack of resources, insufficient budgets, and ineffective public health policies. Developing countries are moreover often short of basic infrastructure, sanitation and health education.

Each year approximately 132 million babies need to be fully vaccinated. This requires immunization systems with sufficient resources, extensive vaccines and trained health workers. Vaccines must be delivered in cool refrigerators and in addition, health staff must be able to get to every child. It is extremely hard to accomplish this in developing countries where infrastructure often is very poor and the majority of the population lives in rural areas. Some developing countries have in addition experienced civil conflict in recent years which has destroyed the little infrastructure that existed and put the population in an even more vulnerable position. Children can also miss out on vaccine because their parents fail to register their birth or because they simply are not aware of the great impact of immunization. (SOWVI, 2003. p. 4)

The poorest populations in the world are most susceptible to infectious diseases and other condition due to a wide range of reasons. They often lack of safe water, suffer from malnutrition, low provision of health services and are too poor to afford medicines. Every year around 11 million children under the age of five die, despite the fact that existing

vaccines could prevent many of those childhood deaths. As pointed out, there are several reasons why populations in developing countries miss out on immunization. Some of the reasons will be discussed next.

3.2 GAPS IN ACCESS TO NEW VACCINES AND R&D GAPS

According to the authors of the article "*The Value of Vaccination*" the number of major western pharmaceutical companies making vaccines fell from 26 in 1967 to 5 today. (Bloom et al., 2005, p. 25) A few developing-country manufactures have taken up some of the loss, but far from all. Seeing that there are greater profit margins for rich-world vaccines, many manufactures concentrate on developing vaccines for diseases in the developed world causing inadequate access for vaccines in developing countries. Of all research and development funds for medicines and vaccines only about 10 percent goes into diseases which account for 90 percent of the global burden of disease. (ARHR, 2006, p. xxv) As new life-saving vaccines have been introduced at the market, the gap between rich and poor countries has widened even further. The prices are too high for most developing countries to afford. Moreover, immunization systems in low-income countries are often too weak in delivering existing vaccines, let alone add new costly ones. Developing countries have a hard time establishing the burden of disease and the likely cost-effectiveness of the new vaccines, due to bad disease surveillance and reporting systems. (SOWVI, 2003, p. 7) This causes uncertainty about how big the demand for the new vaccines is in developing countries. The insecurity and the low price negotiated over the years for the traditional "older" vaccines have deterred manufactures from developing vaccines for use in low-income countries, hence they are perceived to be low-profit countries. In addition, the same disease occurring in both developed and developing countries may be caused by different types of organisms. Therefore, vaccine that prevents this disease in the developed world might now be suitable for use in developing countries. The reason for this is that a disease in a low-income country often takes a more dangerous form, in particular among children also suffering from malnutrition. (SOWVI, 2003, p. 10)

Vaccine R&D is a very risky business due to uncertain demand for a new product. To research and develop a new vaccine is an extremely long process with high costs. A new vaccine can cost US$ 500 million or more and usually it takes 12-15 years from the start until one can introduce the product to the market (SOWVI, 2003, p. 9). Additionally, people

generally need only one dose of a vaccine which restrains the producers' revenue. To make a profit manufactures consequently set a high price for each new vaccine. Manufactures also use TRIPS (the Agreement on Trade Related Aspects of Intellectual Rights) to protect their products. Under this agreement the manufacturer can be given a patent which is an exclusive right to an initial 20-year period. During this period the company can produce the vaccine themselves or license the production in return for payment. When the patent expires, other manufactures are free to produce the vaccine which leads to competition. However, these patents are threatened by developing-country manufactures and vaccine developers are not sure to gain a satisfactory return on their investment. Therefore there is an even greater risk that vaccine development for low-income countries may weaken further. (Bloom et al, 2005, p. 26)

To avoid the 20 year delay in access to new vaccines for the developing world tired pricing can be used. With tired pricing new expensive vaccines are made accessible for the poor countries by reducing prices with the offset of higher prices in the developed world. A premise of tired pricing is the support of developed countries and their governments and public willingness to pay more than developing countries for the vaccines. (SOWVI, 2003, p. 23)

Vaccine R&D is concentrated for children in the rich world, disregarding millions of children in developing countries. As elucidated in previous pieces the problem is three-fold: first, the low demand for new vaccines in developing countries; second, the neglect of low-profit vaccines for low-income markets; and third, differences between developed and developing countries when it comes to the disease-causing organisms.

3.3 HEALTH SERVICE DELIVERY GAPS

Many developing countries have failed to ensure routine immunization for children. Poor managed and weak equipped health service delivery systems are one reason for this failure. Health staff is often poorly motivated and policy makers fail to plan and budget health care effectively. In addition, many populations have no access to health services due to bad infrastructure and communications. To reach remote populations one needs efficient transport systems with different types of transportation, from four-wheel drive vehicles and motorcycles to camels and boats. Vaccines must also be delivered in freezers or refrigerators

which requires constant supply of energy. (Bloom et al., 2005, p. 22) Lack of electricity is a problem facing most rural areas in many developing countries. Of all the children that miss out on vaccination each year, the majority of them live in remote rural areas. It is not just the requirement of good infrastructure and working transportation systems which are needed, it also requires more funding. To vaccinate these children could be up to five times more expensive than to immunize the children in densely populated urban areas. (SOWVI, 2003, p. 27)

To be able to provide children with vaccine it is important to have a functional health delivery system, but it also requires educated and motivated health staff. The World Health Report in 2006 highlighted an alarming mismatch in some countries between the health needs of the population and the geographical location of health workers, the size of the workforce and the mix of skills available. The rich world with the lowest relative needs had most of the workforce; meanwhile the countries with the greatest burden of disease had a much smaller number of workers. This is introduced in Figure 3.1 below. From the figure one can see that the African region suffers from around 24 percent of the global burden of disease but has only access to 3 percent of the workforce.

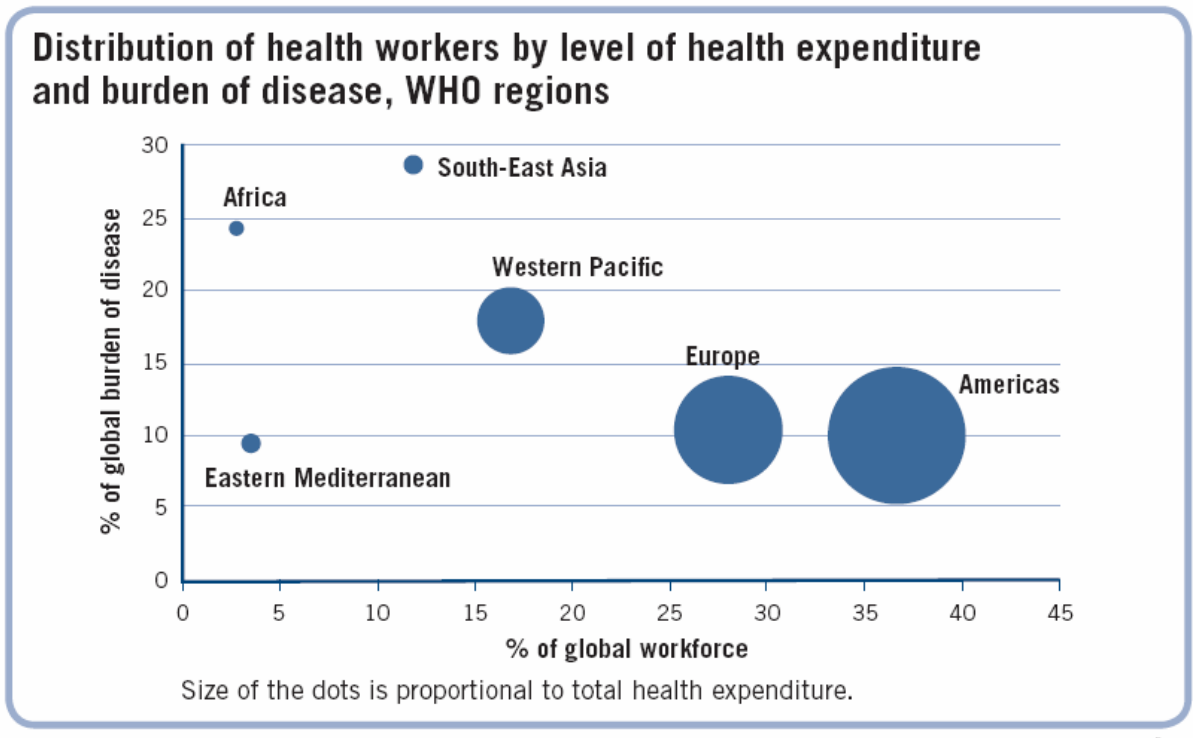

Figure 3.1: Distribution of health workers

(Source: The World Health Report 2006, chapter 1, p. 9)

The World Health Report 2006 also introduced figures over density of health workers. The African region had a figure of 2.3 (per 1000 population), while the same number for Europe was 18.9 and 24.8 for the Americas. Inequities were moreover found within countries, where urban areas had much higher density of health services providers than rural ones. At the same time, researchers found that countries with a higher density of health workforce attain higher levels of measles vaccination. A positively correlation between density of health workers and probability of survival of children was also discovered. (World Health Report, 2006) See figure 3.2 below.

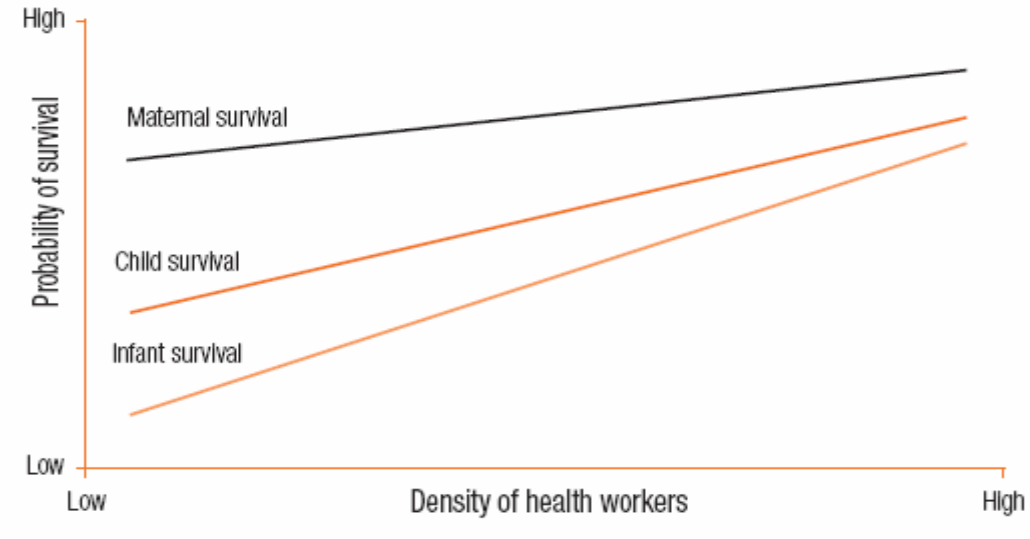

Figure 3.2: Correlation between density of health workers and probability of survival

(Source: The World Health Report 2006, overview, p. xvi)

3.4 FINANCE GAPS

Funding for immunization has failed to keep up with the population growth and the higher cost of health care delivering systems. The average cost to immunize a child has increased, this is due to the fact that the easy-to-reach children has been vaccinated and the need for immunization is now mostly required among the hard-to-reach children in remote rural areas. Furthermore, since the 1990s funding for vaccination declined and as a direct result of this we have seen stagnating or falling coverage levels. United Nations Children's Fund (UNICEF) funding for immunization fell from US$ 182 million to US$ 51.4 million between 1990 and 1998. (Bloom et al., 2005, p. 21)

Many governments in developing countries spend inadequate financial resources on vaccination. The poorest countries only spend US$ 6 per capita a year on health services, with

donor support included. In fact, some of the least-developed countries spend three to five times as much on debt repayments as on fundamental services for their people. Health economists at the World Bank estimate that low-income countries account for 93 percent of the world's disease burden but only 18 percent of its income and 11 percent of global spending on health. (SOWVI, 2003, p. 14) Further, Ehreth (2003, p. 4107) write that "In countries where the services and funding are inadequate the focus tends to be on therapeutic intervention to avert crises rather than on prevention and early treatment".

4 MALI – A CASE STUDY

In this chapter the case study of Mali is presented. An overview of the country, including health and poverty situation, is given and an earlier strategy to improve health status is described. An evaluation of the causes underlying inequities between urban and rural areas in Mali is introduced as well as the grounds of which parents fail to vaccinate their children. Further, I discuss what can be done to improve immunization coverage.

4.1 INTRODUCTION

Mali is a large landlocked country situated in West Africa with a population of approximately 13.9 million. (www.ne.se, "Mali") The country became a French colony in the end of the 1800s, but became independent again in 1960. (Ibid) After the independence Mali was ruled by military dictatorship for about 30 years. In 1992, Mali held its first general election and started growing into a democracy. (www.sida.se) Today, Mali is a republic with President Amadou Toumani Touré (2002 -) as their leader. Official language is French, but around 30 domestic languages are spoken within the country. (sv.wikipedia.org)

Mali is one of the world's poorest countries; rated 174 of 177 according to the UNDPs HDI in 2004. (Hjalte, 2006) Over 90 percent of the population lives on less than US$ 2 per day. (Truedson, 2004) Since the beginning of the 1990s Mali has implemented an economic reform programme which has led to the liberalisation and stabilisation of the economic situation. However, the country is yet today one of the most aid dependent countries in Africa. (www.sida.se)

The climate in Mali varies between subtropical and dry and is harsh and unpredictable with highly variable rainfall and an ever-threat of drought. The population living around the river Niger often suffers from flood. The northern parts consist of desert; the population is less than one person per square kilometre. The majority of the population lives in the southern parts around the rivers Niger and Senegal. The country is sparsely urbanized; just a little more than 30 percent lives in urban areas. (Truedson, 2004) Around 80 percent of the population works in the agriculture or fishing sectors. (Wikipedia, 2007, "Mali")

The Malian household size varies from 5.2 in rural areas to 5.7 in urban zones. It is more common with large households (nine persons or more) in urban areas than in rural ones. A majority of households lack of electricity; only a total of 11 percent of the population have access. There are also large disparities between urban and rural areas; only 2 percent in rural areas have electricity compared with 37 percent in urban zones. (Bartlett et al., 2001, p. 2)

4.1.1 Health situation

Malaria and other preventive diseases are the main causes of illness and death in Mali. Poor environmental conditions such as lack of clean water are where most of the diseases origins from. (Hjalte, 2006, p. 7) Only 42 percent of the population has access to clean water. (Bartlett et al., 2001, p. 2) Large distances and poorly developed infrastructure worsen the access to health care further. In addition, the confidence for western health care is low and only 0,16 new visits per person is registered each year. (Health Support in Africa, 2000, p. 49) Many households still prefer traditional medicine and in a rural village attitudes change slowly. The decision to seek health care is in most cases taken by the man who controls income and other household resources. (HCM, 1999, p. 49) That health care is costly for households and the quality of the health care is doubtful does not improve or hasten development. Furthermore, health knowledge among people is inadequate.

Acute malnutrition is very high among children under 3 years of age; as much as 23 percent. Contributing factors to this are, except poverty, traditional ideas of food and health and raising patterns where the youngest child has the lowest priority. (Health Support in Africa, 2000, p. 49) Of children under the age of five who live with their mother around 38 percent are stunted or chronically malnourished. There are large inequities between urban and rural areas; 43 percent in rural areas suffer from stunting compared to 24 percent in urban zones. Further, the mothers' education level has a distinct affect on a child's risk of stunting. Children whose mothers have either no or only primary level of education run a 38 percent risk to be affected by stunting, while those whose mothers have secondary education or higher only run a risk of 5 percent. Underweight is another childhood problem; 33 percent of the Malian children are underweight, most commonly among children in rural areas. (Bartlett et al., 2001, p. 11) The infant mortality rate in Mali is 113 per 1000 births. However, this indicator varies strongly between regions. In Bamako, the capital, the rate is 94 per 1000

which is the lowest level in the country. This level is also influenced by the mother's level of education. (Bartlett et al., 2001, p. 7)

The World Health Report 2006 pointed out Mali, among the majority of African countries, to suffer from a critical shortage of health workers. (World Health Report, 2006) However, these inequities are also a problem within the country. Attracting and recruiting qualified staff members is difficult, especially in rural areas. Since the communities are determining the salaries, health staff is drawn to the urban areas or better-off regions. (HCM, 1999, p. 49) The density of total health workforce is very low; only 0.852 per 1000. (World Health Statistics, 2006)

4.1.1.1 The health sector

Private health care was not allowed after the independence in 1960, but was allowed again in 1985. However, their extension is still rather limited and they are mainly found in the capital or other urban areas. Mali has a wide variety of health care providers such as public and para-statal health centres, private health centres, health centres belonging to enterprises or the military army, mutual and insurance companies, public and private health care schools, pharmacies, traditional therapists and NGOs. (Hjalte, 2006) The public health system is organized as follows: at the lowest level there are 674 community health centres (CSCOMs). These centres offer a minimum package of health care. The district level includes 55 district health care centres (CSCs). These are mainly financed by public funds and donors, supplemented by user fees. At the hospital level there are 7 regional hospitals and 4 national hospitals. At the central level in the system the Minister of Health has a policy making and coordinating role. (Hjalte, 2006)

4.1.1.2 Financing

The Malian health sector is dependent on financial support from bilateral donors and multinational organisations. There are several NGOs working in the country. Besides these sources of funds the households account for a significant part of the health care expenditures in the country. (Hjalte, 2006)

Financing source	Billion CFA	% (of total)
Government	10.0	17.5%
Others (NGOs)	3.3	5.8%
Aid	14.2	25%
Households	29.2	51.5%
SUM	**56.7**	**100%**

Table 4.1: Distribution of financing sources in the health sector

Source: (Health Support in Africa, 2000, p. 50)

4.1.2 Poverty profile

Due to the close link between poor health and lack of income it is important to introduce a poverty profile of Mali. As already presented, Mali is one of the poorest countries in the world (see introduction) and poverty remains widespread. The population experience poverty due to being part of a low productivity economy, which is highly dependent on agriculture and have very little higher paid employment in the industrial or service sectors. (Toulmin et al., 2000) The implementation of the first Poverty Reduction Strategy (2002-2006) has not given any notable impact so far. Mali is also very much effected by external factors such as unpredictable weather conditions and the political and economic situation in the Sub-region. (Embassy of Sweden in Mali, 2005, p. 5) Poverty tends to vary between rural and urban regions. The northern and more isolated central regions display the highest rates of poverty. (Toulmin et al., 2000)

4.2 THE BAMAKO INITIATIVE[3]

4.2.1 Background and design

The BI was implemented in varying degrees from the start in 1987. Policy makers developed national strategies and implementation plans with support from UNICEF, WHO and the WB to renew community-owned and managed health centres. This was crucial in Mali; hence communities had little or no voice in policymaking.

The situation was especially critical for the majority of poor families living in rural areas who had no access to any affordable and quality health services or medicines. In addition, the

[3] This piece of chapter is a summary of the background paper "Increasing clients' power to scale up health services for the poor: THE BAMAKO INITIATIVE IN WEST AFRICA". Knippenberg R *et al* 2003.

infrastructure was more or less nonexistent in these areas. At the starting point Mali had at most one doctor for 25000 people and most health staff were highly de-motivated to work in rural areas. The main causes of this were delayed salary payments and working conditions such as lack of running water, electricity, equipment vaccines and drugs made it almost impossible for staff to do their work. In addition, fuel shortages worsened the situation even further.

The design of the BI included revitalizing existing health care centres and implement social mobilization and community-based communication strategies to stimulate demand. Focus was professional services such as immunization and support healthy behaviours in families. A reach out approach was to benefit the poorest groups by laying focus on rural areas, the burden of disease, subsidize child care and offer free immunizations.

4.2.2 The results

The BI has shown that sustaining local public health services is empowered by organized communities. Although Mali still has a low rate of immunization, coverage has increased since the launch, especially among the poorest groups which has improved the equity in the population. Other health interventions have also increased in the country, for example utilization of health services and a decrease in under five mortality rate. Due to subsidization and improved access and quality, the affordability of health services has improved.

4.2.3 Future challenges

Even if "relative affordability" improved, most of the poorest families still cannot afford the health services offered; for this reason the "absolute affordability" remains a problem. Access to health services at less then 5 km is still below 50 percent, mainly due to Mali being a very large desert country. Access still remains an obstacle for many poor households in rural areas and they must rely on self medication, especially for childhood illnesses.

Another severe issue is the shortage of trained health staff. Even when debt relief and substantial resources from the Highly In-debt Poorest Countries Initiative (HIPC) made it possible for Mali to employ and pay extra health staff for the poorest regions, there were not enough candidates.

4.3 IMMUNIZATION IN MALI

4.3.1 Introduction

Figures from the Demographic and Health Survey in 2001 showed that immunization coverage in Mali was low: only 29 percent of children age 12-23 months received the entire series of vaccinations and all the doses of vaccines in the EPI. 22 percent of children received no vaccines at all. (Bartlett et al., 2001, p. 9) Children receiving vaccine for measles were 49 percent at the time and 61 percent were immunized with one dose of diphtheria tetanus toxoid and pertussis (DTP1), but only 40 percent received all three doses of diphtheria tetanus toxoid and pertussis (DTP3). However, in recent years coverage has improved. WHO health indicators from 2005 present a great improvement; 75 percent of one-year-olds were immunized against measles and 76 percent with DTP3. (World Health Statistics, 2006) Indicators also showed that 47 percent of all districts had DTP3 coverage at 80 percent or above, 33 percent had coverage between 50 and 79 percent and 21 percent of districts had coverage below 50 percent in 2004. The DTP3-DTP1 drop-out rate was 12 percent. (Immunization Summary, 2006, p. 106) This improvement could be a result of different health projects and strategies implemented in the country, for example the Bamako Initiative. However, despite the positive development, there are still many children left to be vaccinated. 21 percent of the districts still have DTP3 coverage below 50 percent and the DTP3-DTP1 drop-out rate have not enhanced. The inequities in health and immunization coverage are often found between rural and urban areas.

4.3.2 Urban zones versus rural areas

There are large inequities between rural and urban areas concerning health status among children. The under-five mortality rate is 185 in urban zones and as much as 253 in rural areas. (World Health Statistics, 2006) Infant mortality is also considerably lower in urban areas. (Bartlett et al., 2001, p. 7) Immunization coverage differs greatly among regions. In 2001, 70.8 percent of one-year-olds were immunized against measles in urban zones compared to only 41.3 percent in rural ones. (World Health Statistics, 2006) Large inequities among the regions in the country were also pointed out in the Demographic and Health Survey of Mali in 2001. The district of Bamako had the highest immunization coverage with 61 percent of children receiving all the vaccines. In other cities around 40 percent were vaccinated and in rural areas only 22 percent of children receive all vaccines. (Bartlett et al., 2001, p. 9) Further, in SOWVI (2003, p. 4) it is stated that it is more common with large

inequities in countries that are both poor and have low overall immunization coverage, mainly in sub-Saharan Africa.

There are a few aspects concerning urban versus rural areas which are important to illuminate. First, populations in urban zones have lower transportation costs because a generally greater access to health care centres and because they have to spend less amount of time on getting to a health provider. On the contrary, rural populations have usually larger distances to travel and in addition weaker means of transport. On the other hand, people living in cities have often a greater risk of contracting infectious diseases hence the health effects of overcrowding. (William, 1999, p. 27f) However, since more children are vaccinated in urban areas the overcrowding effect does not disadvantage urban inhabited children in the same extent as the access effect disadvantage children in rural areas.

Infrastructure in rural areas often lags behind large cities and urban zones. Mali is a large desert country which makes health services less accessible, especially for rural villages. As pointed out in chapter three (see health delivery gaps) rural areas are much worse off regarding health workforce and density of health workers. Despite the fact that approximately 70 percent of the Malian population live in remote areas most health workforce can be found in cities or urban zones. Mali have a shortage of health staff in general, but the small number of health staff actually working in the county are very de-motivated to work in rural areas. The main causes are bad working conditions because most rural health care centres lack of electricity, running water, equipped vaccines and drugs. Health staff is therefore drawn to urban zones or better-off regions. Further, the few private health providers existing in the country are also based in urban areas.

Another issue, also pointed out in chapter three, is that children living in remote areas are harder to reach out to and, consequently, the cost of vaccinating these children is higher. Household incomes are also often lower in rural areas because, in the majority of cases, they work in the agriculture sector which is very vulnerable to weather conditions and world market prices.

4.3.3 Why parents fail to immunize their children

Individuals make their own choices about health care. It is the parents' decision whether to immunize their children or not. It can be a very complicated decision making process as it may involve advice from relatives and friends as well as physicians. The parents must weigh benefits and disadvantages which can vary according to where they live and how far it is to the nearest health care centre.

It is important to look at the parents' demand for health care services and the certain factors the demand is dependent on. One must consider factors such as vaccine prices, level of income and health status. Weak health status generally results in a high demand for health care services. (William, 1999, p. 55ff) However, with both a low level of income and no affordable vaccines parents are left with no choice than to refuse health care. Low incomes will depress demand for health care, but can also foster conditions that make the population more vulnerable to disease and ill health. (HCM, 1999, p. 45)

Earlier studies have found that the social status of women is positively correlated with both their health status and that of their children. (William, 1999, p. 36) The head of the household is in most cases the man; however, women in urban areas are more likely to play a determining role in the household. Other studies have found the level of education as a significant determinant of health status and particularly that improvements in parents' literacy are correlated with improvements in children's health. (William, 1999, p. 35) In Mali, the adult literacy rate is only 12 percent for women and 27 percent for men. (UNICEF statistics, 2004) WHO indicators from 2001 show that children whose mothers have no education had an approximately 45 percent chance of being immunized against measles, compared to approximately 79 percent for children with mothers with higher education. (World Health Statistics, 2006) The under-five mortality rate also shows large inequities where the rate is 90 for children with mothers that have higher education and as much as 247 for children whose mothers have no education. Children with badly educated mothers have consequently an approximately three-fold greater risk of dying before their fifth birthday.

Out-of-pocket expenses for health care have been an obstacle. However, today with implemented health projects and strategies it is possible for households to receive free immunizations for their children (the BI for example). The income factor is therefore not as important as it has been. Nevertheless, taking children to a health centre can take time if they

live in a remote area where one must walk several kilometres to the nearest centre. The time question will become a money issue for parents if this means they must take time off work or other duties. There are also other issues that remain obstacles such as physical access. Accessibility is mainly a problem for rural areas and particularly during the rainy season. Parents might have to walk several kilometres to get to the nearest health care centre because they lack means of transport. In many remote villages' traditional priorities such as giving the youngest child the lowest priority is a huge barrier to get parents to vaccinate their children. As mentioned earlier in the essay, the populations' confidence for western health care is low and the quality doubtful. Parents may believe traditional medicine is better for their child and save them the time to get to a health care centre and consequently reluctant to immunization.

4.4 WHAT CAN BE DONE?

4.4.1 Improving accessibility

Accessibility still remains an important issue despite the great extent of work during the BI (and other health projects as well). The number of health care centres has increased significantly since the beginning of 1990s. Yet, the majority of households in remote areas must walk over 5 kilometres to get to a health care provider. Over 50 percent of the Malian population has their closest health care centre over 5 kilometres away. Even if immunization is free, without means of transport parents may decide that it is not worth taking the time off work to vaccinate their children. Consequently, improving accessibility is much vital. It does not necessarily mean building more health centres, if anything; it rather means improving community outreach. If health staff on a regular basis could reach out to remote areas and offer immunization parents are much more likely to make "the right choice" for their children.

Improving accessibility also requires an outsized workforce and better density of health staff. It also requires health staff to be well trained and motivated. There are over 30 different domestic languages spoken in Mali and in remote rural villages it is much possible that parents are not able to communicate with health staff if they can not speak their language. Today, inequities both between and within countries are large barriers. Health strategies in Mali must keep focus on rural areas where the burden of disease is higher. International organizations must also try to draw attention to developing countries in a greater extent so that health staff is spread more equally.

Not only is health care accessibility weak, accessibility to new vaccines is another problem facing many developing countries, including Mali. Manufactures consider developing countries as low-income markets and the uncertain demand strengthen their assumption. The government must improve surveillance and reporting systems so that they are more sufficient in establishing the burden of disease and the likely cost-effectiveness of new vaccines. Preferably, developing countries could, with support from international organizations or donors, establish the demand for a new vaccine together. If the demand for a new vaccine was established in Sub-Saharan Africa vaccine manufactures would more easily see an opportunity to make a profit. Even with lower prices negotiated by international organizations the manufactures could be guaranteed a minimum profit by being able to sell the vaccine to a greater extent. To improve the access of new vaccines for the developing world it is essential that tired pricing can be used. The governments and public in developed countries must stay willing to pay more in order to keep vaccines at reduced prices in the developing countries.

4.4.2 Improving information and education

The majority of the Malian population is illiterate and communication from policy makers is insufficient, at least in many rural areas. Earlier in the thesis a close link between education level and demand for health care services was described and from that one can recognize the importance of improving education and information among the poor in Mali. For the most part, populations in urban areas have a higher education level including health education. The significance of immunization is more easily spread in populated centres than rural areas and together with a higher level of education it is much more likely that parents choose to vaccinate their children in urban zones. Since urban populations are more literate and also have a greater possibility of watching world news on television (electricity supply is much greater in those areas) they are often more aware of health measures to prevent childhood diseases. Improving education levels among poor is not an easy task. However, focus should be at improving health knowledge levels to make parents understand the impact of immunization, both direct effects and other enclosed effects. Parents must be aware that immunization is a very effective way to prevent disease and death for their children. Many households, especially in rural villages, trust in traditional medicine and changing old traditions and beliefs can take a very long time. It is important to make parents understand that there are other options than traditional medicine and try to improve their confidence for western health care. This is, as pointed out, not an easy task, however it is neither an

impossible task. To improve information and health education levels among the poor in Mali more educated and motivated health staff is needed. As today, there is already a shortage of health workforce and inequities are twofold; both between countries and within the county. Both health staff and the government must communicate clearer and more compelling about the value of immunization.

4.4.3 International organizations / governmental responsibility

Funding for immunization dropped during the 1990s, but today there is renewed hope due to the establishment of GAVI in 1999. With GAVI the focus on the impacts of immunization was brought back to international organisations and governments all over the world. This is a very positive outcome which can bring a bright future, as long as one can maintain this focus. It is important to learn from the mistake in the 1990s, where less funding lead to drops in immunization coverage in the developing world. Routine immunization plays an important part the whole way until eradication is received and it is crucial to bear this in mind when deciding who to divide budget resources and funding. Even if coverage is improving funding is still essential.

The government in Mali must also face responsibility over the populations' health status and bear in mind that even if vaccinating children may seem like an impossible luxury now, the outcome of more healthy children can lead to large economic benefits in the future. When children are healthier they can attend school in a greater extent and become more productive as adults. If child illness and mortality falls it is also much possible that fertility rates drops which can boost the economy. Immunization is also one of the most cost-effective health interventions available today and governments can save large sums of money buy preventing children to fall ill in the first place. Immunization can also contribute to the improvement of other health interventions such as vitamin A supplementation for malnutrition.

5 DISCUSSION

This final and closing chapter contains of a conclusion of the study and a discussion around the topic. The results are discussed in terms of validity and reliability as well as in terms of choice of method.

This essay has explained the underlying reasons for immunization routine failure in the developing world. The purpose was to determine the inequities between developing and developed countries. A case study of Mali has been implemented with the aim to examine the inequities between urban and rural areas in the country and the reasons behind them and to find out on which grounds parents fail to vaccinate their children. My main contribution with this essay is to highlight how poor households in, mostly, rural parts of Mali could get better access to health care services such as immunization.

My conclusions are that there are several inequities both between and within countries both regarding immunization and health care accessibility in general. Rural areas in Mali are worse off compared to urban zones for multiple of reasons. Poverty is more extensive in those areas, health care services are less accessible, health knowledge levels are lower and traditional thinking regarding medicine and low confidence for western health care are essential reasons. The status of women has proved to be positively correlated with the health of their children. In Mali the head of the household is in most cases the man, however, it is more likely for women in urban areas to have a determining role. Giving the youngest child the lowest priority is also common traditional thinking that deteriorates a child's chance of receiving vaccination. Traditional beliefs and thinking is less likely to change in remote rural villages.

There are, however, things one can do to improve immunization routine and make the situation more equal. I have found that improving health care accessibility is one of the most important things that can be done today. International organizations must make an effort in dividing health staff more equally. Health strategies must be concentrated to poor rural areas and the government must take responsibility and commit to immunization. Further, continued funding is essential to make anything happen and for that reason international organizations must keep their focus on establishing high immunization coverage and aim for disease eradication.

Lessons from the Bamako Initiative showed that organized communities can empower local public health services. During the initiative immunization rates increased for the poorest groups in particular which led to a better state of equilibrium. I believe it is vital that health strategies principally are intended for children in rural areas to sustain development towards full immunization routine.

The results and conclusion of this essay may not be very original or unique; however, I find them particularly interesting due to a range of reasons. First, I believe that it is extremely important to bear in mind what I have concluded in this essay if we ever are going to be able to establish full routine immunization in the world. Next, old habits and traditional thinking are severe things to amend. Parents in remote rural villages that neither have any significant education nor receive important health information from the government or international organizations are not very likely to change their beliefs in traditional medicine or improve their confidence for western health care. Their children are therefore less likely to be vaccinated and more likely to die of vaccine-preventable diseases. This is particularly unfortunate since infectious diseases are the main cause of illness and death in Mali and that at the same time immunization is considered to be one of the most cost-effective health interventions available today. The African region is assumed to have the highest potential in the world to benefit from such investment in health (see the cost-effectiveness of immunization).

As described in this essay (see chapter two), investments in health will indirectly contribute to economic benefits by improving peoples health status. When children are immunized against severe diseases they are less likely to miss out on schooling. When mortality rates drop it is much possible that this leads to drops in fertility rates as well. Healthy children will become more productive as adults due to both health and educational reasons. In addition, when people expect to live longer they also have a greater incentive to save for the future. Those four components are portrayed in figure 2.1 and are major factors contributing to a boost in an economy. Linkages between ill health and income are much clearer today than they have been and it therefore becomes more vital for governments in developing countries as well as for international organization to focus on improving health status and in particular childhood immunizations.

Immunization encloses a range of positive effects. First of all it will increase the child's health, but other effects are maybe not as clear. In the essay I lay focus on the phrase "herd immunity" which refers to an externality of immunization. When enough people are vaccinated, the unvaccinated can receive an indirect protection against the disease by reducing the risk that they come into contact with an infected person. What may be even more important is the fact that immunization can protect the child from illness on their physical, emotional and cognitive development as well. Since 80 percent of the Malian population work within the agriculture or fishing sectors physical handicaps can be very harmful.

I am also finding it very interesting to look at poverty and health related indicators which can strengthen the point of immunization. Lack of safe water is, to give an example, a problem facing as many as 58 percent of the Malian population (see health situation). Since vaccine-preventable diseases are easily spread through air, fluids and water, lack of safe water emphasize immunization. Ill health also makes a person more susceptible to diseases which increase the importance of vaccination further. Vaccination can also be a gateway in improving other health care activities such as vitamin A supplementation for malnutrition. I consider this vital for Mali where malnutrition is a huge problem. Strengthening the impact of immunization is also the fact that children suffering from malnutrition often face diseases in more dangerous forms.

Finally, I intend to discuss my results in methodological terms to establish the reliability, validity and relevance of this essay. I believe that the reliability of the results is high since I have compiled data and statistics from highly respected organizations such as WHO and UNICEF, but also used a large variety of authors in the articles. I feel like this has given me a relative objective platform to work from and has increased my critical attitude to my sources because I have been able to compare their results. Data and statistics from governments in developing countries can be unreliable (governments may want to exaggerate statistics for example) and for that reason have I not to use any data estimated by the Malian government.

Nevertheless, the validity and the relevance of the results can be questioned. A difficulty has been to collect adequate resources of Mali. I made contact with several persons at WHO, however, many of them did not respond to my e-mail. Of the few that did, two of them were able to forward my questions to other contacts at WHO. Unfortunately, one of them replied too late to give me a chance of using the new contacts. Only one of all contacted could supply

me with any information. He did not personally have any Mali facts in possession, but could provide me with some useful links.

I am aware that a more detailed study would have been possible if I had been able to gather information and statistics in Mali, instead of from a computer in Sweden. Also understanding French could have benefited my studies, since French is the official language in Mali and some health surveys and publications were only published in French. For instance, the demographic and health survey 2001 was only fully available in French so I had to settle for a summary in English.

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