

Medical Checks for Children

Medical Report Uganda Oyam 2023



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Introduction

From June 26th to July 1st 2023 Medical Checks for Children (MCC) visited Oyam District for the second time. The MCC team checked and treated free of cost 804 children in 6 days.

The medical checks were organized in close cooperation with Link to Progress (LTP). LTP is a non-governmental organization which aims to serve vulnerable communities in Northern and Eastern Uganda through provision of safe water, sanitation, and hygiene as well as other community developmental services, such as education, school lunches and environmental protection.

The cooperation of LTP existed out of the following (amongst others):

- Announcement of the medical camp in the different villages.
- All contacts with districts/governmental officers, the Mission hospital and the HC.
- Selection of translators/local helpers.
- Ordering medication listed by MCC.
- Arrangements for food, drinks and lodging of the MCC team.
- Transportation of the MCC team from lodge to the villages.
- Give follow-up for the referred children: arranging hospital visits.

The MCC team consisted of ten members from The Netherlands: Iris Jansen (medical-end-responsible and mission leader, general practitioner), Iris van de Gevel (organization-end-responsible, toxicologist), Ruth Appeltant (professor in animal fertility), Maartje Koeter (pediatrician), Juliette van Hattum (medical doctor, PhD candidate), Mariet Groenemeijer (general practitioner), Yvonne Nauta (general practitioner), Bryndis van Schijndel (student), Lotte Aardenburg (children's nurse) and Tom Tijssen (CEO).

The medical checks were performed in collaboration with the Loro Health Centre. Dr. Denis of the Health Centre was an important partner in referring children to hospitals in the area and follow-up for some of the children referred to the Health Centre.

Technical equipment, medical supplies and toothbrushes were brought from the Netherlands by MCC team members. Medication was ordered by LTP in Lira.

The aim of the mission is to make an inventory of the health situation of the children in Oyam District, treat the children if necessary and to advise LTP on the future steps to take. In addition, we also focussed on the dental situation of the children, as well on the malaria situation (education, amount of bed nets, knowledge about the disease etc.), to learn more and to see if further actions or advise is required.

Since the medical camp was organized in collaboration with the Loro Health Centre, the data of the children were shared with the HC (limited to the information recorded for regular patient visits at the HC), but only if informed consent was given by the caretakers (recorded on the CRF, 85%).

Medical Checks for Children on location:

During the free of costs medical checks, the children were checked following the MCC carousel:

1. Registration of the child.
2. Education on hygiene and tooth brushing (a toothbrush was given to each child).
3. Measuring height and weight.
4. Blood test (haemoglobin) and urine test and/or malaria test when indicated.
5. Physical examination by a medical doctor.
6. Giving medication (pharmacy).
7. Enter children's files in data base.

Special attention was given to the transfer of knowledge on hygiene and dental care to the children and parents by use of the information provided by Aisha and Friends (www.aishaandfriends.com).

Results Medical Camp in Oyam District

During the second medical camp in Oyam district MCC saw in total 804 children in different primary school, from villages surrounding these schools. Most important findings are described below, and detailed tables of the findings are given in Annex A.

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

Check locations	26-06-23	27-06-23	28-06-23	29-06-23	30-06-23	01-07-23	Total
Ogugu Primary School	143	0	0	0	0	0	143
Amido Primary School	0	141	0	0	0	0	141
Loro Army Primary School	0	0	168	0	0	0	168
Atop Primary School	0	0	0	120	0	0	120
Agulurude Primary School	0	0	0	0	146	0	146
Loro health Center	0	0	0	0	0	86	86
Total	143	141	168	120	146	86	804

Children and caretakers of multiple villages visited the medical camp, which were grouped into the 6 locations of the schools we visited. The majority of the children visited the medical camp for the first time (97%, which might be an overestimation, given the large number of different villages of last year which made it difficult to find back forms).

In the announcement of the medical children of age below 12 years were invited to come with their caretakers. Of the 804 children, 46% was below the age of 5 years, 42% of the children was between 5 and 10 years of age, and 12% was above 10 years old. During the medical camp at some locations, we had to lower the age from 12 to 10, due to the high number of children attending the medical camp. Children below 5 years of age are considered to benefit most from a medical camp, so we were happy to see these young children and their parents visit the MCC medical camp.



Special attention was paid to the presence of caretakers during the medical camp, at the announcement of the medical camp and at registration. All children (100%) brought a caretaker (parent, grandmother/father, sister/brother). We are very pleased with this high attendance of caretakers, as an important part of the medical camp is the transfer and exchange of medical and healthcare information, from the parents to the doctors and vice versa. We learned from previous medical camps that the presence of caretakers will make the medical camp more sustainable.

The following findings can be highlighted:

- High prevalence of anaemia (43% for all children and 48% for children < 5 years), compared to 51.7% in Uganda (< 5 years) and 15.5% in the Netherlands (< 5 years) (WHO, 2019).
- High prevalence of stunting (16% in total and 22% for < 5 years), compared to 28% in Uganda (for < 5 years), and 1.6% in the Netherlands (WHO, 2020).
- High prevalence of wasting (5% for both total and for < 5 years), compared to 3,5% in Uganda (for < 5 years) and < 0.3% in the Netherlands (< 5 years) (WHO 2020).
- High prevalence of malaria (total 20%, 4% suspected and 16% confirmed).
- High prevalence of acute worm infection (26%) and few children having access to a deworming program (only 15% of children were given a deworming tablet in the past 6 months).
- Other frequent diagnoses: pneumonia (5%), active worm infection (17%), cariës (13%), cariës with pain (9%) and various skin diseases (tinea capitis (11%), eczema (3%), dermatomycosis (3%), scabies (3%)).
- Several children with potential heart problems were identified, 13 children with a suspected pathological murmur and other conditions. In total 13 children are sent to the cardiologist for further diagnosis and treatment.
- In total 20 children were suspected or known of having sickle cell disease.
- Many mothers with children with disabilities came to the medical camp. 26 children and parents were identified to benefit from further follow-up.

Most frequent treatment given to the children was deworming (47%), iron (25% of the children and 4% of the mothers), multivitamin (17%), malaria treatment (14%), antibiotics (6%), various cremes for skin diseases (16%).

There were no specific trends seen in either disease, treatment or follow-up related to a specific location, except that in Agulurude the prevalence of anemia, malnutrition and malaria was highest compared to other villages.



Table 2 Highest prevalence of disease among all children per geographical location

	Total		Ogugu		Amido		Loro Army		Atop		Agulurude		Loro HC	
	804		Total=143		Total=141		Total=168		Total=120		Total=146		Total=86	
	N	%	n	%	n	%	n	%	n	%	n	%	n	%
Underweight	53	7%	8	6%	8	6%	9	5%	12	10%	13	9%	3	3%
Stunting	125	16%	23	16%	23	16%	20	12%	16	13%	29	20%	14	16%
Wasting	25	5%	4	4%	4	4%	5	5%	5	7%	7	7%	0	0%
Anaemia	342	43%	53	37%	46	33%	58	35%	59	49%	85	58%	41	48%
Malaria (suspected)	34	4%	3	2%	3	2%	7	4%	3	3%	11	8%	7	8%
Malaria (confirmed)	128	16%	21	15%	25	18%	22	13%	18	15%	28	19%	14	16%
pneumonia (clinical)	42	5%	9	6%	4	3%	1	1%	10	8%	9	6%	9	10%
active worm infection	136	17%	11	8%	26	18%	14	8%	34	28%	30	21%	21	24%
cariës n.o.s.	103	13%	18	13%	27	19%	23	14%	19	16%	9	6%	7	8%
caries with pain	76	9%	14	10%	13	9%	20	12%	8	7%	14	10%	7	8%
eczema n.o.s.	22	3%	1	1%	5	4%	3	2%	3	3%	6	4%	4	5%
dermatomycosis	23	3%	4	3%	3	2%	4	2%	8	7%	1	1%	3	3%
scabies	21	3%	3	2%	0	0%	4	2%	6	5%	4	3%	4	5%
Tinea Capitis	89	11%	4	3%	15	11%	26	15%	18	15%	13	9%	13	15%
psychomotoric retardation	12	1%	0	0%	0	0%	6	4%	2	2%	4	3%	0	0%
physiological murmur	31	4%	4	3%	4	3%	3	2%	5	4%	9	6%	6	7%
pathological murmur (suspected)	11	1%	1	1%	2	1%	2	1%	2	2%	2	1%	2	2%
Sickle Cell	20	2%	0	0%	3	2%	2	1%	7	6%	3	2%	5	6%

Malnutrition

Of the children seen in the medical camp 7% showed underweight, 16% stunting and 5% wasting. Especially the prevalence of stunting and wasting is high. For both stunting and wasting the highest prevalence was seen in Agulurude Primary school.

Within MCC growth abnormalities were assessed by measuring and weighing all children in a standardized fashion, using the following criteria:

- 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.
- 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.
- 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.

Malnutrition is thought to account for one third of all deaths of children under five (UN Millennium Development Goals). Malnutrition has been related to poor cognitive and school performance. The main factors contributing to malnutrition are rural poverty, lack of sanitation, poor living conditions and a lack of energy, protein intake, iron and multivitamins.

During the medical camp we gave nutritional advice to all children and caretakers, with emphasis on vegetable intake and vitamin C. LTP is working together with the Green Food Foundation, to bring more knowledge on nutritious food and improve the school lunch given, in schools in Oyam. For this purpose, school gardens are made and supported. Learning at school on nutritious food and providing a school lunch containing vegetables and fruits, is endorsed by MCC.



Anemia

43% of the checked children was suffering from anaemia) and 5% had severe anaemia (Hb < 5 mmol). Highest prevalence of anemia was seen in Agulurude (59%).

Anaemia is a condition in which the number of red blood cells or the haemoglobin concentration within them is lower than normal. Haemoglobin is needed to carry oxygen and if you have too few or abnormal red blood cells, or not enough haemoglobin, there will be a decreased capacity of the blood to carry oxygen to the body's tissues. This results in symptoms such as fatigue, weakness, dizziness and shortness of breath, among others. The most common causes of anaemia include nutritional deficiencies, particularly iron deficiency, but also deficiencies in folate, vitamins B12 and A are also important causes. Furthermore, infectious diseases as malaria, tuberculosis, HIV and parasitic infections are common causes. Iron deficiency anaemia has also been shown to affect cognitive and physical development in children and reduce productivity in adults.

Anaemia is an indicator of both poor nutrition and poor health. It is problematic on its own, but it can also impact other global nutritional concerns such as stunting, wasting and low birth weight on one hand as well as childhood overweight and obesity due to lack of energy to exercise on the other hand. School performance in children and reduced work productivity in adults due to anaemia can have further social and economic impacts for the individual and family.

In the villages in Oyam, the high prevalence of anaemia might be due several factors, as the high incidence of malaria (20%), the high incidence of acute worm infection (17%) (and low coverage by a deworming program), and the lack of important vitamins and minerals from fruit and vegetables in the diet.

Deworming

Of all children seen during the medical camp, only 18% received deworming treatment in the last 6 months. In addition, an acute worm infection was seen in 17% of the children (with highest prevalence of 28% in Atop, 21% in Agulurude and 24% in Loro HC).

The presence of intestinal parasites in a population is indicative of lack of proper sanitation, low economic standards and poor educational background. The parasite consumes the nutrients from the children they infect and worsens malnutrition and retards the physical development. There is a strong relationship between a parasitic worm infection and anemia. The parasitic infection can also cause abdominal pain, diarrhea, intestinal obstruction and various other health problems. Prolonged infection affects growth, development and educational achievements.

MCC provided deworming treatment to all children above 1 year of age, and who did not receive deworming treatment in the last 6 months. In total deworming treatment was provided to 439 children. Furthermore, during the medical camp special attention was given to provide education on hand hygiene to prevent worm infections using the information developed in cooperation with Aisha & Friends.

Malaria

A high prevalence of malaria was seen during the medical camp (20%). Most of the children were diagnosed for malaria based on a malaria test for plasmodium falciparum, and all children (with suspected and confirmed malaria) were treated.

According to WHO¹, although the numbers in malaria cases globally are decreasing, Uganda has still a high number of malaria cases (over 13 million of the 45 million population, mainly *P. falciparum*), and a high mortality rate (approx. 20000) in 2021. UNICEF² reports for 2017-2018, also a total of 12 million cases, with a prevalence of 45% for children under 5, and a total of estimated malaria deaths of 13200, with a prevalence of 63% for children under 5. An increase in malaria cases and deaths is reported due to malaria service disruptions (e.g. distribution of mosquito net campaigns).

During this medical camp one child died on the way to the hospital due to the consequences of malaria. In addition, we saw 5 children with malaria in very bad condition, some of them were sent to hospital immediately.

We were given approximately 50 mosquito nets through the Malaria Foundation in the Netherlands, and parents were given these nets and MCC emphasized to use these for the children. Although there are governmental programs in place, there is limited knowledge on alarm symptoms and when to go to a local health centre for treatment.

Sickle cell

During the medical camp 20 children were identified with sickle cell disease. Some of them were already diagnosed, others needed further diagnosis and confirmation through Loro HC. Unfortunately, diagnosis takes a few weeks, and results do not always reach the parents and children.

Sickle-cell anaemia (also known as sickle-cell disorder or sickle-cell disease) is a common genetic condition due to a haemoglobin disorder. A child who inherits two of the same genes, one from each parent, will be born with the disease. In Uganda, 13%³ of the children are carriers of the sickle cell gene, which is approximately 20% in Oyam. The overall number with sickle cell disease is 0.7% and is approximately (1.5%) in Oyam.

Sickle cell disease is a chronic disease, patients can be supported with pain medication, high fluid intake, antibiotics and folic acid supplementation. Currently there are no specific programs for sickle cell disease in place in Oyam district. Patients with sickle cell disease are in principle treated in the Loro HC, provided that sufficient medication is available for this condition and that patients adhere to follow-up.

¹ <https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2022> (page 213).

² Unicef, WMD Covid 2020_DataSnapshot_UGA. Uganda Malaria: Status update on children – data snapshot, 2020.

³

[https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(15\)00288-0/fulltext#:~:text=Overall%2C%20the%20prevalence%20of%20sickle,sickle%20cell%20disease%20in%20Uganda.](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(15)00288-0/fulltext#:~:text=Overall%2C%20the%20prevalence%20of%20sickle,sickle%20cell%20disease%20in%20Uganda.)

Dental problems

We identified 22% of the children with dental problems, 13% children with cariës and 9% children with cariës with pain. As we did not have a dentist in the team we consider this an underestimation of the prevalence of dental problems. Professional dental care is limited in this area and is aimed at treating pain. This underlies the need for good dental programs to educate children and parents on the importance of dental care.

During the medical camp we provided education on dental care, and all children were given a toothbrush.



Referrals to hospital and special needs children

During the medical camp 10 children were immediately brought to the hospital, 6 with severe malaria and/or sickle cell crisis, 4 children with several other conditions (wounds, occluded cerebrospinal fluid (CSF) drain, enlarged liver, inability to walk).

Fourteen children were referred to the cardiologist, two to the eye doctor, four to the urologist, and 1 to the neurologist for further diagnosis and treatment. As stated above one child who suffered from severe malaria died under his way to hospital. Another child died a few days after he was admitted in hospital (cause unknown, it was mentioned that a possible diagnosis could be a malignancy, but the doctors didn't confirm this).

All the children referred to hospital (Mission hospital, Lira Referral hospital and other facilities) were given follow-up by LTP, and diagnosis and treatment were paid by MCC. LTP has done a tremendous amount of work to make appointments at the hospitals, connecting with parents, making transport arrangements, and reporting back to MCC.

For the disabled children, further follow-up is considered necessary, as there is lack of care for this specific group of children, and in addition support and training of the parents. During the medical camp in 2023, 26 children were identified with disabilities, and in 2022 15 children were identified.

Conclusions and recommendations

Based on the large crowds during the medical camp and the observations made, it seems that there is certainly a need for accessible and high-quality healthcare for children in Oyam district. Several recommendations can be made for the future.

1. Deworming

In Uganda, deworming programs are in place, however, not all children are reached. In Oyam district, approximately 82% of the children above the age of 1 year did not receive deworming treatment. It should be investigated what the reasons are for not receiving deworming treatment, and to consider connecting with governmental deworming programs, or otherwise implement a low-cost deworming program.

According to WHO large-scale deworming is the best way to reduce the suffering caused by intestinal worms. Improving basic hygiene, sanitation, health education and providing access to safe drinking-water are also keys to resolving the health and nutritional problems caused by intestinal worms.

For the high incidences in anemia and malnutrition, a good intervention might be to work on further enrolment of a deworming program, as only 18% of the children received the half-year preventive deworming treatment.

2. Nutrition

The high prevalence of stunting, wasting and anemia is considered due to the limited availability (qualitative and quantitative) of nutritious food. LTP provides school lunches in several schools. Travelling through this area it can be noticed that a lot of vegetable crops and fruits are grown but based on economic reasons certain crops are grown and sold to the market. Eating more fruits and vegetables is beneficial for to improve health and physical condition. However, changing food availability or eating habits, to encourage eating more green vegetables and fruits is not easy. MCC advises to follow the recommendations of the Green Found Food Foundation on this topic. In addition, it might be good to investigate the reasons for the high prevalence of wasting, stunting and anaemia in Agulurude.

3. Malaria

A high prevalence of malaria was seen during the medical camp (20%). During the medical camp we can focus on diagnosis and treatment of malaria, however, the best improvement in the health of these children can be made in prevention. For coming years, we will have to investigate together with LTP what the best methods in malaria prevention are in this area. Education, distribution of mosquito nets, indoor residual spraying, etc⁴. In addition, LTP might consider discussing this topic with the district health authorities in order learn and discuss how the best measures in malaria prevention can be taken in close collaboration with the health authorities.

As no education materials are available (discussed with the Dutch Malaria Foundation), MCC will investigate if specific education materials can be prepared to educate caretakers on malaria prevention and medical alarm symptoms. For this purpose, it should be further investigated by LTP what is currently done by the government and how LTP can implement or use the governmental programs in future medical camps.

Since there are children who may be resistant to the anti-malarial medication we brought (artemether/lumefantrine), for future camps it might be worth investigating whether we can

⁴ Bhatt et al. (2015) – The effect of malaria control on Plasmodium falciparum in Africa between 2000 and 2015. Nature 526, 207–211 (08 October 2015) doi:10.1038/nature15535

add an alternative anti-malarial medication to the range for seriously ill children who do not respond to usual anti-malarial medication (e.g. artusenate).

4. Hygiene and dental care

The prevalence of caries and skin diseases can be prevented by providing information about dental care and hygiene (clean blades when shaving the heads of the children). These topics will be addressed in future medical camps, or in other health education programs in the villages, with use of the education materials developed by Aisha & Friends and MCC. MCC will try to bring a dentist to the next medical camp.

5. Special needs children

During the medical camp in 2023, 26 children were identified with disabilities, and in 2022 15 children were identified. We believe that a lot can be done to improve the lives of these children and to support the parents. We are very happy to learn that LTP will start, with the support of FEMI, a project to structure care and support for these children in Oyam district. MCC shared the lists of names and contact details of the caretakers to facilitate this project.

6. Next medical camp

MCC concludes that there is a need to continue with the medical camps in Oyam district. However, we might further discuss in which locations we might best organize the medical camp in the coming years. It might be good to focus on certain villages, were also the recommendations as deworming, dental programs at school, school lunch improvement, and education on nutritious food, hygiene and malaria can be implemented.

We are very grateful for all work performed by Isabella, Everest, Brenda, Alfonso, Lazarus, and Lillian, Dr. Denis of the Health Centre, the permanent group of translators (Donsiamo, Reina, Rosta) and all other translators and helpers during the medical camp in Oyam district. We could not have performed our work without their presence and hard work. We are also very grateful for all the effort made by LTP to support the children which were referred to hospital.

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Annex A- Detailed results

Table A1: Summary of checked children per geographical location, age and gender

Age	Total		Ogugu		Amido		Loro Army	
	804		Total=143		Total=141		Total=168	
	N	%	n	%	n	%	n	%
<=1 year	111	14%	15	10%	19	13%	18	11%
>1 en <5 years	266	33%	46	32%	48	34%	54	32%
<5 years	372	46%	70	49%	58	41%	73	43%
>=5 en <=10 years	339	42%	54	38%	67	48%	76	45%
>10 years	93	12%	19	13%	16	11%	19	11%
Gender								
Boy	402	50%	60	42%	69	49%	84	50%
Girl	402	50%	83	58%	72	51%	84	50%

Age	Atop		Agulurude		Loro HC	
	Total=120		Total=146		Total=86	
	n	%	n	%	n	%
<=1 year	14	12%	29	20%	16	19%
>1 en <5 years	38	32%	52	36%	28	33%
<5 years	49	41%	78	53%	44	51%
>=5 en <=10 years	53	44%	49	34%	40	47%
>10 years	18	15%	19	13%	2	2%
Gender						
Boy	67	56%	75	51%	47	55%
Girl	53	44%	71	49%	39	45%

Table A2: Prevalence of weight/age at or under P3 (underweight) per geographical location by age and gender

	Total		Ogugu		Amido		Loro Army	
	804		Total=143		Total=141		Total=168	
	N	%	n	%	n	%	n	%
Underweight	53	7%	8	6%	8	6%	9	6%
No underweight	655	93%	116	94%	117	94%	140	94%
Unknown	96		19		16		19	
Underweight children per age								
<=1 year	7	6%	0	0%	1	5%	1	6%
>1 en <5 years	29	11%	4	9%	3	6%	5	9%
<5 years	32	9%	4	6%	3	5%	5	7%
>=5 en <=10 years	21	6%	4	7%	5	7%	4	5%
>10 years	0	0%	0	0%	0	0%	0	0%
Underweight children per gender								
Boy	23	43%	3	38%	2	25%	5	56%
Girl	30	57%	5	63%	6	75%	4	44%

	Atop		Agulurude		Loro HC	
	Total=120		Total=146		Total=86	
	n	%	n	%	n	%
Underweight	12	12%	13	10%	3	4%
No underweight	88	88%	114	90%	80	96%
Unknown	20		19		3	
Underweight children per age						
<=1 year	1	7%	3	10%	1	7%
>1 en <5 years	6	16%	9	17%	2	7%
<5 years	7	14%	11	14%	2	5%
>=5 en <=10 years	5	10%	2	4%	1	3%
>10 years	0	0%	0	0%	0	0%
Underweight children per gender						
Boy	7	58%	4	31%	2	67%
Girl	5	42%	9	69%	1	33%

Table A3: Prevalence of length/age at or under P3 (stunting) per geographical location by age and gender

	Total		Ogugu		Amido		Loro Army	
	804		Total=143		Total=141		Total=168	
	N	%	n	%	n	%	n	%
Stunting	125	16%	23	16%	23	16%	20	12%
No stunting	678	84%	120	84%	118	84%	148	88%
Unknown	1		0		0		0	
Stunting children per age								
<=1 year	30	27%	4	27%	6	32%	3	17%
>1 en <5 years	56	21%	10	22%	9	19%	10	19%
<5 years	80	22%	15	21%	11	19%	12	16%
>=5 en <=10 years	32	9%	5	9%	9	13%	7	9%
>10 years	13	14%	3	16%	3	19%	1	5%
Stunting children per gender								
Boy	67	54%	14	61%	9	39%	11	55%
Girl	58	46%	9	39%	14	61%	9	45%

	Atop		Agulurude		Loro HC	
	Total=120		Total=146		Total=86	
	n	%	n	%	n	%
Stunting	16	13%	29	20%	14	16%
No stunting	104	87%	117	80%	71	84%
Unknown	0		0		1	
Stunting children per age						
<=1 year	2	14%	11	38%	4	27%
>1 en <5 years	9	24%	12	23%	6	21%
<5 years	11	22%	22	28%	9	21%
>=5 en <=10 years	2	4%	4	8%	5	13%
>10 years	3	17%	3	16%	0	0%
Stunting children per gender						
Boy	8	50%	18	62%	7	50%
Girl	8	50%	11	38%	7	50%

Table A4: Prevalence of weight/length at or under P3 (wasting) per geographical location by age and gender

	Total		Ogugu		Amido		Loro Army	
	804		Total=143		Total=141		Total=168	
	N	%	n	%	n	%	n	%
Wasting	25	5%	4	4%	4	4%	5	5%
No wasting	498	95%	89	96%	87	96%	96	95%
Unknown	281		50		50		67	
Wasting children per age								
<=1 year	4	4%	0	0%	2	11%	1	6%
>1 en <5 years	15	6%	1	2%	2	4%	4	7%
<5 years	18	5%	2	3%	3	5%	4	5%
>=5 en <=10 years	7	5%	2	8%	1	3%	1	4%
>10 years	0	0%	0	0%	0	0%	0	0%
Wasting children per gender								
Boy	6	24%	1	25%	0	0%	1	20%
Girl	19	76%	3	75%	4	100%	4	80%

	Atop		Agulurude		Loro HC	
	Total=120		Total=146		Total=86	
	n	%	n	%	n	%
Wasting	5	7%	7	7%	0	0%
No wasting	69	93%	92	93%	65	100%
Unknown	46		47		21	
Wasting children per age						
<=1 year	0	0%	1	3%	0	0%
>1 en <5 years	4	11%	4	8%	0	0%
<5 years	4	8%	5	6%	0	0%
>=5 en <=10 years	1	4%	2	10%	0	0%
>10 years	0	0%	0	0%	0	0%
Wasting children per gender						
Boy	3	60%	1	14%	0	0%
Girl	2	40%	6	86%	0	0%

Table A5: Prevalence of anaemia per geographical location by age and gender

	Total		Ogugu		Amido		Loro Army	
	804		Total=143		Total=141		Total=168	
	N	%	n	%	n	%	n	%
Anaemia	342	43%	53	37%	46	33%	58	35%
No anaemia	460	57%	89	62%	95	67%	110	65%
Unknown	2		1		0		0	
Hb <5,0 mmol	44	5%	3	2%	7	5%	7	4%
Anaemia per age								
<=1 year	66	59%	6	40%	12	63%	9	50%
>1 en <5 years	115	43%	16	35%	18	38%	19	35%
<5 years	178	48%	28	40%	25	43%	26	36%
>=5 en <=10 years	128	38%	18	33%	16	24%	27	36%
>10 years	36	39%	7	37%	5	31%	5	26%
Anaemia per gender								
Boy	183	54%	25	47%	21	46%	37	64%
Girl	159	46%	28	53%	25	54%	21	36%

	Atop		Agulurude		Loro HC	
	Total=120		Total=146		Total=86	
	n	%	n	%	n	%
Anaemia	59	49%	85	59%	41	48%
No anaemia	61	51%	60	41%	45	52%
Unknown	0		1		0	
Hb <5,0 mmol	8	7%	11	8%	8	9%
Anaemia per age						
<=1 year	10	71%	18	62%	11	69%
>1 en <5 years	19	50%	30	58%	13	46%
<5 years	28	57%	47	60%	24	55%
>=5 en <=10 years	22	42%	29	59%	16	40%
>10 years	9	50%	9	47%	1	50%
Anaemia per gender						
Boy	32	54%	48	56%	20	49%
Girl	27	46%	37	44%	21	51%

Table A6: Prevalence preventive anti-worm treatment in the last half-year per geographical location by age

	Total		Ogugu		Amido		Loro Army	
	804		Total=143		Total=141		Total=168	
	N	%	n	%	n	%	n	%
Anti-worm	144	18%	21	15%	31	22%	31	18%
No anti-worm	658	82%	121	85%	109	77%	137	82%
Anti-worm per age								
<=1 year	18	16%	4	27%	2	11%	5	28%
>1 en <5 years	51	19%	8	17%	9	19%	16	30%
<5 years	63	17%	10	14%	10	17%	19	26%
>=5 en <=10 years	62	18%	9	17%	16	24%	11	14%
>10 years	19	20%	2	11%	5	31%	1	5%

	Atop		Agulurude		Loro HC	
	Total=120		Total=146		Total=86	
	n	%	n	%	n	%
Anti-worm	6	5%	34	23%	21	24%
No anti-worm	114	95%	112	77%	65	76%
Anti-worm per age						
<=1 year	0	0%	4	14%	3	19%
>1 en <5 years	3	8%	8	15%	7	25%
<5 years	3	6%	11	14%	10	23%
>=5 en <=10 years	1	2%	15	31%	10	25%
>10 years	2	11%	8	42%	1	50%

Table A7: Disease prevalence among all children per geographical location

	Total		Ogugu		Amido		Loro Army		Atop		Agulurude		Loro HC	
	804		Total=143		Total=141		Total=168		Total=120		Total=146		Total=86	
	N	%	n	%	n	%	n	%	n	%	n	%	n	%
Underweight	53	7%	8	6%	8	6%	9	5%	12	10%	13	9%	3	3%
Stunting	125	16%	23	16%	23	16%	20	12%	16	13%	29	20%	14	16%
Wasting	25	3%	4	3%	4	3%	5	3%	5	4%	7	5%	0	0%
Anaemia	342	43%	53	37%	46	33%	58	35%	59	49%	85	58%	41	48%
HIV pos.	1	0%	1	1%	0	0%	0	0%	0	0%	0	0%	0	0%
Malaria (suspected)	34	4%	3	2%	3	2%	7	4%	3	3%	11	8%	7	8%
vitamin deficit (clinical signs)	3	0%	1	1%	0	0%	2	1%	0	0%	0	0%	0	0%
Bilharzia	1	0%	0	0%	1	1%	0	0%	0	0%	0	0%	0	0%
Malaria (confirmed)	128	16%	21	15%	25	18%	22	13%	18	15%	28	19%	14	16%
syndrome n.o.s.	10	1%	0	0%	3	2%	4	2%	1	1%	2	1%	0	0%
pneumonia (clinical)	42	5%	9	6%	4	3%	1	1%	10	8%	9	6%	9	10%
tuberculosis (X-ray confirmed)	1	0%	0	0%	1	1%	0	0%	0	0%	0	0%	0	0%
bronchitis	2	0%	2	1%	0	0%	0	0%	0	0%	0	0%	0	0%
BHR/asthma	13	2%	2	1%	1	1%	1	1%	5	4%	3	2%	1	1%
Respir. Other	8	1%	0	0%	4	3%	1	1%	2	2%	0	0%	1	1%
gardia (suspected)	5	1%	0	0%	1	1%	1	1%	1	1%	2	1%	0	0%
dysentaria	3	0%	0	0%	2	1%	1	1%	0	0%	0	0%	0	0%
dehydration : chronic diarrhoea	1	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%
diarrhoea without dehydration	5	1%	1	1%	2	1%	2	1%	0	0%	0	0%	0	0%
constipation	2	0%	0	0%	1	1%	0	0%	0	0%	0	0%	1	1%
active worm infection	136	17%	11	8%	26	18%	14	8%	34	28%	30	21%	21	24%
GI other	8	1%	2	1%	2	1%	0	0%	2	2%	2	1%	0	0%
otitis media acuta	1	0%	1	1%	0	0%	0	0%	0	0%	0	0%	0	0%
otitis media with effusion	7	1%	2	1%	1	1%	0	0%	3	3%	1	1%	0	0%
otitis externa	9	1%	2	1%	3	2%	2	1%	2	2%	0	0%	0	0%
(adeno)tonsillitis	5	1%	1	1%	1	1%	0	0%	1	1%	0	0%	2	2%
candida stomatitis	6	1%	0	0%	0	0%	2	1%	3	3%	1	1%	0	0%
hearing impairment	4	0%	0	0%	1	1%	0	0%	2	2%	0	0%	1	1%
other	8	1%	1	1%	2	1%	2	1%	0	0%	3	2%	0	0%
cariës n.o.s.	103	13%	18	13%	27	19%	23	14%	19	16%	9	6%	7	8%
pain n.o.s	3	0%	0	0%	1	1%	2	1%	0	0%	0	0%	0	0%
fluorosis	7	1%	2	1%	1	1%	0	0%	1	1%	1	1%	2	2%
caries with pain	76	9%	14	10%	13	9%	20	12%	8	7%	14	10%	7	8%
wounds n.o.s.	8	1%	1	1%	1	1%	1	1%	2	2%	2	1%	1	1%
eczema n.o.s.	22	3%	1	1%	5	4%	3	2%	3	3%	6	4%	4	5%
dermatomycosis	23	3%	4	3%	3	2%	4	2%	8	7%	1	1%	3	3%
Impetigo/furunculosis	17	2%	4	3%	1	1%	3	2%	2	2%	4	3%	3	3%
lice	1	0%	0	0%	1	1%	0	0%	0	0%	0	0%	0	0%
scabies	21	3%	3	2%	0	0%	4	2%	6	5%	4	3%	4	5%
Tinea Capitis	89	11%	4	3%	15	11%	26	15%	18	15%	13	9%	13	15%
wounds infected,	7	1%	1	1%	0	0%	0	0%	2	2%	2	1%	2	2%
Skin other (psoriasis etc)	6	1%	0	0%	1	1%	3	2%	0	0%	1	1%	1	1%
psychomotoric retardation	12	1%	0	0%	0	0%	6	4%	2	2%	4	3%	0	0%
epilepsy	5	1%	0	0%	1	1%	1	1%	2	2%	1	1%	0	0%
spina bifida	1	0%	0	0%	0	0%	0	0%	1	1%	0	0%	0	0%
Neuromusc other	9	1%	2	1%	2	1%	3	2%	0	0%	0	0%	2	2%
physiological murmur	31	4%	4	3%	4	3%	3	2%	5	4%	9	6%	6	7%

	Total		Ogugu		Amido		Loro Army		Atop		Agulurude		Loro HC	
	804		Total=143		Total=141		Total=168		Total=120		Total=146		Total=86	
	N	%	n	%	n	%	n	%	n	%	n	%	n	%
pathological murmur (suspected)	11	1%	1	1%	2	1%	2	1%	2	2%	2	1%	2	2%
Cardio other	4	0%	0	0%	2	1%	1	1%	1	1%	0	0%	0	0%
keratoconjunctivitis	6	1%	2	1%	0	0%	1	1%	0	0%	3	2%	0	0%
amblyopia	1	0%	0	0%	0	0%	0	0%	0	0%	1	1%	0	0%
eye other	15	2%	1	1%	4	3%	2	1%	1	1%	2	1%	5	6%
Sickle Cell	20	2%	0	0%	3	2%	2	1%	7	6%	3	2%	5	6%
urinary infection	4	0%	0	0%	0	0%	0	0%	1	1%	1	1%	2	2%
urogen other	5	1%	0	0%	0	0%	1	1%	0	0%	3	2%	1	1%
nefro other	1	0%	0	0%	0	0%	1	1%	0	0%	0	0%	0	0%
old fracture	2	0%	0	0%	1	1%	1	1%	0	0%	0	0%	0	0%
skeletal other	9	1%	0	0%	1	1%	6	4%	1	1%	1	1%	0	0%
hernia(umbilical etc)	5	1%	1	1%	0	0%	1	1%	0	0%	1	1%	2	2%
abdomen other	1	0%	0	0%	1	1%	0	0%	0	0%	0	0%	0	0%

Table A8: Treatment among all children per geographical location

	Total		Ogugu		Amido		Loro Army		Atop		Agulurude		Loro HC	
	804		Total=143		Total=141		Total=168		Total=120		Total=146		Total=86	
	N	%	n	%	n	%	n	%	n	%	n	%	n	%
ferro	140	17%	23	16%	20	14%	20	12%	24	20%	44	30%	9	10%
mother iron	35	4%	3	2%	7	5%	2	1%	5	4%	11	8%	7	8%
multivitamins	126	16%	24	17%	21	15%	26	15%	19	16%	22	15%	14	16%
anti-worm	439	55%	91	64%	76	54%	103	61%	65	54%	65	45%	39	45%
acute worm	135	17%	11	8%	25	18%	14	8%	34	28%	30	21%	21	24%
anti-lice	2	0%	0	0%	2	1%	0	0%	0	0%	0	0%	0	0%
anti-scabies	17	2%	2	1%	3	2%	4	2%	1	1%	3	2%	4	5%
scabies soap	1	0%	0	0%	0	0%	1	1%	0	0%	0	0%	0	0%
amoxicillin	48	6%	12	8%	5	4%	2	1%	12	10%	8	5%	9	10%
augmentin	15	2%	4	3%	3	2%	1	1%	4	3%	2	1%	1	1%
2e lijns antibiotica	6	1%	2	1%	0	0%	0	0%	2	2%	0	0%	2	2%
malaria treatment	162	20%	22	15%	28	20%	29	17%	23	19%	40	27%	20	23%
ivermectine for lice	3	0%	0	0%	1	1%	2	1%	0	0%	0	0%	0	0%
paracetamol	44	5%	2	1%	8	6%	13	8%	9	8%	10	7%	2	2%
inhaler	11	1%	1	1%	1	1%	1	1%	5	4%	2	1%	1	1%
metranidazol	6	1%	1	1%	1	1%	1	1%	1	1%	2	1%	0	0%
co-trimoxazol	8	1%	2	1%	1	1%	1	1%	1	1%	1	1%	2	2%
ORS	5	1%	0	0%	0	0%	4	2%	0	0%	0	0%	1	1%
eardrops	12	1%	2	1%	3	2%	2	1%	2	2%	1	1%	2	2%
nystatine	5	1%	0	0%	0	0%	0	0%	3	3%	2	1%	0	0%
mupirocine=Bactroban	1	0%	0	0%	1	1%	0	0%	0	0%	0	0%	0	0%
hydrocortisone cream	31	4%	2	1%	4	3%	9	5%	8	7%	5	3%	3	3%
dactarin cream	65	8%	6	4%	8	6%	15	9%	18	15%	8	5%	10	12%
dactacort cream	6	1%	0	0%	0	0%	1	1%	1	1%	3	2%	1	1%
iodine	12	1%	1	1%	1	1%	2	1%	1	1%	5	3%	2	2%
fusidin cream	20	2%	4	3%	1	1%	3	2%	5	4%	3	2%	4	5%
neutral cream	13	2%	2	1%	2	1%	3	2%	0	0%	2	1%	4	5%
griseofulvine	44	5%	4	3%	10	7%	14	8%	7	6%	6	4%	3	3%
eyedrops	21	3%	1	1%	5	4%	3	2%	2	2%	5	3%	5	6%

Table A9: Follow-up of all children per geographical location

	Total		Ogugu		Amido		Loro Army		Atop		Agulurude		Loro HC	
	804		Total=143		Total=141		Total=168		Total=120		Total=146		Total=86	
	N	%	n	%	n	%	n	%	n	%	n	%	n	%
Dentist	3	0%	2	1%	1	1%	0	0%	0	0%	0	0%	0	0%
Specialist in hospital	22	3%	1	1%	3	2%	5	3%	4	3%	6	4%	3	3%
Revisit during medical camp	10	1%	0	0%	6	4%	3	2%	1	1%	0	0%	0	0%
Social program	5	1%	0	0%	3	2%	0	0%	0	0%	2	1%	0	0%
Diagnostics (HIV/Malaria)	150	19%	24	17%	27	19%	27	16%	21	18%	34	23%	17	20%
Nieuwendijk	14	2%	2	1%	3	2%	3	2%	1	1%	3	2%	2	2%
Project disabled children LTP	26	3%	5	3%	2	1%	8	5%	4	3%	5	3%	2	2%