PH.AN. ACETI. JHOSIAH

SOUTH AFRICA IN 2004: IS THERE AN ASSOCIATION
IMMUNIZATION STATUS AND CHILDHOOD MORTALITY IN AGINCOURT?

RESEARCH REPORT

SCHOOL OF PUBLIC HEALTH

FACULTY OF HEALTH SCIENCES

UNIVERSITY OF THE WITWATERSOND
For God and my country.

My late father-in-law Mr. Ernest Obadiah Chikungoro Tojo
My late sister-in-law Accra Bonita A. B. Walter, my late uncle Joho Akili-Puna,
My nephew Moses Obilki, all my brothers and sisters, Mr. & Mrs. Joyce Edial,
To my late daughter Accra Tshogoro.

Dedication
Dated: 28th day of October, 2008

(Signature of Candidate)

I, Dr. Alex Agha Jimmy

Declaration

Wheresoever Johnnie Shoemake, if he has not been submitted for another degree at this or any other University, in the field of Epidemiology and Biostatistics at the University of the...
0.07% (HR 0.08; 95% CI 0.03 - 0.21). The adjusted HRs showed a consistent pattern, with children who received vaccinations having a lower risk of hospitalization than those who did not. The interaction term for vaccination and age was not statistically significant.

The study also controlled for several potential confounders, including child characteristics, socioeconomic status, and household characteristics. The results remained consistent after these adjustments.

The authors conclude that vaccination is associated with a lower risk of hospitalization for respiratory syncytial virus (RSV) infections. The study highlights the importance of vaccination in preventing hospitalization and reducing the burden of RSV infections on healthcare systems.
useful information regarding immunization status and child mortality.

This study was therefore innovative and further analysis on updated data would yield
likely to be attributed to the data collection and collation process. Parts of the results of
be considered cautiously due to the large number of missing values in the data sets
and child mortality. However, with regard to vaccine-specific associations results should
analyses of the current study showed an inverse association between immunization status

Child's admission to hospital in previous 12 months, modes of death and socio-economic
cause of death. Further factors associated with child mortality were: breastfeeding,
other of dying from HIV infection (HR 3.20, 95% CI 1.58 - 6.45, p = 0.010) compared to
Acknowledgement

I would like to acknowledge the unwavering support offered by my supervisor, Professor Kerstin Klipstein-Engerusch, who helped me to understand the data satisfactorily.

I am also grateful to all the staff in the Epidemiology Department for their academic guidance and commitment. I would like to thank the course administrators and peer-reviewed for the support and assistance that enabled me to complete the course.

And finally, I would like to extend my heartfelt gratitude to my colleagues, Ackman Kebogiso for assistance with the provision of the data sets for analysis.

I am greatly indebted to my colleagues, Ackman Kebogiso for assistance with the Principal Component Analysis in Stata. Lastly, I would like to thank all the staff of the Prevention of Health and Demographic Surveillance Site for the wonderful time and the support.

For the wonderful time and the support.
old and specific immunizations compared after adjusting for confounders

Table 3.2: Univariate and Multivariate Cox Regression for mortality in children 1-5 years

Table 3.3: Main cause of deaths in children 1-5 years old born 01/01/1998-31/12/2002

Table 3.4: Immunizations and deaths of children 1-5 years old in Afghanistan between 1998 and 2002

Table 3.5: Socio-demographic characteristics and deaths of children 1-5 years old born in

List of Tables
STI: Sexually Transmitted Infections
URTI: Upper Respiratory Tract Infections
KWH: Kenneth
SIPD: Standard Deviation
GPD: Geographical Positioning System
GIS: Geographic Information System
DTP or DPT: Diphtheria, Tetanus, Pertussis Vaccine
HepB: Hepatitis B Vaccine
Hib: Hemophilus Influenzae Vaccine
BCG or BCG: Bacille Calmette-Guérin Vaccine
WHO: World Health Organization
ICD-10: International Classification of Diseases – 10
HIV: Human Immunodeficiency Virus
AIDS: Acquired Immunodeficiency Syndrome
I. Introduction

A. Statement on the Problem

Childhood mortality is an important issue in many parts of the world. The availability of vaccines and other interventions has significantly reduced mortality rates in many areas, but in some regions, such as Sub-Saharan Africa, child mortality remains a significant problem. The situation has been complicated by the impact of HIV/AIDS on immunization and child mortality. In South Africa, for example, the increase in reported vaccine-preventable childhood mortality and the impact of HIV/AIDS on immunization status and child health have contributed to the high mortality rates.

The objective of this study was to investigate the relationship between immunization status and child health in children under 5 years of age in South Africa. The data were collected from the national health and demographic surveillance system (DHS) in rural and urban areas of South Africa. The study aimed to identify the factors associated with childhood mortality and to assess the impact of immunization on these outcomes.

II. Background

A. Introduction

Immunization is a key component of child health prevention strategies in many countries. The use of vaccines has led to significant reductions in childhood mortality rates worldwide. However, in some regions, such as Sub-Saharan Africa, immunization coverage remains low, and the impact of HIV/AIDS on immunization and child health is a major concern.

In South Africa, the government has implemented various strategies to improve immunization coverage and reduce child mortality. These strategies include the introduction of new vaccines, the expansion of the vaccination program, and the use of innovative delivery methods. However, despite these efforts, child mortality rates remain high, and there is a need for further research to better understand the factors contributing to childhood mortality in South Africa.
In 1998, the child had received all 15 scheduled vaccines in the first two years of life (Hama. et al, 1998). In Bangladesh, all 15 scheduled vaccines were observed to be

done in Australia in Argentina and Torres Strait Island children. And only 42% of

children were 21% and 18% respectively. Despite high vaccination coverage, a study

Bangladesh. The overall decrease in all case mortality rates among the vaccinated

vaccinated children in Zaire and a 66% reduction in mortality among those in

vaccinated and unvaccinated children (Brigham et al, 2002). The reasons

between vaccinated and unvaccinated children (Brigham et al, 2002). The reasons

vaccination coverage of 82% and 83%, respectively compared all cause mortality

the two studies, one done in Zaire and the other in Bangladesh, both reporting

against other infections (Cayford et al, 2003).

vaccination was associated with better survival, which could be attributed to non-specific protection

reaction survived better than those without. Contrasted the positive interaction reaction

another study done to find out whether children with BCG scars or positive interaction

between vaccinated and unvaccinated and a lack of strong health related co-intervention.

immunization studies of children, issues of follow-up, control for bias, etc.

weakness such as difficulties in determining accurately the cause of mortality.

(Weir, et al, 2004). The majority of the studies had serious methodological

sellers found that specific vaccines such as BCG did not have any effect on mortality

several childhood diseases is associated with lower risk of mortality. However, some

mortality and immunization have so far yielded consistent results, that is, immunization

be methodologically sound (Cooper et al, 2003). Most of the studies done on childhood

After reviewing 78 articles on vaccines and childhood mortality, only 2 were found to

1.4 Literature Review

immunization programs specifically focusing on reducing mortality in this vulnerable age

and childhood mortality. It would also give more impetus in the drive to improve

this study, hopefully will add to knowledge on the association between immunization

investigating various aspects of immunization in children have been done. Findings from

association between immunization status and child mortality. Although a lot of studies
West Africa conducted that measles vaccination was associated with better childhood outcomes (Aaby et al., 2003). Reports from later studies confirmed in this region and other countries (Aaby, 2004) showed a higher mortality based on re-annuals of data from these West African studies on gender-related mortality suggest that measles vaccination is associated with decreased overall mortality (Lemmann et al., 2005). A similar well-conducted study done in Papua New Guinea found routine vaccination to be associated with decreased mortality. However, there were no indications of exclusion criteria for years that had a large part (66%) (received all vaccines) observed DTP vaccination to be effective in reducing child survival below age 2.

Investigation into the non-specific effects of vaccination on child survival before age 2

Studies (Aaby, et al., 2004)

differences in mortality according to sex highlighting the difficulties in vaccination differences in mortality according to sex, highlighting the difficulties in vaccination due to high variation in sex. Nevertheless, the outcome of different vaccines varied with sex (Yerina et al., 2004; Aaby et al., 2004). The results showed that the vaccine had a protective effect on mortality in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in Papua New Guinea decreased mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%). (received all vaccines) observed DTP vaccination in the pediatric ward in Papua New Guinea. Subsequent studies showed that the vaccine was associated with reduced mortality. However, there were no indications of exclusion criteria for years that had a large part (66%).
H^a. The proportion of deaths is not the same between all categories of immunization status.

H_0. The proportion of deaths is equal in all categories of immunization status.

OR

H^a. There is no association

H_0. There is no association between immunization status and childhood mortality.

Juszczak's

Research question

Research question:

3. To determine the association between immunization status and child mortality between the ages of 1-5.

2. To determine the proportion of deaths among the immunization groups in children aged 1-5 years of age in Afghanistan in 2002.

1. To determine the proportion of deaths among children between the ages of 1-5 years of age in Afghanistan in 2002.

Specific objectives:

1. To determine the association between immunization status and all cause mortality.

2. To determine the association between immunization status and all cause mortality in children between the ages of 1-5 years of age in Afghanistan in 2002.

3. Study objectives:


survival (Kasonko et al. 1981; Kihurira et al. 2000; Holf et al. 1990; Velma...
year were excluded leaving a sample of n=10226 for follow-up and samples of the
formed the study population. Of these, children who died before reaching the age of one
were those 0–1 year old; those who were 5 years old or until 31 December 2002 (n=10497)
those who were one year old at the time were 5 years old and followed up from the
were included. These children were subsequently followed up from the
collected in 2002 were included. These children were subsequently followed up from the
being alive, whose immunization status and other demographic characteristics were
between 01 January 1999 and 31 December 2002, who first made the age of one year
estimated at 68,631 persons living in 11,212 households in 21 villages. All children born
improvement of or interventions made up the population. The population in 2001 was
movement analysis predominately living in 4 villages and the other villages with
2.3 Study Population

and other reported diseases which is common in the area
ranging from about 50 to 70% in 10 years through the year, a condition which is for making
characterized as semi and severely undernourished and those with low average
Mozambique with 72 communities identified living in the area. The clinical condition is
located in the sub-district of Bushire, refuge in the Sofala Province. Based
and demographic surveillance data were collected annually by trained field workers
Mozambique in 1999/2000, a cross-sectional survey and the HDSS system. Cross-sectional health
1999/2000. In 2001, the HDSS was initially set up in 1999 and was later established in 2002 by the
22 Study Site

for this study

with social back grounds, coupled with high childhood mortality was the movement
high population found in Aguiar and near
where the diversity in populations found in Aguiar and near
reduced
nearly the full

and resulted in high childhood mortality (Holden, 1987). Sub-Saharan Africa has been hardest
worldwide which is the most efficient means of preventing childhood communicable diseases
activities aimed at reducing child mortality have been undertaken in countries around
2.1 Introduction

CHAPTER 2: METHODOLOGY
Diabetes (ICD-10). If there was disagreement, a third medical practitioner reviewed the
assessed a case of death and classified according to the International Classification of
followed by a review assessment independently by two medical practitioners who
questions were asked about symptoms prior to death. This was
necropsy, usually after one month of a death occurring immediately previous to the
decided, usually after one month of a death occurring immediately previous to the

A full verbal autopsy was conducted by interviewing a close family member of the

maps were first used in 2004 to support field operations (Khan, et al., 2007).

Several additional and household identifiers were developed into a GIS database. Digital
were used mainly to update membership, health and demographic information. Data
in 1997, with hand held Geographical Positioning System (GPS), Individual households
resulted in changes. A computerized geographical information system was introduced
continuous identifiers. Continuous identifiers of the maps were done to include
whenever there were any changes in existing dwellings represented and each given an
The baseline census was started in 1992 with a detailed mapping of the
education, etc.) and vital events (Deaths, pregnancy, births, migration, etc.) and our
memberships. Individual and family (identification to household, head, relationship,
workers and a supervisor. Information collected included updates of household

2.4 Data Collection and Management

Data collection in the original study was done by four teams each with five field

Flow Diagram

who finally formed the analytical cohort for the current analysis.

but these were considered during the follow-up period resulting in a total of 8,723 children
during the follow-up period. Of the 9,966 live (5) children died after their 3rd birth day
10,226 children. 9,966 children were alive and 220 had died before their 3rd birth day.
International classification of diseases (ICD-10).

If the parents of the child were dead or not available, a full verbal autopsy was performed to establish cause of death in a child under a certain age. The cause of death was then classified according to the International classification of diseases (ICD-10).

Exposure and outcome measures

Residence in afrocon study area.

The study used available databases to collect data on children’s immunization status, birth weight, and other variables. Children living in rural areas were included in the analysis. The study used a multi-stage sampling design to ensure that the sample was representative of the population. The analysis was conducted using statistical software, and the results were presented in tables and figures. The study found that children living in rural areas had lower vaccination rates than those living in urban areas. The study also found that children living in rural areas were more likely to suffer from malnutrition than those living in urban areas.
was ensured so did not contain any identifiable information of the study subjects.

the intended purpose only. Confidentiality of the information contained in the data set
secondary data analyses (C) (Confidentiality No. 3.4.94/AV) and data was used for

Clerkship. Since the university ethics committee was granted to proceed with the

Wheeler et al. Committee for Research on Human Subjects (Medico) (No. N960720),

Ethical approval for the main study in Afghanistan was granted by the University of the

2.7. RESULTS

Level: Results were reported with 95% confidence intervals (CI).

For potential confounders and other co-factors, all else were done at 5% significance
the hazard ratio (HR) for the association between maternal and immunization status
(December 31, 2005), respectively was used to estimate the relative risk by calculating
(1) and b) (the child's age at recruitment and age at death of cancer

Cox's Proportional Hazard Regression with age as the underlying time variable with

variables

Table and Chi-square analyses to test associations. T-test was used for continuous
years and immunization status. Correlational variables were analyzed using regression.

in the investigation of the association between mortality in children under five

Baseline comparisons were done to provide initial breaks to be

Baseline socio-economic characteristics of children was done by immunization status

analyses was performed to test the hypothesis of an association between

analyses.

Software: Stata Version 9.

Data processing, data cleaning and statistical analyses were done using the statistical

2.6 Data processing and analyses

Analyses.
As a result of HIV infection or its complications, and 26% died from diarrhea.

Unmet need for QI was missed in the document. Approximately 36% of the children died of unknown cause. Since there were no children found in category d (unknown cause), no prevention and management factors were included.

Table 3.2 shows the main causes of death which were a) HIV, b) diarrhoea.

Children affected.

Children who received vaccinations (66.7%), there were 19 deaths out of a total of 4823 the children who were never immunized (33.3%), there were 16 deaths and none of those 12 months compared to 98.5% who had not been vaccinated. Table 3.2 shows that among mothers were dead. Only 1.5% of the children were admitted to hospital in the previous education. 98% of the children had their mothers in spite of the comparison 2% who have never attended school with the other 29% having attended secondary or higher. 18% had SGS (38%), approximately 23% of the mothers had primary education and only 4% (in the medium socio-economic status (SES), compared to low SES (20%) and South African citizens (63%), other non-South Africans (37%). There were more children whose mothers were married compared to 48% who were unmarried. More children were 35 years, where 29% were below 21 years and 13% were above 35 years of age, 22% of heads of households than females (50%) to the numbers were made between 21 and were of the largest number of missing information in these categories. The male (70%) were in the doctor. The numbers of children in certain categories were markedly lower because and 2000. 1.259 (1.49%, Table 3.1). 19,969 (49.4%) and female (50.6%) sex was equally distributed. 1999, 2.14 (22.6%), 1999, 2.11 (20.7%), 2000, 1.15 (18.2%), 1999, 2.11 (22.6%). The data is given as mean and standard deviation. Significance by year of birth were as follows:

Table 3.1: Categorical variables are summarized in parentheses, while continuous variables are shown in

A summary of the children and their socio-demographic characteristics are shown in

3.2 Descriptive of study population

Death or death of children, whichever came first.

Since after the first year of life (1-10/22) were followed up until 31/12/2003, date of

Upon a total of 10,497 children born between 01/01/1999 and 31/12/2002 all children

3.1 Introduction

CHAPTER 3: RESULTS
The age at death was 3.1 years.

Deaths from other causes combined. Out of a total of 230 deaths in children 1-5 years old, the mean

Kwashiorkor and upper respiratory disease combined. Approximately 38% died from eI
A. wealth index based on possession of household assets (e.g. TV, car, cell-phone, bike, etc.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Mean</th>
<th>Std.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Socio-demographic characteristics of children 1-5 years old born in Afghanistan between 1999 and 2002.
<table>
<thead>
<tr>
<th>Year</th>
<th>Deaths</th>
<th>HIV/AIDS</th>
<th>AIDS</th>
<th>Acquired Immunodeficiency Syndrome</th>
<th>Other</th>
<th>None</th>
<th>Total Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1991</td>
<td>11</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>1992</td>
<td>12</td>
<td>4</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>1993</td>
<td>13</td>
<td>5</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>1994</td>
<td>14</td>
<td>6</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>1995</td>
<td>15</td>
<td>7</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>1996</td>
<td>16</td>
<td>8</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>1997</td>
<td>17</td>
<td>9</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>1998</td>
<td>18</td>
<td>10</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>1999</td>
<td>19</td>
<td>11</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>19</td>
</tr>
</tbody>
</table>

Table 2.1: Immune deficiencies and deaths of children 1-5 years old in Afghanistan.
ultimately analyzed. All other variables were not significantly different from the results of the
with DTIP alone and risk reduction of nearly 99.6% (HR 0.2, 95% CI 0.08 - 0.98, p = 0.047) and childrend vaccinated
approximated 70% (HR 0.28, 95% CI 0.08 - 0.98, p = 0.007) and unvaccinated children had a risk reduction of
association for socio-demographic variables, vaccinated children had a risk reduction of
levels of childhood mortality in relation to socio-demographic characteristics. After
variables in the model were adjusted for socio-
HR for 0.45, p = 0.019), whereas measles vaccination remained to be a significantly positive risk
the vaccine. DTIP vaccination was observed to be protective (HR = 0.90, 95% CI 0.86 - 0.94, p = 0.012). In multivariate analysis, adjusting for all
No difference in mortality was observed for individual vaccines, except for measles
in patients in the first 12 months were at increased risk of death (HR = 1.78, 95% CI 0.56 - 5.53, p = 0.316), than those not admitted.
result of admission risk of being admitted (HR = 0.63, 95% CI 0.41 - 0.96, p = 0.031) compared to children
reduced mortality risk (HR = 0.54, 95% CI 0.15 - 1.77, p = 0.22), compared to children
who were children of social activist children in the highest socio-economic group had a
with BCG status (HR = 1.36, 95% CI 1.05 - 1.77, p = 0.015), compared to children
children whose mothers died were at increased risk of death (HR = 3.96, 95% CI 1.31 - 10.78).
additional significant reduction in vaccinated children
90% (HR 0.67, 95% CI 0.39 - 1.23, p = 0.244) compared to those not vaccinated.
days, while those were 70% dead. Risk reduction (Crude) for vaccinated children was about
0.05. Out of 879 children who entered the study, with a total enrollment of 0.1276+0.8
logistic regression. Results are reported with 95% confidence intervals and a significance level of
association between vaccination and other socio-demographic variables in relation to
ultimately and multivariate Cox regression was performed to investigate the
3.3 Association between mortality, vaccination and socio-demographic variables
<table>
<thead>
<tr>
<th>Year</th>
<th>Class</th>
<th>Height (cm)</th>
<th>Yr. Old</th>
<th>Veh. Old</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>No</td>
<td>180.0</td>
<td>130.1</td>
<td>115.5</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>No</td>
<td>180.0</td>
<td>130.1</td>
<td>115.5</td>
<td>Medium</td>
</tr>
</tbody>
</table>

**Table 3.1:** Important details of General Characteristics of the cohort.


<table>
<thead>
<tr>
<th></th>
<th>806.0</th>
<th>747.0 *</th>
<th>0.671</th>
<th>0.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-value</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% CI</td>
<td>0.608–0.739</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.671</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>0.000</td>
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<td>0.608–0.739</td>
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<td></td>
<td>0.671</td>
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<tr>
<td></td>
<td>1.00</td>
<td>0.000</td>
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</tr>
</tbody>
</table>

**Table 3.5:** Estimated and multiple Cox regression for mortality in children 1–5 years old and specific health-related outcomes. The model included age, sex, and socioeconomic status.
was then interviewed about the immunization status of the child.

information, and if this was not available, the mother or whoever provided information

method used: Field worker used he Health Card to Obtain immunization

information potentially biased results. In December calls the BPS revealed the data collection

84.8% of deaths occurred in those with incomplete information on immunization status

deaths occurred in those for whom information on immunization was available, whereas

population completeness to assess if information on immunization was available, 15.2% of all

missing information from the immunization data, less than 372 of the study

of all, 2002. Mortality in those deaths could have originated from the large number of

Khamis et al, 2000; Lobbiaen et al, 2005; Cooper et al, 2004; Boyce et al, 2003; Myres et

vaccination to childhood mortality (Fleming, et al, 1991; Blumberg et al, 2004; Clemons et al, 1988; Abdy et

dearly a contradiction reveals that is already known about the association of

Measures vaccination appear to be associated with increased risk of mortality. This is

mortality for all other reasons, except for children who were vaccinated with measles,

vaccinated and not vaccinated children. There was also no significant difference in

However, in crude analysis there was no significant difference in mortality between

for socio-demographic variables depending on death and risk of mortality of

immunization was significantly inversely associated with child mortality after adjusting

4.2 Immunization and childhood mortality

childhood mortality among the children living in the Agumbe area.

Cox regression model to explain the relationship between immunization status and

status is associated with mortality in children between 1-5 years old. This study used a

prospectively to investigate by means of secondary data analysis, whereas immunization

data already collected within the framework of the Agumbe DSS, she was used
documented over a twelve year period. For the current study, demographic and health

Surveillance System (AHDSS) scheduled in rural north eastern part of south Africa has been

and immunization status data collected from the Agumcon Health and Demographic

The objective of this study was to determine the association between child mortality

4.1 Introduction

CHAPTER 4: DISCUSSION
the risks of mortality after adjusting for socio-demographic variables. All vaccinations in age comparing the effect of immunization (Salinas, et al, 2000). Table 2-4 also shows similar studies also found that levels were a persistence of protection up to 6 years of age controlling for other factors. This could indicate that vaccination had a beneficial effect on health. A study of asymptomatic pertussis infection sometimes after vaccination also found that a subset of vaccinated subjects were very few. The authors also thought this could have occurred as a result of prescriptive behavior. Immunization was found that cell-mediated immune response in young children after primary vaccination was not mediated by humoral responses in young children. Although modernity was assessed over 6 months only (Murray, et al, 1999), although the number of actual pertussis cases was assessed with a slightly higher mortality in children aged 2-5 months (Vesikari, et al, 1999). This is contradictory to other findings from other studies.

DTP and oral polio vaccine was found to have no significant effect on child mortality.

It has also been possible that when vaccinations are given, a suppression effect may actually be achieved by vaccination since especially the death of children whose vaccinations were described. Other sources also concluded that there was a possibility of misinterpretation of vaccination (Haugland, et al, 1994). Although this was a prospective cohort study with two years mortality with BCG and DTP survival better than children who were not non-specific effects of vaccination on child survival, found that children before the age of hepatitis B vaccine, however, BCG and measles vaccines were not investigated into the reduction in child mortality just as was HIB (Haemophilus influenzae) vaccine and DTP vaccine which was associated with a marked and very significant.

All the vaccinations were associated with a marked and very significant.
Although the effect of HIV/AIDS on child mortality rates between different countries has been shown to cause suppression of sex preference, studies have looked at the relationship between child mortality and HIV/AIDS incidence. A study conducted in China found that children who were vaccinated with any vaccine had a lower mortality rate compared to those who were not vaccinated. Another study, conducted in Sub-Saharan Africa, found that higher national income and socio-economic status was associated with lower under-5 mortality rates (Hoeweling et al., 2005). In general, these studies have shown that vaccination reduces child mortality, particularly in children under 3 years of age. Additional studies found that a protective effect was seen in children who were under 3 years of age, although it was found that a reduction in child mortality did not occur. Further studies showed that a protective effect was also seen in children who were under 5 years of age. The results of this study did not show a significant reduction in the incidence of childhood mortality. However, the results of this study also showed that the incidence of childhood mortality may be affected by various factors, and the protective effect of vaccination may be mediated by other factors. In conclusion, vaccination is an effective way to reduce childhood mortality.
argue that access to social services may be easier for South African citizens. Some of the
reasons for this lack of difference could be the fact that the majority of those children had
received high-quality health care from pharmacies. The possible levels were higher among refugees (HIV/AIDS, et al. 2004) because of the
moderate to high difference in mortality between refugees and locals (African). The mortality
levels were higher among refugees (HIV/AIDS, et al. 2004) because of the higher
infections in general. In a study done in Zimbabwe, which found that there was
no difference in mortality between refugees and the South African refugees, this result is
also clear of the same cause (Kahan, et. al., 1999). Also, children who were cared for by
mothers with HIV infections as the main cause of death is therefore plausible that the
mothers compared to those whose mothers were alive. Some one third of deaths were
associated

In the univariate analysis, children whose mothers died were more likely to die.

4.3 Demographic Characteristics

Comparison between cause-specific mortality and other determinants should be interpreted

HIV/AIDS (et. al. 2004), which reinforces available evidence that vaccinations have a
association in all the studies of mortality, derived from verbal autopsy, the association

However, a study done to compare verbal autopsy with registered cause of death

Newell, et. al. 2004), it is difficult to tell its effect on overall mortality since it is difficult
found that there were fewer infections and deaths after the campaign compared to all.

A study done in South Africa to determine the impact of supplementary measles vaccination on mortality due to HIV infection as well as for diarrhea, pneumonia and upper respiratory tract infections. The result is from a randomized trial conducted in rural health facilities in the province of Eastern Cape, South Africa. The study found that vaccination with a single-dose vaccine for measles, hepatitis B and Hib reduced the risk of mortality in children under 5 years of age by 40%.

4. Immunizations and Cause-Specific Mortality

2000)

After the campaign, which included measles vaccination, the incidence of measles in the population decreased significantly. The impact of measles vaccination on mortality is substantial, with a reduction in mortality of 40% in children under 5 years of age. This reduction is due to the decreased incidence of measles and other vaccine-preventable diseases, such as Hib and hepatitis B.

Regression analysis was used to determine the impact of vaccination on mortality. The results showed that vaccination was associated with a reduced risk of mortality in children under 5 years of age. The study found that children who were vaccinated had a lower risk of mortality compared to those who were not vaccinated. The impact of vaccination on mortality was particularly strong in children under 1 year of age.

The impact of vaccination on mortality was also examined in a population-based study in South Africa. The study found that vaccination with a single-dose vaccine for measles, hepatitis B, and Hib reduced the risk of mortality in children under 5 years of age by 40%.

Vaccination programs have been successful in reducing the burden of disease in many countries. The impact of vaccination on mortality is substantial, with a reduction in mortality of 40% in children under 5 years of age. This reduction is due to the decreased incidence of measles and other vaccine-preventable diseases, such as Hib and hepatitis B.
This study utilized secondary data obtained from the AIDSS. Despite a good study design, missing information on children's immunization posed a considerable problem.

4.2 Limitations of the study

Ambiguity in the process of data collection and collation

Overall, there was inconsistency in the results of this study which may be noted largely increased survival in children between 6 weeks to 6 months of age (December of 2004). Bangladesh noted that BCG, measles, and DPT vaccinations were associated with increased illness. Thus was not statistically significant. A study done in the Matlab DSS site in November and December revealed a significant rise in in the number of cases of poliomyelitis and enteric infections. This was not observed in the Matlab DSS site in November and December of 2006. BCG was found to be protective for diarrhoea, measles and enteric infections and surprisingly the likelihood of death (use of data, 2006), BCG was found to be an increased risk for hospitalization. Adequate exposure from the Matlab DSS site to be protective for diarrhoea, measles and enteric infections. Although this was not significantly different, children infected with HIV have been found to be more likely to be hospitalised for diarrhoea and measles. It was also noted that infants would have added depth to the results of analyses.

Possibility of a biased result: Specific data were not given when the different vaccinations were given with missing information could have had positive or negative influence. The impact of a child's health cards were not available to correlate with the vaccination status. Children of Matlab DSS site was good. Therefore, we have large numbers possible confirmation for the spurious results in the current analysis could be in the data.

A similar study conducted in Uganda focusing on the incidence of measles, found the protective effect of measles vaccination (data, 2006; Africa, et al. 1993) in early age of 4 months in measles endemic area confirmed. In Matlab DSS site, Bangladeshi measles vaccination was associated with 30% reduction in respiratory disease (data, 1988). Data from a case control study conducted in Matlab DSS site, Bangladeshi measles vaccination was associated with a 30% reduction in the incidence of measles and in childhood mortality directly associated with deaths from diarrhoea, pneumonia and upper respiratory diseases.
Although mortality information was ascertained through verbal autopsy, the information collected was through a structured verification system to ensure that there was agreement with data from a repeatable demographic surveillance information system in adjacent large number of children with information were analyzed. This was a follow up study. Despite the large number of missing information about the vaccinations, still a study.

The strength of the study

Into consideration methodological differences, investigation. Therefore, these results are subject to information with caution taking attention to the immunization information since it was the primary subject of assumed to have been satisfactory. It is possible that data measurement did not pay much process. The main measure of the cold chain could not be verified therefore it was not have any significant information which then complicated matters further. The immunization vaccination or not. The other problem was that some of the people found at the homes did workers when asked to rely on the mothers of guardians to confirm whether the child was information on vaccination could be recorded. Under such circumstances, the help for many children their need to Health Cards was not available and therefore no The field workers encountered difficulties during the data collection process because death unbiased ascertainment bias in the study although efforts were made to verify the final cause of vaccination categories. The use of verbal autopsy could have also introduced a sample size for analysis was determined very small especially the number of deaths in the not know for some who happened to the other children with missing information. The results obtained after analysis of data and may have introduced bias because we do had missing information on measles vaccination. The effect of this can be seen in the with over 50% missing from each vaccine category. For example, 64.9% of the children.
one found if immunization data were complete. Between specific vaccinations and mortality would have yielded different results from the
comparisons that were made. Immune children had a significantly lower risk of dying from
2004; Keijser et al., 2003; Cooper et al., 2003; Hall et al., 1999). In this study, having
After other studies that confirm the protective effects of measles vaccination (Keijser et al., 2004; Keijser et al., 2003)
vaccination alone was the main cause of death. This result is contradicted by other studies that
showed that children vaccinated against measles were at a higher risk of dying compared
with those who were not vaccinated. However, there were some methodological difficulties encountered during data collection
and their effect on lowering child mortality. Similarly, in this study, immunization was
found to be associated with a significant reduction in mortality in children 1-5 years old
of the world, such studies have found very strong associations between immunizations
that had positive effects on the health of children in the developed and developing world. In preventable disease-endemic regions
early (Keijser et al., 2003; Cooper et al., 2003; The Kasungo Team Project, 1987; Vihle et al., 2002).
Several studies assess the relation between immunization and childhood mortality

5.1 Conclusion
CHAPTER 5: CONCLUSION AND RECOMMENDATION

immunization data were complete. Between specific vaccinations and mortality would have yielded different results from the
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Several studies assess the relation between immunization and childhood mortality

5.1 Conclusion
CHAPTER 5: CONCLUSION AND RECOMMENDATION
childhood mortality, especially in the 1-5 year old age group. This indicates the need for further studies to assess the association between immunization and mortality in these areas. The access to vaccines poses a significant challenge in many countries, especially in low-income regions. The success of the Expanded Programme on Immunization (EPI) is crucial in reducing childhood mortality, especially in rural and remote areas. The effectiveness of vaccines in preventing diseases like polio and measles has been remarkable, highlighting the importance of continuous efforts towards immunization. Immunization is a very important tool in the prevention of childhood mortality and morbidity.
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46. Luttringham, Anna. Percent Kala at Impact of the 1996-1997 Supplementary Measles

### HEALTH CARE UTILIZATION TABLE

The table below shows the health care utilization data for individuals living in the study area during the observation period. Data was collected in the baseline study, 1992, updated in 1993 and 1994.

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### IMMIGRATION TABLE

The table below shows the immigration data for individuals entering the study area during the observation period. Data was collected in the baseline study, 1992, updated in 1993 and 1994.

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**Appendices**

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Please ensure the protocol number, in the form 5960/1234567, is correct. It must be the same as the number in brackets on the cover page of the research protocol.

DATE

Signature

I/we hereby undertake to abide by the protocol of the Committee and to carry out the approved research in accordance with the conditions under which I/we are authorized to carry out the approved research. I/we fully understand and agree to be bound by the conditions of this protocol.

SECRETARY AT ROOM 1000, 12TH FLOOR, SANTA CLARA UNIVERSITY.

To be completed in duplicate and one copy retained at the
SECRETARY OF INVESTIGATIONS.

DEPARTMENT OF COMMUNITY HEALTH, MEDICAL SCHOOL.

C. SUPERVISOR: DR. S. TOLMAN

CHAIRMAN: (Professor & Dean, Jones)

97012

DATE

APPROVED UNCONDITIONALLY

FECULTY OF THE COMMITTEE

97012

DATE CONSIDERED

ACCOMMODATION

HEALTH COMMUNITY HEALTH

OF S. TOLMAN

INVESTIGATOR:

OF RURAL SOUTH AFRICA:

IN THE FIELD AND POPULATION DYNAMICS

PROJECT

CLEARANCE CERTIFICATE:

PROTOCOL NUMBER 5 960/20

RE: 5/4/123456789

COMMITTEE ON HUMAN SUBJECTS (ETHICAL)

DIVISION OF THE RESEARCH REGISTRAR (ETHICAL)

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