Medical Checks for Children

Medical Report

South Africa, KwaZulu-Natal 2016

In collaboration with

LETCEE & Kinderfonds MAMAS

August, 2016

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1.Introduction

From July 4th till July 8th 2016, a Medical Checks for Children (MCC) team visited five locations in KwaZulu-Natal, a province in the south-east of South Africa. Free of cost, the MCC team checked and treated 872 children, aged newborn until 12 years. The team consisted of Ines von Rosenstiel, paediatrician and medical mission leader; Veronique Schram, project leader and organizational mission leader; Danielle de Jongh, youth health care physician; Femke van Caulil, HR advisor; Mariette van Caulil, HR officer; Marlies Mensen, pulmonologist; Jeanine Terwindt, psychologist; Jop Jans, pediatric resident; Stephen van den Elshout, digital designer and verification engineer; Sabine Wesseldijk, legal expert at national umbudsman; Hanaâ Benjeddi, pediatric resident and Marloes Duitsman, internal medicine resident.

Our host patron during our stay was Mary James, from the LETCEE project, in partnership with the Dutch organization Kinderfonds MAMAS. This was a first exploratory mission to this region in South Africa.
Technical equipment and some of the supplies were brought from the Netherlands by the MCC team members. Most of the medication was ordered through a local pharmacy, with the help of Rajin Naidoo.

Kinderfonds MAMAS (Children's Fund MAMAS) is a Dutch charity organisation that has been co-funding dozens of high quality grassroots childcare organisations all across South Africa since 2000. Kinderfonds MAMAS believes in MAMA POWER! LETCEE works under the umbrella of Kinderfonds MAMA as a local organisation.

LETCEE is a non-profit organization that operates from Greytown, in the heart of the KwaZulu-Natal midlands. The name (Little Elephant Training Centre for Early Education) is derived from the Zulu name for Greytown eNdlovana – the place of the little elephant. LETCEE's mission is to build the confidence and capacity of adults so that they will create nurturing environments for the children in their communities.

The cooperation with LETCEE consisted of the following (amongst others):

- Identifying and engaging the local stakeholders;
- Prior announcement and preparations of the medical camp in the locations;
- Selection of locations and selection of the children;
- Giving full support to the MCC team during the medical camp;
- Commitment to ensure relevant medical follow-up.

The MCC team was delighted by the cooperation with Mary James and her husband and all the local (healthcare) workers who helped us during this intense first medical camp under the strong leadership of Kitso Maragelo.

2. Medical Checks for Children on location

During the medical checks, the children were checked following the MCC carrousel:

1. Registration of the child
2. Measuring height and weight
3. Blood test for haemoglobin
4. Physical examination
5. Giving medication and education about the correct use of it (pharmacy)
6. Education on hygiene and tooth brushing (a tooth brush was given to each child)

Data collection
Anthropometric measurements were recorded, and a finger prick sample was taken for determination of the haemoglobin (Hb) concentration. Each child was examined by a Medical Doctor. History of illnesses was recorded. Specifically, caretakers were asked if the child had diarrhea, an upper respiratory infection, vomiting, decreased appetite and/or weight loss. They were also asked if their child received treatment for any of these, and if so, from where. The data of the children are saved and analysed through the MCC database.

3. General information on the different locations

KwaZulu-Natal is located in the southeast of South-Africa, enjoying a long shoreline beside the Indian Ocean and sharing borders with three other provinces and the countries of Mozambique, Swaziland and Lesotho. Its capital is Pietermaritzburg and its largest city is Durban. It is the 2nd most populous province in South Africa with slightly less than Gauteng. 3.5 million children and adolescents live in the KwaZulu-Natal province, this is approximately 23% of all the children living in South-Africa.

The average household has 5.5 members with an income of less than 1 dollar per day per member. Unemployment in this region is high: 50-75%. The result is that the circle of poverty, abuse, malnutrition and neglect becomes even wider.

The pediatric department of the Pietermaritzburg hospital complex is responsible for children's health both in Pietermaritzburg and in the Western half of KwaZulu-Natal. Our point of reference was Grey's Hospital with contact point Dr. Govender, who was one of the valuable co-creators of this medical mission.

The medical checks were performed on five days at five different locations.

Program:
Day 1: Mpazala & Phakwe C.P. School
Day 2: Ngomep. School
Day 3: Village
Day 4: Mbongeleni Cente
Day 5: Bhambatha High School

At the different locations we checked children who were included in the LETCEE program and other children from the villages.

Location	04-07-2016	05-07-2016	06-07-2016	07-07-2016	08-07-2016	Total
Bhambatha High School	0	0	0	0	150	150
Mbongeleni Center	0	0	0	173	0	173
Mpalaza	42	0	0	0	0	42
Ngomep. School	0	252	0	0	0	252
Phakwe C.P School	136	0	0	0	0	136
Village	0	0	119	1	0	120
Total	**178**	**252**	**119**	**174**	**150**	**873**

Table 1: Number of checked children per day and geographical location

	Total	
	873	
Age	**N**	**%**
<=1 year	105	12%
>1 en <5 years	228	26%
<5 years	333	38%
>=5 en <=10 years	419	48%
>10 years	121	14%
Gender		
Boy	425	49%
Girl	448	51%

Table 2: Summary of checked children: age and gender

4. Specific diagnoses

1. Growth abnormality and malnutrition

Undernutrition has long been considered a consequence and cause of poor human health, development, and achievement throughout life. There are severe forms of malnutrition, characterized by classical clinical signs such as extreme thinness or edematous extremities and hair signs. More prevalent are the hidden forms of undernourishment that can stunt child growth and development and impair the immune system[1]. It is reported that over one-third of child deaths in South-Africa are due to undernutrition, mostly from increased severity of disease[2].

The following definitions categorize the different types of malnutrition:

- Underweight = weight for age at or under the third percentile of the reference population (WHO growth curves), only children up to 10 years old. This is an indicator of malnutrition or weight loss because of disease.
- Stunting = height for age at or under the third percentile of the reference population, (WHO growth curves) only children up to 19 years of age. This is an indicator of chronic malnutrition.
- Wasting = weight for height at or under the third percentile of the reference population (WHO growth curves), only children up to 120 cm in height. This is an indicator of acute malnutrition.

According to the UNICEF 2009 State of the World's Children report, 27% of South-African children under the age of five are stunted, 12% are underweight, and 5% are wasted. In 2011 it was reported that South-Africa is classified as one of the 36 high burden countries for child malnutrition with specific reference to a stunting prevalence of higher than 20% and 10% underweight[3].

In the area surrounding Greytown which we have visited for our medical mission, 3% of the children was classified as underweight. Ten percent of the children suffered from stunting and 4% suffered from wasting. If we look at children under five specifically (high risk group), we see that 5% of children is underweight, 15% is stunting and 7% is wasting.

Undernutrition in South African children younger than ten years old has dropped significantly since 2005 with the exception of 0-3 years. In the group aged 0-3 years, in 2012 the prevalence of stunting is 26.9% for boys an 25.9% for girls. In group aged 7-9 the percentage of stunting for boys was 10% with 8.9% for girls. This shows the vulnerability of the younger group of children.

[1] Merson, Global Health Disease Programs, Systems and Policies, page 243.
[2] UNICEF 2009 State of the World's Children report
[3] South-African National Health and Nutrition Survey SANHANES 1 study

	Total	
	873	
	N	%
Underweight	27	3%
No underweight	736	84%
Unknown	110	13%
Underweight children per age		
<=1 year	10	1%
>1 en <5 years	5	1%
<5 years	15	2%
>=5 en <=10 years	11	1%
>10 years	1	0.1%
Underweight children per gender		
Boy	15	2%
Girl	12	1%

Table 3: Prevalence of weight/age at or under P3 (underweight) by age and gender

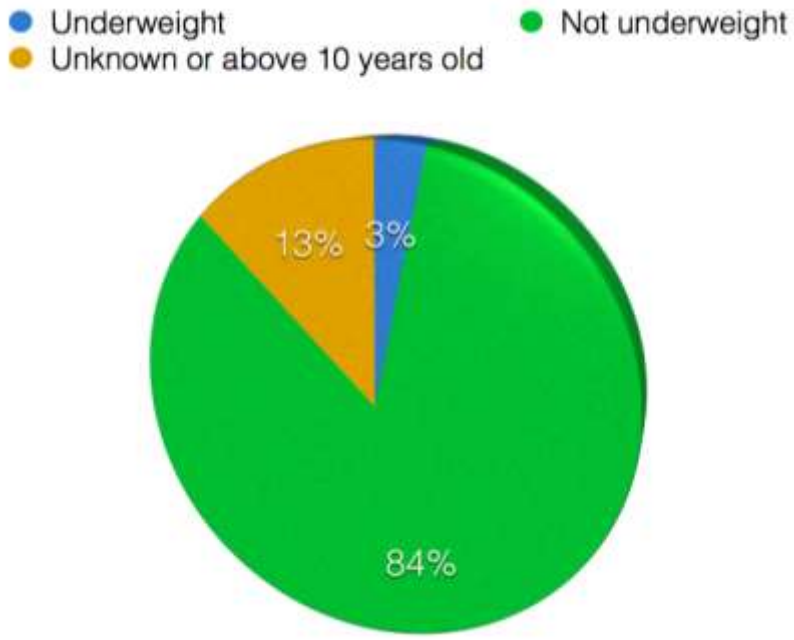


Figure 1: Prevalence of weight/age at or under P3 (underweight)
(Underweight 3%, Not Underweight 84%, Unknown 13%)

	Total	
	873	
	N	%
Stunting	85	10%
No stunting	779	89%
Unknown	9	1%
Stunting children per age		
<=1 year	19	2%
>1 en <5 years	31	4%
<5 years	50	6%
>=5 en <=10 years	18	2%
>10 years	17	2%
Stunting children per gender		
Boy	45	5%
Girl	40	5%

Table 4: Prevalence of length/age at or under P3 (stunting) by age and gender

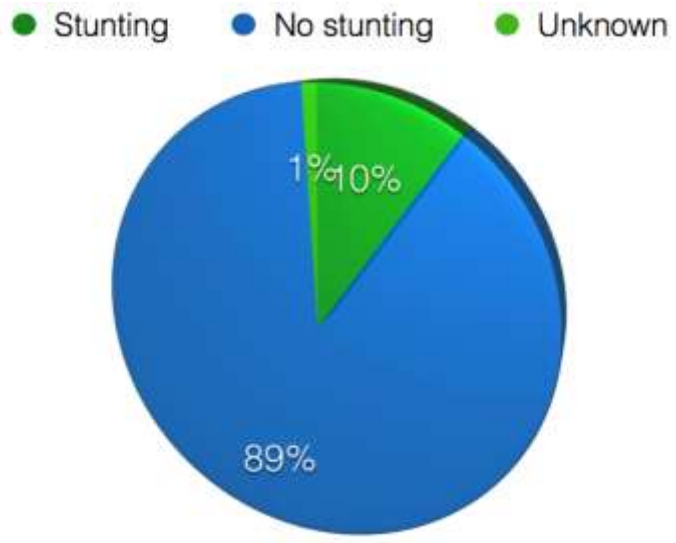


Figure 2: Prevalence of length/age at or under P3 (stunting)
(Stunting 10%, No stunting 89%, Unknown 1%)

	Total	
	873	
	N	%
Wasting	36	4%
No wasting	497	57%
Unknown	340	39%
Wasting children per age		
<=1 year	9	1%
>1 en <5 years	13	1%
<5 years	22	3%
>=5 en <=10 years	13	1%
>10 years	1	0.1%
Wasting children per gender		
Boy	13	1%
Girl	23	3%

Table 5: Prevalence of weight/length at or under P3 (wasting) by age and gender

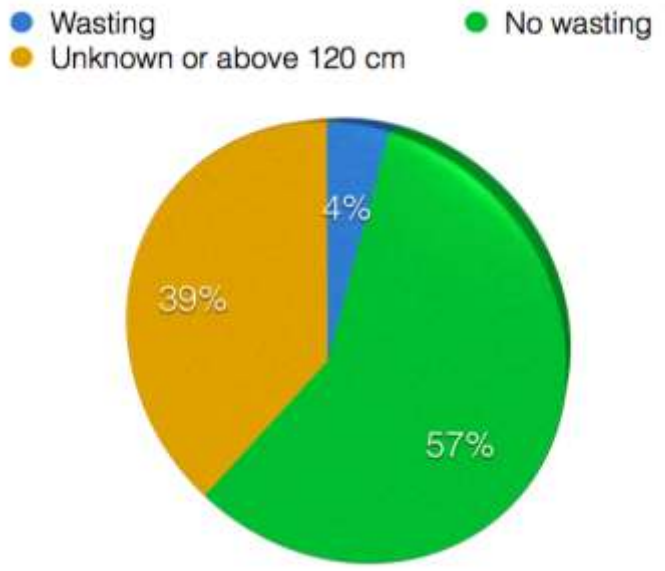


Figure 3: Prevalence of weight/length at or under P3 (wasting)
(Wasting 4%, No wasting 57%, Unknown 39%)

A large portion of the children stated during their visit to our medical camp that they only drank 1 or 2 cups of water a day. Unsafe water and inadequate sanitation and hygiene are significant

contributors to the 1.8 million deaths caused by diarrhoea every year. For children under five years of age, this burden is greater than that covered by HIV and malaria combined. Lack of water and chronic thirst in schoolchildren have negative effects on their concentration in school and on further academic achievements, often causing headaches.

Suggestions:

- MCC advises to execute the strategy to ensure appropriate nutrition during the first 1000 days of a child's life.
- MCC advises that children drink at least 4 cups of water each day. We advise LETCEE to play a counseling role for parents and children herein.

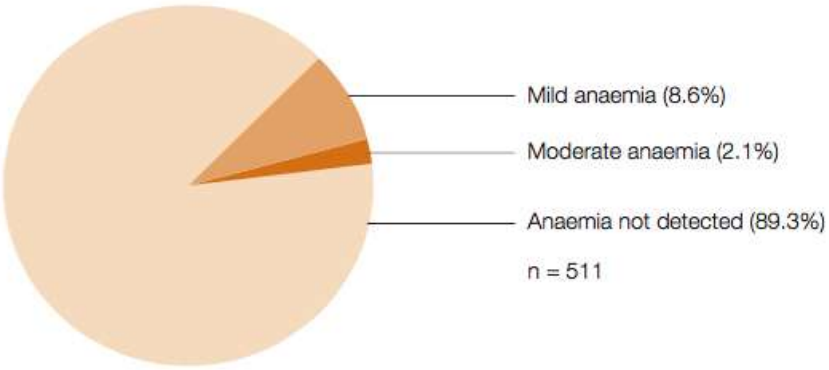
2. Anaemia

Iron is essential in the body for oxygen transportation and cellular respiration - functions that are especially critical in red cells, brain and muscle. Iron deficiency is considered the most common micronutrient deficiency in the world; anemia, characterized by abnormally low blood hemoglobin concentration, is its major clinical manifestation. In addition to iron deficiency, other micronutrient deficiencies (such as folate, vitamin B12 and vitamin A), chronic inflammation and inherited disorders of haemoglobin structure can all cause anaemia (WHO/UNICEF/UNU 2001)[4].

Iron deficiency, a common form of nutritional deficiency during childhood, results from sustained negative iron balance, which is caused by inadequate dietary intake, absorption and/or utilisation of iron, increased iron requirements during the growth period, or blood loss due to parasitic infections such as malaria, soil-transmitted helminth infestations and schistosomiasis. In later stages of iron depletion, the haemoglobin concentration decreases, resulting in anaemia.

The South African National Health and Nutrition Survey, 2012 (Sanhanes-1 study)[5] is a survey about the national health and nutritional status of the South African nation. This study states that it is estimated that 600 million preschool- and school-age children worldwide are anaemic, and it is assumed that at least half of these cases are attributable to iron deficiency (WHO/ CDC 2008). Current rates of anemia among preschool aged children in South-Africa are 24%[4]. In the South African National Health and Nutrition Survey, 2012 (Sanhanes-1 study) the prevalence of anaemia was 10.7% (children under five years of age) (see figure 4: from the Sahanes-1 study). The huge decrease is correlated to the beneficial effect of the Food Fortification Program.

[4] WHO. 2008. Worldwide Prevalence of Anemia 1993-2005: WHO Global Database on Anemia
[5] The South African National Health and Nutrition Survey, 2012 (SANHANES-1 study)



[5]

Figure 4: Anemia prevalence rates according to the Sahanes-1 study

Overall the prevalence of anemia seems to drop, although the recent publication in South-African Journal for Child Health, *Persistent and new-onset anaemia in children aged 6 - 8 years from KwaZulu-Natal Province, South Africa*, the prevalence of anemia seems to be higher. The baseline anaemia prevalence in this article was 56.9% and at follow-up the anaemia prevalence was 41.9%.

In South Africa no national policy has been implemented so far to provide iron supplements to pregnant women or young children. While iron deficiency is frequently the primary factor contributing to anaemia, it is important to recognise that the control of anaemia requires a multi-faceted approach. In addition to iron deficiency, infectious diseases such as worm infections, other chronic infections, particularly HIV-AIDS and tuberculosis, as well as other nutritional deficiencies are risk factors for anemia, and as well as side effects of ART medication in HIV positive children.

Anaemia is always multifactorial in cause. Household factors are important when considering malnutrition and anaemia. If we look at the menu provided in KwaZulu-Natal a few observations can be made:

- the diet is rich in carbohydrates (high caloric food).
- fat is added.
- the vegetables are mostly roots and cabbage, spinach being the exception.

The diagnosis anemia in all the children that were checked was made in 36% of the children. Of the children under five, 37% was anemic. Cut-off values were determined based on age and height of the place where the children lived, using the World Health Organization cut-off values for anemia. In eight children (1%) the Hb level was lower than 5.0 mmol/l marking a more sever form of anemia, and suggesting possible underlying pathologies other than iron deficiency.

Depending on the age and presence of growth abnormalities, children were given iron supplements or multivitamins for at least two months. Children with severe anemia (<5.0 mmol/l) were treated with supplementation as well as referred for further diagnostics.

In the table below percentages of anemia on the different locations are displayed.

Location	**Percentage of children with anemia**
Bhambatha High School	37%
Mbolengelni Center	42%
Mpalanza	36%
Ngomep. School	37%
Phakwe C.P. School	32%
Village	30%

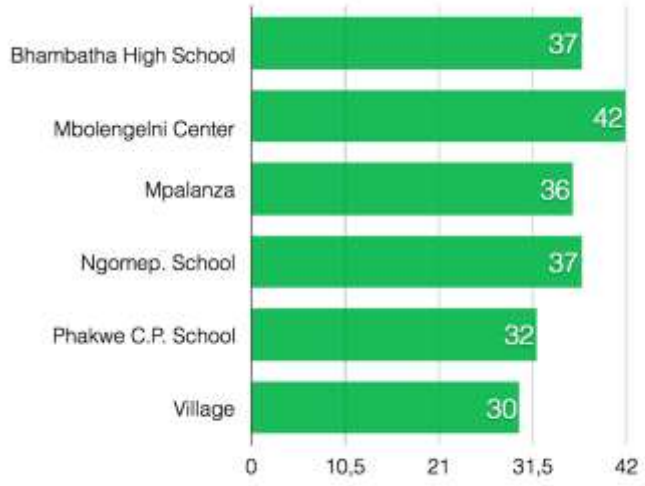


Figure 5: Percentages of anaemia

MCC complements LETCEE on providing nutritional meals on a daily basis for children in the Village.

Suggestions:

- MCC advises a diet rich in fruits and vegetables and great diversity.
- MCC supports the general guidelines: mothers known to be HIV infected should exclusively breastfeed their infants for the first 6 months of life, introducing appropriate complementary foods thereafter and continue breastfeeding for the first 12 months of life. Breastfeeding should continue until the age of 2 years and should be supported by ART adherence strategies.

3. Worm infections

Worm infections are one of the major health problems confronting millions of school-age children. These parasites consume nutrients from the children they infect, thus aggravating malnutrition and retarding physical development. They also destroy the tissues and organs in which they live. They cause abdominal pain, diarrhoea, intestinal obstruction, anaemia, ulcers and various other health problems.

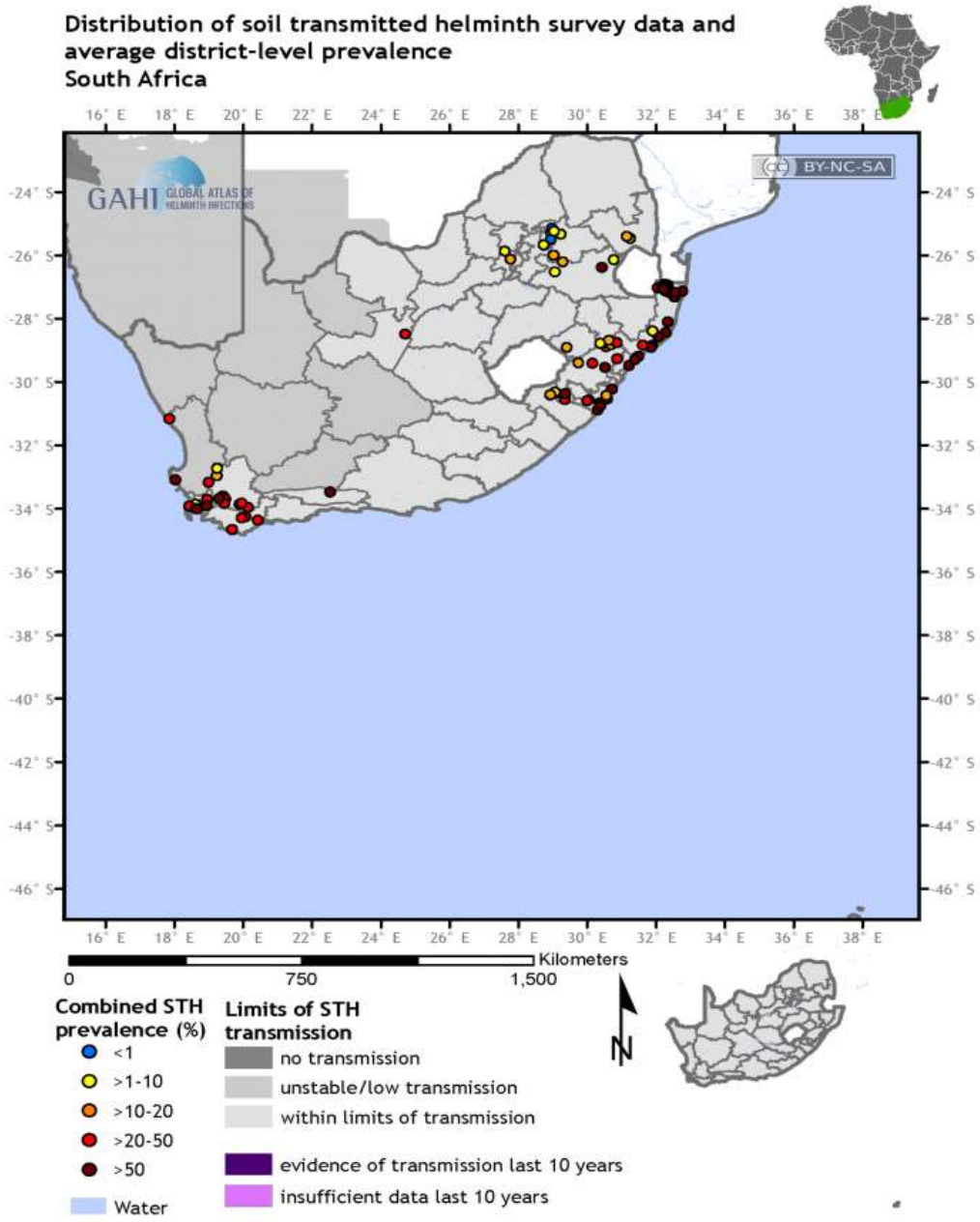
Heavy, prolonged infection adversely affects growth, development, and educational achievement, and significantly increases childhood morbidity. Parasite infections produce different manifestations according to the site, intensity and length of infection. The host response also influences the clinical course of the infection. In general, children experience the heaviest worm burden, and persistent infection is common in low- and middle-income settings.

The three main types of common intestinal worms that infect humans are large intestinal roundworm (*Ascaris lumbricoides*), hookworm *(Ancylostoma duodenale and Necator americanus*) and whipworm (*Trichuris trichuira)*[6]. The highest rates of roundworm, hookworm and whipworm infections are often in children between age 5 and 15.

In May 2001, South Africa endorsed the World Health Assembly (WHA) resolution 54.19 in which member states were urged "to sustain successful control activities in low-transmission areas in order to eliminate schistosomiasis and soil-transmitted helminth infections as a public health problem, and to give high priority to implementing or intensifying control of schistosomiasis and soil-transmitted helminth infections in areas of high transmission, while monitoring drug quality and efficacy". South-Africa Department of Health has translated this resolution into a national deworming programme, launched in 2016[7]. The department said the goal was to attain a minimum target of regular administration of deworming medication to at least 75% of school-age children and up to 100% of those at risk of morbidity. South-Africa has a program in which children are offered preventive anti-worm medication. In our group of children, only 18%, 157 of 853 children, had received anti-worm treatment in the last half year. All of the children who had not received anti-worm treatment were given one dose of mebendazol 500 mg above the age

[6] http://www.unicef.org/eapro/Prevention_of_intestinal_worm_infections.pdf
[7] http://allafrica.com/stories/201603010156.html

of five and 250 mg for the age of 2-5 years. Children with severe acute worm infections were treated with mebendazol during three consecutive days.



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[8] http://www.thiswormyworld.org

Suggestions:

- MCC advices to roll out a *community delivery strategy* of anti-worm medication delivered by trained teachers and other school personnel, twice a year one tablet of mebendazol 500 mg.

4. Respiratory problems

Acute respiratory infections comprise infections of various parts of the respiratory tract, ranging from mild viral and bacterial infections of the upper respiratory tract (e.g. common cold), to life-threatening infections of the lower respiratory tract. Lower respiratory tract infections are the cause of enormous morbidity and of mortality. Pneumonias in particular are typically one of the leading causes of death among infants and children younger than 5 years[9]. Risk factors for Acute Respiratory Infections (ARI) are poverty, crowding, lack of parental education, malnutrition, low birth weight, lack of breastfeeding.

In the areas surrounding and including Greytown, we saw that 5 out of 873 (1%) suffered from a clinically evident pneumonia. Depending on their medical history and previous treatment, they were treated with amoxicilline, another type of antibiotics or referred for a chest X-ray under the suspicion of tuberculosis. A total of 28 children (3%) suffered from upper respiratory infections (otitis media, otitis externa or tonsillitis). Three children showed dyspnea because of asthma. The amount of respiratory problems was surprisingly low.

KwaZula-Natal has the highest TB burden in the country. A number of 9691 cases of TB in children under five years were reported in 2011. TB CARE II South Africa was launched in October 2014 to support the South Africa National Department of Health (NDOH) TB prevention and control efforts, working closely with national and provincial partners to close gaps in areas identified and to further develop sustainable systems which can carry forward long-term improvements in TB and drug-resistant (DR) TB diagnosis, care, and treatment services.

5. Cardiac problems

Congenital heart disease is #8 leading cause of under-five child mortality in South-Africa[10], with the ventricular septal defect as the most prevalent type. In South-Africa, rheumatic heart disease is the leading acquired heart disease among children. It affects over 15 million people around the world and kills hundreds of thousands every year. Africa has the largest number of children with rheumatic heart disease. Acute Rheumatic Fever is caused by an untreated sore 'strep' throat, which may lead to repeated attacks affecting the joints (arthritis), skin (rash) and heart (carditis). After attacks of untreated ARF, chronic heart valve damage (RHD) may develop. In the instance of RHD, open-heart surgery is necessary to repair or replace heart valves[11].

[9] Graham, 1990 - Merson, Global Health Disease Programs, Systems and Policies, page 191.
[10] http://www.unicef.org/southafrica/SAF_publications_mrc.pdf
[11] http://www.pcssa.org/faq/

The medical carrousel included a cardiac examination. We suspected five children (1%) of having a pathological heart murmur. They all were referred to the pediatric cardiologist for an ultrasound of the heart. One child had adding symptoms fitting the diagnosis of acute rheumatic fever and was treated with antibiotics. Ten children (1%) were suspected of a physiological heart murmur and were not referred for an ultrasound.

6. HIV/AIDS

HIV is one of the biggest healthcare problems in South Africa. According to UNAIDS, 240 000 children aged 0-17 years in South-Africa are HIV infected[12]. 2 100 000 children are made orphans due to AIDS. HIV prevalence in KwaZulu-Natal is among the highest in the world; 38.7% of the population is infected. Despite this significant progress, the number of children becoming newly infected with HIV remains unacceptably high. About 150 000 children became infected with HIV in 2015, down from 490 000 in 2000[13].

We saw 2 children children who were already diagnosed HIV positive. This might underestimate the real number as we probably only coded the known cases of HIV. Three children were tested on the spot by healthcare worker from the Department of Health and turned out to be negative for HIV. She was also available for HIV counseling and support.

7. Skin disease

In respect to skin diseases we saw 46 (5%) of children with dermatomycoses, mainly tinea capitis. Tinea capitis in African countries is highly prevalent and often spread through the use of dirty razor blades when shaving the heads of the children. The presenting signs include scaling of the scalp with or without alopecia, or kerion. The ringworm of the scalp was sometimes associated with skin involvement on other areas of the body. We've treated 7 children for scabies. Antifungal cream was given for dermatomycosis and hydrocortisone crème was given for different forms of dermatitis. We encountered a broad range of different kind of wounds and skin disorders, which were treated by antibacterial creams, sometimes in combination with oral antibiotics. Eleven children had impetigo and/or furunculosis, for which overcrowding, poor personal hygiene, minor skin trauma or eczema are the main predisposing factors.

The spectrum of pediatric skin disease is diverse. According to "*Prevalence of Pediatric Skin conditions at a dermatology clinic in KwaZulu-Ntal Province over a 3 month period, July 2016*" allergic dermatitis constitutes a high burden among children in KwaZulu-Natal. Surprisingly, we did not see many children with allergic dermatitis.

8. Dental health

[12] http://www.unaids.org/en/regionscountries/countries/southafrica
[13] Children and HIV: fact sheet, UNAIDS, 2016

Of the 873 that were checked, a number of 190 children (20%) were suffering from evident caries. In this group, 54 children were suffering pain from their caries. When children were complaining about dental pain, they were referred to the dentist. Some locations that were visited had a dentist on site with a new mobile dental clinic. Aside from dentist referrals, all children were instructed on tooth brushing, as part of the broader health promotion objective, coordinated by Iris, social worker from Kinderfonds MAMAS.

Suggestions:

- MCC encourages the dental mobile clinic to regularly diagnsoe and treat children for dental healthcare.
- Upscaling health promotion concerning dental health.

9. Bilharzia

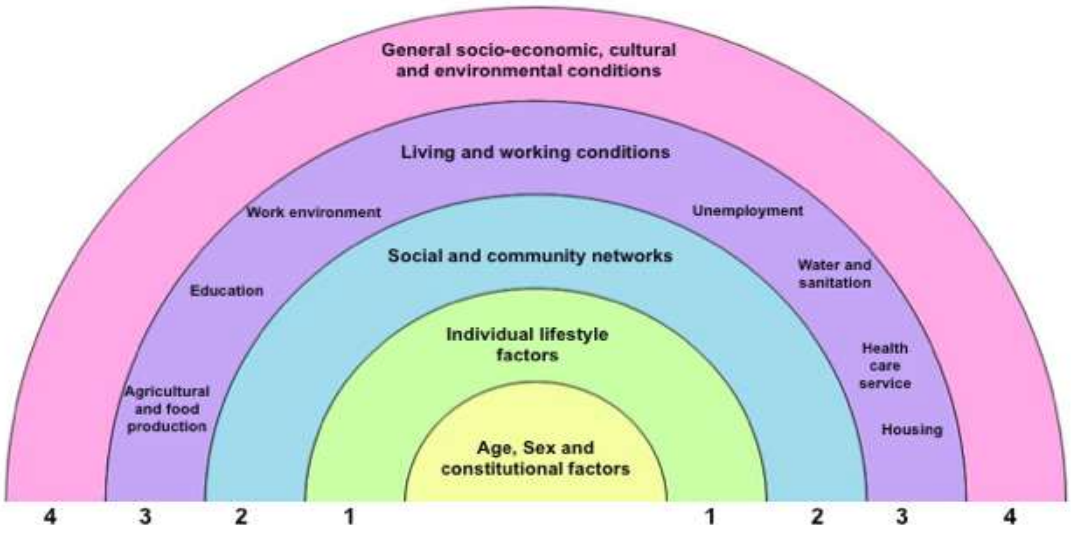
After malaria, schistosomiasis (bilharzia) is the second most prevalent tropical infection, caused by the infection of a parasitic worms. There are two forms of the disease: urinary schistosomiasis, caused by *Schistosoma haematobium*, and intestinal schistosomiasis, caused by *Schistosoma mansoni*. Failure in the supply of safe water sources and sanitation leads to continuous transmission. Lack of hygiene and certain play habits of school-aged children such as swimming or fishing in infested water make them especially vulnerable to infection[14]. Intestinal schistosomiasis can result in abdominal pain, diarrhoea and blood in the stool. The classic sign of urogenital schistosomiasis is haematuria (blood in urine). The economic and health effects of schistosomiasis are considerable and the disease disables more than it kills (infertility, anemia, stunting, learning disabilities). In South-Africa, the Schistosoma haematobium is the most prevalent, causing mainly the urogenital type of bilharzia. We surprisingly diagnosed no child with this diagnosis. We suspect that this is because of the winter season in which there is not much swimming and fishing.

10. Social health

The social determinants of health (SDH) are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. A healthy child is a child with not only a healthy body, but also a healthy and safe environment where it is loved, nourished and encouraged to grow.

[14] http://www.who.int/mediacentre/factsheets/fs115/en/

Social Determinants of Health



Dahlgren & Whitehead 1991 Policies and strategies to promote social equity in health. Stockholm: Institute of Future Studies.

The etiology, characteristics and presentation of child abuse are the product of a complex interaction of social, cultural and interpersonal factors. In the areas in and surrounding Greytown, the[15] percentage of alcohol misuse is 24%. Child rape peaks in summer month and is lowest during winter. Around half of all the girls till the age of 18 have experience sexual abuse.

A number of 8% of the children did not have a caretaker present at the day of the medical check. Six children were referred to a social worker for referral to a special school or in the case of suspicion of domestic violence, sexual abuse and/or neglect. The most concerning location in which social problems and medical problems as consequence of surroundings, was the Village. The Village are shacks or informal housing where children where children are often affected by burns and paraffin poisoning.

Thurman & Kidman[15] did a survey in 2011 about maltreatment of children in Kwa Zulu Natal. They found that 43% of the children reported some experience of being maltreated by adults.

Any Physical Maltreatment	32%
Disciplined with stick, belt, etc.	31%
Slapped, punched, hit	13%
Any Verbal Maltreatment	25%
Threatened by being called names, such as dumb or lazy	22%
Threatened to be kicked out of home	9%
Any Maltreatment	43%

[15] Thurman, T and Kidman, R (2011). *Child Maltreatment at Home: Prevalence among Orphans and Vulnerable Children in KwaZulu-Natal, South Africa.* New Orleans, Louisiana.: Tulane University School of Public Health and Tropical Medicine

During our check we came across children who were severely maltreated and abused at home. The results of the survey done by Thurman & Kidman, suggests that the percentage of maltreatment is probably much higher than we found.

In a report published in 2002, a total of 2036 children were screened. Of these children, 168 were reported with a disability. The overall confirmed prevalence rate for children with disabilities under 10 years was 6%. The most prevalent disabilities were mild perceptual or learning disability, followed by cerebral palsy, hearing loss, moderate to severe perceptual disability and seizure disorders. Very few disabled children were presented to us during our checks in and around Greytown . We did check five children with a general developmental delay. One child had cerebral palsy. Two children with autism and one child with fetal alcohol syndrome.

MCC complements the great efforts of LETCEE and local healthcare workers towards treatment and support of maltreated and (sexually) abused children.

Suggestions:

- Upscaling of human resources in addressing the social ills that plague the communities. Hiring a full time social worker for the LETCEE projects and outreach to the whole community is pivotal to enhance the quality of life of many children.
- Encouragement of parents to bring disabled children to the medical carrousel.
- Strengthening efforts in collaboration with local NGO's and national initiatives.

11. Referrals

During MCC's visit to Greytown and surrounding areas, a list was set up of children needing referral for further diagnosis and/or treatment for suspected pathologies. In collaboration with LETCEE and Dr. Govender, these referrals were organised and completed. There was a total of 50 referrals. Most children were referred for a cardiac ultrasound as a heart defect was suspected, for a repeat bloodtest, to the ENT doctor, neurologist or to the social worker. In the table below, a list is made of all referrals.

Cardiac ultrasound	7-year old girl with heart murmur
Cardiac ultrasound	4-year old boy with heart murmur
Cardiac ultrasound	5-year old boy with heart murmur
Cardiac ultrasound	7-year old boy with heart murmur
Cardiac ultrasound	10-year old boy with heart murmur
Cardiac ultrasound	10-year old girl with pathological murmur gr III/VI with thrill, no HSM, also tonsillitis/faryngitis, DDx VSD, coarctatio, cave (post) GAS infection/acute reumatic disease. Treated with amoxicillin.
Cardiac ultrasound	3,5-year old girl with pathological heart murmur, stunting.
Ultrasound testis	6-year old boy with hydrokèle right side, unclear if testis is descended. Referral for diagnosis.

ENT doctor	7-year old girl with left ear drum perforation
ENT doctor	7-year old girl with big tonsils; snoring, sleep apnea.
ENT doctor	7-year old boy with bloody noses. referral to ENT for closing nasal blood vessels. if not the cause of bloody nose, then blood test.
ENT doctor + audiometry	11-year old girl with hearing problems
ENT doctor	8-year old boy with hearing problems, referral for audiological diagnosis and treatment. Otherwise healthy.
ENT doctor	11-year old girl with deafness both sides, otherwise healthy, physical exam no abn, Hb 7.1 (anemia).
Orthopedist	4-year old girl with X-legs. Referral for management
Orthopedist	3-year old girl with extreme O-legs, otherwise healthy.
Neurologist + urologist	11 year old boy with big head circumference and incontinence. Already appoimtments in Greytown hospital. (27-7 neuro, 26-8 xray, 12-9 uro). Needs 120 Rand for each appointment for transport.
Neurologist	11-year old girl with seizures since last year, referral for EEG and treatment.
Neurologist	7-year old boy with staring at schook, mild learning problems, no PE abnormalities, HB 6.7 (anemia). Referral for EEG, DDx abcense epilepsy.
Neurologist	3-month year old boy with history of myoclonias 2/day for 2 minutes, possible post ictal. Development seems fine. Dysmorphic. Hb 4.4, stunting. Referral for EEG and further work up.
Neurologist	10-year old boy with seizurex 1/month, epilepsy?
CT-cerebrum	1.5-year old boy with macrocephalia 49 cm, standing at 1,5 years, now only able to walk a few steps, talks, no abnormalities physical examination. Hb 5,5, referral for CT scan and physiotherapy. Blood test repeat 3 months for anemia.
CT-cerebrum	-year old boy with ptosis left eye, seems to be since birth, otherwise no abnormalities in physical examination. Headache + morning vomiting ++ night sweating. DDx congenital ptosis, ICP?
Rehabilitation doctor	11-year old girl with med history of stroke for which neurosurgery. Hemiparese leg left. Post surgery scar left. Limps leg left. Referral for physicl rehabilitation.
Bloodtest repeat	8-year old boy with anemia 2.2/3.0 mmol/l. Blood test in 1 month. HIV test?
Bloodtest repeat	6-year old with anemia 3.9, scabies otherwise healthy. blood test after 3 months. No phone no. Mbongeleni Center 7/7.
Bloodtest repeat	4-year old boy with anemie 5.3, otherwise healthy, blood test after 3 months.
Bloodtest repeat	6-year old with anemia 3.9, scabies otherwise healthy. blood test after 3 months.
Bloodtest repeat	4-year old with anemia 5.6, otherwise healthy. 3 months blood repeat.
Bloodtest repeat	9-year old boy with anemia. Otherwise healthy. Herpes labialis. Hb 3.8/4.2. Treated with iron, repeat blood test 3 months.
Bloodtest repeat	10-month year old boy, very low Hb 3.2, no other abnormalities, sat 98%, stunting. Repeat blood test afte after 3 months.
Bloodtest repeat	6-year old boy with anemia 5.7, no other problems, started with multivitamins and referral for repeat blood test after 3 months.

Bloodtest repeat	8-year old girl with anemia 5.4, otherwise healthy, no other abn
Bloodtest repeat	3-year old boy with anemia and stunting. 85 cm with 16.3 kg. Otherwise healthy. Started multivitamins. Repeat blood after 3 months.
Bloodtest repeat	8-month year old boy with anemia 5,1. Sores around ears bilaterally DDx impetigo for which claritromycine. Also eczema, rash in armpits for which hydrocortison. Started with multivitamins for mother + child, repeat blood after 3 months.
Bloodtest repeat	4-year old girl with sores right arm, hand and peri oral. Hb 5.9. Signs of vitamin deficiency. Impetigo for which claritromycin. Repeat after 3 months.
Physiotherapy	1-year old boy with deformed right lowerleg deformed foot. Referral to physio for guidance movement.
Physiotherapy	11-year old girl, status after stroke.
Social worker	8-year old boy with anemia 2.2/3.0 mmol/l. Sister: 7-year old girl with UTI and suspicion sexual abuse. Referral for guiding entire family. Concerns about social family situation and potential abuse.
Social worker	9-year old girl with scar abovr right eye, black eye right side, suspician physical child abuse, mother passed away. Hb 6.6 anemia.
Social worker	4-year old girl with skin problems, infection all over body, HIV quick test negative, treated with augmentin for infection. Referral social work due to suspicion extreme neglect.
Social worker: referral special school	12-year old boy, unable to read, referral to special school.
Social worker: referral special school	4-year boy, slow development, doesn't talk, no hearing/vision problems, mother HIV +, mother passed away, HIV fast test boy negative, now sores bilateral ears/head, stunting 93 cm with 13 kg, end stage plexus brachialis lesion right side, normal grabbing movement. Treated with claritromycine for sores.
Social worker: referral special school	5--year old boy, problems with speech. Only able to speak a few words since 4-years old. Comprehends language. Hb 6.6 anemia. Referral for special development program.
Dermatologist	8-year old boy with naevus and hairgrowth.
Ophthalmologist	11-year old girl with eye problems since birth.
Dietician + X-ray	10-month year old boy with feeding problems, previously known with TBC for which treatment. Vomiting + and wrong diet. Physical exam: microcephalia 39 cm, stunting 69 cm with 7,5 kg
Clinic	1,5 year old girl obstipated with vomiting, otherwise healthy, PE no abnormalities. Referral for forlax/klysma.
Emergency (already referred)	7-year old boy with trauma 1 day ago, now not able to stand on right leg, slighty swollen lower leg, painful palpation proximal leg. Referral on 08-07 for X-ray suspected fracture.
Emergency (already referred)	11-year old boy, HIV positive, pneumonia.

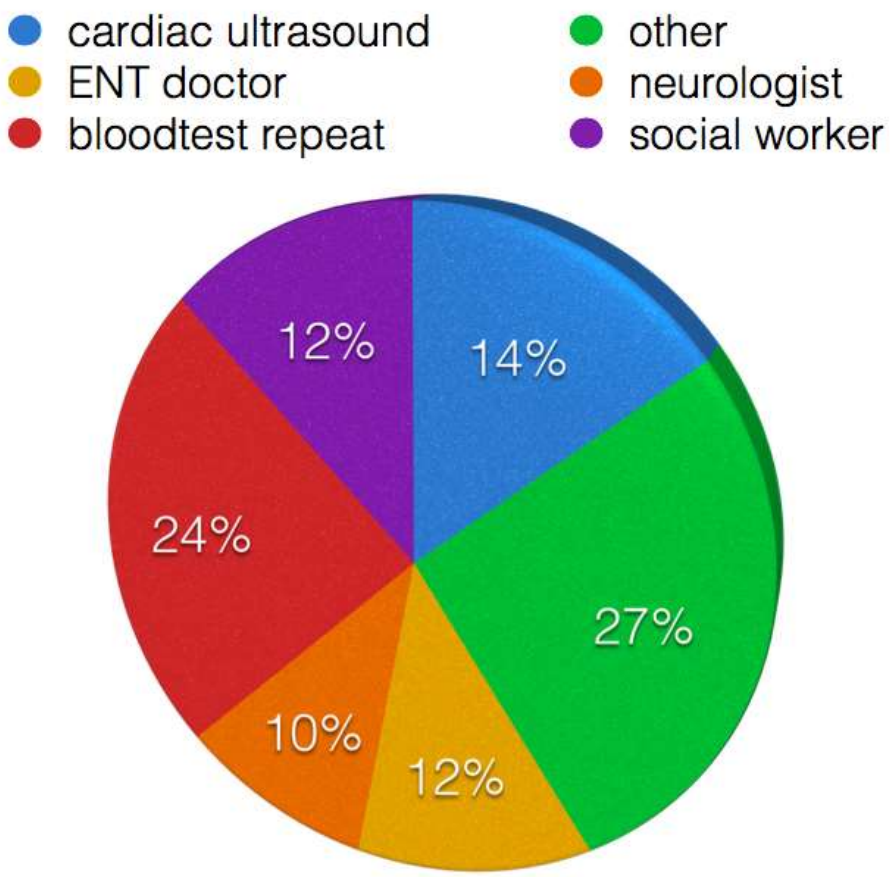


Figure 6: Percentages of referrals

5. Treatment

	Total	
	873	
	N	%
ferro	58	7%
mother iron	9	1%
multivitamins	388	44%
anti-worm	613	70%
acute worm	2	0%
anti-scabies	8	1%
niclosamide	1	0%
amoxicillin	13	1%
augmentin	2	0%
2e lijns antibiotica	10	1%
co-trimoxazol	1	0%
paracetamol	18	2%
mupirocine=Bactroban	7	1%
hydrocortisone cream	14	2%
dactarin cream	22	3%
fusidin cream	6	1%
sudo cream	1	0%
iodine	1	0%
eyedrops	2	0%

6. Summary of suggestions

Growth abnormalities and malnutrition:

- MCC advises to execute the strategy to ensure appropriate nutrition during the first 1000 days of a child's life.
- MCC stresses the importance of access to clean and sufficient drinking water. MCC advises that children drink at least 4 cups of water each day. We advise LETCEE to play a counseling role for parents and children herein.

Anemia:

- MCC advises a diet rich in fruits and vegetables and great diversity.
- MCC supports the general guidelines: mothers known to be HIV infected should exclusively breastfeed their infants for the first 6 months of life, introducing appropriate complementary foods thereafter and continue breastfeeding for the first 12 months of life. Breastfeeding should continue until the age of 2 years and should be supported by ART adherence strategies.

De-worming:

- MCC advices to roll out a *community delivery strategy* of anti-worm medication delivered by trained teachers and other school personnel, twice a year one tablet of mebendazol 500 mg.

Dental health:

- MCC encourages the dental mobile clinic to regularly diagnose and treat children for dental healthcare.
- Upscaling health promotion concerning dental health.

Social health:

- Upscaling of human resources in addressing the social ills that plague the communities. Hiring a full time social worker for the LETCEE projects and outreach to the whole community is pivotal to enhance the quality of life of many children.
- Encouragement of parents to bring disabled children to the medical carrousel.
- Strengthening efforts in collaboration with local NGO's and national initiatives.

7.Concluding comments and last words

We feel grateful for the amazing support from all the people from the LETCEE project, the MCC team felt more than welcome at our first medical camp in KwaZulu-Natal in South Africa. Mutual targets were hit, and personal connections were made in a partnership climate. It was a successful pilot project in which the medical results and all round evaluation are leading for future plans. All three parties (Kinderfonds MAMAS, LETCEE and MCC) have agreed continue joining forces to improve local child's health in KwaZulu-Natal. We are excited to continue our close collaboration with all stakeholders. Additionally, we aspire to empower local current and future healthcare workers in future ventures.

We are grateful to all caretakers and community people for bringing the children to location and helping to conduct the program. We are happy we got the opportunity to work with and to learn from all volunteers, translators and others who have helped directly or indirectly, despite their own obligations. And last but not least, we would like to thank the children and their caretakers who came to the checks for their inspiring presence.

We will be back in September 2017!

MCC South Africa KwaZulu-Natal
July 2016

On behalf of the MCC LETCEE team 2016:

Hanaâ Benjeddi & Marloes Duitsman

Appendix

Disaese prevalence among all children per geografical location

	Total		Bhambatha High School		Mbongeleni Center		Mpalaza	
	873		Total= 150		Total= 173		Total= 42	
	N	%	n	%	n	%	n	%
Underweight	27	3%	1	1%	3	2%	1	2%
Stunting	85	10%	27	18%	6	3%	3	7%
Wasting	36	4%	0	0%	7	4%	2	5%
Anaemia	316	36%	56	37%	72	42%	15	36%
HIV pos.	2	0%	1	1%	0	0%	0	0%
AIDS	0	0%	0	0%	0	0%	0	0%
Malaria (suspected)	0	0%	0	0%	0	0%	0	0%
vitamin deficit (clinical signs)	26	3%	5	3%	2	1%	0	0%
Bilharzia	0	0%	0	0%	0	0%	0	0%
syndrome n.o.s.	0	0%	0	0%	0	0%	0	0%
pneumonia (clinical)	5	1%	0	0%	1	1%	0	0%
pneumonia (X-ray confirmed)	0	0%	0	0%	0	0%	0	0%
tuberculosis (clinical)	1	0%	0	0%	0	0%	0	0%
tuberculosis (X-ray confirmed)	1	0%	1	1%	0	0%	0	0%
bronchitis	2	0%	0	0%	0	0%	1	2%
BHR/asthma	3	0%	1	1%	1	1%	0	0%
gardia (suspected)	0	0%	0	0%	0	0%	0	0%
dysenteria	3	0%	0	0%	2	1%	0	0%
dehydration : acute diarrhoea	0	0%	0	0%	0	0%	0	0%
dehydration : chronic diarrhoea	0	0%	0	0%	0	0%	0	0%
diarrhoea without dehydration	1	0%	0	0%	0	0%	0	0%
constipation	0	0%	0	0%	0	0%	0	0%
active worm infection	4	0%	0	0%	1	1%	0	0%
active lintworm	0	0%	0	0%	0	0%	0	0%
otitis media acuta	8	1%	2	1%	2	1%	1	2%

otitis media with effusion	1	0%	1	1%	0	0%	0	0%
otitis externa	3	0%	0	0%	0	0%	1	2%
tympanic perforation	1	0%	0	0%	0	0%	0	0%
mastoiditis	0	0%	0	0%	0	0%	0	0%
(adeno)tonsillitis	16	2%	1	1%	0	0%	1	2%
candida stomatitis	0	0%	0	0%	0	0%	0	0%
sinusitis	0	0%	0	0%	0	0%	0	0%
hearing impairment	0	0%	0	0%	0	0%	0	0%
other	12	1%	1	1%	2	1%	3	7%
cariës n.o.s.	136	16%	25	17%	22	13%	5	12%
pain n.o.s	4	0%	1	1%	0	0%	0	0%
fluorosis	0	0%	0	0%	0	0%	0	0%
caries with pain	54	6%	8	5%	7	4%	4	10%
wounds n.o.s.	5	1%	0	0%	3	2%	0	0%
eczema n.o.s.	4	0%	2	1%	2	1%	0	0%
dermatomycosis	46	5%	9	6%	5	3%	7	17%
Impetigo/furunculosis	11	1%	4	3%	3	2%	0	0%
lice	1	0%	0	0%	0	0%	1	2%
scabies	7	1%	0	0%	3	2%	0	0%
erysipelas / cellulites	0	0%	0	0%	0	0%	0	0%
wounds infected,	0	0%	0	0%	0	0%	0	0%
insect bite	2	0%	0	0%	0	0%	0	0%
other (psoriasis etc)	9	1%	2	1%	0	0%	2	5%
psychomotoric retardation	5	1%	0	0%	0	0%	0	0%
hypertonia	0	0%	0	0%	0	0%	0	0%
hypotonia	0	0%	0	0%	0	0%	0	0%
epilepsy	1	0%	0	0%	0	0%	0	0%
spina bifida	0	0%	0	0%	0	0%	0	0%
migraine/headache	1	0%	1	1%	0	0%	0	0%
meningitis	0	0%	0	0%	0	0%	0	0%
leg kramps	0	0%	0	0%	0	0%	0	0%
physiological murmer	10	1%	1	1%	3	2%	0	0%
pathological murmur (suspected)	5	1%	1	1%	0	0%	1	2%
refractory problem	0	0%	0	0%	0	0%	0	0%
strabismus	3	0%	0	0%	0	0%	0	0%

keratoconjunctivitis	1	0%	0	0%	0	0%	0	0%
amblyopia	0	0%	0	0%	0	0%	0	0%
thyroid dysfunction (suspected)	0	0%	0	0%	0	0%	0	0%
diabetes	0	0%	0	0%	0	0%	0	0%
menorraghia	0	0%	0	0%	0	0%	0	0%
amenorrhoea	0	0%	0	0%	0	0%	0	0%
pregnancy	0	0%	0	0%	0	0%	0	0%
epi/hypospadia	0	0%	0	0%	0	0%	0	0%
cryptorchism	0	0%	0	0%	0	0%	0	0%
inguinal hernia	1	0%	0	0%	0	0%	0	0%
urinary infection	0	0%	0	0%	0	0%	0	0%
chronic kidney path.	1	0%	0	0%	0	0%	0	0%
artralgia n.o.s.	2	0%	0	0%	0	0%	0	0%
septic arthritis	0	0%	0	0%	0	0%	0	0%
hip dysplasia	0	0%	0	0%	0	0%	0	0%
old fracture	0	0%	0	0%	0	0%	0	0%
new fracture	1	0%	1	1%	0	0%	0	0%
hernia(umbilical etc)	17	2%	3	2%	1	1%	1	2%

Continued: Disaese prevalence among all children per geografical location

	Ngomep. School		**Phakwe C.P School**		**Village**	
	Total= 252		**Total= 136**		**Total= 120**	
	n	**%**	**n**	**%**	**n**	**%**
Underweight	6	2%	8	6%	8	7%
Stunting	26	10%	14	10%	9	8%
Wasting	6	2%	13	10%	8	7%
Anaemia	94	37%	43	32%	36	30%
HIV pos.	1	0%	0	0%	0	0%
AIDS	0	0%	0	0%	0	0%
Malaria (suspected)	0	0%	0	0%	0	0%
vitamin deficit (clinical signs)	8	3%	0	0%	11	9%
Bilharzia	0	0%	0	0%	0	0%
syndrome n.o.s.	0	0%	0	0%	0	0%
pneumonia (clinical)	1	0%	3	2%	0	0%
pneumonia (X-ray confirmed)	0	0%	0	0%	0	0%

tuberculosis (clinical)	1	0%	0	0%	0	0%
tuberculosis (X-ray confirmed)	0	0%	0	0%	0	0%
bronchitis	1	0%	0	0%	0	0%
BHR/asthma	0	0%	1	1%	0	0%
gardia (suspected)	0	0%	0	0%	0	0%
dysenteria	0	0%	0	0%	1	1%
dehydration : acute diarrhoea	0	0%	0	0%	0	0%
dehydration : chronic diarrhoea	0	0%	0	0%	0	0%
diarrhoea without dehydration	0	0%	1	1%	0	0%
constipation	0	0%	0	0%	0	0%
active worm infection	1	0%	2	1%	0	0%
active lintworm	0	0%	0	0%	0	0%
otitis media acuta	3	1%	0	0%	0	0%
otitis media with effusion	0	0%	0	0%	0	0%
otitis externa	1	0%	1	1%	0	0%
tympanic perforation	0	0%	1	1%	0	0%
mastoiditis	0	0%	0	0%	0	0%
(adeno)tonsillitis	11	4%	1	1%	2	2%
candida stomatitis	0	0%	0	0%	0	0%
sinusitis	0	0%	0	0%	0	0%
hearing impairment	0	0%	0	0%	0	0%
other	5	2%	1	1%	0	0%
cariës n.o.s.	32	13%	26	19%	26	22%
pain n.o.s	2	1%	0	0%	1	1%
fluorosis	0	0%	0	0%	0	0%
caries with pain	18	7%	11	8%	6	5%
wounds n.o.s.	1	0%	0	0%	1	1%
eczema n.o.s.	0	0%	0	0%	0	0%
dermatomycosis	16	6%	4	3%	5	4%
Impetigo/furunculosis	3	1%	0	0%	1	1%
lice	0	0%	0	0%	0	0%
scabies	2	1%	0	0%	2	2%
erysipelas / cellulites	0	0%	0	0%	0	0%

wounds infected,	0	0%	0	0%	0	0%
insect bite	1	0%	1	1%	0	0%
other (psoriasis etc)	2	1%	2	1%	1	1%
psychomotoric retardation	2	1%	1	1%	2	2%
hypertonia	0	0%	0	0%	0	0%
hypotonia	0	0%	0	0%	0	0%
epilepsy	1	0%	0	0%	0	0%
spina bifida	0	0%	0	0%	0	0%
migraine/headache	0	0%	0	0%	0	0%
meningitis	0	0%	0	0%	0	0%
leg kramps	0	0%	0	0%	0	0%
physiological murmer	3	1%	2	1%	1	1%
pathological murmur (suspected)	2	1%	1	1%	0	0%
refractory problem	0	0%	0	0%	0	0%
strabismus	2	1%	0	0%	1	1%
keratoconjunctivitis	1	0%	0	0%	0	0%
amblyopia	0	0%	0	0%	0	0%
thyroid dysfunction (suspected)	0	0%	0	0%	0	0%
diabetes	0	0%	0	0%	0	0%
menorraghia	0	0%	0	0%	0	0%
amenorrhoea	0	0%	0	0%	0	0%
pregnancy	0	0%	0	0%	0	0%
epi/hypospadia	0	0%	0	0%	0	0%
cryptorchism	0	0%	0	0%	0	0%
inguinal hernia	0	0%	1	1%	0	0%
urinary infection	0	0%	0	0%	0	0%
chronic kidney path.	1	0%	0	0%	0	0%
artralgia n.o.s.	2	1%	0	0%	0	0%
septic arthritis	0	0%	0	0%	0	0%
hip dysplasia	0	0%	0	0%	0	0%
old fracture	0	0%	0	0%	0	0%
new fracture	0	0%	0	0%	0	0%
hernia(umbilical etc)	5	2%	4	3%	3	3%