Medical Checks for Children

Medical Report
Tanzania Mikocheni 2017

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December 2017

Introduction

In the third week of August 2017 Medical Checks for Children (MCC) visited several villages in the North of Tanzania for the eighth time. The MCC team checked and treated free of cost 1067 children of Mikocheni. The medical camp was organized for six days from 16th until 21st of August.

The MCC team consisted of six members from The Netherlands: Eryn Liem (medical manager and mission leader, paediatrician), Iris van de Gevel (logistics manager, toxicologist), Amy Gunning (surgeon in training), Jessica Pruijsen (resident in paediatrics), Nel Mocking (mediator) and Hedwig Gosselink (education advisor).

The medical checks were organized in close cooperation with NGO FT Kilimanjaro with the aim to improve general health of the community in Mikocheni.

The village of Mikocheni is located in the Kilimanjaro Region of northern Tanzania. The nearest hospital is Tanganyika Planting Company (TPC) hospital, approximately 15-20 km from Mikocheni.

Technical equipment, medical supplies and toothbrushes were brought from the Netherlands by MCC team members. Most of the medication was ordered by Gerbert. Soap for every child was purchased from local shops in Moshi.

The cooperation of FT Kilimanjaro (FTK) (in person of Gerbert Rieks, Harry Mwerinde, Eunice Mollel and Stella Mserikia) consisted of the following (amongst others):

- Education and selection of translators/local helpers.
- Providing board and lodging of all MCC team members.
- Transportation of the MCC team from Kilimanjaro airport to TPC and transportation to the check locations.
- Announcement of the medical camp in the villages.
- Making copies of all necessary papers.
- Giving support in ordering and delivery of medication.
- Giving all kinds of support to the MCC team during the medical camp.
- Bringing children to TPC hospital.
- Providing follow-up for the referred children to KCMC and CCBRT.

Medical Checks for Children on location:
The medical checks were performed in six days in three sub villages: Mikocheni Ndogo, Mikocheni Kubwa (including Masaini), Kirungu and Samanga. During the free of costs medical checks, the children were checked following the MCC 'carrousel':

1. Registration of the child
2. Measuring height and weight
3. Blood test (haemoglobin (Hb)) and urine test and/or malaria test when indicated
4. History and physical examination by a medical doctor
5. Providing medication (pharmacy)
6. HIV/AIDS counseling
7. Mother/child care questionnaire
8. Education on tooth brushing, hand hygiene and nutrition. A tooth brush, soap and tooth paste were given to each child.
9. ENT specialists

Special attention was given to the transfer of part of the medical carrousel to FTK team members. Station 1, 2, 3, 6, 7, 8 and 9 were completely performed by FTK team members, and were only supported incidentally by MCC team members. We did have to help the FTK members in starting up their stations and introducing new members to executing their tasks.
At the doctor's station, the MCC doctors were accompanied by three Tanzanian doctors. The Tanzanian doctors were working completely independently. In order to facilitate the process of cooperation, the MCC codes for diagnosis and treatment were translated in Kiswahili.
Two ENT doctors from KCMC Hospital in Moshi were present during all days of the medical camp. They evaluated children on request of the doctors in the carrousel, and could either treat the children with available medication or refer the children to the ENT department for further investigation and/or treatment on a later date.
For assistance and general knowledge of the population, the 3 Home Based Care workers were present during the medical camp, serving in several roles (e.g. plasters, registration), and more specifically for children referred to the hospital or a social program. The 3 village managers also played an important role in referring the children to the hospital and for all required follow-up actions.
At the education post, 2 interns from the Netherlands and a school teacher were training the children on tooth brushing and nutritious food.
Overall the composition of the MCC and FTK teams during the medical camp was as follows:

Station	MCC	FTK	
		workers	Translators
Coordination/computer	0.5	1	
Registration	0	2	
Measuring height/weight	0	2	
Blood test	0	3	
Doctor's examination	3	3	3
Pharmacy	2	1	1
HIV/AIDs counseling	0	1	
Education	0	1	2
Disabled children	0.5	1	
Tea/coffee	0	1	
Total	6	16	6

The cooperation between MCC and FTK workers worked great. Due to the unexpected high number of children, registration was sometimes hectic and busy. All FTK workers were quickly trained for their jobs. For the next medical camp we will have some further recommendations, as initially discussed after the finalization of the medical camp and further described given in the last chapter.

At each station, and especially at the physical examination and pharmacy stations, education was given to the children and their care takers on good nutrition and hygiene.
The MCC team paid special attention to the prevalence, treatment and prevention of anemia, growth abnormalities, worm infections and HIV/Aids.
HIV counseling was given to all caretakers (voluntary), and a HIV test could be offered to all caretakers and on medical indication for children, after agreement of the caretaker. Furthermore, on medical indication, a malaria test could be performed on the spot.

In cooperation with Driving Nurses, a questionnaire was prepared and all mothers were requested to answer questions on child mortality, mother-child care, the Mama bus, etc. The results of this questionnaire will be shared with FTK separately.

Results Mikocheni
In Mikocheni, we saw 1067 children in total. For Mikocheni Ndogo it was the fifth medical camp, for Mikocheni Kubwa and Kirungu it was the fourth medical camp, for Samanga it was the second and for Chem Chem the first.
Of all children, 37% of the children attended the medical camp also in 2016 (the registration notes of these children from 2016 were found). Far more children visited the medical camp in 2017 when compared to 2016 (713 children), which lowers the overall percentage of revisits. Still, considering the number of re-visits in the last years, we think the overall figure for revisits is an underestimation.
It is unclear why it was so busy during the medical camp in 2017. Possible factors might have been that FTK paid special attention to the announcements of the medical camp, it was checked if there were no competing events, and a kanga was given to the visiting mothers.
In Kirungu, Mikocheni Ndogo and Samanga we saw the same number of children as in 2016. We saw more than twice as many children from Masaini (147 versus 60 in 2016) and a third more in Kimkocheni Kubwa (390 compared to 291 in 2016).

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

	16-08-17	17-08-17	18-08-17	19-08-17	20-08-17	21-09-17	Total
Chem Chem	0	69	40	0	17	1	127
Kirungu	1	0	0	0	112	43	156
Masaini	0	0	50	75	17	5	147
Mikocheni Kubwa	1	1	124	157	81	26	390
Mikocheni Ndogo	0	0	0	0	0	142	142
Samanga	68	31	0	0	0	0	99
Others	0	1	1	0	1	3	6
Total	**70**	**102**	**215**	**232**	**228**	**220**	**1067**

In general it can be stated that most of the children coming from Masaini are Masai. Some other children coming from other subvillages were also reported as Masai; 3 from Chem Chem, 12 from Kirungu, 73 from Mikocheni Kubwa and 37 from Mikocheni Ndogo. Because we expected some differences in malnutrition and anemia according to tribe, we performed separate analyses according to tribe (Masai versus non-Masai). In total, we registered 274 (26%) chilren as being Masai, compared to 238 in 2016 (33%).

Table 2: Child with caretaker at the day of the check

	Total		Chem Chem		Kirungu		Masaini		Mikocheni Kubwa	
	1067		Total=127		Total=156		Total=147		Total=390	
	N	%	N	%	n	%	n	%	N	%
No	48	4%	43	34%	0	0%	0	0%	1	0%
Yes	1008	94%	84	66%	156	100%	145	99%	380	97%
Teacher	11	1%	0	0%	0	0%	2	1%	9	2%

	Mikocheni Ndogo		Samanga		Other	
	Total=142		Total=99		Total=6	
	N	%	N	%	n	%
No	0	0%	4	4%	0	0%
Yes	142	100%	95	96%	6	100%
Teacher	0	0%	0	0%	0	0%

Special attention was paid to the presence of caretakers during the medical camp, at the announcement of the medical camp and at registration. Almost all children (1008, 94%) brought a caretaker (48, 4% came with a teacher). We especially saw more children with caretakers in Kirungu and Samanga compared to last year. 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. We know that the presence of caretakers will make the medical camp more sustainable. Therefore, we stress that in the coming years, equal attention should be paid again to the presence of the children's caretakers.

Table 3: Summary of checked children per geographical location, age and gender

	Total		Chem Chem		Kirungu		Masaini		Mikocheni Kubwa	
	1067		Total=127		Total=156		Total=147		Total=390	
Age	**N**	**%**	**N**	**%**	**n**	**%**	**n**	**%**	**N**	**%**
<=1 year	210	20%	14	11%	29	19%	29	20%	74	19%
>1 en <5 years	348	33%	25	20%	54	35%	42	29%	145	37%
<5 years	545	51%	36	28%	83	53%	70	48%	216	55%
>=5 en <=10 years	450	42%	48	38%	72	46%	68	46%	165	42%
>10 years	72	7%	43	34%	1	1%	9	6%	9	2%
Gender										
Boy	501	47%	52	41%	80	51%	59	40%	189	48%
Girl	564	53%	75	59%	76	49%	88	60%	201	52%

	Mikocheni Ndogo		Samanga		Others	
	Total=142		Total=99		Total=6	
Age	**N**	**%**	**n**	**%**	**n**	**%**
<=1 year	41	29%	22	22%	1	17%
>1 en <5 years	38	27%	43	43%	1	17%
<5 years	79	56%	59	60%	2	33%
>=5 en <=10 years	58	41%	36	36%	3	50%
>10 years	5	4%	4	4%	1	17%
Gender						
Boy	66	46%	51	52%	4	67%
Girl	75	53%	47	47%	2	33%

Anemia

In 2017 42% of the 1067 children were anemic (in 2016 32% and in 2015 40%). For the Masai tribe the prevalence of anemia was 46%. The highest prevalence of anemia was seen in Masaini (52%), a Masai tribe village. In general, Masai might experience differences in living conditions, food availability and eating tradition when compared to the other tribes, which might explain this high prevalence when compared to the other sub-villages.

The Tanzania National Anemia Profile (Spring – US AID, 2010, https://www.spring-nutrition.org/sites/default/files/publications/anemia-profiles/spring_nap_tanzania.pdf) reports an overall prevalence of anemia of 58.6% for Tanzanian children under five. Thus, Mikocheni does compare well compared to the overall prevalence in Tanzania. We think that the lower prevalence found in 2016 was an underestimation (both in 2014 and 2015 the prevalences have been comparable to the 42% we found this year).

All children with anemia were treated with iron or multivitamins.

A total of 42 (4%) children had an Hb below 5 mmol/l (compared to 28 (4%) in 2016). Of the 42 children, 18 (43%) were from the Masai tribe. All these children were treated and will be invited for an Hb re-check after 3 months. In addition, all children with an Hb below 5 mmol/l were investigated for malaria and referred to TPC hospital if required (6 children were referred).

Table 4: Prevalence of anemia per geographical location by age and gender

	Total		Chem Chem		Kirungu		Masaini		Mikocheni Kubwa	
	1067		Total=127		Total=156		Total=147		Total=390	
	N	%	N	%	N	%	N	%	n	%
Anaemia	443	42%	35	28%	53	34%	77	52%	159	41%
No anaemia	614	58%	91	72%	101	65%	70	48%	228	58%
Unknown	6	1%	0	0%	0	0%	0	0%	2	1%
Hb <5,0 mmol	42	4%	2	2%	2	1%	12	8%	11	3%
Anaemia per age										
<=1 year	122	58%	8	57%	13	45%	21	72%	43	58%
>1 en <5 years	162	47%	5	20%	19	35%	29	69%	64	44%
<5 years	280	51%	12	33%	32	39%	49	70%	106	49%
>=5 en <=10 years	142	32%	12	25%	20	28%	25	37%	50	30%
>10 years	21	29%	11	26%	1	100%	3	33%	3	33%
Anaemia per gender										
Boy	222	44%	17	33%	30	38%	36	61%	80	42%
Girl	221	39%	18	24%	23	30%	41	47%	79	39%

	Mikocheni Ndogo		Samanga		Others		Masai tribe	
	Total=142		Total=99		Total=6		Total=274	
	N	%	N	%	N	%	N	%
Anaemia	66	46%	51	52%	2	33%	131	48%
No anaemia	75	53%	48	48%	1	17%	142	52%
Unknown	1	1%	0	0%	3	50%	0	0%
Hb <5,0 mmol	10	7%	5	5%	0	0%	18	7%
Anaemia per age								
<=1 year	24	59%	12	55%	1	100%	39	63%
>1 en <5 years	22	58%	23	53%	0	0%	48	61%
<5 years	46	58%	34	58%	1	50%	86	61%
>=5 en <=10 years	20	34%	14	39%	1	33%	42	34%
>10 years	0	0%	3	75%	0	0%	3	30%
Anaemia per gender								
Boy	33	50%	25	49%	1	25%	61	50%
Girl	33	44%	26	55%	1	50%	70	46%

During the medical check-ups, we gave nutritional advice to all children and their guardians with emphasis on vegetable intake and vitamin C. When it comes to the prevention of anemia, the vitamin C intake is important because vitamin C facilitates the uptake of iron in the gut (while milk and tea reduce its uptake). Therefore we recommend to add a vitamin C source to the school meal, e.g. a ¼ orange, lemon or tomato. As already planned for Kirungu, children might benefit from the school gardens and trees to be planted at the school. Not only when the fruits and vegetables are added to the school meal, but also from an educational point of view.

For babies, we advised exclusive breastfeeding up to six months, then start with the introduction of normal food and we discussed the possibilities of donation of breast milk by another woman when the normal supply is lacking.

Malaria tests were performed if suspected based on medical history, or based on an Hb below 5 mmol/l. Of 40 malaria tests, 0 tested positive (0 out of 27 in 2016, 3 out of 47 in 2015).
An HIV-counselor was present during the medical camp. All parents received counseling. On request of the parents, HIV-tests were available for parents and children. During the medical camp 58 HIV tests were performed, and of these tests one was positive.

Malnutrition
In total 8% (2016: 10%; 2015: 17%; 2014: 13%) of the children in Mikocheni were underweight, 10% (2016:10%; 2015:17%; 2014: 24%) were stunted and 4% (2016: 8%; 2015: 11%; 2014: 10%) wasted. Details can be found in tables 5, 6 and 7. In general, the prevalence of underweight, stunting and wasting has improved in 2016-2017, when compared to previous years. For the Masai tribe, the prevalence for underweight was 9%, stunting 9% and wasting 5% (no significant differences when compared to the whole population).
The millennium development goal for underweight is 15%. The WHO recently reported that of Tanzanian children < 5 years 13.4% are underweight, 34.7% suffers from wasting and 3.8% are stunted (WHO World statistics 2015).
Of children under five in Mikocheni 9% of the children are underweight, 4% are wasted and 14% are stunted (in 2016 6%, 6% and 12% respectively). The children of Mikocheni do better when compared to the overall WHO figures for underweight and wasting. More children are stunted in Mikocheni, when compared to the overall figures for stunting in Tanzania.
Stunting, or low height for age, is caused by long-term insufficient nutrient intake and frequent infections. Stunting generally occurs before age two, and effects are largely irreversible and have a huge impact on general development, school results and financial situation in later life.
Wasting, or low weight for height, is a strong predictor of mortality among children under five. It is usually the result of acute significant food shortage and/or disease.
Underweight encompasses both stunting and wasting.

Additional attention might be paid to availability of nutritious food in Mikocheni and knowledge on nutritious foods, for mothers and young children. In addition, possibilities to include a food program in the school, or to improve current food programs should be investigated. Furthermore, advises on hygiene and anti-worm treatment, are of importance to prevent gastro-intestinal infections leading to growth abnormalities.

Table 5: Prevalence of weight/age at or under P3 (underweight) per geographical location by age and gender

	Total		Chem Chem		Kirungu		Masaini		Mikocheni Kubwa	
	1067		Total=127		Total=156		Total=147		Total=390	
	N	%	N	%	N	%	n	%	N	%
Underweight	77	8%	5	6%	10	6%	17	12%	29	8%
No underweight	909	92%	77	94%	144	93%	122	88%	350	92%
Unknown	78	7%	45	35%	1	1%	8	5%	10	3%
Underweight children per age										
<=1 year	18	9%	1	7%	3	10%	4	14%	6	8%
>1 en <5 years	31	9%	3	12%	5	9%	7	17%	11	8%
<5 years	48	9%	3	8%	8	10%	11	16%	17	8%
>=5 en <=10 years	28	6%	2	5%	2	3%	6	9%	11	7%
>10 years	1	25%	0	0%	0	0%	0	0%	1	100%
Underweight children per gender										
Boy	31	6%	1	3%	5	6%	8	14%	12	6%
Girl	46	9%	4	9%	5	7%	9	11%	17	9%

	Mikocheni Ndogo		Samanga		Others	
	Total=142		Total=99		Total=6	
	N	%	n	%	n	%
Underweight	10	7%	5	5%	1	33%
No underweight	127	93%	87	94%	2	67%
Unknown	5	4%	6	6%	3	50%
Underweight children per age						
<=1 year	4	10%	0	0%	0	0%
>1 en <5 years	0	0%	5	12%	0	0%
<5 years	4	5%	5	8%	0	0%
>=5 en <=10 years	6	10%	0	0%	1	100%
>10 years	0	0%	0	0%	0	0%
Underweight children per gender						
Boy	3	5%	1	2%	1	50%
Girl	7	10%	4	10%	0	0%

Table 6: Prevalence of height/age at or under P3 (stunting) per geographical location by age and gender

	Total		Chem Chem		Kirungu		Masaini		Mikocheni Kubwa	
	1067		Total=127		Total=156		Total=147		Total=390	
	N	%	N	%	n	%	n	%	N	%
Stunting	108	10%	11	9%	13	8%	11	7%	44	11%
No stunting	951	90%	116	91%	142	91%	136	93%	344	89%
Unknown	6	1%	0	0%	0	0%	0	0%	2	1%
Stunting children per age										
<=1 year	27	13%	2	14%	5	17%	2	7%	10	14%
>1 en <5 years	52	15%	5	20%	5	9%	5	12%	22	15%
<5 years	76	14%	6	17%	10	12%	7	10%	30	14%
>=5 en <=10 years	24	5%	2	4%	3	4%	3	4%	10	6%
>10 years	8	12%	3	7%	0	0%	1	11%	4	50%
Stunting children per gender										
Boy	48	10%	4	8%	8	10%	6	10%	18	10%
Girl	60	11%	7	9%	5	7%	5	6%	26	13%

	Mikocheni Ndogo		Samanga		Others	
	Total=142		Total=99		Total=6	
	N	%	n	%	n	%
Stunting	18	13%	10	10%	1	33%
No stunting	123	87%	88	89%	2	67%
Unknown	1	1%	0	0%	3	50%
Underweight children per age						
<=1 year	7	17%	1	5%	0	0%
>1 en <5 years	6	16%	9	21%	0	0%
<5 years	13	16%	10	17%	0	0%
>=5 en <=10 years	5	9%	0	0%	1	100%
>10 years	0	0%	0	0%	0	0%
Stunting children per gender						
Boy	8	12%	3	6%	1	50%
Girl	10	14%	7	15%	0	0%

Table 7: Prevalence of weight/height at or under P3 (wasting) per geographical location by age and gender

	Total		Chem Chem		Kirungu		Masaini		Mikocheni Kubwa	
	1067		Total=127		Total=156		Total=147		Total=390	
	N	%	N	%	n	%	n	%	N	%
Wasting	29	4%	1	2%	5	4%	9	10%	8	3%
No wasting	763	96%	53	98%	124	95%	84	90%	311	97%
Unknown	273	26%	73	57%	26	17%	54	37%	71	18%
Wasting children per age										
<=1 year	11	5%	0	0%	3	10%	4	14%	3	4%
>1 en <5 years	12	3%	1	4%	2	4%	4	10%	2	1%
<5 years	23	4%	1	3%	5	6%	8	12%	5	2%
>=5 en <=10 years	4	2%	0	0%	0	0%	1	4%	1	1%
>10 years	2	40%	0	0%	0	0%	0	0%	2	67%
Wasting children per gender										
Boy	11	5%	1	4%	3	4%	5	12%	3	2%
Girl	12	3%	0	0%	2	3%	4	8%	5	3%

	Mikocheni Ndogo		Samanga		Others	
	Total=142		Total=99		Total=6	
	N	%	n	%	n	%
Wasting	3	3%	3	3%	0	0%
No wasting	106	97%	82	95%	3	100%
Unknown	33	23%	13	13%	3	50%
Wasting children per age						
<=1 year	1	2%	0	0%	0	0%
>1 en <5 years	0	0%	3	7%	0	0%
<5 years	1	1%	3	5%	0	0%
>=5 en <=10 years	2	7%	0	0%	0	0%
>10 years	0	0%	0	0%	0	0%
Wasting children per gender						
Boy	1	2%	0	0%	0	0%
Girl	2	4%	3	8%	0	0%

Deworming

The WHO recommends deworming in their current programs (2012, Deworming to combat the health and nutritional impact of soil-transmitted helminths, Biological, behavioural and contextual rationale). Soil-transmitted helminths, which include roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*) and hookworms (*Necator americanus* and *Ancylostoma duodenale*), are among the most common causes of infection in people who live in the developing world.

In general, Tanzania is still considered a country with a high prevalence (>50%) of soil-transmitted helminthiases (WHO, 2010, Working to overcome the global impact of neglected tropical diseases, First WHO report on neglected tropical diseases).

FTK implemented a deworming program in Mikocheni for all school children between 5 and 12 years. The last campaign was in May 2017, > 3500 children received a deworming tablet. All schools were given deworming tablets and corresponding information on treatment by FTK. The recommended drugs (albendazole 400 mg or mebendazole 100 mg) are effective, inexpensive and easy to administer by non-medically personnel.

Of all children checked in the medical camp, 12% of the children reported to have received deworming treatment in the last 6 months (see table 8a). In the Masai tribe, 11% of the children received deworming treatment.

Table 8a: Prevalence of preventive anti-worm treatment in the last half-year per geographical location by age and gender

	Total		Chem Chem		Kirungu		Masaini		Mikocheni Kubwa	
	1067		Total=127		Total=156		Total=147		Total=390	
	N	%	n	%	N	%	N	%	N	%
Anti-worm	128	12%	5	4%	20	13%	14	10%	72	18%
No anti-worm	939	88%	122	96%	136	87%	133	90%	318	82%
Anti-worm per age										
<=1 year	4	2%	0	0%	3	10%	0	0%	0	0%
>1 en <5 years	25	7%	1	4%	6	11%	3	7%	10	7%
<5 years	29	5%	1	3%	9	11%	3	4%	10	5%
>=5 en <=10 years	91	20%	3	6%	11	15%	10	15%	57	35%
>10 years	8	11%	1	2%	0	0%	1	11%	5	56%

	Mikocheni Ndogo		Samanga		Others		Masai Tribe	
	Total=142		Total=99		Total=6		Total=274	
	N	%	n	%	N	%	N	%
Anti-worm	9	6%	8	8%	0	0%	30	11%
No anti-worm	133	94%	91	92%	6	100%	244	89%
Anti-worm per age								
<=1 year	0	0%	1	5%	0	0%	0	0%
>1 en <5 years	0	0%	5	12%	0	0%	6	8%
<5 years	0	0%	6	10%	0	0%	6	4%
>=5 en <=10 years	8	14%	2	6%	0	0%	22	18%
>10 years	1	20%	0	0%	0	0%	2	20%

The highest coverage of deworming was seen in Mikocheni Kubwa, 35% of the children between 5 and 10, and 56% of the children above 10 years received deworming treatment, which is considered to be due to the FTK school deworming program. Overall the highest coverage was seen for the children above 5 years.
The percentage in 2017 is much lower than previous years (see table 8b). This cannot be explained by a difference in the percentage of children checked under the age of 5 years. Because most of the children going to school in Mikocheni are considered to be in the FTK deworming program, we would recommend investigating if school attendance has decreased or what other reason can be given for the low coverage.
In addition, a better coverage of the deworming campaign should be studied, for all non-school going children above 2 years.

Table 8b: Prevalence preventive anti-worm treatment in the last half-year per year

	Total 2014	Total 2015	Total 2016	Total 2017
Total	40%	51%	38%	12%

It should be noted that the number of children included in the deworming program, might be underestimated, based on incorrect information given by parents or children at registration.
In 2017, an active worm infection was suspected in 17 children (2%) (3 children in 2016 (0%) and 51 cases in 2015 (6%). This might be an underestimation, since no feces examination was performed and diagnoses was based on history. Two children were diagnosed with dysentery, 22 with diarrhea and 1 with giardia (suspected).
Simple ways of improving personal hygiene and sanitation through hand washing, nail trimming, wearing of shoes and use of a latrine and clear water supplies were encouraged.
Although all members of a population can be infected by worms, those who are at most risk and would benefit most from preventive interventions are the pre-school (2-5 years), school age children, adolescent girls and women of childbearing age.

Other diagnoses
Other diagnoses included dermatomycosis other than tinea capitis (132 children, 12.3%), tinea capitis (30, 2.8%), clinical signs of vitamin deficit (26, 2.4%), eczema (39, 3.7%), psychomotor retardation (5, 0.5%), epilepsy (7, 0.7%), umbilical hernia (23, 2.2%), pathological heart murmur (2, 0.2%), pneumonia (26, 2.4%), ear problems (otitis media acuta, otitis externa, tympanic perforation) (40, 3.7%), carries (69, 6.5%), fluorosis (78, 7.3%), scabies (10, 0.9%) keratoconjunctivitis (14, 1.3%) and urinary tract infection (10, 0.9%). Details can be found in Table 1-1 on diagnoses in the Appendix.
Compared to 2016, the prevalence of vitamin deficit, eczema, epilepsy, pneumonia, ear problems, scabies, keratoconjunctivitis and urinary tract infection have increased.
For the ENT problems, this could be due to the fact that ENT doctors were included during the entire medical camp. Although children were seen by one of the general doctors first, many were referred for a second look by the ENT doctors. The ENT doctors diagnosed in accordance with the MCC diagnosis codes, and found many more problems than previous years. We think that this is partly due to their expertise, and partly due to cultural differences. In the Netherlands, we do not consider ear wax to be a medical problem unless it causes functional problems. We treat it with oil or water, whereas the Tanzanian ENT doctors use hydrogen peroxide which needs follow-up. In the literature we did not find any evidence to suggest that hydrogen peroxide is superior to oil or even plain water to soften earwax.
Another problem often diagnosed by the ENT doctors was acute respiratory tract infections (otitis, pharyngitis, tonsillitis). The most common cause of ENT-infections are viral infections (which are scored as 'upper respiratory tract problems – other' by many Dutch physicians). Our Tanzanian colleague's state that in Tanzania high prevalence of bacterial infections is found, with a high prevalence of complications such as acute rheumatic fever and cerebral infections. In their opinion, antibiotics should be prescribed readily, even without any signs of an actual bacterial infection, to decrease bacterial colonization and thereby prevent such complications. This line of thinking is supported by the 'Addis Abeba communiqué'(Watkins D. et al. Seven key actions to eradicate rheumatic heart disease in Africa: the Addis Ababa communiqué). While rheumatic heart disease is nearly completely eradicated in the industrialized world, it still affects 1.5-3% of school-aged children in Africa. Other

developing countries have shown that eradication is feasible through comprehensive public health programs. Although the key actions in this article do not advocate preventive antibiotic treatment, it does suggest that rheumatic heart disease is still a major health problem.
The increased reported prevalence of pneumonia and urinary tract infections is most likely also due to cultural difference in prescribing antibiotics.
We think that the increased prevalence of scabies, eczema and clinical signs of vitamin deficit could be due to our Tanzanian colleagues recognizing these conditions better. We think that working together with Tanzanian doctors improves our knowledge and understanding of disease in the Tanzanian population.
This also holds true for knowledge on treatment. For example, resistance patterns of antibiotics. Cotrimoxazole is hardly prescribed by Tanzanian doctors because of resistance problems. And iron is not commonly prescribed to mothers of anaemic infants who are still breastfed. Analyzing the Hb-rechecks in 2015, we did not find an improvement in Hb after prescribing mothers iron. Although this could have been due to adherence problems, many studies have been published which show an increased risk of iron deficiency in exclusively breastfed infants, mainly after the first 6 months of life. This would suggest that iron supplementation should be prescribed to the infants themselves.
We treat scabies with ivermectin, but were not able to do so in the smaller children because our tablet require a minimum weight. For 2018, we would like to look into ordering scaboma, since this has been found to be equally effective compared to ivermectine according to the literature.

Referrals

If necessary, children were referred to TPC or CCBRT.
We referred 23 children to medical specialists at TPC Hospital for further evaluation and/or treatment, e.g. for suspected heart defect, severe anemia treatment, incision of cyst, umbilical hernia or dentist. Furthermore, 35 children were referred to and seen by CCBRT (34 in 2016). Some of these children were already known by CCBRT. We referred children with for example a clubfoot, burn wounds, developmental delay, rickets, spina bifida, etc. We are very pleased with the help of CCBRT and FTK in supporting these special needs children. Most of the children seen by CCBRT will receive further follow-up by a specialist at CCBRT or at KCMC. These visits will be coordinated and supported by FTK. Some of the children are referred to CCBRT for a week of intensive treatment and training of parents.

Furthermore, we identified 9 children who might need more attention, through a social program, e.g. for neglected children, single mothers, non-school going children, or extremely poor parents. The village managers and HBC's were requested to visit these families during the year to further discuss the situation and arrange for follow-up.
7 Children were referred directly to KCMC hospital in Moshi for further evaluation and treatment, e.g. for sickle cell crisis, and neurological problems. Unfortunately, the child with the sickle cell crisis died a few weeks after the medical camp.

30 Children were referred to the ENT department of KCMC hospital, based on the examination by the ENT specialists during the medical camp. Main reasons for referral were a possible need for tonsillectomy or hearing problems.

In order to support follow-up by FTK staff, lists of children referred to TPC, CCBRT and KCMC were sent to FTK, with photos and medical information of the children and the contact details of the parents.

Conclusions and recommendations

MCC is delighted to hear that there is a TPC outreach program in place in the sub-villages with a frequency of once per month and for children under five twice a month. We are also very pleased to hear that the Mama bus is working in the Mikocheni and ChemChem areas.

In addition to this, it is recommended to start education programs for mothers on mother/child care. Several topics can be considered: improvement of child food, education on breast feeding and additional feeding, education on hygiene and importance of deworming and education of the HBC's (e.g. first aid training).

Although there is a deworming program in place, still we see a lot of children which are not in the deworming program and these numbers have increased over the past 2 years. As the FTK deworming program is focused on the schoolchildren, and we see children between 0 and 9 years old, it is not a surprise many children at the medical camp did not receive a deworming agent in the last 6 months. However, we did find an increase also in school-aged children. Although this increase could have been due to reporting bias, we feel that further investigation in warranted to exclude other possible factors such as decreased school attendance. FTK might discuss with the health posts and governmental institutes how the deworming is arranged for the general population, and how the current program can be improved considered the overall low coverage in the villages. We would recommend to further discuss deworming with the DMO, and investigate how the children of at least two years of age and above can be reached, in order to have a better overall coverage of the children in Mikocheni. Yet again, and with more insistence than last years, we would like to stress the importance of a sound deworming program for the overall population, twice a year.

Based on our advice in the past years, the HBCs were provided with a first aid kit and instructions. Follow-up should be given to keep to boxes filled and the HBCs further trained in performing first aid. In addition, we would recommend to train the HBC or FTK workers embedded in the Mikocheni area in the coming year in health care topics, e.g. nutrition, mother-child care, to improve their health motivation skills.

One of the expected non-measured benefits of the medical camps is considered the transfer of knowledge. Knowledge about the importance of hygiene, deworming and nutritious foods. MCC considered this year's education program, again with Patience and Upendo, a success. We hope to continue next year with motivated FTK workers at this station. MCC and FTK need to discuss further topics and education methods to bring the most relevant messages across.

Considering the high prevalence of dental carries (69 children, which might be an underestimation), the importance of oral hygiene should be further considered. FTK might consider to implement brushing programs at the schools, as for instance the BAS program of NOSH (http://www.nohs.nl/).
This year a large number of children visited the medical camp (1067, versus 713 in 2016 and 798 in 2015). We are very grateful to FTK for all efforts to increase the number of children to the medical camp, e.g. through the announcements, flyers, and handing out a Kanga. Furthermore, once again MCC was thrilled by the presence of so many caretakers during the medical camp.

Handover

This year was the second year in the gradual handing over of the medical camp from MCC to FTK. Overall the cooperation between FTK and MCC team members worked well.
FTK workers can now fully run the first 3 stations (registration, measuring height/weight, and Hb-check). Although, there is still a need for further improvement at these first stations, to keep all well organized and to keep all organized and to speed up the process if necessary. In addition, transfer of knowledge on protocols from one year to the other (with changing team members) should be guaranteed.
At the doctor's station, the Tanzanian doctors worked independently, using the MCC codes for diagnosis and treatment, beside the MCC doctors (who worked with translators). Overall it can be concluded that both parties can learn from each other, but it seems that MCC doctors tend to be more restrained in referring children to hospitals for further examination than the Tanzanian doctors. This is something FTK should consider in future medical camps, as it will affect the financial budget but also the need for further coordination and follow-up for referred children. Once referred, the children should get the medication attention they need, and in most cases this means that arrangements should include transport and guidance to and in the hospital. In addition, there is a big difference between prescribing antibiotics between MCC doctors and Tanzanian doctors. This is something which might need some further attention for the medical camp of 2018.
This year, with the ENT doctors present all days during the medical camp, a lot of children were referred to the ENT department, and additional medication was prescribed (hydrogen peroxide for cerumen, lots of creams, antibiotics, ear/eye drops). We feel that in future medical camps, presence of one ENT doctors during 1 or maximum 2 days is considered sufficient, to have a review by the ENT doctor for special cases only.
With regard to pharmacy the initial thoughts are to set up two pharmacies: one for iron, multi-vitamins, and deworming, and another for all other medication. This would be in line with FTK's wish to probably provide only iron, multivitamins and deworming in their own medical carrousel. The first pharmacy can be gradually transferred to FTK, while the second pharmacy will still be covered by MCC. However, this year with

a lot of special medication prescribed by Tanzanian doctors and ENT doctors, and the high number of children, we could not handle all patients with two separate pharmacies, and the pharmacy was completely run by 2 MCC team members with the help of FTK translators.
We are not keen to consider a further reduction in MCC staff for the medical camp of 2018. 6 MCC team members are considered the minimum number of team members required for a good flow, control, and registration of the work. This is based on the following considerations:

- The FTK team needs to be further made responsible for the actual set-up and breakdown of the stations, the cleanliness of the tools, equipment and necessary goods. For this goal we recommend the FTK team to develop SOPs (standard operating procedures) for all stations, which can be reviewed by the MCC team. In addition, each station will be captained by one FTK team member at the 2018 medical camp. This person will be responsible for the set-up, necessary equipment, flow and personnel working at this station.
- More attention should be paid by MCC to increase uniformity in diagnosis, treatment, referrals and also documentation, by both MCC and FTK doctors.
- We learned in 2017 that the pharmacy cannot be transferred easily. Although we initially worked with 2 separate pharmacies (one for multivitamin, iron and deworming and one for all other medication), this turned out not to be feasible. Partly due to the number of children checked, but also because one single pharmacy provides a final check to ensure that all doctors follow MCC protocol as much as possible.
- With CCBRT coming for 3 days during the medical camp, we need one of the MCC team members involved in order to keep track of further needs, appointments and referrals.
- The number of referrals by Tanzanian doctors is higher, which takes time, otherwise spent by checking children.

In conclusion, when MCC is still on board in the medical camp, the overall responsibility for the medical care of the children is for MCC. A complete transfer of the medical camp is not possible in 2018. FTK is asked to send us a further plan for 2018 and beyond, and the SOPs for review. Once FTK plans are available, MCC can discuss the further needs with FTK and with the MCC board and prepare for the 2018 medical camp.

Final words

We are very grateful for all work performed by Gerbert, Eunice, Stella, Harry, doctors, HBCs, translators and helpers during the medical camps in Mikocheni. We could not have performed our work without their presence and hard work. The cooperation with TPC, TPC hospital, CCBRT and KCMC hospital is of greatest importance for all the children that need additional help. We are grateful for the efforts of FTK to keep all parties united.

Although much improvement is still needed in the general health care of the children of Mikocheni, Kirungu, ChemChem and Samanga, we feel confident that much will be achieved in the following years. We would therefore like to thank all people working at FTK, TPC, TPC hospital and CCBRT for their enthusiasm and cooperation.

Iris van de Gevel and Eryn Liem

Appendix 1 – Detailed tables for Mikocheni

Table Appendix 1 – 1: Disease prevalence among all children per geographical location

	Total		Chem Chem		Kirungu		Masaini		Mikocheni Kubwa		Mikocheni Ndogo		Samanga		Other	
	1067		Total= 127		Total= 156		Total= 147		Total= 390		Total= 142		Total= 99		Total= 6	
	N	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Underweight	77	7%	5	4%	10	6%	17	12%	29	7%	10	7%	5	5%	1	17%
Stunting	108	10%	11	9%	13	8%	11	7%	44	11%	18	13%	10	10%	1	17%
Wasting	29	3%	1	1%	5	3%	9	6%	8	2%	3	2%	3	3%	0	0%
Anaemia	443	42%	35	28%	53	34%	77	52%	159	41%	66	46%	51	52%	2	33%
HIV pos.	9	1%	1	1%	0	0%	1	1%	6	2%	1	1%	0	0%	0	0%
AIDS	1	0%	0	0%	0	0%	0	0%	1	0%	0	0%	0	0%	0	0%
Malaria (suspected)	11	1%	2	2%	0	0%	1	1%	4	1%	4	3%	0	0%	0	0%
vitamin deficit (clinical signs)	26	2%	1	1%	6	4%	5	3%	10	3%	4	3%	0	0%	0	0%
Bilharzia	2	0%	1	1%	0	0%	0	0%	1	0%	0	0%	0	0%	0	0%
syndrome n.o.s.	7	1%	3	2%	0	0%	0	0%	2	1%	0	0%	2	2%	0	0%
pneumonia (clinical)	26	2%	4	3%	2	1%	3	2%	6	2%	1	1%	10	10%	0	0%
pneumonia (X-ray confirmed)	1	0%	1	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
tuberculosis (clinical)	1	0%	0	0%	0	0%	1	1%	0	0%	0	0%	0	0%	0	0%
bronchitis	6	1%	1	1%	0	0%	0	0%	2	1%	2	1%	1	1%	0	0%
BHR/asthma	3	0%	0	0%	0	0%	0	0%	2	1%	1	1%	0	0%	0	0%
gardia (suspected)	1	0%	0	0%	0	0%	0	0%	0	0%	1	1%	0	0%	0	0%
dysenteria	2	0%	0	0%	0	0%	0	0%	1	0%	1	1%	0	0%	0	0%
dehydration : acute diarrhoea	5	0%	0	0%	0	0%	0	0%	3	1%	0	0%	2	2%	0	0%
diarrhoea without dehydration	17	2%	0	0%	3	2%	0	0%	7	2%	6	4%	1	1%	0	0%
constipation	9	2%	0	0%	1	1%	0	0%	5	1%	3	2%	0	0%	0	0%
active worm infection	17	2%	2	2%	3	2%	3	2%	10	3%	1	1%	0	0%	0	0%
otitis media acuta	9	1%	1	1%	0	0%	1	1%	4	1%	1	1%	0	0%	0	0%
otitis media with effusion	5	0%	0	0%	1	1%	0	0%	2	1%	2	1%	0	0%	0	0%
otitis externa	15	1%	2	2%	4	3%	3	2%	3	1%	1	1%	2	2%	0	0%
tympanic perforation	3	0%	0	0%	0	0%	1	1%	1	0%	1	1%	0	0%	0	0%
Mastoiditis	1	0%	0	0%	0	0%	0	0%	1	0%	0	0%	0	0%	0	0%
(adeno)tonsillitis	20	2%	4	3%	2	1%	2	1%	3	1%	0	0%	9	9%	0	0%
hearing impairment	8	1%	2	2%	1	1%	1	1%	4	1%	0	0%	0	0%	0	0%
other (e.g. cerumen)	53	5%	7	6%	6	4%	4	3%	19	5%	2	1%	15	15%	0	0%
cariës n.o.s.	69	6%	17	13%	13	8%	9	6%	17	4%	8	6%	5	5%	0	0%

	Total		Chem Chem		Kirungu		Masaini		Mikocheni Kubwa		Mikocheni Ndogo		Samanga		Other	
	1067		Total= 127		Total= 156		Total= 147		Total= 390		Total= 142		Total= 99		Total= 6	
	N	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Fluorosis	78	7%	27	21%	8	5%	9	6%	20	5%	9	6%	5	5%	0	0%
caries with pain	4	0%	0	0%	0	0%	0	0%	3	1%	1	1%	0	0%	0	0%
wounds n.o.s.	2	0%	0	0%	1	1%	0	0%	0	0%	0	0%	0	0%	1	17%
eczema n.o.s.	39	4%	3	2%	4	3%	10	7%	17	4%	2	1%	3	3%	0	0%
dermatomycosis	132	12%	9	7%	16	10%	27	18%	42	11%	23	16%	15	15%	0	0%
Impetigo/furunculosis	4	0%	1	1%	1	1%	0	0%	1	0%	1	1%	0	0%	0	0%
Scabies	10	1%	0	0%	0	0%	6	4%	2	1%	1	1%	1	1%	0	0%
wounds infected,	8	1%	0	0%	0	0%	3	2%	4	1%	1	1%	0	0%	0	0%
insect bite	2	0%	0	0%	0	0%	0	0%	1	0%	0	0%	1	1%	0	0%
Tinea capitis	30	3%	2	2%	4	3%	9	6%	10	3%	1	1%	4	4%	0	0%
psychomotoric retardation	5	0%	1	1%	0	0%	3	2%	1	0%	0	0%	0	0%	0	0%
Epilepsy	7	1%	2	2%	0	0%	1	1%	2	1%	0	0%	1	1%	1	17%
spina bifida	1	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	17%
migraine/headache	1	0%	1	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
leg kramps	1	0%	0	0%	0	0%	0	0%	1	0%	0	0%	0	0%	0	0%
physiological murmer	12	1%	1	1%	1	1%	2	1%	5	1%	1	1%	0	0%	2	33%
pathological murmur (suspected)	2	0%	0	0%	0	0%	0	0%	1	0%	0	0%	1	1%	0	0%
refractory problem	1	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%	0	0%
Strabismus	1	0%	0	0%	0	0%	1	1%	0	0%	0	0%	0	0%	0	0%
keratoconjunctivitis	14	1%	0	0%	4	3%	3	2%	6	2%	1	1%	0	0%	0	0%
inguinal hernia	3	0%	0	0%	0	0%	0	0%	1	0%	1	1%	1	1%	0	0%
urinary infection	10	1%	2	2%	1	1%	2	1%	2	1%	2	1%	1	1%	0	0%
chronic kidney path.	3	0%	0	0%	0	0%	1	1%	1	0%	1	1%	0	0%	0	0%
old fracture	1	0%	0	0%	0	0%	1	1%	0	0%	0	0%	0	0%	0	0%
hernia(umbilical etc)	23	2%	2	2%	3	2%	1	1%	12	3%	3	2%	2	2%	0	0%

Table Annex 1-2: Treatment among all children per geographical location

	Total		Chem Chem		Kirungu		Masaini		Mikocheni Kubwa		Mikocheni Ndogo		Samanga		Other	
	1067		Total=	127	Total=	156	Total=	147	Total=	390	Total=	142	Total=	99	Total=	6
	N	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
ferro	295	28%	18	14%	35	22%	52	35%	111	28%	46	32%	32	32%	1	17%
mother iron	29	3%	1	1%	2	1%	8	5%	8	2%	8	6%	2	2%	0	0%
multivitamins	221	21%	23	18%	33	21%	31	21%	84	22%	30	21%	19	19%	1	17%
anti-worm	693	65%	91	72%	113	72%	103	70%	240	62%	88	62%	56	57%	2	33%
acute worm	24	2%	2	2%	3	2%	7	5%	10	3%	1	1%	1	1%	0	0%
anti-lice	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
anti-scabies	8	1%	0	0%	0	0%	5	3%	2	1%	1	1%	0	0%	0	0%
amoxicillin	43	4%	8	6%	3	2%	9	6%	9	2%	3	2%	10	10%	1	17%
augmentin	11	1%	3	2%	1	1%	0	0%	5	1%	1	1%	1	1%	0	0%
2e lijns antibiotica	8	1%	0	0%	0	0%	0	0%	2	1%	2	1%	4	4%	0	0%
metranidazol	21	2%	1	1%	3	2%	0	0%	7	2%	8	6%	2	2%	0	0%
co-trimoxazol	3	0%	0	0%	0	0%	0	0%	2	1%	1	1%	0	0%	0	0%
AB urine infection	2	0%	1	1%	0	0%	0	0%	0	0%	0	0%	1	1%	0	0%
paracetamol	56	5%	9	7%	11	7%	9	6%	19	5%	7	5%	1	1%	0	0%
ORS	6	1%	0	0%	1	1%	0	0%	4	1%	1	1%	0	0%	0	0%
eardrops	22	2%	5	4%	3	2%	0	0%	8	2%	4	3%	2	2%	0	0%
nystatine	3	0%	0	0%	1	1%	1	1%	0	0%	0	0%	1	1%	0	0%
mupirocine=Bactroban	8	1%	1	1%	3	2%	0	0%	2	1%	1	1%	1	1%	0	0%
hydrocortisone cream	30	3%	1	1%	0	0%	6	4%	17	4%	2	1%	4	4%	0	0%
dactarin cream	69	6%	6	5%	6	4%	10	7%	25	6%	11	8%	11	11%	0	0%
dactacort cream	5	0%	0	0%	0	0%	1	1%	0	0%	1	1%	3	3%	0	0%
fusidin cream	13	1%	0	0%	0	0%	4	3%	3	1%	3	2%	2	2%	1	17%
neutral cream	1	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%	0	0%
griseofulvin	32	3%	0	0%	5	3%	10	7%	9	2%	6	4%	2	2%	0	0%
eyedrops	38	4%	5	4%	9	6%	5	3%	15	4%	4	3%	0	0%	0	0%
folic acid	2	0%	0	0%	0	0%	1	1%	1	0%	0	0%	0	0%	0	0%
hydrogen peroxide drops	23	2%	1	1%	1	1%	1	1%	17	4%	1	1%	2	2%	0	0%
itraconazole	3	0%	0	0%	0	0%	0	0%	3	1%	0	0%	0	0%	0	0%
nasal drops	10	1%	0	0%	1	1%	0	0%	7	2%	1	1%	1	1%	0	0%