

A community-based survey in a low-income area of the City of Cape Town of the information contained in the Road-to-Health booklet of children under 5 and their actual health status.

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Declaration

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Abstract

Background: The present study is a community-based survey in certain low-income areas of the City of Cape Town of the information contained in the 'Road to health booklet' of children under 5 and their actual health status. A cross-sectional survey design with a systematic sampling strategy was employed in this study.

Methods: The study took place in four low-income areas in the Kuils River area of the Cape Metropole, namely, Kalkfontein, Wesbank, Happy Valley and Eerste River. In total 250 households were randomly selected for participation in the study, when a child under the age of 5 was not present in the home, the next house with such a child was selected. The RtH booklets or cards were analysed for completeness of information. The information on demographics and health was obtained through a structured interview with the main caregiver in each household. A home inspection was performed in order to determine general living conditions.

Results: A total of 278 children under the age of 5 years were included in this study. A reported 22.3% had the older RtH card, 65.5% had the newer booklet, while 11.9% had no card or a lost or missing card. When looking at the quality of information contained in the RtH cards/booklets, 18% was classified as good, 59.6% as fair and 22.4% as poor. A reported 88.6% of RtH cards/booklets were up to date but only 13.5% had complete information. The study found that both immunizations and weight-for-age were completed 91% of the time. Vitamin A was completed 83.3% of the time while deworming was 77.1% completed. The least completed sections were height-for-age at 22.4% and mid upper arm circumference at 18%.

Sixty three percent of dwellings were brick houses while 37% were shacks. A reported 31.7% of household occupants had full time employment while 57.5% were unemployed. Almost 10% of households had an income of less than R600 per month while 38.8% of households had a total income between R600 and R2500. A reported 24.8% of households suffered from food insecurity. Almost 53% of households living conditions was classified as in a poor state.

Conclusion: Results of that study indicated that many of the RtH cards or booklets were incomplete with the exception of weight-for-age and immunization which had an over 90% completion. Major data missing was the completion of the height-for-age and mid upper arm circumference.

The RtH system is the major strategy to track development, health needs and health status of young children. It is vital to utilize all aspects of the RtH system in order to alert healthcare workers of a child with a health issue so that immediate corrective action can be taken. The study identified a need to improve the training of healthcare workers as well caregivers on all aspects of the RtH

booklet in order to utilize its full potential in improving the health of children under the age of five years old.

The information that could potentially be collected by an optimal RtH system can be of immense value for health planning. At present this opportunity is lost due to the poor information available from the RtH system.

Key words: Road-to-Health card/booklet, immunization, growth monitoring, healthcare workers, vitamin A, deworming

Opsomming

Agtergrond: Die huidige studie is 'n gemeenskapsgebaseerde opname in sekere lae-inkomste gebiede van die Stad Kaapstad. Die inligting verkry van die Pad-na-Gesondheid kaart/boekie en die gesondheidstatus van kinders onder die ouderdom van 5 jaar is versamel. 'n Dwarsdeursnit opname studie met 'n sistematiese monsterneming met ewekansige beginpunte is gebruik.

Metodes: Die studie het plaasgevind in vier lae-inkomste gebiede in die Kuilsriviergebied van die Kaapstadse Metropool, naamlik Kalkfontein, Wesbank, Happy Valley en Eersterivier. 'n Totaal van 250 huishoudings is ewekansig geselekteer vir deelname. In huishoudings waar daar nie 'n kind onder 5 jaar teenwoordig was nie was die volgende huis met so 'n kind geselekteer. Die Pad-na-Gesondheid kaart of boekie is gebruik om inligting te bekom. Die inligting oor demografie en gesondheid is bekom met behulp van 'n gestruktureerde onderhoud met die hoofversorger in elke huishouding. 'n Inspeksie van die huis is uitgevoer om die algemene lewenstoestand te bepaal.

Resultate: 'n Totaal van 278 kinders onder die ouderdom van 5 jaar is ingesluit in die studie. Daar was 22.3% van die kinders wat die ouer weergawe naamlik 'n kaart gehad het, 65.5% het die nuwer boekie gehad terwyl 11.9% nie 'n kaart gehad het nie of wie se kaart verlore was. Die kwaliteit van die inligting op die kaarte/boekies is beoordeel as goed in 18% van gevalle, gemiddeld in 59.6% van gevalle en swak in 22.4% van gevalle. Daar was 88.6% van die kaarte/boekies wat op datum was, maar slegs 13.5% het volledige inligting bevat. Vitamien A dosering is aangeteken in 83.3% van die rekords. Immunisasie en gewig-vir-ouderdom is aangeteken in 91% van gevalle terwyl ontworming aangeteken is in 77.1%. Die seksies wat die swakste voltooi is, was lengte-vir-ouderdom (22.4%) en midboarm omtrek (18%).

Drie-en-sestig persent van die wonings was baksteenhuise terwyl 37% krotwoningen ("shacks") was. 'n Gerapporteerde 31.7% van huishoudings het 'n persoon met voltydse werk gehad terwyl 57.5% werkloos was. Byna 10% van die huishoudings het 'n inkomste van minder as R600 per maand gehad terwyl 38.8% 'n inkomste tussen R600 en R2500 per maand gehad het. Daar het 24.8% van huishoudings gerapporteer dat hulle voedselonsekerheid ondervind. Byna 53% van die huishoudings het geleef in omstandighede was as swak geklassifiseer is.

Gevolgtrekking: Die resultate het aangedui dat oor die algemeen die Pad-na-Gesondheid dokumente onvolledig was met die uitsondering van gewig-vir-ouderdom en immunisasie, wat meer as 90% volledig was. Lengte-vir-ouderdom en midboarm omtrek was die swakte aangeteken.

Die Pad-na-Gesondheid stelsel is die belangrikste strategie om ontwikkeling, gesondheidsbehoefte en gesondheidstatus van jong kinders na te volg. Dit is noodsaaklik dat alle aspekte van die stelsel

in orde is sodat gesondheidswerkers bewus kan wees van kinders met gosondheidsprobleme en sodat behoorlike aksies so gou moontlik geneem kan word. Die studie het uitgewys dat daar 'n behoefte bestaan om gesondheidswerkers se kennis en aanwending van al die aspekte van die Pad-na-Gesondheid stelsel te verbeter. Dit sal bydra om die gesondheid van kinders onder die ouderdom van 5 jaar te verbeter.

Die inligting wat potensieel versamel kan word deur 'n behoorlik funksionerende Pad-na-Gesondheid stelsel kan van groot waarde wees vir gesondheidsbeplanning. Huidig is hierdie geleentheid verlore weens die swak inligting wat op hierdie stelsel aangeteken word.

Sleutelwoorde: Pad-na-Gesondheid kaart/boekie, Immunisasie, groei-monitoring, gesondheidswerkers, Vitamien A, ontworming

Dedication

To my late mother Marlene whose love, sacrifices and support I am eternally grateful for, words cannot express how much I love and miss you.

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List of Abbreviations

BNG	Breaking New Ground
EPI	Expanded Programmed on Immunization
GOBI-FFF	Growth Monitoring, Oral Rehydration, Breastfeeding, Immunization, Female Education, Family Spacing, Food Supplements
HIV/AIDS	Human Immunodeficiency Virus, Acquired Immunodeficiency Syndrome
IMCI	Integrated Management of Childhood Illnesses
MAUC	Mid Upper Arm Circumference
MDG	Millennium Development Goals
RDP	Reconstruction and Development Programme
SDG	Sustainable Development Goals
ORS	Oral Rehydration Solution
NDoH	National Department of Health
PHC	Primary Health Care
PMTCT	Prevention of Mother to Child Transmission
RtH	Road to Health
RtHB	Road to Health Booklet
RtHC	Road to Health Card
STH	Soil-transmitted Helminths
TB	Tuberculosis
UNICEF	United Nations Children's Fund
WHO	World Health Organization

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Chapter 1

Introduction

Neglecting the health needs of young children will have serious implications on their well-being and their future lives. Such impacts leave a long shadow into their individual futures and the future of their communities. (UNICEF, 2019)

This is especially true for children living in resource-poor communities. (Racine, 2016) Such children are solely dependent on a state or public health care system. In such a system no one has the privilege of seeing the same professional health care staff member on successive visits. So, continuity of care rests on the record-keeping in the health care facility that they visit. Even with good record keeping - which is by no means a given in many resource-poor community facilities - when they visit a different facility continuity is lost. The major risk in such a system is that monitoring for vulnerable children who are failing to thrive and who need intervention is difficult and diagnosis of such conditions is frequently made very late.

Many factors play a role in developmental problems of children living in resource-poor settings. (Murphey & Redd, 2014) Children who live in poverty are more likely to live in neighbourhoods where numerous social ills are predominant.. Education level of the caregiver, disposable household income, food security and quality, housing types, the sanitation situation and the general hygiene behaviour of the inhabitants are all indicators of risk to the health of the children.

Children living in poverty

Children growing up in resource-poor environments and the effects of such environments are not the direct subject *per se* of the present study. Such an environment, however, has a very important effect on all who live in it, not least of all the small children. Thus, a brief overview of how the main drivers of the health of young children are affected by poverty is presented here to place the broader crisis in context.

Millennium Development Goal (MDG) 1C of the United Nations aimed to halve the proportion of people who suffer from hunger between 1990 and 2015. While the proportion of undernourished people in the developing regions had fallen by almost half since 1990, by the time the MDGs were assessed, there was still an estimated 795 million people worldwide who were considered

undernourished. Crucially important, more than 90 million children under age five were still deemed to be undernourished and underweight. (WHO, 2018a)

By 2018 the WHO (WHO, 2018b) published estimations indicating that the number of deaths worldwide of children under 5 years of age fell from 12.7 million in 1990 to 6.3 million in 2013. In developing countries, the percentage of underweight children under 5 years old dropped from 28% in 1990 to 17% in 2013.

The MDGs have been superseded by the Sustainable Development Goals (SDGs). The most recent SDG report (UN, 2020) reported on the devastating effect of the COVID-19 pandemic on poverty worldwide. Among the key findings were: An estimated 71 million people were expected to be pushed back into extreme poverty in 2020, the first rise in global poverty since 1998. Lost incomes, limited social protection and rising prices meant even those who were previously secure could find themselves at risk of poverty and hunger. Underemployment and unemployment due to the crisis meant that some 1.6 billion already vulnerable workers in the informal economy – half the global workforce – might have been significantly affected, with their incomes estimated to have fallen by 60 per cent in the first month of the crisis.

From these figures, it is clear that the effects of poverty will be increasing for some time to come and that a rising number of children, particularly in developing countries, will be affected by such adverse conditions. A Fact Sheet by the WHO on improving survival and well-being of children (WHO, 2020) stated "Although the world as a whole has been accelerating progress in reducing the under-5 mortality rate, differences exist in under-5 mortality across regions and countries. Sub-Saharan Africa remains the region with the highest under-5 mortality rate in the world, with 1 child in 13 dying before his or her fifth birthday, 20 years behind the world average which achieved a 1 in 13 rate in 1999. Two regions, Sub-Saharan Africa and Central and Southern Asia, account for more than 80 per cent of the 5.2 million under-five deaths in 2019, while they only account for 52 per cent of the global under-five population."

Murphey and Redd (2014) stated the most important five ways in which poverty harms young children:

- 1. Poverty harms the brain and other body systems.*

Poverty in its extremes, can negatively affect the development of the body and mind and can change the vital structure and functioning of the brain. Children who experience these levels of

extreme poverty have an increased probability of suffering chronic illnesses leading into adulthood and therefore shortening life expectancy. (Murphey & Redd, 2014)

2. Poverty creates and widens achievement gaps.

When comparing children growing up in poverty with those in more financially secure environments, impoverished children lag behind in early intellectual development. Beginning in infancy, gaps in key facets of learning, knowledge, and development of social and emotional skills are apparent. These gaps in development become increasingly wider when neglected. Reading ability of poor children lags behind their financially secure counterparts by the end of third grade. (Murphey & Redd, 2014)

3. Poverty leads to poor physical, emotional, and behavioural health.

Even when poverty does not directly affect development of a body's biological systems, it is apparent that growing up poor leads to an increased likelihood that children will have poor physical health as well as poor emotional and behavioural health. Poverty works in several ways to limit a child's opportunities and exposes them to risks that threatens their well-being. Poor children are more likely to suffer from food insecurity and have diets that lack important nutrients for healthy development. Cases of numerous chronic health conditions, namely asthma, are higher among poor children. Children from poor families are also less likely to receive necessary medical and dental care. (Murphey & Redd, 2014)

4. Poor children are more likely to live in neighbourhoods with concentrated poverty, which is associated with numerous social ills.

In research, direct causality between impoverished neighbourhoods and children's outcomes is difficult to identify, researchers have found that growing up in these neighbourhoods with extreme poverty is linked to poor academic performance, added social and behavioural problems, and poorer health and fitness outcomes. In these impoverished neighbourhoods, children are also more likely to be exposed to environmental toxins as well as other physical risks which includes crime and violence. (Murphey & Redd, 2014)

5. Poverty can harm children through the negative effects it has on their families and the home environment.

While poor families' strengths and resilience regularly goes unnoticed, parents in these household's experience several difficulties that can affect their own mental and emotional well-being as well as that of their children's. Greater stress, frustration and symptoms of depression are reported by poor parents compared to their higher-income counterparts. Parents with less financial resources face difficulties in planning and providing for the needs of their families. Children of poorer families have less books and educational material in their homes and face the prospect of missing out on family outings and activities as well as opportunities to experience learning programs. These poor families are also more likely to experience housing insecurity. (Murphey & Redd, 2014)

Growth Monitoring

Growth monitoring is widely regarded as essential in the primary health care of infants and young children (Ashworth et al., 2008) It is an accepted standard component of paediatric services throughout the world. It is defined as the consistent recording of a child's anthropometric measurements whereby remedial action is taken if the growth of a child is found to be abnormal in any way. (Panpanich & Garner, 1999) A growth monitoring and education programme can assist in preventing infant malnutrition, it can also warn as well as advise parents of the consequences if corrective action is not taken timeously. Most growth monitoring programmes use charts to plot a child's weight-for-age and height- for-age which provide a graphic representation of the child's growth. A child that is undernourished or sick will have a slower rate of growth compared to a well-nourished or healthy child. Plotting of a child's weight at regular intervals and comparing the pattern of growth curve to that of a healthy child's as a reference allows detection of any growth faltering. Growth monitoring in this manner provides an early warning signal to apply corrective measures timeously.(Ashworth et al., 2008) Success in a growth monitoring programme depends solely on consistent accurate measurements, complete available records and knowledgeable staff. (Harrison et al., 1998)

History of growth monitoring

Growth monitoring has a history dating back to the 1850s and was first introduced by Guillot for assessing the adequacy of lactation in neonates by regularly weighing infants. In the 1870s, Cnopf was first to systematically weigh infants beyond the perinatal period in Nuremberg. In St Petersburg, Russow was a pioneer of growth standards and that growth was a reflection of an infant's well-being.(Tanner, 1991) In St Helens, England 1899 – regular weighing of children and practical advice was provided by the Infant Welfare Movement which led to a nationwide network of welfare centres in the mid-1920s that were organised around the weighing of children.(Williams, 1986) In England

1906, the first growth reference was introduced. (Ashworth et al., 2008) In Jamaica as early as 1910 it was reported by Dr Cicely Williams that mothers were weighing their babies. (Rohde & Northrup, 1988)

The World Health Organisation (WHO) in 1962 recommended the use of growth charts in joint committee along with the Food and Agriculture Organisation. (WHO, 1962) The term 'Road-to-Health chart' was originally derived in Malawi but much of the work and promotion of growth monitoring was pioneered by Dr David Morley and colleagues in Nigeria. (Morley, 1963) Many different types of growth charts have been designed over the years which also include child and caregiver personal information, records on illness episodes, immunization status etc. as well as additional information for caregivers on child feeding, oral rehydration therapy and when to seek care. (Ashworth et al., 2008) Growth monitoring was then implemented in the 1970s by numerous developing countries in Asia, Africa and Latin America by both governments and health organizations. (Griffiths, 1981) This brought about the emergence of many systems whereby the WHO stepped in to coordinate efforts in developing a standard weight chart and published guidelines for use in health services. (WHO, 1978a)

In the 1980s, support of growth monitoring and promotion grew significantly, and the United Nations Children's Fund (UNICEF) was a major promoter. It formed a vital element apart of UNICEF's selective primary health-care strategy that promoted growth monitoring, oral rehydration, breast feeding and immunization (GOBI) UNICEF also advocated community participation in health care as part of the strategy to make affordable, simple technologies available to improve the health of all at risk children. (Grant, 1984) UNICEF supported the development of local growth charts and provided countries with scales for weighing. However, adequate allocation of funds to develop local capacity to allow programmes to work effectively was not provided. (Grant, 1984)

Growth promotion had always been envisioned as an essential part of growth monitoring measures, yet growth promotion actions were regularly overshadowed by weighing and plotting. Therefore, the term 'growth monitoring and promotion' (GMP) was introduced to make growth promotion a clear component. (Pearson, 1995)

In 1990, the Director of the UNICEF Evaluation Office began an assessment of growth-monitoring activities supported by UNICEF in several countries. This revealed insufficient coverage, poor understanding of malnutrition causes and few growth-promotive measures. (Pearson, 1995) The report concluded that insufficient funding had been invested in order to allow growth monitoring and promotion programmes to work. Many misunderstood the report to mean that UNICEF-supported growth-monitoring was ineffective. The report led to deliberations that reformed UNICEF's policies

and strategies and there was a shift away from community-based nutrition and growth monitoring programme expenditure towards breastfeeding, immunization and micronutrients promotion. (Ashworth et al., 2008)

The development of the current WHO/UNICEF strategy of Integrated Management of Childhood Illness (IMCI) came about due to limitations experienced in disease-specific child health programmes. In 1996 it was first introduced at country level with the goal of reducing child mortality. The main elements of this strategy were to improve health systems, improve health worker skills and improve family practices to prevent disease and encourage care-seeking. (Bryce et al., 2005) Within the IMCI strategy a child's weight-for-age is plotted and classified in order to inform decisions on follow-up and referrals. Nutritional counselling is given emphasis at every sick-child interaction rather than on regular growth monitoring. (Ashworth et al., 2008)

Objectives of Growth monitoring

The main aims of growth monitoring are:

1. As a screening tool – Health professionals regularly measure children's height and weight and plot information on the growth chart, when growth is abnormal, appropriate investigations are undertaken and a serious illness can be diagnosed early and the prognosis can be improved by an early diagnosis. (Scherdel et al., 2016)
2. For education and promotional purposes – An opportunity to teach mothers, caregivers, and health care workers how diet and illness can affect growth and what the benefits of growth monitoring are. Also an opportunity for mothers to ask questions about child care to improve household practices and be reassured about their children's health. (Faber et al., 2003)
3. Provide regular contact with primary healthcare services - Regular growth monitoring can improve utilization of preventative health-care services. Children with increased health service utilization may experience the benefits of improved nutritional status and reduced mortality. (Ashworth et al., 2008)
4. Community-based participatory activity – The value of moving toward community-based participatory growth monitoring builds confidence in health and nutrition services, raises awareness of health and nutrition problems which increases community participation in primary health care activities. (Faber et al., 2003)

5. Targeting supplementary feeding - The weight chart is commonly used to determine if a child is eligible for entry into a supplementary feeding programme. A weight-for-age below one of the reference curves on the weight chart is the standard criterion used which is equivalent to 'moderate' underweight. This shifts the focus from growth monitoring to identifying children who meet this criterion, rather than acting at the first indication of growth faltering. Using weight charts in this manner is in opposition of the principle of growth monitoring.(Ashworth et al., 2008)

6. Reporting prevalence of underweight – Governments and International agencies may require statistics on the number of children failing to grow (underweight) monthly. Currently, over 50% of countries provide statistics obtained from growth monitoring to higher levels.(De Onis et al., 2004) Weights may be recorded and not plotted, growth charts may be used to determine if a child's growth is faltering and sometimes at another time instead of in the mother's presence. Thus, negating the objectives of growth monitoring and promotion. Additionally, information submitted may not allow for accurate analysis and interpretation so that surveillance of nutrition status objectives may be achieved.(Ashworth et al., 2008)

History of the Home-based records

The growth and development of children is a valuable tool in gauging the health of a population in the early stages of life, development, and learning occurs most rapidly whereby a child is most susceptible to external factors such as infections or poor nutrition and stimulation. Growth and development in children need to be observed closely so that corrective measures can be taken early enough to ensure normal growth. This has been a key area of interest for the World Health Organization since 1951.(WHO, 1951)

A home-based record is a health document used to record the history of health services received by an individual.(WHO, 2018b) Home-based records have a long history, their use has changed and content has expanded over time. In the mid-1800s, they were originally used to document proof of smallpox vaccinations.(Riedel, 2005) In the mid-1900s, it was subsequently used to document health education and services for mothers in Japan.(Takeuchi et al., 2016) A health and weight chart concept was first promoted by D Morley in 1962 following his experiences in Nigeria.(Donald & Kibel, 1984) The records varied in complexity from the simple 'Road to Health' card developed by the World Health Organization to the comprehensive 'Carte de Sante' designed by the French.(Lakhani et al., 1984) Subsequently, there was increased attention by international health organizations, governments and health professionals on home-based records due to fewer practical problems and higher levels of patient satisfaction.(Saffin & Macfarlane, 1991)

The use of home-based records spread globally, they varied greatly in terms of design and information they documented across countries and regions. Their designs later expanded to include antenatal care notes or vaccinations only and progressed to child health books which included health education information.(WHO, 2018b)

Subsequently, child health cards have been introduced throughout the world as part of accurate record-keeping, important for continuity and quality of care(Ferranti et al., 2006) and now forms one part of the foundation of preventative and promotive paediatrics.(Harrison et al., 2005)

History and development of 'Road-to-Health' system in South Africa

In South Africa, a preschool record card was introduced in Cape Town in 1971. It was designed by Dr Robertson and Professor Hansen, basing its 'road to health' percentiles on the well-known Harvard standards.(Donald & Kibel, 1984) It was introduced to the rest of South Africa in 1973 to help track health and record immunization status.(Turner & Fuller, 2011) It contained records of a child's significant health events, included information such as personal identifying data, mother's pregnancy details and antenatal care, birth details, birth size, family and sibling history, immunization records, guidelines for infant feeding, family planning practices, growth weight plotting, development milestones and illnesses.(Tarwa & De Villiers, 2007) It provided a simple, inexpensive and convenient way of monitoring child health (Hart et al., 1991) and was seen as mobile databank. In some instances it may have served as the only reliable record of child health where migrating families and disjointed health services were common in developing countries.(Tarwa & De Villiers, 2007) These records were designed to track child health history and ease the continuity of care among healthcare workers, it also allowed mothers to track their child's health.(Naidoo et al., 2018)

Over 40 different design formats were used in southern Africa until 1987. The large variety resulted in confusion among healthcare workers when presented with unfamiliar cards and consequently led to under-utilization of the potential of 'road to health' cards. (Crisp & Donald, 1987) The variety and difference in layouts on the cards, the realization was met that educational campaigns focusing on the RtHC at national and regional levels were being hindered. A RtHC was designed and developed in conjunction with the Department of National Health and Population Development. The objective was to create a design to which local authorities can make their own adjustments as needed.(Crisp & Donald, 1987)

Since 1995, the RtHC had been reviewed and updated four times, with the last occurring in 2002.(Cloete et al., 2013) In 2010, the absence of HIV-related care in the RtHC provoked a re-design

in the card and a new Road-to-Health Booklet (RtHB) was developed which included two pages on HIV-related care.(Naidoo et al., 2018)

In 2011, the National Department of Health (NDoH) implemented the new Road-to-Health booklet as a national assessment and monitoring tool for child health, replacing the Road-to-Health card.(NDoH, 2014) The RtHB is an all-inclusive record for the following interventions: growth monitoring, immunizations, developmental screening, oral health, vitamin A supplementation, deworming, infectious diseases, including HIV and tuberculosis and health promotion (HP). The section on Health promotion includes messages on age specific health promotion related to feeding of infants and young children, communication, and play. Also included is messages on feeding during illness as well as danger signs of childhood sicknesses, with the aim of allowing healthcare workers to communicate age-appropriate messages where applicable to caregivers at each clinic visit.(Du Plessis et al., 2017)

In line with the Sustainable Development Goals and the Global Strategy for Women's, Children's, and Adolescents' Health, it was essential to shift focus away from ensuring that a child survived to ensuring that they thrived.(EWEC, 2016) A co-ordinated approach to providing integrated services that promoted survival as well as nurturing care of young children that comprised of health, nutrition, early learning, safety and security and responsive caregiving through the health system had been lacking.(Black et al., 2017) To address this issue, the Road to Health Booklet was redesigned in 2018, a process led by the National Department of Health (NDoH) along with partners. The content of the booklet was arranged around five new themes, namely: Nutrition, Love, Protection, Healthcare, and Extra care.(Goeiman & Wessels, 2019) The new RtHB is at the centre of the NDoH under five child health campaign known as the Side-by-Side campaign. The goal is to ensure that young children have access to all nurturing care services at household and health facility levels.(Slemming & Bamford, 2018)

The Side-by-Side campaign defines the relationship between child and caregiver, as well as relationship between healthcare workers who advise the caregiver. The campaign aims to promote the notion of partnership on the journey of child-rearing that caregivers undertake with their children and those who support them. (Slemming & Bamford, 2018)

Components of the 'Road to health' system

Growth monitoring Charts

Measuring growth is common practice worldwide in child healthcare. Healthcare workers monitor growth to detect and take action when growth faltering has occurred. (De Onis et al., 2004) These anthropometric measurements are widely used to determine prevalence of undernutrition and overnutrition and helps to identify children with increased nutritional and health needs. (de Onis & Blössner, 2003) The application of these growth indicators are based on the concept that regular and accurate growth monitoring can best identify the health and nutritional status of children. (de Onis & Yip, 1996) The current RtHB contains a section on weight-for-age (W/A), length/height-for-age (H/A), weight-for-height (W/H), and mid upper arm circumference (MAUC). To determine short term growth or whether a child is growing adequately the W/A is used to monitor whether a child is gaining weight. For longer term growth, H/A is best used to determine if a child's growth is faltering or stunted. While MAUC or W/H is used as an indicator of wasting in children, this is an important measurement as it classifies a child as having Severe Acute Malnutrition and may need hospitalization or therapeutic feeding. (Western Cape Government, 2018)

Expanded Programme on Immunization (EPI) Schedule

Vaccines are widely acknowledged to be one the most successful medical advancements in the modern era. Childhood diseases that were common in previous generations are now increasingly rarer. (Balding, 2006) Since the introduction of the Expanded Programme on Immunization (EPI), immunizations have prevented over 2.5 million deaths a year and protects millions of children from illness and disability according to estimates. (Dlamini & Maja, 2016) Vaccinations have impacted significantly to the decline in child mortality in South Africa. (Bärnighausen et al., 2008) According to the National Institute of Communicable Diseases, it is the best way to protect children from unpredictable side effects of dangerous infectious diseases. (NICD, 2016) It provides a reliable source of immunization status for healthcare workers when dealing with migrating families. (Naidoo et al., 2018) It allows caregivers to track dates for their child's next vaccination visit as well as helping them to understand which vaccines their child is getting at each visit. (NICD, 2016)

Vitamin A supplementation

Vitamin A deficiency is a major public health problem in regions of Africa and South-East Asia affecting a projected 190 million children under the age of 5. (WHO, 2009b) These children require increased levels of Vitamin A in order to combat disease and promote rapid growth. A Vitamin A deficiency at this age, if severe, may cause visual impairment or increase the risk of disease and mortality of childhood illnesses such as measles and diarrhoea. (Sommer & West, 1998) Almost 6% of all child deaths in Africa and 8% in South-East Asia are caused by a Vitamin A deficiency. (WHO,

2009a) Supplementation of Vitamin A in children under the age of 5 is associated with a reduced risk in all causes of child mortality as well as reduced diarrhoea incidence. (Imdad et al., 2017)

Deworming

Regular deworming of children of under the age of 5 has been the main strategy of prevention of soil-transmitted helminthiasis (STH) recommended by the WHO. (Lo et al., 2018) Soil-transmitted helminthiasis affects a third of the world's population and is considered among the neglected tropical diseases. (Welch et al., 2017) Heavy worm infection of children particularly in low-income communities where sanitation is inadequate is associated with malnutrition, poor growth and anaemia. (Taylor-Robinson et al., 2015) Deworming of children as young as 12 months can improve their health and can create community health awareness and compliance. (WHO, 2004a)

Developmental screening

Globally, more than 200 million children living in low or middle-income countries have developmental delays or disabilities. A reduction in mortality rates of children under the age of 5 in these countries due to medical advancements is resulting in more children surviving with development delays or disabilities. (Scherzer et al., 2012) Early identification of these developmental delays and disabilities along with early intervention is the best possible strategy to minimize the adverse effects of risk factors and maximize developmental outcomes. (Slemming & Saloojee, 2013) Apart from benefitting these at-risk children, these early detection programmes allow governments to determine incidence of these delays or disabilities and plan appropriately. The only current development screening tool in South Africa forms part of the RtHB. (van Der Linde et al., 2015) The development screening is conducted by nurses at primary health care clinics and children identified with developmental delays or disabilities are referred to secondary or tertiary hospitals for further assessment. (Samuels et al., 2012)

Nutrition and Breastfeeding

Breastfeeding is a primary strategy used worldwide to improve child nutrition and increase child survival. (Siziba et al., 2015) The WHO recommends that mothers should breastfeed exclusively for the first 6 months of a child's life and introduce complementary food thereafter along with continued supplementary breastfeeding until 2 years of age and beyond. (WHO, 2002) For most infants, breastfeeding is the best source of nutrition and provides immunologic protection as well. It also provides health benefits for mothers. (Morin, 2012) Breast milk contains all necessary nutrients to improve an infant's health, growth and development. (Alimoradi et al., 2014) The current RtHB

provides helpful information for mothers on the benefits of breastfeeding as well as supplementary feeding after the first 6 months of life. The RtHB also provides specific instructions on how to breastfeed for HIV positive mothers and Healthcare workers provide counselling on replacement for mothers who are unable to breastfeed.(Western Cape Government, 2018)

Oral rehydration therapy

Diarrhoeal disease is a global problem and among the leading causes of child mortality. (Troeger et al., 2018) The burden of Diarrhoea is greatest in low-income populations with poor access to clean water, sanitation, and health care. Prevention and treatment of diarrhoea is challenging although largely avoidable. (Troeger et al., 2017) It has been estimated that Oral Dehydrations Therapy (ORT) has prevented 54 million deaths due to Diarrhoeal disease alone. (Nalin & Cash, 2018) It can be used to treat up to 95% diarrhoea cases successfully and a solution can be made at home using water, sugar and salt. (Dippenaar et al., 2005) The RtHB informs caregivers on what warning signs to look out for and when they need to be taken to a health care facility. It also guides caregivers on how to prepare their own Sugar Salt Solution and administer to children with diarrhoeal symptoms.(Western Cape Government, 2018)

Head circumference

Measuring head circumference is a quick, simple, inexpensive and non-invasive method of determining whether an infant's central nervous system is developing normally or at risk of neurodevelopment disorders. (Harris, 2015) Early identification of infants with a head size too large (megacephaly) or head size too small (microcephaly) allows healthcare workers to refer infants to specialized services for diagnosis and treatment improving long term prognosis for infants. (Holden, 2014)

Prevention of Mother-to-Child Transmission (PMTCT)

South Africa has the highest prevalence of HIV infected adults in the world (Kuhn & Goga, 2019) but has seen significant progress in reducing new infections and AIDS related deaths. (Woldesenbet et al., 2019) The PMCTC strategy has played a major role in reducing infant HIV related morbidity and mortality as well as considerably improving maternal health. (Jones et al., 2014) The PMCTC provides an array of services to women and infants. These four pillars include, prevention of HIV infection in women of childbearing potential, preventing unwanted pregnancies in women living with HIV, prevention of HIV transmission from mother to child and providing women living with HIV the appropriate treatment, care and support. (NDoH, 2019)

Oral care

Globally, oral diseases are among the most prevalent diseases despite being largely preventable. Dental caries affects young children and is a lifelong disease that tracks across adolescence into adulthood. (Peres et al., 2019) In the Western Cape alone, over 80% of children in the 6 year old age group experience dental caries and are reliant on public health services for treatment. (Cader & Naidoo, 2019) Children with poor oral health care or dental disease are not healthy and may be disadvantaged when it comes to their physiological, social and mental development. (Blumenshine et al., 2008) The oral section was introduced onto the RtH system in 2011. (Cader & Naidoo, 2019) It provides valuable information on how to properly care for a child's teeth and educate caregivers on how to feed children in the care to prevent tooth decay. (Western Cape Government, 2018)

Health promotion messages

With the inauguration of the Alma-Ata Declaration in 1978, the WHO identified Primary Health Care as key to promote health for all. The International Conference on Primary Health Care included health promotion as one of the tools to address inequalities in healthcare globally as it was also vital to sustain global economic and social development. (WHO, 1978b) In South Africa, the Strategic Plan for Maternal, Newborn, Child and Women's Health and Nutrition (2012 - 2016) was introduced. (NDoH, 2012) It embraced primary health care (PHC) and aimed to reduce mortality and morbidity among mothers and children and improve health and nutritional status of women and their children through promotion of healthy lifestyles and improved access to nutrition and health care services. (Du Plessis et al., 2017) A health promotion section was included on the RtHB which contains age specific health promotion messages for caregivers which relates to feeding, communicating with your child, and providing safe spaces to play. It also contains specific messages for feeding during illness and warning signs to look out for during illness. The inclusion of the health promotion messages provides healthcare workers with an opportunity to communicate age-appropriate messages at clinic visits. (NDoH, 2014)

Limitations in the utilization of the RtH system

Studies conducted in South Africa

While the child health records have long been accepted as being a cornerstone of preventative and promotive paediatrics' in South Africa (Donald & Kibel, 1984), there have been few evaluations on this health record since its inception questioning the effectiveness of its implementation. In early

South African studies done, it showed that neither healthcare workers nor caregivers used the RtHC effectively. (Donald & Hesselning, 1987) A survey conducted by Kuhn et al., found that weight was measured or plotted incorrectly. (Kuhn & Zwarenstein, 1990) A study in Soweto found that the card was too complex for all mothers to comprehend. (Wagstaff & de Vries, 1986) A study conducted by Harrison et al. in Cape Town found that over half the nurses interviewed were too busy to fill in details while 37% of them did not know how to use the weight-for-age chart. (Harrison et al., 1998)

A study by Schoeman et al. revealed that when assessing weigh-for-age chart completion - a vital component of the RtH system - weights were plotted 46% of the time, enabling the researcher to determine that 50% of children were underweight or suffering from growth faltering. The study highlighted shortcomings in the lack of training in PHC nurses, lack of supervision and nutrition monitoring, as well as inconsistent GMP practices. (Schoeman et al., 2006)

A study carried out by Tarwa et al. found that healthcare workers seldom plotted a child's weight at consultation and often did not ask for the RtHC, which likely prevented caregivers from bringing the RtHC to future consultations as it was not needed. (Tarwa & De Villiers, 2007)

A study conducted in the Eastern Cape and KwaZulu-Natal provinces revealed that PHC nurses were key in implementing nutrition programmes, however ongoing training in integrated nutrition protocols was neglected. This contributed to missed opportunities as PHC nurses were unable to identify nutritionally at risk children for intervention. (Schoeman et al., 2010)

A study conducted by Kitenge et al. found that more than 50% of nurses believed the challenges faced in monitoring the RtHC were due to staff shortages, work overload and lack of equipment. Vaccine stock was also inadequate while the RtHC was often absent from consultations. Kitenge et al. also reported that nurses' interpretations of growth curves were poor and also seldom asked to see the RtHC at consultations. (Kitenge & Govender, 2013)

A study conducted at clinics in the Cape Metropole area in South Africa found many missed opportunities in utilization of the RtHB. The study revealed that 12 of 17 child immunizations were not done for their age, 3 of 4 children did not receive Vitamin A for their age, 13 of 17 mothers received no information from healthcare workers on the RtHB and 16 of 17 children had no development assessments done for their required age. (Jonker & Stellenberg, 2014)

In a study conducted by Smith et al. found that only 60% of doctors plotted weights correctly on growth charts. Only 41% of doctors had adequate knowledge scores regarding growth monitoring and only 41% of doctors scored and acceptable usage of these growth charts. The study concluded

that although doctors reported a positive attitude to the usage of growth charts they lacked adequate knowledge to use them optimally and therefore did not use them often. (Smith & Reji, 2015)

A study conducted by Cloete et al. in the Tygerberg subdistrict concluded that nurses did not have sufficient knowledge on how to effectively implement and utilize the RtHB and required refresher courses in order to improve knowledge and optimize the benefits of the RtHB. (Cloete et al., 2013) The study by Blaauw et al. revealed that with exception of weight, other anthropometric measurements were not recorded routinely, and healthcare workers were still not clear on the importance of the measurements in determining a child's health. Less than half of caregivers had their child's growth explained to them. (Blaauw et al., 2017)

A study conducted at Primary Health Care facilities in the Western Cape discovered that a third of caregivers were not aware of Health promotion messages in the RtHB and did not receive any counselling on it. Reasons for this was due to time and staff constraints. This study also recommended training and re-training of healthcare workers on the importance of the implementation of health promotion messages. (Du Plessis et al., 2017)

A survey conducted by Ramraj et al. demonstrated that RtHB possession at the first immunization visit was high however overall completeness of the RtHB was below 50% and the responsibility of the incomplete RtHBs was due to healthcare workers. (Ramraj et al., 2018)

A study conducted in the Kalafong Provincial tertiary Hospital revealed that length-for-age was only plotted in 5.2% of RtHBs and required further training and supervision of healthcare workers. The study also found that only 3.6% of RtHBs had head circumference recorded despite it being asked at 14 weeks. Recommendations from the study concluded that healthcare workers required in-service training on the use of the RtHB. (Naidoo et al., 2018)

A study conducted by Wiles et al. at the Red Cross War Memorial Children's Hospital to determine the degree and accuracy doctors used the RtHC. The study found information that was recorded on new hospital records was poorly recorded on the RtHC. The study confirmed that the use of the RtHC as a central record for child health was nullified as doctors did not record clinic notes regarding hospital visits on the RtHC. (Wiles & Swingler, 2018)

A study conducted by Win et al. in the rural primary health care facilities in Gauteng revealed that height-for-age was only completed 37% while weight-for-length was completed 33% of the time. The study found that the challenges for completing these measurements were due to equipment shortages as well as a lack of training of healthcare workers. In addition, the study revealed a lack

of familiarity with the new sections in the RtHB that were not previously in the RtHC.(Win & Mlambo, 2020)

Studies conducted internationally

When looking at studies conducted internationally, a study in Lesotho by Ruel et al. revealed that knowledge of healthcare workers of growth charts was 3.4 out of 10 because they never received adequate training on the RtHC. However, results showed that with proper training, healthcare workers were able to improve knowledge scores on growth charts. (Ruel et al., 1991)

A study conducted in Papua New Guinea revealed that children that were malnourished were often detected too late. Problems encountered were that children were not considered ill enough for a clinic visit, scales were faulty or poorly calibrated, weights were plotted inaccurately and infrequently, and nurses were unsure of what measures to take when growth curves were flat. (Edwards, 2000)

A survey by de Onis et al. assessing growth monitoring in 202 countries revealed that weight-for-age was used universally whereas 41% of countries used length-for-age, 33% used head circumference, and 23% used weight-for-length. The survey also revealed problems encountered by healthcare workers, 48% of countries had difficulty interpreting growth curves, 40% had trouble plotting accurately, 29% did not understand reference curves and 7% experienced from lack of training or equipment. (De Onis et al., 2004)

A review of growth monitoring conducted by Roberfroid et al. concluded that GMP was not ineffective at diagnosing malnutrition because health workers did not understand growth charts and its relevance toward child nutrition. It determined that health workers were the reason for GMP practices failing.(Roberfroid et al., 2005)

In Thailand, a study testing health officers and village health volunteers on knowledge of GMP practices revealed 90% of health officers could correctly plot and explain growth charts while only 50% of volunteers correctly plotted and interpreted growth charts. Both groups tested indicated a lack of time to perform weighing and GMP activities composed of too many documentation. (Chotivichien et al., 2006)

A study conducted in the Eastern Mediterranean on 16 countries uncovered many of the same problems in implementing GMP practices encountered in each country. The most common problem encountered was a lack of adequate training of health staff followed by poor understanding of the risks of being overweight and inaccurate plotting on growth charts. Difficulties faced also included

lack of understanding and interpretation of growth curves, poor maintenance of weight scales and timely replacement of broken scales. Less common problems encountered were the lack of understanding the risks of a child being underweight as well as identifying and referring these children for intervention. (Abul-Fadl et al., 2010)

A study conducted in Nigeria uncovered poor knowledge of growth monitoring procedures with more than 50% of health workers not knowing the regularity of growth monitoring. Many respondents could not interpret growth charts correctly. A key issue responsible for poor knowledge and understanding was found to be a lack of regular training of GMP practices for healthcare workers. (Iyanuoluwa et al., 2011)

In Ethiopia, a study conducted by Bilal et al. revealed many challenges in the practice GMP. Health workers lacked the sufficient skill in weighing children and plotting weight on growth charts as well as using information collected to counsel mothers on proper childcare. Health workers also highlighted the lack of funds to secure equipment and maintain it and sighted high caseloads as additional challenges in implementing GMP. (Bilal et al., 2014)

A study conducted in Nigeria revealed the many challenges in achieving a minimum vaccination coverage target of 80%. Due to rumours, misinformation, and fear many caregivers as well decision makers reject scheduled immunizations. Also supply of vaccines are limited due to unavailable funds or those funds not being released on time. This results in thousands of children becoming victims of vaccine preventable diseases.(Ophori et al., 2014)

A study conducted in Nairobi determined the main causes of missed opportunities for children who are age-eligible for vaccinations were due to poor health worker training as to when a child should be vaccinated as well poor supplies of those vaccines.(Borus, 2004)

A study conducted by Tarrant et al. in Canada highlighted some of the issues affecting immunization rates. The study found that mothers were unaware as to how vaccinations worked and when their children still got sick after receiving a preventative vaccination, they lost trust as to whether vaccinations actually worked.(Tarrant & Gregory, 2001)

A study conducted in Mozambique revealed a multitude of factors for missed vaccinations namely long waiting times at health facilities, no health personnel available, no vaccinations being available, a child being sick on day of vaccination as well as forgetting which day the vaccination was.(Jani et al., 2008)

Chapter 2

Aims and Objectives of the study

Background

One of the important strategies to improve the survival and development of children set by UNICEF include the GOBI-FFF strategy, which comprises growth monitoring, oral rehydration therapy, and promotion of breastfeeding, food supply, family planning and female education.(Kuhn et al., 1990) GOBI-FFF is considered to be a cost-effective strategy that could strengthen child health and reduce infant mortality and morbidity.(Wisner, 1988)

The effects of prevention and intervention strategies to address infant mortality should be measurable, monitored and recorded on a regular basis to ensure progress or improvement of the growth and health related issues of the child.(Stats SA, 2015b)

The Road to Health booklet is designed as a tool to track all healthcare needs of your child and should be taken with to every visit to a clinic, hospital or doctor . (Western Cape Government, 2019)

Several studies have investigated the risk factors for malnutrition among young children in developing countries which include low family socio-economic and education levels, difficult family dynamics (e.g. mother pregnant with another child, father unemployed, or separated), sub-optimal nutrition (e.g. lower breastfeeding rates or stopping breastfeeding at earlier age, lack of food) and poor environmental and hygiene conditions (e.g. inadequate housing, absence of water and sanitation). Studies have also investigated how well clinic staff and caregivers/parents understand the importance of the RtH booklet and how to optimally utilize the benefits the booklet provides. Few studies, however, have investigated the completeness of information contained in the RtH booklet and then compared it to the actual health status of children under five years old as well as investigating the health status of children who are not in possession of an RtH booklet.

The present study aims to investigate the reported health status as reflected in the booklet of children under the age of 5 years - both those who are in possession of an RtH booklet as well as those who do not possess an RtH booklet. Further issues to be explored are where the lapse has occurred in primary health care with regard to children who do not have an RtH booklet.

The community-based study seeks to provide an objective assessment of how well the RtH booklet is succeeding in its aims and stores vital information on each child. This home-based survey further

seeks to record the home environment of each child in the study since adverse home conditions (poor sanitation, poor hygiene, poor housing, etc.) are known risk factors for ill health and failure to thrive.

A cross-sectional survey of caregivers and child health in these communities can provide an objective measure of current health status for children in the low-income urban communities, and the results from this study may be used to gauge the effectiveness of health care policy reforms in improving standard of living of all South Africans with an emphasis on child health and would shed light on unmet health needs of children in South Africa.

Overall aim:

An investigation into the existence of a Road-to-Health booklet and the information contained therein and the actual health status of children under 5 living in a low-income area of the City of Cape Town.

Objectives:

- Objective 1 An assessment of the demographic characteristics of children in the study and the main caregiver as well as the household (e.g. age, gender, work status, size of the rest of the family, socio-economic characteristics, relationship to child, etc.) as well as the health risks in the home environment
- Objective 2 An assessment of the particular reported health attributes associated with each child with a Road-to-Health booklet (assessment of weight, height and upper arm circumference, particular health issues and amount of health care needed, main source of health care).
- Objective 3 An assessment of the information contained on the actual Road-to-Health booklet obtained in the homes visited in the study.
- Objective 4 An assessment of the same attributes and health needs as in Objectives 2 and 3 of those children without a Road-to-Health booklet in order to identify where these lapses in primary care were most likely to occur.
- Objective 5 An assessment of the differences in how information is recorded on the RtH booklet at different Health facilities.

Chapter 3

Methodology

In this chapter, the study design, study population, sampling strategy, data collection and data analysis are explained.

Study Population and Area

The study took place in June 2014 in four low-income communities in the Kuils River municipal area and surrounding settlements of the City of Cape Town Metropole. The inhabitants of these communities were classified as the study population for the cross-sectional study. The following low-income communities formed part of the study, namely: Kalkfontein in Kuils River, Wesbank, Happy Valley in Blackheath and Eerste River.

In selecting sites for the study, various low-income sub-areas were identified with the help of municipal officials so that the different socio-economic and cultural groups in the study were covered in a representative way. Dense settlements, areas with government-sponsored low-cost housing, low-income areas near industrial areas, etc. were selected to form a representative subsample of the low-income portion of the geographical area of the Cape Town Metropole.

Specific criteria for inclusion into the study was that the participant had to be the caregiver of a child under the age of 5 years old and residing in the designated study area.

Design of the study

This study is a community-based survey, and its strength does not lie in the traditional comparative designs usually encountered in the analytical studies used in clinically based research. Descriptive epidemiology uses observational methods to describe the distribution of disease in terms of person, place, and time. (Mortimer & Borenstein, 2006) The study describes the distribution of number of variables related to the topic of the study without regard to causal or other hypotheses. Personal factors investigated in such a design usually include age, gender, educational level, and the variables closely related to the topic of the study. The present study was aimed at recording whether a card/booklet was present and what information was recorded in it, the risk factors for each child such as home hygiene, housing conditions, poverty, etc.

The approach of this descriptive study was to gather demographic and health information through a structured interview with the major caregiver in each participating household as well as take

anthropometric measurements of the child in their care. The nature of the data recorded on the Rth card/booklet (if obtainable) was observed and a home inspection performed in order to determine general living conditions.

A cross-sectional study examines the relationship between disease (or other health related state) and other variables of interest as they exist in a defined population at a single point in time or over a short period of time. (Wang & Cheng, 2020) A major advantage of cross-sectional studies is that they can be used to assess the burden of disease or health needs of a population and they are particularly useful in informing the planning and allocation of health resources. (Setia, 2016)

Advantages and Limitations of Study design

Cross-sectional study design can be used to determine the prevalence of an outcome of interest for a target population provided that a suitably representative sample with a random element in the design was employed. (Wang & Cheng, 2020) They are carried out at a single point in time or over a short period. Data can be collected on individual characteristics such as health, behaviour, attitudes, or lifestyle choices of participants. This provides a 'snapshot' of the outcome of interest along with the characteristics associated with it, at the point in time the data was collected. They are generally inexpensive to complete and are less time consuming to conduct as interviews only take place once (C.J.Mann, 2003). As a result, there is no loss to follow up. Data collected is then analysed and investigated to identify if there are any associations between risk factors and the outcome of interest (C.J.Mann, 2003). Therefore, information collected from cross-sectional studies is useful in generating new hypothesis and is regularly used in planning public health initiatives (Bates et al., 2007). Many aspects can be studied at the same time and thus it is possible to create an in-depth research study. (Wang & Cheng, 2020)

However, cross-sectional studies are not without limitations. Due to the fact that cross-sectional studies provide a 'snapshot' of one point in time, the sequence of events cannot be ascertained (Bates et al., 2007). Therefore, it provides no evidence of whether exposure occurred before the outcome of interest (Bates et al., 2007). No causality can be determined and when carried out in a different point in time, the results may differ (Bates et al., 2007).

With cross-sectional designs it is not possible to study time-related events or characteristics. Data are collected at only one point in time. (C.J.Mann, 2003)

Bias is an ever-present risk in all study designs. (Wang & Cheng, 2020) Sampling bias may occur when certain types of individuals are more or less likely to be selected (for example those who are

often away from home, those who are difficult to reach physically, etc.) Non-response bias can also occur when significant numbers of potential participants refuse to participate. (Wang & Cheng, 2020)

Data was collected by means of structured interviews which has its own advantages and limitations. Structured interviews follow a standard set of questions which makes the process efficient and therefore allows answers to be compared and trends observed. Due to the structured nature, interviews are easily repeated to check reliability of data. (Qu & Dumay, 2011) Questions are designed to provide the exact information needed by the interviewer. The interviewer is present to explain or clarify questions for the study participant which increases the accuracy of data collected. Structured interviews enable the researcher to include participants from the target population of the study. (Zohrabi, 2013) All interviewees in the study were voluntary participants which yielded a 100% response rate.

The Interviewer effect is the phenomenon whereby the appearance of the interviewer i.e., gender, race, age, personality may influence the answers of the interviewee. This poses a problem as it may bias the results of the study and make them invalid. (Davis et al., 2010) Other issues which arise during interviews is that the process is time consuming and expensive to conduct when the sample size is large. (Kelley et al., 2003) Memory is selective and interviewees are unable to recall all information at the moment of asking. (Bowling, 2005) Anonymity during the interview process is lost and therefore when more sensitive topics are discussed with regard to socially unacceptable behaviour such as drug use or HIV status, interviewees may be dishonest with their answers as it may seem too intrusive or embarrassing to answer truthfully. (Bowling, 2005) In these cases, the interviewer is unable to tell if the interviewee is being honest which may bias the results.

Sampling Strategy

Sampling is the process of selecting a group of subjects in order to represent the study population they were selected from. By drawing a sample in the optimal manner from a population, inferences can be made about the population characteristics. (Yount, 2006)

The strength of a community-based survey does not lie in its sophisticated design but in the validity and representativity of the sampling strategy. (Messiah et al., 2014) On deciding the size of the sample, a number of factors had to be taken into consideration. At the onset of this study no *a priori* hypotheses were constructed (as it was not the intention of this community survey).

The present study is what is usually termed in survey design as a small-scale research study. It does not seek to determine *quantitative answers that need to be extrapolated to a larger population*. Thus, the traditional statistical approach to calculation of sample size presents problems. A further complication is that the present sampling needs to be aimed at only those households with a child below the age of 5 years old. That means that conventional sampling calculations and strategies will include large numbers of houses without such a child. The children under 5 years of age are both a sampling *target* and a *result* of the survey. Ordinary sampling size calculations will give rise to a far too small sample of eligible children for the study. Therefore, the usual strategy under such circumstances is to employ a systematic sampling strategy with random starting points. (SMART, 2012) That enables conventional inferential statistics to be used where needed, while enabling the survey to concentrate on only those households containing an eligible child.

The aims in survey methodology are firstly to attain a sufficiently representative and unbiased sample and then secondly to attain information from sufficient sampling units to permit inclusion of less common instances of the variables under investigation. (Huchzermeyer & Karam, 2006) The sample had to be large enough as it better represents the population. However, as sample size increases, so do the costs involved in carrying out the study, not of money only but time as well. Therefore, in this study, the sampling strategy was approached in the same manner as empirical research to obtain the largest realistic sample size while balancing the accuracy of the data with the cost of the study. (Bless & Higson-Smith, 1995) Sampling in such study designs aims to acquire the most accurate depiction of conditions under study as possible without the need to obtain data for the entire population for these purposes of practicality and cost-efficiency. (Katzenellenbogen et al., 1999)

Systematic sampling

(Messiah et al., 2014) concluded that conducting health surveys with community-based random samples is essential to capture an otherwise unreachable population. When faced with an orderly layout of streets, a systematic sampling procedure with random starting points provides the best random coverage with the least amount of travel. (SMART, 2012) Systematic sampling with random starting points is a procedure in which every k^{th} household is included in the sample. The “K” refers to the interval at which every household is selected. The first sample is selected at random (either rolling a dice or using a random number table) and from there every k^{th} dwelling is selected. (UN, 2005) Should a household not contain a child under 5 years old, the next house is selected until a house with a qualifying child is found. From that point on the next k^{th} house is selected again.

The sampling strategy for this study occurred in two stages. In the first stage, the four study areas were selected with the help of municipal officials to be representatives of the low-income portion of the Kuils River area of the City of Cape Town. In the second stage, households in the study area were selected by means of the above-described systematic sampling strategy. A random starting point was selected for every street and then every 10th house from that point on. If a dwelling fell within the sampling selection and no child under 5 years old was present, then the next house with such a child was selected. A total of 250 households were selected in this manner, 63 in Kalkfontein, 60 in Wesbank, 67 in Happy Valley and 60 in Eerste River.

Research tools

The following tools were used in this survey:

- A questionnaire was administered by the investigator in order to determine the biographical details of members of the household.
- A health survey was conducted by the investigator in order to assess health status of individuals in the household.
- A comprehensive housing evaluation questionnaire and inspection checklist was conducted by the investigator in order to determine living conditions participants in the study.
- An electronic scale and height measurement device was used by the principal investigator in order to collect anthropometric measurements of children under the age of 5 years old taking part in the study.
- The Road to Health booklet or card of children under the age of 5 years old was examined in order to assess the information contained therein.

Data Collection

The data collection process could be divided into four sections, namely: the demographic and health evaluation questionnaire, the housing evaluation questionnaire, housing inspection checklist as well as the section whereby anthropometric measurements were taken of children under the age of 5 and the Road to Health booklet analysed.

The interviews were carried out by the principal investigator with the main caregiver of each household. In one instance when the main caregiver was unable to communicate in English or Afrikaans a family member or neighbour was able to translate to assist in the interviewing process

During the health questionnaire interview process, demographic characteristics of the participants as well as inhabitants living in either a main dwelling or shack was obtained. A health survey was conducted in order to determine the health status of children under 5 years old as well as status of other inhabitants living in the household.

During the housing evaluation questionnaire interview process, information regarding the household was obtained ranging from household income to hygiene habits. During the housing inspection, living conditions of participants was assessed in order to determine any structural or sanitation problems experienced by participants in their homes.

Anthropometric measurements were taken of children under the age of 5 present in the household also the Road to Health booklet or card was examined to determine whether it was up to date, anthropometry was recorded and plotted, Vitamin A, deworming as well as whether immunizations were received.

On average the data collection process took 20–25 minutes to complete. A large amount of data was collected during the process and recorded on individual answer sheets. After an interview was completed, the questionnaires were placed in a sealed box and only opened at the end of the study in order to maintain anonymity. All data collected was then captured onto an Excel spreadsheet for further analysis and reported as grouped data and therefore no individuals or households can be identified.

Data analysis

The data obtained in this study was analysed by the Centre for Statistical Services at the University of Stellenbosch. The data was captured and analysed using Microsoft Excel and transferred by Professor M. Kidd to Statistica version 13.0 (StaSoft Inc. 2013, USA) for further analysis. The candidate entered the data himself and verified all entries with the statistician. Data integrity was monitored by the study supervisor and the statistician during the analysis and reporting of the data.

The data was presented using descriptive statistics in the form of tables for the entire study population, followed by *post hoc* comparisons between the RtHC and RtHB groups, using chi-square tests for categorical variables. A p-value of <0.05 was considered statistically significant

Ethical Considerations

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and was conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research. The study was registered at the University of Stellenbosch under the project number S13/03/048.

Financial support for the study was obtained from the National Research Foundation and Stellenbosch University. No conflicts of interests were declared for the present study.

All structured interviews were carried out by the principal investigator. All participants in this study were provided with an information leaflet in their preferred language which explained all the details of the project. Participants were encouraged to ask any questions of the principal investigator about participation in the study they did not fully understand to allow them to make an informed decision to participate. In only one instance did a participant indicate that they were not comfortable reading the information leaflet provided but would like to continue participating in the study. An adult family member that could read was present for duration of the interview and data collection process and was able to understand and explain, if necessary, any questions or information the participant not comfortable reading did not understand.

All participants were made fully aware that participation in the study was entirely voluntary and that they would not be compensated financially for their time. Participants were also advised that they were free to decline participation without any consequences. Also, participants were explained to that all information collected during the process would be treated as confidential and that the identity of participants would remain anonymous. Signed consents forms were obtained from participants by the principal investigator to allow participation in the study, also to give permission to take measurements of the child in their care as well as permission to take and use pictures of their home and family members for publication purposes. Completed answer sheets were posted in a sealed box and only opened at the end of the study in order to preserve anonymity.

The questionnaires were developed and designed in collaboration with the study leader, who is trained in the construction of community health research questionnaires and adapted from Thaslin Govender's PhD Thesis.(Govender, 2011) The questionnaires were piloted in the first 20 households of the Kalkfontein Community meeting the study inclusion criteria. No ambiguity, misunderstandings or other problems were encountered among the participants. Data collected from these 20 households were then included in the study.

Chapter 4

Results

In this chapter all the data was obtained from a total of 250 households selected as described in the previous chapter. There were 63 households from Kalkfontein, 60 from Wesbank, 67 from Happy Valley and 60 from Eerste River. A total of 278 children below the age of 5 were included in the study.

Demographics

Table 4.1: Role of occupants in household in relation to the interviewee

Roles in Household	No. of persons (n=1219)	%
Children under 5	278	22.8
Children older than 5	274	22.5
Adult child older than 18	20	1.6
Mother	246	20.2
Father	158	13.0
Grandmother	68	5.6
Grandfather	32	2.6
Brother	57	4.7
Sister	42	3.4
Other family relations*	22	1.8
Non-related Persons**	22	1.8

***Other family relations** includes aunts, uncles, nieces, great grandmothers, and cousins

****Non-related persons** includes friends, girlfriends, in-laws, and tenants

Table 4.2: Number of households in the different study areas

Study Area	No. of households (n=250)	%	No. of children <5 yr (n=278)	%
Kalkfontein	63	25.2	66	23.7
Wesbank	60	24.0	68	24.5
Happy Valley	67	26.8	77	27.7
Eerste River	60	24.0	67	24.1
Total	250		278	

Table 4.3: Housing type of inhabitants in all four settlements in the study

Dwelling type	Households (n=250)	%	No. of children <5 yr (n=278)	%
Main house	157	62.8	173	62.2
Shack	93	37.2	105	37.8

No statistically significant difference in children with RtHC, RtHB between housing types (Chi-square, $p=0.3740$)

Table 4.4: Reported number and gender of children under the age of 5

Gender	No. of children under 5	% (n=278)
Male	147	52.9
Female	131	47.1

Table 4.5: Sociodemographic characteristics of the occupants of dwellings

Characteristic	No. of persons	% (n=1219)
Gender		
Male	555	45.5
Female	664	54.5
Disabled individuals	5	0.4
Nationality		
South Africans	1192	97.8
Non-South Africans	27	2.2
Mean occupancy (persons per dwelling)	4.87	

Table 4.6: Educational status of adult occupants older than 18 years

Highest Education level	No. of persons	% (n=635)
Unsure	80	12.6
No schooling	10	1.6
Grade 0-4	15	2.4
Grade 5-7	78	12.3
Grade 8-10	241	37.9
Grade 9-12	203	32.0
Tertiary level	8	1.2

Table 4.7: Employment status of all occupants of working age

Employment status of all income earners	Number	% (n=630)
Full time	200	31.7
Part time	67	10.6
Irregular	1	0.2
Unemployed	362	57.5

Table 4.8: Combined monthly income of the study population per dwelling

Combined household monthly income	No. of households	% (n=250)
<R600	24	9.6
R600-R1200	32	12.8
R1200-R2500	65	26.0
>R2500	109	43.6
Unsure	20	8.0
Households receiving a social grant	192	76.8

Table 4.9: Breakdown of social grants received by households

Social grant	No. of grants received
Child grant	201
Pension grant	14
Disability grant	5

Road-to-Health Information

Table 4.10: Number of 'Road-to-Health' record types

Road to Health record type	No. of RtH records	% (n=278)
Card	62	22.3
Booklet	182	65.5
Missing or lost booklet/card	33	11.9
Temporary card	1	0.3

There was no statistically significant difference in RtH cards/booklets numbers between 4 study areas (Chi-square $p=0.9187$)

Table 4.11: Rating of quality of information contained in 'Road-to-Health' card/booklet (n=245)

	Good	%	Fair	%	Poor	%
Quality of card/booklet	44	18.0	146	59.6	55	22.4

There was no statistically significant difference in RtH cards/booklets numbers between 4 study areas (Chi-square $p=0.9187$)

Table 4.12: How many RtH cards/booklets were up to date and information completed (n=245)

	Yes	%	No	%
Up to date	217	88.6	28	11.4
Complete information	33	13.5	212	86.5

Up to date – This is an indication of whether a caregiver had taken the child in their care for their most recent immunization clinic visit

Complete information – This is an indication of how many RtH card/booklet had all information in table below recorded onto the RtH card/booklet

Table 4.13: Completeness of information recorded on RtH card/booklet (n=245)

Completeness of information recorded	Yes	%	No	%
Immunizations received	223	91.0	22	9.0
Weight-for-age plotted	223	91.0	22	9.0
Vitamin A treatment recorded	204	83.3	41	16.7
Deworming recorded	189	77.1	56	22.9
Height-for-age plotted	55	22.4	190	77.6
Mid Upper arm circumference recorded	44	18.0	201	82.0

Living Conditions**Table 4.14:** Report of whether participants paid for water

	Yes	%	No	%	Paid to municipality
Pay for water	25	10	225	90	25

Table 4.15: Report of whether participants paid for electricity

	Yes	%	No	%	Prepaid	Prepaid/ Homeowner
Pay for electricity	246	98.4	*4	1.6	171	75

*The four households that did not pay for electricity had no access to an electrical connection in their backyard shack

Table 4.16: Report of where toilet is situated

Toilet location	No. of observations	% (n=250)
Inside house	169	67.6
Outside house	78	31.2
Communal toilet	21	8.4
No toilet	1	0.4

Table 4.17: The type of toilet

Type of toilet	No. of observations	% (n=250)
Flush	249	99.6
No toilet	1	0.4

Table 4.18: Does toilet break often

Toilets break often	No. of observations	% (n=250)
Yes	43	17.2
No	205	82.0
Unsure	1	0.4
No access to a toilet	1	0.4

There was no statistically significant difference in toilets breaking in different study areas (Chi-square, $p=0.8680$)

Table 4.19: How often toilet cleaned

Frequency of cleaning	No. of observations	% (n=250)
Once a day	142	56.8
Twice a week	85	34.0
Once a week	5	2.0
Sometimes	2	0.8
Unsure	16	6.4

There was no statistically significant difference in frequency of cleaning toilets in different study areas (Chi-square, $p=0.5893$)

Table 4.20: Cleaning materials used for toilet

Cleaning materials	No. of observations	% (n=250)
Disinfectant	168	67.2
Soap	77	30.8
Unsure	5	2.0

Table 4.21: Working tap available

Working tap	No. of observations	% (n=250)
Inside house	183	73.2
On property	66	26.4
Nearby	1	0.4

Table 4.22: Facilities to wash hands after using the toilet

Hand washing facility	No. of observations	% (n=250)
Yes	184	73.6
No	66	26.4

There was no statistically significant difference in toilets breaking in different study areas (Chi-square=3.56, p=0.3132)

Table 4.23: What facilities are used by participants to bath

Bathing facilities	No. of observations	% (n=250)
Basin (plastic tub)	132	52.8
Bath	114	45.6
Shower	4	1.6

Table 4.24: Disposal of wastewater after bathing for those without a bath or shower

Wastewater disposal	No. of observations	% (n=250)
Outside	49	19.6
Toilet	65	26.0
Street drain	1	0.4

Table 4.25: Customary meal frequency as indicator of food insecurity

Meal frequency	Households	% (n=250)
1 meal per day	1	0.4
2 meals per day	11	4.4
2-3 meals per day	50	20.0
3 meals per day	188	75.2

Table 4.26: Self-reported substance use

Substance use	Households	% (n=250)
Smoke cigarettes	166	66.4
Consume alcohol	161	64.4
Had a member using drugs (non-specified)	14	5.6

Table 4.27: General state of living conditions in households

	Good	%	Fair	%	Poor	%
State of living conditions	14	5.6	105	42	131	52.4

Table 4.28: Report on whether participants found it difficult to keep home clean

	Yes	%	No	%
Difficult to keep home clean	28	11.2	222	88.8

Table 4.29: Indicators of structural condition of main houses

Structural component	No. of observations	% (n=158)
Cracked walls	47	29.75
Door not well fitted	11	6.96
Broken windows	16	10.13
Toilet not operational	0	0
Toilet leaking	3	1.89
Tap leaking	0	0
Roof leaking	23	14.56
Structural damage	39	24.68

Table 4.30: Condition of sanitation facilities

Sanitation feature	Number reported to be poor/absent	% (n=250)
Bathroom/toilets condition poor	133	53.2
Toilet not working	5	2.0
Toilet leaking	9	3.6
Tap leaking	1	0.4
No toilet paper in bathroom	80	32.0
No soap available in bathroom	180	72.0
No clean towel to dry hands	237	94.8
Condition of drain poor	138	55.2

Sanitation knowledge and behaviour of respondents**Table 4.31:** What happens when rubbish is thrown in toilet

Rubbish in toilet	No. of observations	% (n=250)
Block	248	99.2
Nothing	1	0.4
Unsure	1	0.4

Table 4.32: Who to contact if drain blocked

Blocked drain	No. of observations	% (n=250)
City Council	164	65.6
Unsure	66	26.4
Private plumber	18	7.2
Homeowner	2	0.8

Table 4.33: Can one get sick from not washing hands after using the toilet

Sick from not washing hands	No. of observations	% (n=250)
Yes	246	98.4
No	4	1.6

Table 4.34: Do you oversee children washing hands after using the toilet

Oversee children washing hands	No. of observations	% (n=250)
Always	9	3.6
Sometimes	240	96.0
Never	1	0.4

Table 4.35: The knowledge of respondents on whether they could get ill from the following

Ill from:	Yes	%	No	%
Using dirty toilet	250	100	0	0
Unclean home	249	99.6	1	0.4
Dirt in yard or street	249	99.6	1	0.4
Drinking dirty water	250	100	250	0
Drinking water from rivers or streams	250	100	250	0

Health aspects of households**Table 4.36:** Recent illnesses/symptoms of children < 5 as self-reported by respondents

Diagnoses reported	Number	% (n=250)
Runny nose	44	17.6
Cold	52	20.8
Flu	58	23.2
Diarrhoea	13	5.2

Table 4.37: Four most frequent chronic illnesses of adults as self-reported by respondents

Chronic illnesses reported	Number	% (n=250)
Hypertension	31	12.4
Asthma	20	8.0
Diabetes	13	5.2
Arthritis	5	2.0

Clinic Information**Table 4.38:** Clinics utilised by respondents

Clinic	No. of Clinics	% (n=250)
Sarepta	55	22.0
Wesbank	57	23.0
Bluedowns	61	24.0
Russel's Rest	58	23.0
Other	19	8.0

There was no statistically significant difference in RtH cards/booklets in clinics utilized by respondents (Chi-square, $p=0.9370$)

Table 4.39: Mode of transport to clinic

Clinic	No. of observations	% (n=250)
Walk	207	82.8
Taxi	33	13.2
Private transport	7	2.8
Train	2	0.8
Hospital taxi service	1	0.4

Table 4.40: Report of whether participants had money to pay to travel to clinics

	Yes	%	No	%
Money for travel	30	12	220	88

Table 4.41: The experiences at clinics as assessed by the respondents

Experience reported	Yes	%	No	%	Unsure	%	P-value χ^2
Satisfied with services	148	59.2	89	35.6	13	5.2	0.5951
Long waits	94	37.6	156	62.4	0	0	0.9161
No immunization stock	17	6.8	233	93.2	0	0	0.7327
No medication	35	14.0	215	86.0	0	0	0.2475
Poor service	44	17.6	206	82.4	0	0	0.6683
Understaffed	15	6.0	235	94.0	0	0	0.5762
Got sent away	5	2.0	245	98.0	0	0	0.6655
No family planning	1	0.4	249	99.6	0	0	0.4799
Private health facilities provide better services	245	98.0	5	2.0	0	0	0.2768

There was no statistically significant difference between the 4 study areas on the variables above

Chapter 5

Discussion

The 'Road to Health' booklet is the primary strategy designed to track development, health needs and health status of young children. It is provided free for all babies born at public or private health care facilities in South Africa. It contains invaluable information to help the child thrive and serves as a record of the child's growth and development milestones. (Western Cape Government, 2018)

The children in resource-poor communities are dependent on public health services where they are not likely to see the same health service provider on successive visits. The RtH system is therefore crucial to ensure continuity in care. In these resource-poor settings where parents or caregivers do not have a great deal of childcare or health care knowledge, the RtH system can provide them with the necessary information on how to feed their child and what warning signs and symptoms they should be on the lookout for and when they should visit a clinic for their next immunization. The RtH system can also alert the health care system timeously about children in need of intervention (poor nutrition, stunted growth, etc) when utilised correctly. (Western Cape Government, 2018)

The present study concentrated on just such communities in and around the Kuils River area of the City of Cape Town. The predominant housing type in the study area was constructed under the Reconstruction and Development Programme (RDP) later called Breaking New Ground (BNG). That is state subsidised housing for the needy. The housing types, the sanitation situation and the general hygiene behaviour of the inhabitants were noted during the survey as indicators of risk to the health of the children in the study.

A proportion of the housing in the study area included informal housing (either shacks in the backyards of RDP houses or freestanding shacks). None of these structures possessed their own water supply or toilet, which posed major health risks. The inhabitants in the shacks in the backyard of RDP houses used the toilet in the main house, thereby putting severe pressure on the facilities. Such toilets were often non-functioning (blocked or broken).

Given that the study design was a community-based survey with a systematic sampling strategy, the number of children in these communities without RtH cards/booklets is a true reflection of those children who fell outside the RtH system and are being missed.

Objective 1 An assessment of the demographic characteristics of children in the study and the main caregiver as well as the household (e.g. age, gender, work status, size of the

rest of the family, socio-economic characteristics, relationship to child, etc.) as well as the health risks in the home environment

This study area covered four low-income sub districts of Cape Town namely: Kalkfontein, Wesbank, Happy Valley and Russels Rest with an even distribution of households among the study areas. The study gathered information on 1219 persons living in the homes selected in the study. The main study population of 278 children under the age of 5 shared accommodation with 941 other occupants. Two dwelling types were observed with 62.8% being main (brick) houses (almost all of them RDP type dwellings) and 37.2% represented by shacks; the backyard of a main dwelling or on its own. The mean occupancy per dwelling was 4.9 per household. Keep in mind that the homes in question were extremely small, and the vast majority only consisted of one room. The children under 5 years old are referred to as the study population while the rest of the occupants are referred to as participants.

The gender distribution of children under the age of 5 is almost evenly distributed with males at 52.9% and females at 49.1% while the distribution of gender of the total study participants is females representing 54.5 % and males 45.5%. The study population was 97.8% South African with 2.2% represented by foreign nationals. Most of the foreign nationals encountered during the field survey refused to participate in the study due to possible xenophobia or being fearful of possible consequences should they be identified as foreign nationals.

The educational status of participants over the age of 18 (including those who were captured as unsure) shows that almost half (46%) of the participants have the highest education level of grade 7 the last grade of primary school (Table 4.6). Less than 1 in 5 has an educational level of grade 9 to 12. The higher the education level of a caregiver the better the chance a child has at receiving adequate care.(Christian et al., 1988) Education is one of the major factors that would allow participants to best use the resources available to them.(WHO, 2004b) The higher the educational level the better chance of understanding the importance of the 'Road to Health' card/booklet so that the caregiver understands the nutritional needs of a child and the importance of proper diet for growth.(Du Plessis et al., 2017) Lack of caregiver education on the healthcare needs of a child in the crucial years of life can also cause long term negative effects on adult life.(Porterfield & McBride, 2007)

Just over 30% of adults in the study had full-time employment with 57.5% being unemployed (Table 4. 7), which is more than double the 25.1 % unemployed statistic for South Africa in 2014.(Stats SA, 2014a) Households in this study had low levels of income. From Table 8, the data shows that 9.6%

of households has an income of less than R600 a month which would classify them as living under extreme poverty (Stats SA, 2015a) The data also shows that 12.8% of households earned R600 – R1200 a month which would put them in between lower-bound poverty line of R647 per month and the upper-bound of R992 per month (in 2014 prices). (Stats SA, 2015a)

The food poverty line is represented by the amount of money required to purchase the minimum required daily energy intake. (Ruch, 2014). The food poverty line during the study was given as R441 per person per month. (Stats SA 2015) The lower-bound poverty line includes households being able to buy food and non-food items but requires households to sacrifice food items to afford non-food items, while households in the upper-bound poverty line are able to purchase both adequate food and non-food items. (Stats SA, 2014b)

Most households (76%) received a government grant. The most prevalent grant were child grants at (201 grants received) followed by old age pensions (14 received) and disability grants at (5 received). Some mothers indicated they were not currently receiving a child grant but were in the process of applying for one. Many households were reliant on the child grants of R310 (in 2014 prices) as a source of income.(Beukes et al., 2017) The child grant is an extremely important lifeline in putting food on the table to ensure that these children have adequate nutrition for growth. (Grinspun, 2016) Given the severely constrained family income, the grant ends up being spent on other household expenses and not specifically for food needs for the targeted child. So, the children risk not having their basic nutritional needs for adequate growth met. (Community Agency for Social Enquiry, 2008)

Child support grants are an important strategy to reduce hunger and to provide basic nutrition for children living under extreme poverty (Patel et al., 2017) it can never be an adequate replacement for all the financial needs of a child living in a household with steady employment. A government support system of grants will never be able to replace or mitigate the detrimental effects of a poor or failing economy.

Of the 250 households in the present study, only 10% indicated that they paid for municipal water while 90% indicated they did not. This represents a significant risk factor to good health for the children in the present study. Access to potable water and hygienic sanitation is necessary to sustain human life and ensure good health. (Water Aid, 2017) A shortage of drinking water also results in more sickness and death and leads to higher health costs. (Ahmad et al., 2010) In developing countries, polluted drinking water is also considered as major health hazard and associated with most of the deadly diseases. However, if only 10% of participants are paying for water, it is difficult for a municipality to repair and maintain such a valuable service. This leads to a decrease in supply,

a decline in quality as well as a resulting increase in demand for safe drinking water. Safe drinking water is an essential component of primary health care. (Akinyemi et al., 2018)

All main dwellings had access to prepaid electricity while shacks made use of an illegal electrical connection point to the main dwelling and paid the homeowner for electricity use. Illegal electricity connections pose great risks to both main dwellings and shacks. Illegally connections drawing power from a system meant that there is a real risk of overload and the system tripping/failing, leaving no one with electricity in the area.(Eskom, undated) These unsafely constructed connections do not have the required protection and may cause structural fires resulting in homes in being destroyed and people getting killed. The most concerning aspect is a child being electrocuted by unwittingly touching a poorly/unsafely laid electrical cable.(Eskom, undated)

Of the 250 households in the study, 67.6% indicated that they have a toilet inside their homes while 31.2% (mostly shacks) indicated that their toilet was outside their home, while 8.4% of households indicated that they shared a communal toilet. This toilet is usually situated some distance from their dwelling. All main dwellings in the study had access to a flush toilet while backyard shacks had to use the toilet in the main house. Free standing shacks had to make use of a communal toilet or ask a neighbour to use theirs. 17.2% of households indicated the toilet broke often. 56.4% of respondents indicated the toilet was cleaned once a day while 34% respondents indicated that it was cleaned twice a week. 67.2% of respondents indicated that they used disinfectant to clean their toilets while 30.8% used soap.

Housing code stipulations require that an RDP house (later BNG) must have a flush toilet. (Department of Human Settlements, 2009) Unfortunately, a large proportion are not in a good state of repair. Toilets are subject to heavy use and often inadequately cleaned. Almost all of the respondents indicated that the toilet would block if any rubbish or foreign objects are thrown in the toilet while 65.6% of respondents indicated they would call the local council if a drain was blocked on the property. A quarter of the respondents were unsure of who to contact in the case of a blocked toilet. Only 7.2% of respondents indicated they would contact a plumber. Most respondents failed to recognise that they are the legal owners of these homes and that they were responsible for maintaining and repairing any damage to their homes. The local council would only be responsible for repairing blocked street drains.

A vast majority of the toilets in these households are operating as 'communal toilets' in reality with a large number of people using the toilet. Coupled with sub-optimal cleaning, these toilets pose a major health risk to children. Participants indicated that they use disinfectants, but any evidence thereof was lacking. Relatively speaking this a well provided for group of participants as all have access to

a tap and are aware of the importance of proper hygiene but do not practice it consistently or effectively. It is well known in community health that knowledge that does not necessarily translate into consistent action it is debatable whether participants oversee children washing hands. This lack of the transfer of safety habits to minimize risk of infection poses yet another environmental and behavioural risk to the children in this study.

All respondents indicated that they have a working tap inside their homes or on their property and 98.4% agreed that you could get sick after not washing hands after toilet use. Over 99% of respondents also understood that you could get sick from using a dirty toilet, having a dirty home, having dirt in your yard or street, or drinking dirty water. However, only 3.6% of respondents indicated that they always oversee washing of their children's hands after using the toilet. The data shows that the respondents are aware of the consequences of poor sanitation, but they do not practice it "They know, but they do not do". Hygiene and cleanliness behaviour of participants is a major contributor to the poor health of children. Knowledge and usage reported of respondents regarding the hygiene practices contradicts what has been observed by the interviewer.

Over half of the respondents at 52.8% indicated that they used a plastic tub to bathe while 45.6% had a built-in bath in their homes. The fact that more than half of the households use a plastic tub would provide an obstacle if everyone would have to use the same tub. 19.6% of respondents indicated that they disposed of their wastewater outside of their homes. Improper disposal of wastewater in this manner contributes to environmental pollution and could contaminate outdoor play areas for children which is a major risk factor for pathogens especially enteric pathogens which causes diarrhoeal diseases.(Govender et al., 2011a) Twenty-six percent of households indicated that they disposed of their wastewater down the toilet, adding pressure to already overburdened infrastructure. This inappropriate behaviour is a direct consequence of the lack of information on how to practice good hygiene as well as inconvenient access to a sewage system in these state-funded housing.

Over 75% of respondents indicated that they ate 3 meals a day, while 20% of respondents ate 2 to 3 meals a day. 4.4% of respondents indicated that they ate 2 meals. Judging by meal frequency, over 25% of participants are plagued by food insecurity. This highlights the importance of utilizing the RtH card/booklet for monitoring growth in order to determine if a child is receiving enough nutrition to grow optimally or whether preventative action needs to be taken.

Almost two-thirds of respondents indicated that they had a smoker living in their household, while 64.4% of households indicated they consumed alcohol. Apart from the direct risks, this may have a detrimental effect on child health due to the fact that in these poor households there is now less

money to spend on food items or other household necessities. Only 5.6% of households indicated that they have a member using drugs. Due to the sensitive nature of the question this is almost certainly an undercount of drug use. The nature of the type of drug used was not explored.

Of the homes inspected by the interviewer for the state of hygiene and living conditions, only 5.6% were found to be in a good state while 42% were found to be in fair state, while 52.4% of households were categorised as in poor state. This is yet another contradiction of awareness versus reality since 88.8% of respondents indicated that they did not find it difficult to keep their home clean.

When looking at the structural condition of the main houses, 29.75% had cracked walls while 10% of them had broken windows. Also, 14.56% of the main houses had roofs that were leaking and 24.68% had structural damage. The number of bathrooms/toilets observed to be in a poor condition was 53.2%. This may be due to the high level of usage. Only 2% reported that the toilet was not working, 32% no toilet paper, 72% no soap and in 94.8% no clean towel was observed in the toilet/bathroom.

Housing instability has long been identified as a major predictor of health at the individual as well as the community level. (Fullilove, 1998) It serves the basic function of providing protection and shelter for people from their environment and provides necessities such as heat, light, cooking facilities and appropriate waste disposal. Substandard housing forces people to live in overcrowded, unsanitary and dilapidated conditions adversely impacting on health. (Rauh et al., 2002) When looking at the poor state of living conditions of the some of these households, there is an increased risk of chronic illnesses for the occupants, especially children. The structural damage of these homes allows water to get in, increasing dampness. These damp households provide environments for mites, cockroaches, viruses and moulds which all play a role in respiratory diseases. (Verhoeff et al., 1995) Overcrowding and poor ventilation also increases interior moisture. (Markus, 2011) This poor ventilation now also poses a serious risk of spreading COVID-19 since the SARS-CoV-2 virus is notorious for building up in poorly ventilated spaces. (WHO, 2021)

Structural defects of these homes allow cockroaches and rodents to enter. Ineffective waste disposal and improper food storage allow these pests to survive and become established in the home. (Krieger & Higgins, 2002) This is another source of infection transmission and poses a high risk to young children as they often play on the floor of the dwelling and often put their fingers into their mouths.

Continued poor maintenance of these houses leads to dilapidation that creates conditions such as poor or non-functioning toilets, taps and damp conditions that can compromise human immune

systems. These living conditions along with inadequate hygiene create pathways for transmission of infectious diseases. (Carr, 2001) The respondents who were recipients of state-sponsored houses (RDP houses) are owners of these homes, but they lack knowledge and finances to properly maintain these homes. This places children who live in these dwellings under greater risk of contracting diseases.

Objective 2 An assessment of the particular reported health attributes associated with each child with a Road-to-Health booklet (assessment of weight, height and upper arm circumference, particular health issues and amount of health care needed, main source of health care).

Interventions targeting early diagnosis of child undernutrition with immediate corrective action have been prioritised globally and specifically in lower to middle income countries.(Ashworth et al., 2008) Therefore, Growth Monitoring and Promotion (GMP) is used in these countries to diagnose when a child is growing poorly at the earliest stage in order to improve the child's growth outlook through counselling on nutrition as well as other health promotion actions.(Pollifrone et al., 2020) According guidelines set out by the WHO, GMP includes (1) Measurement - routine monitoring of child's weight and length/height, (2) Assessment – plotting of child's measurements of weight for age and weight for height to standardised growth chart to assess growth (3) Analysis – Interpreting child's growth pattern (4) Corrective action – counselling on nutrition or examining child for disease.(Pollifrone et al., 2020) However, accuracy of these anthropometric measurements are vital in making an informed decision regarding clinical care.(Gupta et al., 2020) Failure to accurately measure these anthropometry leads to misdiagnosis of undernutrition or obesity as well as treatment thereof.(O'Connor et al., 2004) Studies have revealed the reasons for incorrect measuring and plotting of these weights were due to lack adequate training(Kuhn & Zwarenstein, 1990) and knowledge. (Cloete et al., 2013) Studies have also revealed incorrect measuring of weights due to the lack of experience as well as lack of the correct standardised equipment.(de Onis et al., 2004)

This objective posed unforeseen difficulties in the field when gathering the data. The candidate is a young male person and not registered in the clinical field of medicine. The data capture was carried out at the height of winter and the children were dressed in multiple layers of clothing while some of them wore thick-soled shoes. Thick clothing and shoes with thick soles added significant weight and height to the measurements obtained for small children. There are strict instructions in the Rth system on how the anthropometric measurements should be taken. The candidate could not ask the caregiver to undress the children without creating suspicion in some households, thereby impairing the trust and confidentiality of the interviewing process. The anthropometric measurements were therefore deemed to be too inaccurate. It was further not possible for the candidate to obtain to afford the standardised equipment used in the health system to determine the anthropometric

measurements with the precision needed. It was decided that the measurements will be carried out for the entire study so as to keep the interview process the same for the whole study, but the measurements were not used in determining whether the children are on par with the expected milestones on their cards or booklets, as was originally intended. Therefore, the anthropometric data collected in this study has not been included in the overall data analysis as the accuracy of the data could not be guaranteed due to the reasons outlined here.

When looking at reported health concerns experienced by children, adults were asked if any symptoms/illnesses were experienced by children or occupants in the household recently, 17.6% indicated a runny nose, 20.8% indicated colds, 23.2% indicated flu and only 5.2% of households indicated diarrhoea. This is likely an undercount of the illnesses or symptoms experienced by children and the rest of the household. When initially asking the question, many respondents indicated that the household did not experience any symptoms/illnesses in the past two weeks. However, on numerous occasions when observing the child in their care, the interviewer had to point out the child had a runny nose or such visible signs of infection. This lack of healthcare knowledge of caregivers poses a threat to the health of children in their care. Many respondents seemed to think a child was only sick when the condition of the child was so bad that they had to take the child to a clinic for medical care.

When respondents were asked if their households were experiencing any other health problems, 12.4% indicated hypertension, 8% indicated asthma, 5.2% indicated diabetes and 2% indicated arthritis. When asked this question, respondents were easily able to point out health problems affecting adults. The amount of attention paid to adults compared to children in households when it came to identifying health conditions is concerning.

Objective 3 An assessment of the information contained on the actual Road-to-Health booklet obtained in the homes visited in the study.

In total 278 children under the age of 5 were included in the study, 22.3% had the old 'RtH' card while 65.5% had the newer 'RtH' booklet. While 11.9% of respondents indicated they had either lost or misplaced their child's card/booklet. When a child does not have an RtH card/booklet, it is cause for major concern as nurses and doctors are unable to determine a child's medical history.

The rating system for quality of information contained in the card/booklet was based on 5 criteria of whether the information was recorded or not. These criteria were chosen as it was present on both the card as well as the newer RtH booklet. The criteria were as follows: weight plotted, vitamin A and deworming received, height plotted, and upper arm circumference recorded. If all 5 criteria were

recorded the card/booklet was classified as good, if 3 to 4 of the criteria were recorded it was classified as fair, while if 2 or less of the criteria were recorded it was classified as poor.

Table 4.11 shows that 22.4% of cards were classified as poor which equates to the card/booklet not being utilised at all for its intended purpose. 59.6% of the cards/booklets were classified as fair which meant 1 or 2 of the criteria were not recorded on the card. When combining the poor and fair categories, 82% of the cards/booklets looked at were not being used for their intended purpose. This is a staggering statistic considering the importance of this record of child health. This may result in missed opportunities to monitor the growth and determine whether a child is growing at a healthy rate or underweight. This will result in no corrective action being taken to improve a child's condition. (Naidoo et al., 2018) Only 18% of the cards/booklets looked at had all five criteria recorded.

Of the cards/booklets inspected, 88.6% were up to date. This indicates that most caregivers were taking their children for their regular scheduled immunization visits. The caregivers who had not taken their children for their most recent immunization indicated they planned on doing so soon. This implies that most caregivers understood the importance of the regular scheduled visits for the health of their children. (Harrison et al., 2005) However, there is room for improvement whereby healthcare workers at clinics can provide more information on why it is important for caregivers to make regular clinic visits. If caregivers better understood the implications of all the health services provided by clinics, they would be more likely to utilize such services more often. (Van Plentzen & MacGregor, 2013) Caregivers with an android smartphone are now able to download the Road to Health app which provides reminders about next immunization visits as well as useful healthcare information. (Jembi, 2019)

Malnutrition (including undernutrition as well as poor or unbalanced diet) is a major contributor of deaths in young children and improving feeding and nutrition is vital in reducing these infant and child mortality rates. Early identification and accurate diagnosis of malnutrition is critical in taking immediate corrective action in children under the age of 5. Regular measurements of these anthropometric indices along with correct plotting and interpretation on the RtH card/booklet is fundamental in the strategy of growth monitoring and promotion. (NDoH, 2012)

The growth charts from this study show that (with the exception of the weight-for-age), the other anthropometric measurements such as height-for-age were recorded in 22.4% of cases and mid-upper arm circumference (MUAC) at 18%, were recorded less frequently. The possible reason for the higher completion of the weight-for-age may be due to healthcare workers only using this measurement on the older RtHC and therefore not understanding the importance of recording height/length to determine growth faltering. (Blaauw et al., 2017) Other possible reasons poor

completion height-for-age may be due to insufficient time to complete, shortage of staff or unavailability of the correct equipment to measure height.(Blaauw et al., 2017) When the height-for-age and MAUC is not recorded accurately, this results in a missed opportunity to determine if a child is underweight, stunted or suffering from severe acute malnutrition and requires urgent specialised care. Similar studies done by Schoeman et al. (2006) and Kitenge et al. (2013) both highlighted issues in poor practice of recording length-for-age as well as MUAC. In a study conducted by Puoane et al. reported insufficient resources, unavailability of scales in good working condition was major contributor to inadequate care.(Puoane et al., 2001) While a study conducted in Nigeria by Iyanuoluwa et al. revealed that poor understanding of growth charts and its intended purpose were why programmes of monitoring growth failed.(Iyanuoluwa et al., 2011) A study conducted by de Onis et al. revealed that more than half of countries evaluated by UNICEF(In 1973 and 1999/2000) had difficulties with using the RthC.(de Onis & Blössner, 2003)

Healthcare workers may still not understand the importance of measuring and recording all anthropometry on the Rth booklet in determining health of children. Along with healthcare workers, caregivers also need to be educated on the importance of growth monitoring and promotion in the prevention of malnutrition when accurate anthropometric measurements are performed.(Blaauw et al., 2017) Studies conducted by Thandrayen et al. and Jonker et al. (2014) found that caregivers were not provided with any feedback when the growth of their children were assessed, resulting in missed opportunities to educate caregivers on the children's health.(Thandrayen & Saloojee, 2010) In South Africa, time constraints in completing tasks, shortage of staff, healthcare workers inability to fully comprehend all aspects of growth charts as well as inadequate time to counsel caregivers on nutrition are major barriers affecting Growth Monitoring and Promotion.(Blaauw et al., 2017) For monitoring the growth and development of children to be a success, healthcare workers knowledge of growth charts, ability to perform measurements and interpret results accurately must be improved.(Blaauw et al., 2017)

Of the cards/booklets inspected, 13.5% had all relevant information recorded and completed. One of the most regularly completed sections were immunizations received at 91%. Immunizations are a vital cost-effective strategy for reducing child morbidity and mortality. (Machingaidze et al., 2013) Primary Healthcare facilities in South Africa provide these immunizations free of charge in order to increase coverage and reduce the risk of vaccine preventable diseases. (Blaauw et al., 2017) The immunization coverage of 90% is in line with the target set by the NDoH. (Burnett et al., 2019) These findings of 90% coverage are similar to other studies done by Du Plessis et al (2017) and Win et al. (2020) where immunization sections were completed well. The high immunization coverage indicates that there were few missed opportunities for immunizations. According to Win et al. the high immunization coverage on the RthB may be down to the fact that the immunization schedule

was on the older RthC and nurses were well versed in completing it. (Win & Mlambo, 2020) However, these findings differ from a study conducted by Tarrant et al. in Canada which revealed that missed opportunities for immunizations were due to side effects of the immunizations, caregivers believed immunizations were making their children sick and were not bringing them back for subsequent immunizations. (Tarrant & Gregory, 2001) While closer to home, a study conducted in Mozambique revealed that 71.1% of children had a complete vaccination status. The reasons determined for missed opportunities for vaccinations were due to caregivers forgetting which days vaccinations were taking place, no vaccinations being available and difficulties in getting to health facilities. (Jani et al., 2008) A study conducted in Kenya, revealed a vaccination coverage of over 80% and reasons for missed for missed opportunities were due to no stock of vaccinations, vaccinations weren't scheduled on the day of the day of clinic visits and children were either sick or too ill to receive a vaccination. (Borus, 2004)

Although this study found that over 90% of children received their age-appropriate vaccinations, the Expanded Program on Immunization (EPI) still faces a number of challenges in South Africa. This includes poor coverage of vaccinations in some regions, as well as poor knowledge in communities on the purpose and value of the immunization program. (Wiysonge et al., 2012) More challenges facing South Africa in successfully implementing EPI relate to poor knowledge by healthcare workers on immunizations in general as well as inadequate stock of vaccinations due to financial constraints and staff shortages. (Jonker & Stellenberg, 2014)

The NDoH endorsed the implementation of Vitamin A supplementation for all children under the age of 6. (Hendricks et al., 2007) Vitamin A supplementation decreases vulnerability to a multitude of illnesses which includes diarrhoea, measles, and respiratory infections. It plays a major role in reducing mortality in children under the age of 5. (Mayo-Wilson et al., 2011) The study found that the Vitamin A section was completed for the majority of children at 83.3% which corresponds with a similar study done by Blaauw et al. (2017) The completion rate of Vitamin A was higher than the National coverage rate of 74%. (Saitowitz et al., 2001) However, a study done by Jonker et al. found that 3 out of 4 children did not receive Vitamin A supplementation according to their age. (Jonker & Stellenberg, 2014) While a study by Win et al. found the Vitamin A section completed at 65% of the time. (Win & Mlambo, 2020) A study conducted in Ethiopia found that Vitamin A supplementation did not reach over 50% of preschool age children and concluded that higher education levels of caregivers was an important associated factor in children receiving Vitamin A capsules. (Semba et al., 2008) A study conducted in Niger found that over 80% of children received twice annually Vitamin A supplementation due to national micronutrient campaigns. (Aguayo et al., 2005) Studies by Du Plessis et al. (2007) and Hendricks et al. (2007) revealed that few caregivers actually knew why their children received Vitamin A. If caregivers had a more comprehensive understanding of the benefits

of these nutrition services provided by clinics, they would be more likely to utilize them. It may also result in caregivers demanding a better quality of service and reduce the number of missed opportunities for Vitamin A supplementation. (Blaauw et al., 2017)

Children around the world are targeted for regular deworming as they are disproportionately affected by soil transmitted helminths (STH). STH infections can result in impaired child growth as well as impaired cognitive development. (Errea et al., 2019) This study found that deworming was also frequently recorded at 77.1% of the time but still less than that of the Vitamin A even though both share similar schedules. Studies done by Win et al. (2020) and Blaauw et al. (2017) found that deworming sessions were only completed 50% of the time. According to Win et al., this may be due to clinics not having sufficient stock of the deworming medication mebendazole. (Win & Mlambo, 2020) A study conducted in Nigeria found that only 44.8% of children were dewormed at 3-month intervals and concluded that more active health promotion programmes were required to improve deworming compliance. While a study in Kenya revealed a 70% success rate of over 5 million children targeted for phased deworming. (WHO, 2009c) Missing opportunities to dispense disease preventing drugs such as Vitamin A and mebendazole directly contributes to high incidence of child mortality and morbidity. (Jonker & Stellenberg, 2014)

Few studies have looked at the barriers affecting the proper utilization of the Rth system and a number of challenges have been uncovered. Schoeman et al. (2010) highlighted shortcomings in the lack of training in PHC nurses, lack of supervision and nutrition monitoring, as well as inconsistent GMP practices. Tarwa et al. (2007) found that healthcare workers seldom plotted a child's weight at consultation and often did ask for the RthC. There is a lack of understanding and interpreting the growth indices. (Kitenge & Govender, 2013) Also, healthcare workers are understaffed, overwhelmed and do not have the time or motivation to record all relevant information. (Win & Mlambo, 2020) This would mean that healthcare workers require constant training in order to improve implementation of health promotion and Rth booklet. (Du Plessis et al., 2017)

All four study areas included in the study had a clinic located in the surrounding areas which was utilised by the respondents. Due to the close proximity of clinics to the respondents, 82.8% chose to walk to the clinic while 13.2% took a taxi. A study conducted by (Govender et al., 2011b) found that 60% chose to walk to clinics while 39% used a taxi. However, 88% of respondents indicated that most times they were unable to afford to pay for travel to a clinic.

When respondents' experiences of clinic visits were assessed, 59.2% indicated they were satisfied with services provided at clinics. This does differ from a study by (Govender et al., 2011b) which found that 71% of households were dissatisfied with services provided by clinics. In this study,

37.6% of respondents indicated they had to wait long for someone to help them. Only 6.8% experienced no stock of immunizations when going to clinics, while 14% indicated the clinic did not provide them with medication for a sick child. Only 17.6% respondents rated the service of their local clinic as poor. Six percent of respondents thought clinics were understaffed, and 2% indicated they got sent home when clinics were too full. A poor opinion of quality of care provided by clinics may lead to poor utilization of these services in communities.(Haddad et al., 1998) However, 98% of respondents indicated private health facilities provided better services.

Objective 4 An assessment of the same attributes and health needs as in Objectives 2 and 3 of those children without a Road-to-Health booklet in order to identify where these lapses in primary care were most likely to occur.

From Table 4.10, of the 278 RtH cards/booklets examined, 33 of these cards were lost or missing as indicated by caregivers in this study. This equates almost 1 in 8 children not having a RtH card/booklet in their possession which serves as a vital record of a child's medical history as well as growth and development milestones.(Western Cape Government, 2018) When a child is not in possession of such a valuable health record tracking these milestones when taking into context the adverse conditions these children are living in, they have little chance of overcoming these challenges they face. Responsibility of safeguarding this RtH card/booklet lies with caregivers, however they need to be made aware of the importance of this health record at all clinic visits so that they are taking proper measures in protecting it. Growth monitoring without adequately educating caregivers and healthcare workers on the importance of this document is futile.(Griffiths, 1988) When information is communicated with caregivers regarding the health of their child it encourages them to play a larger role in the management of their child's health as well as informs them of when to be concerned about their growth and development.(Harrison et al., 2005)

Few studies have looked at where these lapses in the primary healthcare have taken place with regard to explaining to caregivers why the card is important and what purpose it serves. A study conducted by (Harrison et al., 1998) revealed that only 60% of mothers received an explanation of the card when issued while 73% received explanations at subsequent clinic visits. The study also revealed that was general lack of understanding the different aspects of the RtHC. A Study conducted by Blaauw et al. only 32% of caregivers had all the sections of RtHB explained to them while 30.9% of caregivers indicated that they had information explained to them.(Blaauw et al., 2017) The study determined the barriers affecting caregiver knowledge of the RtHB were lack of training opportunities, staff shortages and insufficient time to complete tasks on the part of healthcare workers. While language barriers in explaining the RtHB as well as failure to present the RtHB by caregivers were preventing caregivers from receiving more information on the RtHB. While a study

conducted by Tarwa et al. uncovered that a large proportion of caregivers did not bring their child's RtHC to clinic and hospital visits as healthcare workers seldomly asked to see it at consultations.(Tarwa & De Villiers, 2007) The study recommended that for the RtHC to be utilized as an effective tool in improving child health, that time be allotted for educating caregivers on the benefits and importance of the RtHC and bringing it to all child health visits as well as other issues such as diet, immunizations, and family planning. For the RtH card/booklet to be a success as a preventative and promotive tool in the monitoring of child health, knowledge, dedication, and co-operation between caregivers must be improved. If the RtH card/booklet is requested at all child health visits, caregivers are more likely to understand its importance as a tool in monitoring the health of their child.(Tarwa & De Villiers, 2007)

Therefore, caregivers are more likely to take more care the RtH card/booklet and store it in a safe place to prevent damage or loss.

Objective 5 An assessment of the differences in how information is recorded on the RtH booklet at different Health facilities.

This objective was initially devised in order to determine how some health facilities fared in comparison to others when recording information on the RtH system. If a health facility was shown to fare better than others, the aim was to ascertain why and how there was a difference in the quality of information recorded. However, in practice, this objective proved to be extremely challenging to achieve, since over the course their lives, many children included in this study visited different health facilities. The official channels to obtain permission to speak to healthcare workers at the clinics in these study areas proved to be too difficult to navigate and therefore this route of gathering data had to be abandoned.

Chapter 6

Conclusions

Objective 1 - This study revealed many of the challenges faced by children in their home environments that could potentially have devastating effects on their long-term growth and development. From poor caregiver education levels, unemployment, low household income levels, food insecurity as well as unsanitary living conditions. These challenges underscore the importance of a properly functioning RtH system that could timeously diagnose any children with growth faltering so that healthcare workers can advise and educate caregivers on what specific measures needs to be taken to improve the health of children in their care.

Objective 2 - This study was unable to meet objective 2 as the anthropometric measurements of children under the age was not deemed accurate enough to be included in the study. Anthropometry of these children was difficult to obtain accurately in these home environments due to a number of reasons. The study occurred in the winter months, and it was not possible to obtain accurate weight measurements without asking children in the study to remove all clothes. Many caregivers would be suspicious of requests for their children to remove most of their clothing and would not co-operate to having their measurements taken. Without a standardised calibrated scale as well height measurement device it was not possible to accurately record their anthropometry.

Objective 3 - This study revealed that with the exception of components that previously existed on the RtHC (namely: weight-for-age, immunizations, vitamin A and deworming), the implementation of the RtHB is extremely poor, with newer components being poorly completed. This results in the RtHB not being used for its intended purpose to identify children with growth faltering at the earliest opportunity so that caregivers are informed, and corrective measures can be taken. When considering health risks faced by children in these low-income communities, it is vital to utilize all aspects of the RtHB in order to minimize missed opportunities in diagnosing health conditions to ensure that children not only survive but thrive.

Objective 4 - Further attention needs to be placed on children with lost or missing RtHB, as it serves as a crucial safety net for children in these communities. This study revealed that 1 in 8 children did not have a RtH card/booklet, when looking at the broader picture of South Africa where majority of children grow up in adverse conditions, unless we ensure that all children are in possession of an RtHB and it is utilized to its fullest potential, they have no chance of overcoming the challenges they face. This will result in a perpetual cycle of poor developmental outcomes (physical and mental health). The first few years of a child's life are where risks they are exposed to have the likelihood to inflict the most harm. The RtHB provides an opportunity for early preventative and promotive health interventions that can benefit all children in their most vulnerable years.

Objective 5 – This study was unable to meet this objective as many children included in this study visited different health facilities and receiving permission to speak to health workers at these clinics proved to be too difficult to achieve and therefore had to be abandoned.

Overall conclusion - For the RtH system to be the major strategy to track growth and development, health needs and health status of young children, it is vital to utilize and implement all of aspects of the RtH booklet in order to alert healthcare workers of children with particular health issues so that immediate corrective can be taken in order to improve their health outcomes. However, this cannot be achieved without providing adequate training to healthcare workers. If adequate implementation of the RtH system is not achieved, children with health issues cannot be identified, diagnosed, and treated. Furthermore, also educating caregivers on the importance RtH booklet at all clinic visits may increase uptake of child health services available to them.

The information that could potentially be collected by a properly functioning RtH system can be of immense value for health planning. At present this opportunity is lost due to the poor information available from the RtH system.

Limitations of the study

The findings of this particular study cannot be generalised or extrapolated to the rest of the country as a relatively small geographical area and sample size was used in conducting it due to time and cost constraints. The study was also limited to lower income areas in the City of Cape Town and results obtained from this study may differ when conducted in other middle to higher income areas of South Africa. Therefore, conclusions drawn from this study may not reflect what is happening nationwide and it is recommend that study be conducted nationally. It did however identify some operational and structural deficiencies in the RtH system that underscores the need to repeat this research on a much bigger geographical scale. That will be an undertaking for the health services to plan and execute.

Conducting structured interviews through a questionnaire can result in recall bias as caregivers may not have recalled all information relating to themselves, their household, or child in their care at the time of the interview. Due to the personal nature of questions posed to the caregivers in this study may have also exposed the study to social desirability biases. This can result in caregivers under reporting socially undesirable attitudes or behaviours as well over reporting behaviours that are deemed more acceptable socially.

Recommendations emanating from the study

The present system

URGENT - Improving the quality and frequency of the training of primary health care staff in the present system and organizing a proper oversight mechanism to ensure that all aspects of the RtH booklet is understood and utilized to its fullest potential.

Governance and leadership

Good governance is key towards effectively implementing the RtH system. A strong system of governance and appropriate mechanisms of accountability in Primary Healthcare facilities can enhance healthcare worker performance. When healthcare workers are not held accountable for poor performance or neglecting to complete sections of the RtHB, they will not be motivated to continue implementing the RtHB. Only with proper oversight and regular supervision of growth monitoring procedures, immunizations, vitamin A and deworming etc. can quality of services provided be improved.

Capacity Building

To ensure that Primary Healthcare facilities provide safe and high-quality services, a sufficient number of well-trained healthcare workers are required. This would ensure that there are adequate numbers of healthcare workers on each shift at health facilities to manage all tasks assigned without the danger of overloading, whereby specific aspects of the RtHB are omitted due to time constraints. A larger contingent of well-trained primary healthcare workers with sufficient oversight over the quality and completeness of implementing the system could ensure they are addressed.

Digital health technology integration

Development of digital health technologies that would allow healthcare workers to provide better services. An electronic Road to Health record could allow healthcare workers to improve efficiency and accuracy of anthropometric measurements of children by removing responsibility of determining whether a child's growth is faltering or not. After weight-for-age, length-for-age, mid-upper arm circumference etc. measurements are taken, healthcare workers would be able to input measurements into a software programme that could plot and interpret growth curves for them. Any changes in the growth patterns of a child would be red-flagged and healthcare workers would be

informed instantly, this would allow healthcare workers to immediately advise caregivers of specific corrective action to be taken in order to improve the health of the child.

In the case of immunization records, when a caregiver loses or misplaces the Road-to-Health booklet and presents a child at a health facility where an existing medical record is not available an electronic vaccination system would allow healthcare workers to immediately access a child's vaccination record and determine which immunization they require. Also, a national electronic database for vaccinations will provide the National Department of Health with an accurate reflection of immunization coverage in the country which would allow them to monitor and improve vaccination strategies.

Community Involvement

Involving communities in education and health promotion activities on a regular basis to empower people to have an active role in safeguarding their health. Trained community health volunteers from their respective communities will be able to educate caregivers (in their home language) on a range of topics. These topics include the value of the RtHB, the importance of immunizations, proper nutrition for growth, importance of regular clinic visits and which services are available, proper hygiene and sanitation practices as well as warning signs of childhood illnesses and what appropriate measures to take.

Wider use of the data

Gathering the RtH data electronically can provide a valuable data source, not only for health monitoring and planning purposes, but also for Statistics SA to incorporate into the databases comprising the national statistics. The input from this function of government is often overlooked and this will contribute a lot of information of households with young children to the national information services.

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Addenda

Appendix A: Participant Information Leaflet and Consent Form

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT:

A community based survey in Kuils River of the information contained in the Road-to-Health booklet of children under 5 and some actual health status indicators.

REFERENCE NUMBER: S13/03/048

PRINCIPAL INVESTIGATOR: Lance George, MSc Candidate, Division of Community Health, Department of Interdisciplinary Health Sciences, Faculty of Health Science, Tygerberg Campus, Stellenbosch University.

ADDRESS:

CONTACT NUMBER:

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff or doctor any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

The reason for us doing the study is to investigate the existence of a Road-to-Health booklet for the child and the information contained therein as well as actual reported health status indicators. This study will provide an assessment of how well the RtH booklet is working in prevention of infectious diseases and improving child health. This study will take place in the Kuils River municipal area and the surrounding settlements Kalkfontein, Wesbank, Blackheath and Eersteriver. A total of at least 50 children under the age of 5

years and caregiver will be randomly selected to take part in the study in your area. Overall a total of 250 children and caregivers will be selected in all the study areas.

Firstly, we will ask you questions about you, the caregiver and your home. Questions will include what your role is in the household as well as employment and educational status of you and your family members. For this part of the survey we will also take a look around your home whereby we will look at your toilet, bathing and kitchen facilities as well as your general living conditions. Questions asked here will be on hygiene and your living environment. You may accompany us during this part of the survey.

Secondly, we will ask you some questions about the health of the child and of your family. During this part of the survey measurements will be taken by the investigator of the child in your care which includes weight, height, and upper arm circumference of the child. These surveys will be done for your home alone. The interview process will take on average 30 minutes and will not exceed 45minutes. We will not be taking down any names of you and your family in the interview. This is done so that no one will be able to identify from whom the information was obtained and who is sick or who became ill in your home. This consent form will not be attached to your answer sheet, so that again no one will be able to find out that this information was provided by you. Once you have completed this consent form, this form will be placed in a sealed box together with all the other forms from your community, for safety purposes.

You can contact Dr XXX at 000-0000000 if you have any questions or problems or would like to know the results of this study. You may also contact the Committee for Human Research at Stellenbosch University at 021-938 9207 if you have any concerns or complaints. You will receive a copy of this information and consent form for your own records.

Why have you been invited to participate?

You have been invited to participate because you are the parent/caregiver of a child under the age of 5. Also the selection was done randomly so that the information we gather is a fair representation of your community. We want to investigate the health status of the child and your family and the living conditions in and around your environment.

What will your responsibilities be?

To please answer the questions as best you can. Also, to give permission so that measurements (height, weight, upper arm circumference) can be taken of the child in your care.

Will you benefit from taking part in this research?

The results from this study will be summarised and provided to the local, provincial and national government in order to improve planning for health and housing. The results will help us understand the needs of your community and environment.

Are there in risks involved in your taking part in this research?

There are no risks involved in taking part in the study. And we assure you of your anonymity.

If you do not agree to take part, what alternatives do you have?

You have a right to not take part or stop the interview; and there will be no implications if this is your decision.

Who will have access to your medical records?

All information collected will be treated as confidential and protected it will be summarised and provided to the local, provincial and national government in order to improve planning for health and housing. If it is used in a publication or thesis, the identity of participants will remain anonymous.

What will happen in the unlikely event of some form injury occurring as a direct result of your taking part in this research study?

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to take part in the study and there will be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

- You can contact Dr XXXX at 000-0000000 if you have any further queries or encounter any problems.
- You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your study investigator.
- You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I agree to take part in a research study entitled: A community based survey in Kuils River of the information contained in the Road-to-Health booklet of children under 5 and some actual health status indicators.

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) on (*date*)

.....
Signature of participant

.....
Signature of witness

Declaration by participant

By signing below, I agree to take part in a research study entitled: A community based survey in Kuils River of the information contained in the Road-to-Health booklet of children under 5 and some actual health status indicators.

I declare that:

- I have given permission to take measurements (eg. height, weight) of the child in my care.

Signed at (*place*) on (*date*)

.....
Signature of participant

.....
Signature of witness

Declaration by participant

By signing below, I agree to take part in a research study entitled: A community based survey in Kuils River of the information contained in the Road-to-Health booklet of children under 5 and some actual health status indicators.

I declare that:

- I have given permission to take and use pictures of my home and family members for publication purposes.

Signed at (place) on (date)

.....
Signature of participant

.....
Signature of witness

Declaration by investigator

I (*name*) declare that:

- I explained the information in this document to
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*)

Signed at (*place*) on (*date*) 2005.

.....
Signature of investigator

.....
Signature of witness

Declaration by interpreter

I (*name*) declare that:

- I assisted the investigator (*name*) to explain the information in this document to (*name of participant*) using the language medium of Afrikaans/Xhosa.
- We encouraged him/her to ask questions and took adequate time to answer them.
- I conveyed a factually correct version of what was related to me.
- I am satisfied that the participant fully understands the content of this informed consent document and has had all his/her question satisfactorily answered.

Signed at (*place*) on (*date*)

.....
Signature of interpreter

.....
Signature of witness

Appendix B: Health Evaluation Questionnaire**Health Evaluation Questionnaire - Structured Interview**

Good day Sir / Madam

My name is Lance George. You are invited to take part in a research project carried out by the Medical Faculty of the University of Stellenbosch. We are going to be studying your child's "Road to Health" booklet and actual health status. Note that your participation in the study is voluntary and you may opt to leave the interview at any time. All answers and comments will be kept highly confidential. We will not record your name and we promise that no information you give us will be attached to you or anyone living in your home. Please do not hesitate to ask any questions that you may have with this study.

Section 1: Biographical Details

1.1 Please provide us with the following information, so that we can learn more about your family.

Code of Person	Role in Household	Age	Sex		Status of individual	Educational Status:
			Male	Female		
					U – Unemployed F – Full time employed P – Part time employed IRR – Irregular employment S – Scholar C – Child at home A – Adult at home	A – No schooling B – Pre-primary to grade 4 C – Grade 5 to grade 7 D – Grade 8 to grade 10 E – Grade 11 to grade 12 F – Tertiary level U – Unsure
A1						
A2						
A3						
A4						
A5						
A6						

1.2 Are members of the household?

Mark the person's choice (✓)

South African Citizens	Yes	
	No	
If no, what is your country of citizenship		

And for how long have you lived in South Africa	
And for how long have you lived in this residence	

Section 2: Disease and health services

2.1 During the past two weeks, are there symptoms that affected you or persons living in your house?

Symptom	Code of person / persons with symptom										Home treatment (✓)	Visited clinic / Doctor (✓)
Diarrhoea												
Fever												
Nausea												
Vomiting												
Cramps / Abdominal pain												
Blood in stools or vomit												
Worms in faeces												
Body / hand sores												
Eye infection												
Coughing												
Shortness of breath												
Tiredness & weakness of body												
Coughing blood												
Loss of appetite & weight												
Night sweats												
Headaches												
Nits / Lice												
Yellow looking skin												
White of eyes are yellow												
Itchy skin												
Coughing for more than 1 week												
Other:												

2.2 Have any children under 5 visited the clinic and/or doctor in the past two months and been diagnosed with an illness/disease?

Code of the person	Illness/disease	Medication name	Is the illness cured? (Y/N)	Have you or any member in your household suffered from the illness before? (Y/N)

2.3 Are any children under 5 on chronic medication?

Mark the person's choice (✓)

Yes	
No	
If yes, specify for what illness	
Medication name	
Issued by which clinic	

*** Note to interviewer: If the answer is yes, ask to see the medication.

2.4 Do any children under 5 in the household suffer from the following diseases at the moment?
(Optional- Answer is Voluntary)

Mark the person's choice (✓)

	Yes	No	Unsure
TB			
HIV/AIDS			

2.5 What are some of the other health problems facing your household?

1.	2.	3.
4.	5.	6.

2.6 Do members of the household take part in using the following substances?

Mark the person's choice (✓)

	Cigarettes	Alcohol	Drugs
Yes			
No			
Unsure			

2.7 What is the name of the clinic that members of your household visit when ill?

2.8 How do you get to the clinic?

Mark the person's choice (✓)

Walk	
Taxi	
Bus	
Private transport	
Other, specify:	

2.9 What is distance to clinic and how long does it take?

2.10 What does a return trip to the clinic cost (if you need to pay)? R _____, _____

2.11 Has there ever been a time when you or a family member needed to visit the clinic, but did not have the money to pay for transport?

Mark the person's choice (✓)

Yes	
No	

Unsure	
--------	--

2.12 Are you satisfied with the services provided by the clinic?

Mark the person's choice (✓)

Yes	
No	
Unsure	

2.13 Do you think that private health facilities provide better services than your clinic?

Mark the person's choice (✓)

Yes	
No	
Unsure	

2.14 Have you or members of your household ever called for an ambulance?

Mark the person's choice (✓)

Yes	
No	
Unsure	

2.15 Usually, how many meals does your family eat per day?

Ring the person's choice 1 2 3 4 5

Section 3: Hygiene and the environment

3.1 Do you think that you can get sick from the following?

Mark the person's choice (✓)

Using a dirty toilet	Yes	No	Unsure
An unclean home	Yes	No	Unsure
Dirt and rubbish in your yard or the street	Yes	No	Unsure
Drinking dirty water	Yes	No	Unsure
Drinking water from rivers and streams	Yes	No	Unsure

3.2 Is it difficult to keep your home clean?

Mark the person's choice (✓)

Yes	
No	
Unsure	

3.3 Have you or any member of your household been a victim of crime in the past six months?

Mark the person's choice (✓)

Yes	
No	

Unsure	
--------	--

3.4 Are there safe places to play for the children in your household?

Mark the person's choice (✓)

Yes	
No	
Unsure	

Notes:

Thank you for taking the time to answer our questions. Again, any information provided by you during the interview will be kept confidential. Your participation in the study is highly appreciated.

Date of interview:	
Time of interview:	

Appendix C: Housing Evaluation Questionnaire and Anthropometric measurements**Housing Evaluation Questionnaire**

My name is Lance George. You are invited to take part in a research project carried out by the Medical Faculty of the University of Stellenbosch. We are studying your health and home. Please note that your participation in the study is voluntary. All answers and comments will be kept highly confidential. We would appreciate it if you could allow us to ask you some questions about your home and have a look at the structure of your house. We will not need your name and we promise that no information you give us will be attached to you or anyone living in your home. Please do not hesitate to ask any questions that you may have regarding this study.

Section 1: Household information

1.1 What is the total income of the household living in the dwelling per month? Answer optional

Mark the correct one (✓)

Less than R600 per month	
R600 to R1 200 per month	
R1200 to R2500 per month	
More than R2500 per month	
Unsure	

1.2 Do you (or somebody in your home) receive a social grant?

Mark the correct one (✓)

Yes	
No	
Unsure	

1.3 If yes, what grant(s)?

Mark the correct one (✓)

Pension	
Child Grant	
Disabled Grant	

1.4 Did you take this into account when you stated the monthly income?

Mark the correct one (✓)

Yes	
No	

1.5 Do you pay for water to drink and clean your home? If yes, who do you pay?

Mark the correct one (✓)	Yes	No	Unsure	Recipient of payment:
Drink				

Clean your home				
-----------------	--	--	--	--

1.6 Do you pay for electricity? If yes, who do you pay?

Mark the correct one (✓)

Yes		Recipient of payment:
No		
Unsure		

Section 2: Toilet facilities

2.1 Where is the toilet for the persons living in this house?

Mark the correct one (✓)

	Primary	Secondary
Toilet inside the house		
Toilet outside the house, but on the same property		
Communal toilet away from the dwelling		
No toilet available within easy walking distance		
If no toilet is available, what do the inhabitants use?		

2.2 What sort of toilet is it?

Mark the correct one (✓)

Flush toilet	
Longdrop (pit latrine)	
Bucket system	
Other, specify:	

2.3 Does your toilet break or is it blocked often?

Mark the correct one (✓)

Yes	
No	
Unsure	
Not applicable	

2.4 Where do the members of the household dispose of soiled products, e.g. sewage, soiled nappies?

Please mark ✓=Yes, X=No

In the street		Outside bin	
Into the storm water drain		If other, specify:	
Rubbish skip			

2.5 If the toilet is away from the dwelling, how far do the inhabitants have to walk to get to the toilet?

Distance: paces

2.6 Do you know who to contact if there is a drain blocked or overflowing? If yes, specify.

Mark the correct one (✓)

Yes	
No	
Unsure	

2.7 Who would you tell if there is a drain blocked and overflowing?

1.	2.
----	----

2.8 What will happen if rubbish is thrown into the toilet?

Mark the correct one (✓)

Nothing	
It will block the toilet and the pipes	
Don't know	

2.9 Can you get sick from not washing your hands after you used the toilet?

Mark the correct one (✓)

Yes	
No	
Unsure	

2.10 How often is your toilet cleaned?

Mark the correct one (✓)

Once a day	
Twice a week	
Once a week	
Sometimes	
Unsure	

2.11 What are the cleaning materials used to clean the toilet?

Please mark ✓=Yes, X=No

Disinfectant	
Soap	
Detergent	
Toilet brush	
Cloth	

2.12 Do you pay to use the toilet?

Mark the correct one (✓)

Yes	
No	
Unsure	

Section 3: Washing and other water use

3.1 Is there a working tap available?

Mark the correct one (✓)

Inside the house	
On the property	
Nearby (not on property)	

3.2 Are there facilities nearby to wash hands after using the toilet?

Mark the correct one (✓)

Yes	
No	
Unsure	

3.3 Do you oversee the children washing their hands when they have used the toilet?

Please mark ✓=Yes, X=No

Always	
Sometimes	
Never	

3.4 Where do the persons living in the house wash themselves?

3.5 What happens to the wash water?

Thank you for taking the time to answer our questions. Again, any information provided by yourself during the interview will be kept confidential. Your participation in the study is highly appreciated.

Date of interview:	
Time of interview:	

Checklist

Survey Number:						
		Ring the appropriate answer			Comments	
		Main dwelling	Shack in backyard	Other		
1	Type of dwelling					
2	Is the house neatly maintained?	Poor	Fair	Good		
3	Are the outside walls of the home painted?	Yes	No			
4	Are the inside walls of the home painted?	Yes	No			
5	Are there cracks on the wall?	Yes	No			
6	Does the house have electricity?	Yes	No			
7	Is the roof of the house leaking?	Yes	No			
8	Is the door well fitted?	Yes	No			
9	Does the house have any broken windows?	Yes	No			
10	Is the bathroom clean?	Poor	Fair	Good		
11	Is the toilet in working order?	Yes	No			
12	Is the toilet leaking?	Yes	No			
13	Is the tap leaking?	Yes	No			
14	Is there toilet paper in the bathroom?	Yes	No			
15	Is there soap available in the bathroom to wash hands?	Yes	No			
16	Is there a clean towel or paper towels available in the bathroom?	Yes	No			
17	Is the drain clean?	Poor	Fair	Good		
18	Is the roof leaking?	Yes	No			
19	Are there any structural damages to the home?	Yes	No			
20	Are there any structural alterations or extensions to the home?	Yes	No			
21	What is the state of the yard outside the home?	Poor	Fair	Good		
22	Is there a bin inside the home?	Yes	No			
23	Is there a bin outside the home?	Yes	No			
24	Is there a garden outside the home?	Yes	No			
25	Is rubbish evident outside the home?	Yes	No			
26	Are there pools of water outside the home?	Yes	No			
27	Is there broken glass evident outside the home?	Yes	No			
28	Does the family own pets/animals?	Yes	No			
29	Does the home have electricity? And if yes, is it legal or illegal?	Yes	No	Legal	Illegal	
30	Is there evidence of other forms of heating/lighting?	Yes	No			
31	Does the home have an operational refrigerator?	Yes	No			
32	Does the home have an operational stove?	Yes	No			

Anthropometric Measurements

Sex	
Age	
Weight	
Height	
Upper arm circumference	

Notes

Appendix D: Ethics Approval

UNIVERSITEIT•STELLENBOSCH-UNIVERSITY
Jou kennisvennoot • your knowledge partner

Approved with Stipulations
Response to Deferral

24-Jun-2013

GEORGE, Lance Michael

Ethics Reference #: S13/03/048

Title: A community based survey in kuis River of the information contained in the Road-to- Health cards of children under 5 and some actual health status indicators

Dear Mr Lance GEORGE,

The **Response to Deferral - (New Application)** received on **29-May-2013**, was reviewed by staff members of the HREC office on **24-Jun-2013**. Please note the following information about your approved research protocol:

Protocol Approval Period: **23-Jun-2013 - 23-Jun-2014**

The Stipulations of your ethics approval are as follows:

1. With regards to the participant informed consent form:

1.1 On p2 at the end of the 2nd paragraph, please edit.

1.2 Delete the word 'anthropometric' and mention all measurements to be taken (also on next page). On p4 kindly delete the prompt - NA.

Please remember to use your **protocol number (S13/03/048)** on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:

Please note a template of the progress report is obtainable on www.sun.ac.za/ids and should be submitted to the Committee before the year has expired.

The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372

Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and De Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel: +27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and documents please visit: www.sun.ac.za/ids

If you have any questions or need further assistance, please contact the HREC office at 0219389207.

Included Documents:

APPLIC FORM

COV LETTER

CV BARNES

PROTOCOL

CHECKLIST