Medical Checks for Children

Medical Report
Tanzania Mtakuja 2012

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Introduction:
In the third week of July 2012, Medical Checks for Children (MCC) visited for the fourh time Mtjakuja, a small village in the North of Tanzania (Africa).
The MCC team checked and treated free of cost 1023 children (mainly aged 12 years and below). The medical camp was organized for seven days starting the 15th of July, at two different locations.

The MCC team consisted of ten members from The Netherlands: Karlien Bongers (medical-end-responsible and mission leader, general surgeon and consultant), Iris van de Gevel (organization-end-responsible, toxicologist), Anne Vlietstra (family doctor), Kaj Wage (paediatrician), Reini Knoppers (youth doctor), Danielle de Jongh (youth doctor), Nicky Jacobs (dental assistant), Marinke van der Kroon (policy advisor), Oscar van der Kroon (managing editor) and Loes van der Linden (children's nurse).

The medical checks were organized in close cooperation with The Mtakuja Development Project, a partnership between Mtakuja village and the Dutch NGO FD Kilimanjaro with the aim to eradicate poverty from the community of Mtakuja.
The village is located in the Kilimanjaro Region of northern Tanzania. It has approximately 4250 inhabitants (2008) of whom more than 50% are younger than 20 years of age.
The nearest hospital is Tanganyika Planting Company (TPC) hospital, approximately 6 to 11 km from Mtakuja (2-3 hours by foot, 1-2 hours by bike).

Technical equipment and some of the supplies and medication were brought from Europe by MCC team members.
Most of the medication was ordered by Gerbert Rieks from TPC hospital with help of Dr. Harry Mwerinde. An overview of all purchased medicine can be found in Appendix D.
Soap and tooth paste for every child was purchased from local shops in Moshi and was sponsored by Iris van de Gevel. Toothbrushes and plaque control tablets were donated through sponsor activities of Nicky Jacobs and Saskia van der Kroon.

The cooperation of FD Kilimanjaro (in person of Gerbert Rieks and Stella Mserikie) existed out 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.
- Arranging the cooperation with eye doctor Chantal Giramahoro (KCMC), CCBRT and Pius Tarimo, dental assistant and Tamari Moses (former HIV counselar of TPC hospital).

We are grateful to all the parents, care takers and community people for bringing the children and helping to conduct the program. We are happy we got the opportunity to work with and to learn from all volunteers, translators and other supporting members who have helped directly or indirectly, despite their own obligations.

Our special thanks go to the following people:

- FDK coordinator Gerbert Rieks
- MCC and FDK "mamma" Stella Msarekie
- Translators: William Mshana, Gasper Muli, Peris Liverson, Ian Saria, John Robert, Benedicta Msarekie, Ibrahim Lema, Felista Haule, David Mgidia, Zacharia Yacob, Sylvanus Mmanga, Elisabeth Eduard and Upendo Jamanne
- HIV/AIDs couselar Tamari Moses
- Pius Tarimo, dental assistant of TPC hospital
- TPC company for providing board and lodging for the MCC team

- Leif Stabell, University College Utrecht for collaboration during the medical camp.
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- Marieke Dekker, neurologist at of the Kilimanjaro Christian Medical Centre (KCMC)
- The CCBRT teamfor follow-up for the disabled children
- Doctor Harry Mwerinde of TPC hospital
- Rachel Simon, Veina Kiribot, Reiness Rodges and Raula Mohamed for cleaning, cooking and tea.
- FEMI, in the person of Douwe de Vries, for the financial support of the medical camp.

Medical Checks for Children on location:

The medical checks of the 1023 children were performed in seven days at two different locations. The first three days MCC was based at Mtakuja Primary school, and the last four days at the new Community health centre. 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. Food and water inventory
4. Blood test (haemoglobin)
5. Physical examination by a medical doctor
6. Giving medication (pharmacy)
7. HIV/AID counseling
8. Education on tooth brushing (a tooth brush, soap and tooth paste was given to each child)

At each station, and specially at physical examination and pharmacy station, 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 anaemia, growth abnormalities, worm infections and HIV/Aids. In addition to the information given to the parents during the medical camp, a special training was given to the Community Health Workers. For the seond time, a HIV test was performed for all mothers (voluntary) and on medical indication for children as part of the carrousel.

At registration, efforts were made in order to retrieve the forms of all children seen in 2011, 2010 and 2009 in the medical camp, in order to have medical follow-up information available.

Of all children seen in this year, 758 children (74%) were seen previously and for 265 children (26%) it was indicated that in 2012 was their first check-up.
Since the age distribution in these three groups of children is not the same (see table 1a), we can not the compare the groups without any bias.

Table 1a *Summary of number check-ups by age for newly and previously checked children*

LOCATION	New checked in 2012				Previously checked			
	N			%	N			%
Total	265	/	1023	26%	758	/	1023	74%
Age								
>=0 and <1	44	/	265	17%	10	/	758	1%
>=1 and <5	74	/	265	28%	242	/	758	32%
>=5 and <12	143	/	265	54%	503	/	758	65%
>=12 and <18	3	/	265	1%	3	/	758	0%

Of all children seen in the medical camp the last four days, overall 34% was (known as) a child of a TPC employee.

Furthermore, on two days the Tanzanian organisation CCBRT, based in Moshi, joined the medical camp to investigate disabled children. During their visit, CCBRT investigated and questioned handicapped children and their parents. For each child they set up a programme in order to support the children with disabilities and to assist parents. Several children and parents seen at the medical camp for the first time were invited by CCBRT to join a week of intensive training at the CCBRT office in Moshi. CCBRT made appointments for further assessment and surgery (paediatric, eyes, orthopaedics, neurosurgery). For some of the children appointments with hospitals were made, e.g. for an operation for club feet in Matsjane hospital, or for other children in KCMC. In addition, most were children included in the CCBRT outreach programme set up last year were seen by CCBRT to give further follow-up.

During the medical camp, Nicky Jacobs (dental prevention assistant) gave tooth brush instructions for small groups of children of the Mtakuja school, and the Mserekia school. During these tooth brush instructions, plaque control tablets were used.
Furthermore, in conversations with teachers, parents, translators and (sub)village leaders, we were further informed about live conditions of the community, as (drinking) water access, food (availability), and other factors influencing health. In addition, as part of the carrousel, an inventory on mother and child care and child-mortality for all sub villages was made. The results can be found in Table 14 and 15.

On several days, as part of the medical camp, the dental assistant of TPC hospital, investigated children with caries with pain and referred children to TPC hospital for further investigation and treatment.

It should be noted that FD Kilimanjaro supported the children who were referred to TPC and KCMC hospital financially.

All sub villages of Mtakuja (see Table 1b) are poor rural areas. Mtakuja consists of several sub villages: Mafuriko, Mbeya Kubwa, Remiti, Risavu, Mabatini, Josho and Upareni.

During the week, MCC checked 1023 children. Due to the high risk of mortality and morbidity under five years of age, the focus of MCC is checking young children.
Off all checked children, 99% of the children had the age of twelve years or younger and 36% of the children had the age of five or younger.

Table 1b *Summary of number check-ups per geographical location by age and gender*

LOCATION	Josho		Upareni		Mabatini		Risavu		Mbeya Kubwa		Mafuriko		Remiti		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Total	206		111		109		53		151		269		123		**1023**	
Age																
>=0 and <1	7	3%	8	7%	4	4%	3	6%	8	5%	15	6%	9	7%	54	**5%**
>=1 and <5	53	26%	31	28%	29	27%	14	26%	48	32%	90	33%	51	41%	316	**31%**
>=5 and <12	145	70%	70	63%	75	69%	35	66%	94	62%	164	61%	63	51%	646	**63%**
>=12 and <18	1	0%	2	2%	1	1%	1	2%	1	1%	0	0%	0	0%	6	**1%**
Boy	91	44%	61	55%	51	47%	26	49%	76	50%	137	51%	67	54%	509	**50%**
Girl	115	56%	49	44%	57	52%	27	51%	73	48%	127	47%	57	46%	505	**49%**
Gender unknown	0	00%	0	0%	1	1%	0	0%	1	1%	4	2%	0	0%	6	**1%**
School	131	64%	70	63%	81	74%	37	70%	93	62%	160	59%	63	51%	635	**62%**
Non-school	75	36%	41	37%	28	26%	16	30%	58	38%	109	41%	60	49%	388	**38%**

We identified 635 (62%) children who are going to schools with the food program of FD Kilimanjaro (in 2010 :757 (62%), the numbers of 2011 on school-going children are considered incorrect: 432 (35%)). Most of the school-children are visiting Mserekia school or Mtakuja school. There are two children visiting another school: one to the Chekereni school, and one to the Mabogini school. Because of age differences school-children cannot be compared with the whole group of non-school children.

Some of the major diagnoses and ailments are presented in table 2.

Table 2 *Frequency of major diagnoses per geographical location*

Major diagnoses	Anaemia		Deep Anaemia		Dermatomycosis		Pneumonia		Urinary tract infection		Active worm infection	
	N	%	N	%	N	%	N	%	N	%	N	%
Josho	116/206	56	14/206	7	9/206	4	3/206	1	2/206	1	7/206	3
Upareni	65/111	59	6/111	5	8/111	7	1/111	1	1/111	1	1/111	1
Mabatini	60/109	55	5/109	5	9/109	8	2/209	2	1/109	1	2/109	2
Risavu	35/53	66	3/53	6	2/53	4	0/53	0	0/53	0	1/53	2
Mbeya Kubwa	79/151	52	17/151	11	4/151	3	1/151	1	2/151	1	1/151	1
Mafuriko	149/269	55	16/269	6	9/269	3	1/269	0	5/269	2	6/269	2
Remiti	89/123	72	27/123	22	0/123	0	6/123	5	4/123	3	2/123	2
Total	**593/1023**	**58**	**88/1023**	**9**	**41/1023**	**4**	**14/1023**	**1**	**15/1023**	**2**	**20/1023**	**2**

Most of the ailments, could be treated on the spot.

We referred 46 children to medical specialists in the TPC Hospital for further diagnoses and/or treatment, 69 children for a blood test after 3 months to TPC Hospital (due to low Hb), and 116 children and/or mothers were tested for HIV.

Furthermore, 33 children were referred to and seen by CCBRT.
In order to support follow-up by FD Kilimanjaro and TPC hospital, lists of children referred to TPC for a medical specialist or blood test after three months will be send by MCC to Gerbert Rieks and Harry Mwerinde.

1: <u>Growth abnormality and malnutrition:</u>
(underweight: 14% (145/1014), stunting: 16% (161/1023), wasting: 8% (55/683))

Percentages of growth retardation is correlated with poverty, malnutrition, living conditions, hygiene and the prevalence of chronic diseases.
According to UNCCA the two major causes of malnutrition are poor feeding practices and inadequate childcare. Adequate food intake and education programs addressing nutrious food need to be provided. Malnutrition is thought to account for one third of all deaths of children under five years of age (UN Millennium Developmental Goals).

Many children younger than 5 years in developing countries are exposed to multiple risks, including poverty, malnutrition, poor health, and un-stimulating home environments, which detrimentally affect their cognitive, motor, and social-emotional development. There are few national statistics on the development of young children in developing countries. Two factors are which are available worldwide, namely the prevalence of early childhood stunting and the number of people living in absolute poverty, can be used as indicators of poor development. Both indicators are closely associated with poor cognitive and educational performance in children who are not fulfilling their developmental potential. Most of these children live in south Asia and sub-Saharan Africa. These disadvantaged children are likely to do poorly in school and subsequently have low incomes, high fertility, and provide poor care for their children, thus contributing to the intergenerational transmission of poverty.
Although under nutrition in infancy and early childhood is thought to adversely affect cognitive development, the evidence of lasting effects is not well established. A study in a cohort of Filipino children shows lower test scores at school age in children stunted between birth and two years than non-stunted children, which was the result of a substantial delay in initial enrolment as well as higher absenteeism and repetition of school years among stunted children. Interactions between stunting and schooling were not significant, indicating that stunted and non-stunted children benefitted similarly from additional schooling. However, after multivariate adjustment, severe stunting at age two years remained significantly

associated with later deficits in cognitive ability. Results emphasize the need to prevent early stunting and to provide adequate schooling to disadvantaged children.
A report of the World Bank shows that one percentage decrease in adult height due to childhood stunting correlates with 1.4 percentage loss of productivity. The report shows furthermore the fact that stunting in general is associated with as much as eleven points decrease in Intelligence Quotient (IQ). Malnutrition is thought to account for one third of all deaths of children under five years of age (UN Millennium Developmental Goals).

The survey of FD Kilimanjaro in the Mtakuja in 2008 showed that 37% of the families live on just one meal a day, 42% get two and 21% get three meals a day. The same survey noted that the typical household's diet is additionally very low in diversity of food products.

MCC assessed growth abnormalities, 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.
- 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.

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. 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.
Data on stunting were complete as opposed to underweight and wasting data. However, estimation of age is sometimes troublesome without official documents stating date of birth and children or even parents not knowing children's age, making the stunting data less reliable than wasting data.

It has to be noted that reference data were only available for certain heights, weights and ages (as specified above), leading to the following general prevalence's of growth abnormalities in Mtakutja:

Table 3a *Prevelance of underweight in all children checked in 2009, 2010, 2011 and 2012.*

Underweight	Total 2009		Total 2010		Total 2011		Total 2012	
Total	176/1179	**15%**	167/1221	**14%**	172/1216	**14%**	145/1014	**14%**
>=0 and <1	14/68	21%	16/81	20%	17/101	17%	7/54	13%
>=1 and <5	68/405	17%	62/364	17%	64/374	17%	38/315	12%
>=5 and <12	94/706	13%	89/771	12%	91/721	13%	100/644	16%

Table 3b *Prevelance of stunting in all children checked in 2009, 2010, 2011 and 2012.*

Stunting	Total 2009		Total 2010		Total 2011		Total 2012	
Total	251/1188	**21%**	152/1220	**12%**	191/1217	**16%**	161/1023	**16%**
>=0 and <1	24/68	35%	8/81	21%	24/101	24%	10/54	19%
>=1 and <5	107/403	27%	78/364	8%	99/374	26%	74/316	23%
>=5 and <12	117/711	16%	65/770	10%	66/722	9%	77/646	12%

Table 3c *Prevelance of wasting in all children checked in 2009, 2010, 2011 and 2012.*

Wasting	Total 2009		Total 2010		Total 2011		Total 2012	
Total	78/860	**9%**	103/752	**14%**	53/856	**6%**	55/683	**8%**
>=0 and <1	9/66	14%	17/80	21%	7/99	7%	3/53	6%
>=1 and <5	35/401	9%	52/356	15%	30/373	8%	24/312	8%
>=5 and <12	34/393	9%	34/316	11%	16/379	4%	28/317	9%

The frequency of underweight, wasting and stunting of all children checked in 2012 are given in table 3a, b and c. In addition, the figures of 2009, 2010 and 2011 are added for comparative reasons.

There are no clear trends seen in growth abnormalities between the groups of checked children in 2009, 2010, 2011 and 2012. Although there seems to be a trend in a decrease in stunting. There is no positive effect seen from the efforts made in de medical camp, or by FDK. However, one should keep in mind that the living conditions, as the availability of food and drinking water has not improved in the last years and might be deteriorated in the last year and the age distribution in the three groups of children is not the same (see table 1a), these groups are not comparable without any bias. In the group of children which we checked in 2010 and 2011 more children are in age category one to five years of age. At this age growth disturbances and anaemia is more common.

In Table 4, details on the growth abnormalities per geographical location are given for 2012. In addition, data for children attending school and not attending school are given. For non-school children, only the children of age 5-12 were included in order to make a comparison possible. The children attending school (most of them with the FD Kilimanjaro food program) did better on all parameters for growth abnormalities. Therefore it is recommended to continue with the food program on the schools.

The high incidence of underweight in Remiti and stunting in Mbeya Kubwa is should be taken into consideration for further recommendations. Additional education on nutritious food by community health workers specified for each subvillage, looking to possibilities to promote home gardening or increase participation in the agricultural project of FD Kilimanjaro should be investigated in order to improve the malnutrition in the Mtakuja.

Table 4 *Prevalence of underweight, wasting and stunting per geographical location in 2012*

	Underweight				Stunting				Wasting			
	n	/	N	%	n	/	N	%	n	/	N	%
Josho	34	/	204	17%	36	/	206	17%	9	/	126	7%
Upareni	7	/	109	6%	11	/	111	10%	2	/	76	3%
Mabatini	6	/	107	6%	15	/	109	14%	0	/	66	0%
Risavu	5	/	52	10%	6	/	53	11%	3	/	32	9%
Mbeya Kubwa	15	/	150	10%	32	/	151	21%	10	/	103	10%
Mafuriko	47	/	268	18%	46	/	269	17%	12	/	181	7%
Remiti	31	/	123	25%	15	/	123	12%	19	/	98	19%
School	86	/	592	15%	59	/	594	10%	27	/	269	10%
Non-school	14	/	52	27%	18	/	52	35%	1	/	48	2%
Total	**145**	**/**	**1014**	**14%**	**161**	**/**	**1023**	**16%**	**55**	**/**	**683**	**6%**

The amount of growth abnormalities in the group of the children of Rimiti (and also in Josho, though in a lesser extent) are alarming and further investigation for the underlying reasons is required.

In comparison of the Tanzania data, with 21.8 % underweight children and 37.7 % stunted children, the population of Mtakutja seems with the prevalence of underweight in 14% and stunting in 16% of the children a little bit better. The children attending a school with the FD Kilimanjaro food program did better on underweight and stunting parameters, than children of the same age not attending school.

During the medical check-ups, we gave all children and their guardians hygiene and nutritional advise, with emphasis on hand-washing, vitamin C and vegetable intake, so their children may grow healthy and strong. We noticed the policy of a lot of mothers to feed their babies up to the age of one year or even more, almost only with breast milk. For babies, we advised exclusive breastfeeding up to six months and then start with the introduction of normal food. For babies without a mother or a mother without enough milk we discussed the

possibilities of breastfeeding by another mother. We noticed this policy is quite normal in early days in the hospital but when a baby is at home a lot of fathers are against getting milk from another woman because of culture believes and the fear of being in dept with the husband of the milk giving woman.

2: Anaemia (593/1023, 58 %, see table 5).
Anaemia is the most prevalent micronutrient disorder. In Tanzania no national policy has been implemented 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 which, through integrative interventions, addresses the various factors that play a significant role in producing anaemia in a given community. In addition to iron deficiency, infectious diseases such as worm infections, other chronic infections, particularly HIV-AIDS and tuberculosis, malaria, as well as other nutritional deficiencies, are especially important.
As pointed out in the paragraph about growth abnormalities, the survey of FD Kilimanjaro in 2008 shows that 37% of the families live on just one meal a day and 42% get only two meals a day. The same survey noted that the typical household's diet is additionally very low in diversity of food products low in fat and low in sources of vitamin C. Maize and some green leafy vegetables dominate the menu on a daily basis; complemented by beans, rice, fish and green bananas on a weekly basis and some meat on a monthly basis.
We were shocked about the increasing amount of children with a anaemia (see table 5a). Since anaemia is a multifactorial disease it is hard to explain the reason. Possibilities were discussed within the MCC team, e.g. increase in worm infections (see next paragraph), bad living conditions, poor availability of good food, lack of safe water (pesticide residues), etc.

Table 5a *Prevalence of ANAEMIA per GEOGRAPHICAL LOCATION, in 2009, 2010, 2011 and 2012*

YEAR	2009				2010				2011				2012			
NUMBERS	n	/	N	n	n	n	n	%	n	/	N	%				
Total	**445**	**/**	**1172**	**40%**	**449**	**/**	**1211**	**37%**	**527**	**/**	**1105**	**48%**	**593**	**/**	**1023**	**58%**
Josho	98	/	269	36%	110	/	230	48%	118	/	223	53%	116	/	206	56%
Upareni	34	/	117	29%	41	/	125	33%	34	/	100	34%	65	/	111	59%
Mabatini	49	/	136	36%	64	/	150	43%	68	/	136	50%	60	/	109	55%
Risavu	23	/	82	28%	21	/	68	31%	21	/	67	31%	35	/	53	66%
Mbeya Kubwa	138	/	292	47%	82	/	240	34%	79	/	171	46%	79	/	151	52%
Mafuriko	103	/	284	36%	129	/	308	42%	142	/	300	47%	149	/	269	55%
Remiti	-		-	-	52	/	91	57%	65	/	107	61%	89	/	123	72%
Unknown	2	/	1192	0.2%	16	/	1227	1.3%	114	/	1219	9%	0	/	1023	0%
School	70	/	321	22%	248	/	746	33%	135	/	419	32%	297*	/	594	50%
Non-school	74	/	276	27%	251	/	465	54%	392	/	686	57%	30*	/	52	58%

* Children of age 5-12 years only.

Table 5b *Prevalence of children with Hb ≤ 5 per GEOGRAPHICAL LOCATION in 2009, 2010, 2011 and 2012*

YEAR	2009				2010				2011				2012			
	Hb ≤ 5				Hb ≤ 5				Hb ≤ 5				Hb ≤ 5			
NUMBERS	n	/	N	n	n	n	n	%	n	/	N	%	n	/	N	%
Total	**75**	**/**	**1152**	**6%**	**68**	**/**	**1221**	**6%**	**92**	**/**	**1105**	**8%**	**88**	**/**	**1023**	**9%**
Josho	17	/	264	6%	12	/	230	5%	24	/	223	11%	14	/	206	7%
Upareni	3	/	115	3%	1	/	125	1%	4	/	100	4%	6	/	111	5%
Mabatini	9	/	130	7%	5	/	150	3%	6	/	136	4%	5	/	109	5%
Risavu	5	/	78	6%	2	/	68	3%	5	/	67	7%	3	/	53	6%
Mbeya Kubwa	27	/	289	9%	13	/	240	5%	10	/	171	6%	17	/	151	11%
Mafuriko	14	/	275	5%	17	/	308	6%	24	/	300	8%	16	/	269	6%
Remiti	-	/	-	-	18	/	91	20%	19	/	107	18%	27	/	123	22%
School	-	/	-	-	27	/	746	4%	7	/	419	2%	8*	/	594	1%
Non-school	-	/	-	-	41	/	465	9%	86	/	686	13%	2*	/	52	4%

* Children of age 5-12 years only.

Anaemia was less prevalent in children attending school (50%) compared with children not attending school with the FD Kilimanjaro food program (58%). This difference most probably reflects the benefits of the school food program, which confirms the importance of nutrition in respect to anaemia and, hence, to health in general. Still, the (growing) amount of anaemic children in the FD Kilimanjaro food program gives rise to re-consider the composition of the food program.
The high incidence of anaemia in Remiti, seen in 2010, 2011 and 2012, might be related to differences in eating and drinking habits. This is also reflected in the food inventory made in 2011. The food and drinking water inventory indicates that the children from Remiti drink more milk, eat less meat/fish/duck and drink mainly water from the plantation.

We treated the children with anaemia (and their mothers if they were breast fed) with supplements for three months. Of 1023 children, 276 (23%) were given iron tablets or iron syrup, 402 (33%) were given multivitamins. Iron supplements were given to 83 (8%) mothers breast-feeding a child with anaemia. These figures are comparable to the figures of 2010.
In 88 children (9%) the haemoglobin level equals or was less than 5.0 mmol/l (see Table 5b). These children were referred to the TPC Hospital for further diagnostic procedures.
We will ask for a re-check of the haemoglobin level, including HIV test, TB and exclusion of sickle cell anaemia (an inborn malformation of the red blood cells) of the children with Hb < 5 mmol/L. In addition, we would like to request for a check of amoeba in stool. At the time of the writing of the report these results were not yet available, however, re-checks will be planned by FD Kilimanjaro in cooperation with TPC hospital.
As pointed out in the paragraph of growth abnormalities, we gave during the medical check-ups all children and their guardians nutritional advise with emphasis on vegetable intake and vitamin C. When it comes to the prevention of anaemia, the vitamin C intake is important because vitamin C facilitates the uptake of iron in the gut (as milk and tea counterparts it). Therefore we recommend to add a vitamin C source to the school meal, e.g. a ¼ orange, lemon or tomato. It should be further investigated whether trees or plants can be grown for this purpose at the agricultural project or at school.

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.

All children with low Hb (<5) in 2011, were referred to TPC hospital for a re-check in November 2011. These children were all checked for Hb only (TB, sickle cell anaemia, HIV and malaria were requested). Of the 86 children with Hb < 5 in 2011, 35 (41%) came to the re-check. Of

these 35 children, 12 children had still an anaemia, 3 children had an Hb < 5. All children with anaemia were treated with iron by TPC hospital.

During the medical camp there were some differences between the results coming from the TPC Hb measurements, compared to the measurements made with the MCC Hemocues. Results of the TPC measurements showed that the children were less anaemic than when measured by MCC during the medical camp.
At TPC measurements are also made with Hemocues but also with another haemoglobin measurement apparatus (ABX micros 60 hematology analyser, photometry).
During a visit to TPC hospital a comparative measurements were done with the TPC hemocues and the MCC hemocues. Both hemocues gave comparable results (8.4-8.5 mmol/L for MCC hemocues and 13.5 g/dl = 8.4 mmol/L). Next year we should further investigate the quality of the glasses used by TPC.

3: Worm treatment (791(77%) prophylactic and 20 (2%) therapeutic) (see table 6)
A strong relationship exists between a Helminth, an Ascaris Lumbricoides, a Hookworm or a T. Trichiura infection and anaemia. In the last years a de-worming program was established in Tanzania where there is a high prevalence of these infections in (school-aged) children. This de-worming program doesn't have a 100% coverage.
Of all children, 55% reported receipt of a anti-worm tablet in the last 6 months. It remains unclear whether the tablets given last year for treatment in February 2010, were included in these figures or not.
Despite the de-worming program, we treated the 1011 (83%) children on the spot with Albendazol. An active worm infection was suspected in 21 (2%) children, compared to 48 (4%) in 2010 and 102 (8.6%) children in 2009.
Health education on the spot was aimed at increasing awareness of worm transmission, the disabilities caused by intestinal helminth and the importance of the de-worming program every half year.
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.

Based on the high incidence of anaemia, the MCC team discussed with TPC hospital the possibility of other worm infections as a possible additional cause for the anaemia. Although there were no clear clinical indications for worm/amoebe infections, there might be a possibility for Ascaris lumbricoides (eel-worm), Schistosomiasis and/or amoebiasis.For some of these infections might not be symptomatic. Symptoms can range from mild diarrhea to dysentery with blood and mucus in the stool.
In the MCC carrousel we do not have the possibility to check stools yet. Next year we would like, in close cooperation with TPC hospital (Mary Malamsha), to investigate the possible worm infections to a greater extend, and if there, to treat the children when infected. For this purpose we need additional assistance from TPC hospital for fresh faeces checks during the medical camp. Additional disposables (containers, slides and colouring agents) and a microscope should be brought to the medical camp.

Table 6 *Prevalence of prophylactic and therapeutic anti-worm treatment and , in 2009, 2010, 2011 and 2012*

	2009				2010				2011				2012			
	n	/	N		n	/	N	%	n	/	N	%	n	/	N	%
Total preventive antiworm treatment	963	/	1190	81%	1037	/	1227	85%	1011	/	1219	83%	791	/	1023	77%
Per age category																
>=0 and <1	3	/	68	4%	4	/	81	5%	8	/	105	5%	5	/	54	9%
>=1 and <5	302	/	405	75%	294	/	366	80%	297	/	374	79%	209	/	316	66%
>=5 and <12	652	/	711	92%	734	/	773	95%	692	/	724	96%	572	/	646	89%
>=12 and <18	6	/	6	100%	5	/	6	83%	13	/	15	87%	5	/	6	83%
Probable acute worm infection	106	/	1189	9%	48	/	1227	4%	21	/	1219	2%	20	/	1023	2%

4: Pneumonia (in 2012 14 (1%) in 2011 36 (3%); in 2010 53 (4%); in 2009 69 (6%) (see table 2)
The 14 children with a severe acute respiratory infection (ARI) were treated with appropriate antimicrobials and home treatment advice.
"Pneumonia", "coughing", "fast/difficult breathing", "chest indrawing" and "inability to suck milk" are the key words used by care-takers indicating a (severe) ARI.
For a doctor normally working in Europe it is amazing how few children have asthma in Tanzania. We saw 3 (0.3%) children with symptoms of asthma.

5: Suspected pathological Cardiac Murmurs (in 2012 7 (0.7%); in 2011 3 (0%); in 2010 16 (1.3%); in 2009 23 (1.9%)) (see table 2).
The MCC carrousel includes a cardial examination. We suspected 7 children of having a pathological heart murmur, mainly due to a septal defect. Of these 7 children, 3 were of one family. The children were referred to TPC and KCMC for further investigation, diagnosis and treatment.
Mitral regurgitation and atrial septal defects being the most common heart problems in the third world. For this condition no treatment is available although a good dental situation is essential for a healthy live.
The children and their care takers with the suspected pathological heart murmurs were stressed on teeth brushing procedures. Besides this, they were told and got a written explanation to give their child antibiotics when going to a dentist for a teeth extraction.

6: Stomach ache and other gastrointestinal complaints (see table 7)
During our health checks we encounter a rising percentage of (older) schoolchildren with complaints of stomach pain. In the absence of weight loss, bloating or fever these pains could be stress induced. Pressure on adolescents to succeed academically is well known, alongside with problems at home. Data on milk products sensitivity, gastritis or peptic ulcers are currently lacking as well as the prevalence of Helicobacter pylori bacteria.
Of the 14 children diagnosed with obstipation.
We also noticed a lot of children who have complains about obstipation/constipation, leg cramps and headaches (no exact data available). These complaints can be due of the habit of drinking too little. We noticed the normal drinking habit of schoolchildren in Tanzania consists of drinking only one or two cups a day while they need at least a litre a day. We explained the children and their care takers how and why they should change their drinking habits.

The scoring of diarrhoea and dyseneria might be an underestimation, due to hesitation of the children to talk about their stools, but also due to the type of toilets, in which blood or mucus in stool cannot be seem therefore not excluded. Further attention will be given to worm and amoebe infections in 2013 (see also paragraph 3 on worm infections).

Table 7 *Prevalence of GASTROINTESTINAL COMPLAINTS in 2010, 2011 and 2012*

	2010				2011				2012			
DIAGNOSIS	n	/	N	%	n	/	N	%	n	/	N	%
Dysenteria	13	/	1227	1%	18	/	1219	1%	10	/	1023	1%
Dehydration - acute diarrhoea	3	/	1227	0%	1	/	1219	0.1%	1	/	1023	0.1%
Diarrhoea without dehydration	3	/	1227	0%	8	/	1219	2%	3	/	1023	0.3%
Obstipation	27	/	1227	2%	27	/	1219	2%	14	/	1023	1.4%

7: Ear-Nose-Throat (ENT) (in 2012: 19 (2%); in 2011: 48 (4%); in 2010: 32; (3%), see table 8)
Chronic or recurrent ear infections are a common condition encountered by the ENT surgeons in the third world. Effective initiatives for better hygiene and nutrition will play a part in diminishing chronic ear infections and their complications. Treatment of middle ear infections with antibiotics have a big impact in preventing deafness as well.
Three children with hearing problems were referred to a specialist.
One child was referrend to an ENT specialist for a tonsillectomy.

The prevalence of acute ear infections is comparable with the prevalence in the Netherlands. The total incidence of ear-nose-throat complaints in 2012 was slightly lower than in 2010 and 2011.

Table 8 *Prevalence of EAR-NOSE-THROAT COMPLAINTS in 2010, 2011 and 2012*

	2010				2011				2012			
DIAGNOSIS	n	/	N	%	n	/	N	%	n	/	N	%
Otitis media acuta	3	/	1227	0%	11	/	1219	1%	3	/	1023	0.3%
Otitis media with effusion	9	/	1227	1%	5	/	1219	1%	4	/	1023	0.4%
Otitis externa	7	/	1227	1%	10	/	1219	1%	3	/	1023	0.3%
Tympanic perforation	2	/	1227	0%	2	/	1219	0%	2	/	1023	0.2%
Adenotonsillitis / tonsillitis	8	/	1227	1%	15	/	1219	1%	3	/	1023	0.3%
Candida stomatitis	2	/	1227	0%	3	/	1219	0%	3	/	1023	0.3%
Hearing impairment	1	/	1227	0%	2	/	1219	0%	1	/	1023	0.1%
Total	**32**	**/**	**1227**	**3%**	**48**	**/**	**1219**	**4%**	**19**	**/**	**1023**	**2%**

8: Skin diseases (in 2012: 52 (5%); in 2011: 117 (10%); in 2010: 162 (13%) see Table 9)
Among the skin diseases the following disorders are the most common in children in Africa, pyoderma, tinea capitis, scabies, viral skin disorders (mainly moluscum contagiosum) pedicolosis capitis, dermatitis and reactions due to insect bites.
In Mtakuja, we mainly saw dermatomycosis, a skin disease caused by a fungus. Antifungal cream (eventually in combination with hydrocortison) was given for fungal infections and hydrocortison crème was given for different forms of dermatitis.
Scabies is an infective skin disease caused by a mite (Sarcoptes scabiei) and is transmitted in situations of poor hygiene and prolonged physical contact (15 min) with an infected person or contaminated bed sheets or clothing. The female mite burrows just beneath the upper skin layer, producing 0.2 - 0.6 cm long lines on the skin, primarily between and on the fingers, palms, wrists, around nipples (women) and genital areas (men). In severe cases, the mite spreads even to the skin of the belly and sometimes the back. Itching and sometimes secondary infection of scratch lesions are the main symptoms. Chronic severe scabies infection may lead to dark (hyperpigmented) spots on the skin. A scabies infection was seen in six children. Since the best treatment for a severe Scabies infection (Ivermectine) is not available in Tanzania, we brought this from the Netherlands. Health education and hygienic instructions were given to the children and their care takers about scabies.

The total incidence of skin diseases in 2012 was lower than in 2010 and 2011.

Table 9 *Prevalence of SKIN DISEASES in 2010, 2011 and 2012*

	2010				2011				2012			
DIAGNOSIS	n	/	N	%	n	/	N	%	n	/	N	%
Wounds n.o.s.	3	/	1227	0%	4	/	1219	0%	4	/	1023	0.4%
Eczema n.o.s.	6	/	1227	0%	4	/	1219	0%	0	/	1023	0%
Dermatomycosis	116	/	1227	9%	80	/	1219	7%	41	/	1023	4%
Impetigo / furunculosis	12	/	1227	1%	11	/	1219	1%	5	/	1023	0.5%
Scabies	10	/	1227	1%	14	/	1219	1%	0	/	1023	0%
Wounds infected	15	/	1227	1%	4	/	1219	0%	2	/	1023	0.2%
Total	**162**	**/**	**1227**	**13%**	**117**	**/**	**1219**	**10%**	**52**	**/**	**1023**	**5%**

9: Eye problems (in 2012: 10 (1%); in 2011: 31 (3%); in 2010: 13 (1%), see table 10)

Especially in the group of children above five years of age a rather common complaint was dry and/or painful eyes. Xerophtalmia can be attributed to Vitamin A deficiency. Vitamin A deficiency effect growth, the differentiation of epithelial tissues and immune competence. The most dramatic impact, however is on the eye and includes night blindness, xerosis of the conjunctiva and cornea and ultimately corneal ulceration and necrosis of the cornea. Vitamin A deficiency occurs when body stores are exhausted and supply fails to meet the body's requirements, either because there is a dietary insufficiency, requirements are increased, or intestinal absorption, transport and metabolism are impaired as a result of conditions such as diarrhoea. The most important step in preventing Vitamin A deficiency is insuring that children's diets include adequate amounts of carotene containing cereals, tubers, vegetables and fruits.

The total incidence of eye problems in 2012 was lower than in 2010 and 2011. However, this year no eye-doctor was present in the medical camp, which might be a bias in the data.

Table 10 *Prevalence of EYE PROBLEMS in 2010, 2011 and 2012*

	2010				2011				2012			
DIAGNOSIS	n	/	N	%	n	/	N	%	n	/	N	%
Refractory problems	3	/	1227	0%	3	/	1219	0%	0	/	1023	0%
Strabismus	3	/	1227	0%	1	/	1219	0%	2	/	1023	0.2%
Keratoconjunctivitis	7	/	1227	1%	27	/	1219	2%	8	/	1023	0.8%
Amblyopia	2	/	1227	0%	0	/	1219	0%	0	/	1023	0%
Total	**13**	**/**	**1227**	**1%**	**31**	**/**	**1219**	**3%**	**10**	**/**	**1023**	**1%**

10: Urinary tract infections and genital organs (in 2012: 19 (1.9%); in 2011: 8 (0.7%), in 2010: 5 (0.4 %); see table 11)
We performed urine screening test in the children with urination related complaints. Some protein will appear in the urine if the level of protein in blood becomes high (infections) even when the kidney is functioning properly. Antibiotics, severe emotional stress and strenuous exercise can interfere with the test. In 15 children we found a urine infection which we treated with antibiotics.

Several children were referred to TPC and/or KCMC: one boy needs a circumcision, one boy was referred with a hernia and hydrocele, one boy was referred with a hydrocele, one body with a chryptochism and one girl was referred to CCBRT with a possible nephrotic syndrome.

One girl was seen with a circumcision and recurrent urinary tract infections.
Based on these observations, MCC, Stella Mserikia and Gerbert Rieks, had together with a long conversation with the leader of the Masai in the region on female circumcision. Although female circumcision is prohibited in Tanzania, circumcisions still take place in the Masai community. Since the circumsicion are illegal, there are no or limited possibilities for medical care in case of complications at the time of the operation. Emphasis was made that not only at times of the operation medical care was limited but also at child bearing this can be a problem. Since the Tanzania Governement is not supporting education on midwives in

the community anymore, mother depend on medical care in the Hospital and since female circumcision is illegal, mothers will be scared to go to a Hospital for labour.
MCC doctors highlighted the possible risks and the need for good care and education.
As a result of this discussion, an appointment was made to bring further education to the Masai community by the community health workers. In addition, the Masai head brought forward his concern about the absence of safe and sufficient water sources in the Masai community. It is recommended to give follow-up to the education on female circumcisions in the Masai community, and to put effort in bringing safe water to the Masai community to show we really care for them. The open discussion on circumcisions should be given follow-up, and bringing safe water to the Masai people, might be used in the negotiations to bring education on circumcision to the Masai community.

Table 11 *Prevalence of URINARY TRACT PROBLEMS in 2010, 2011 and 2012*

	2010				2011				2012			
DIAGNOSIS	n	/	N	%	n	/	N	%	n	/	N	%
Epi- / hypospadia	1	/	1227	0%	0	/	1219	0%	1	/	1023	0.1%
Cryptorchism	0	/	1227	0%	1	/	1219	0%	1	/	1023	0.1%
Inguinal hernia	1	/	1227	0%	1	/	1219	0%	2	/	1023	0.2%
Urinary tract infection	3	/	1227	0%	6	/	1219	0%	15	/	1023	1.5%
Total	**5**	**/**	**1227**	**0.4%**	**8**	**/**	**1219**	**0.7%**	**19**	**/**	**1023**	**1.9%**

11: Dental problems (in 2012: 228 (22%); in 2011: 397 (33%); in 2010: 251 (20%), see table 12)
This Medical Check for Children mission to Tanzania did not include a dentist.
The number of cases mentioned probably underestimate the prevalence of dental disease in the children we checked with severe toothaches and caries.
We had the impression that the more wealthier the people were, the more painful caries we saw. Maybe this is due to the more buying of sweets and cookies when there is more money available.
After the check local volunteers gave out toothbrushes and educated the people in teeth brushing. Special instructions were given to school classes of the Mtakuja school, and the Mserekia school.
The TPC dental assistant Pius Tarimo participated in the educational program, and also looked at the children identified with painfull caries. If necessary he referred the children to TPC hospital for further investigation and treatment. In total 32 children were referred to the dentist.

A high incidence of fluorosis was seen (13.4%), with the highest incidence in Mbeya Kubwa and Mafuriko. Most likely, this number is an underestimation of the fluorosis seen in the villages, unfortunately, not in all cases fluorosis was recorded as diagnosis. Fluorosis is most probably due to high concentrations of fluoride in the drinking water. Unfortunately, no analytical data for fluoride are available of the boreholes in Mtakuja.

Excessive ingestion of fluoride during the early childhood years may damage the tooth-forming cells, leading to a defect in the enamel known as dental fluorosis. Teeth impacted by fluorosis have visible discoloration, ranging from white spots to brown and black stains. Teeth with fluorosis also have an increased porosity of the enamel. In the milder forms, the porosity is mostly limited to the sub-surface enamel, whereas in the more advanced forms, the porosity impacts the surface enamel as well, resulting in extensive pitting, chipping, fracturing, and decay of the teeth.

The WHO set a general guideline of 1.5 mg/L concentration of fluoride in drinking water to avoid adverse effects of higher concentrations including severe dental fluorosis and skeletal fluorosis, as these effects were minimal at this concentration or lower (WHO Drinking-water Quality Series, 2006).

At a minimum, the fluoride levels in local water supplies should be monitored and the population should be further examined for signs of excessive fluoride exposure (e.g. moderate and/or severe dental fluorosis). Based on an estimation of the daily intake of drinking water, a risk assessment can be made, and further actions might be considered.

Table 12 *Prevalence of DENTAL PROBLEMS in 2010, 2011 and 2012*

	2010				2011				2012			
DIAGNOSIS	n	/	N	%	n	/	N	%	n	/	N	%
Caries n.o.s.	220	/	1227	18%	121	/	1219	10%	88	/	1023	8.6%
Caries with pain	31	/	1227	3%	15	/	1219	1%	3	/	1023	0.3%
Fluorosis	-		-	-	261	/	1219	21%	137	/	1023	13.4%
Total	**251**	**/**	**1227**	**20%**	**397**	**/**	**1219**	**33%**	**228**	**/**	**1023**	**22%**

- no data

12: Neuromusculair and Skelet problems (see Table 13)

In 2010, CCBRT was introduced to Mtakuja for the children with psychomotoric retardations and skeletal problems. CCBRT started an outreach program in Mtakuja, and 21 children of Mtakuja were included. In 2011 and 2012 CCBRT was included in the medical camp for two days. CCBRT saw the children already in the program for further advice, but we also referred new children to CCBRT.

As some of the mothers struggle with the daily care of their children, due to the fact that they need to work and take care of the other children, we would promote further investigations for the possibility to set-up day care for the disabled children in Mtakuja.

In 2012 26 children were seen by CCBRT in the medical camp. CCBRT referred several children to the paediatrician at CCBRT, some parents were requested to come to CCBRT for a week of intensive treatment, plans were made for preparing walking frames and Montessori training, but also referred children to KCMC for eye problems, albinism, etc. In addition, one child was referred for a double club-feet operation to Matsjame hospital.

Table 13 Prevalence of NEUROMUSCULAR AND SKELETAL PROBLEMS

	2010			2011			2012		
DIAGNOSIS	n	/	N	n	/	N	n	/	N
Psychomotoric retardation	7	/	1227	6	/	1219	7	/	1023
Hypertonia	3	/	1227	2	/	1219	0	/	1023
Hypotonia	3	/	1227	1	/	1219	3	/	1023
Epilepsy	1	/	1227	2	/	1219	4	/	1023
Learning difficulties	3	/	1227	1	/	1219	1	/	1023
Arltralgia	1	/	1227	1	/	1219	1	/	1023
Hip displasia	0	/	1227	1	/	1219	1	/	1023

13: HIV-AIDS, TB and malaria

In 2012, Tamari Moses worked in the medical camp as a HIV counselar for the second time. From the second day of the medical camp it was possible to perform an HIV screening test. Due to the limited number of tests available (approximately 20-30 a day), caretakers were offered a HIV test (on a voluntary basis). If mothers were tested positive, children were offered a HIV test as well. Furthermore, if MCC doctors diagnosed a child "suspected HIV/Aids", the children (accompanied by caretakers) were offered a screening HIV test.

The diagnosis "suspected HIV/Aids", "possible malaria" and "TB" were either children who told us spontaneously or on request they were on treatment for the disease or the MCC doctor suspected the mentioned disease.

The screening test used, was a rapid antibody test, based on CD4 measurement.
In total 116 tests were performed, from which 3 showed a positive result. Of the 3 identified positives, 2 were children (1 boy of six years and 1 girl of 2 years). The families with a positive HIV test were referred to TPC hospital for further investigation and treatment.

14: Education health workers, caretakers and other local helpers:
One of the important tasks of MCC is to encourage the continuation of education of the caretakers and older children. During our week we had teaching sessions on common diagnoses of frequent illnesses and medication. We especially focused on anaemia and malnutrition, on balanced diet, infection, parasites and failure to thrive. Our information mainly consisted of knowledge and practical advice about nutritious food and vitamin supplements, as well as hygienic and health promotion issues.
During one of the last days of the medical camp, a special instruction meeting was organized for the Community Health workers. During this session, one of the MCC doctors talked with the Community Health workers on general health issues.

15: Mother and child inventory
An inventory on children's mortality rates was performed during the medical camp in July 2012. An indirect method was chosen, only a few short simple questions were required to collect the data:

- Woman's age
- The total number of living children
- The number of children died during pregnancy, between delivery and 3 months, between 3 months and 1 year, between 1 year and 5 years, and older than 5 years.

Based on the inventory several calculations were made:

- Perinatal mortality rate:
  total of fetal deaths (as reported)/total of children (living and died)*1000
- Infant mortality rate:
  total of children died between 0 and 1 years of age/total of children (living and died)*1000
- Under-five mortality rate:
  total of children died between 0 and 5 years of age/total children (living and died)*1000

Table 14 Mortality and fertility rates

	Risavu	Josho	Upareni	Mabatini	Mbeya Kubwa	Remiti	Mafuriko	Total Mtakuja
Perinatal mortality rate	0	34	45	39	31	85	35	45
Infant mortality rate	71	17	27	20	19	38	46	34
Under-five mortality rate	95	29	27	39	19	38	51	39
number of mothers in questionaire	16	50	37	27	58	50	115	353
average age mother	30	29	30	33	30	29	30	30
average fertility rate	2	3	3	3	3	4	3	3

To compare these results, data were derived from public available data from Tanzania.
The Tanzania Ministry of Health and Social Welfare published in 2008 The National Road Map Strategic Plan To Accelerate Reduction of Maternal, Newborn and Child Deaths in Tanzania 2008 – 2015. From this report some parts are included below.

In general in can be concluded that, although the total number of questioned mothers for each subvillage were low, the calculated mortality rates are in line with the data already available for Tanzania.

The following general information is available on the child mortality on Tanzania[1]:
The total fertility rate in Tanzania has been consistently high over the past ten years and currently stands at 5.7 children per woman. There are regional variations with urban-rural disparities, where rural women have higher fertility rates than their urban counterparts.

[1] The National Road Map Strategic Plan To Accelerate Reduction of Maternal, Newborn and Child Deaths in Tanzania, 2008 – 2015, United Republic of Tanzania, Ministry of Health and Social Welfare, April 2008.

While significant progress has been made to reduce child mortality in Tanzania, the neonatal mortality rate (deaths between births and 28 days of age) remains high at 32 per 1,000 live births, and accounts for 47% of the infant mortality rate which is estimated at 68 per 1,000 live births.
In Tanzania, the estimated annual number of maternal deaths is 13,000, the estimate for under-fives is 157,000, and newborn deaths are estimated at 45,000.

According to modelled estimates for Tanzania, 79% of newborn deaths are due to three main causes: infections including sepsis/pneumonia (29%), birth asphyxia (27%); and complications of preterm birth (23%).
Many of these conditions are preventable and closely linked to the absence of skilled birth attendance at delivery. Eighty-six percent (86%) of neonatal deaths in Tanzania are also low birth weight, many of whom are preterm.
Pneumonia is one of the major contributors towards under five mortality and it accounted for 21.1% of under five deaths in 2006. Malaria contributes to 23% percent of under five mortality in Tanzania.
In Tanzania, although access to health services is good, many people seek care when it is too late or not at all. Attention should be paid to the fact that only 57% of under-fives receive anti- malarial treatment within 24 hours of developing symptoms.
Nutrition indicators for under-fives have shown some improvement over the years but undernutrition is still widely prevalent in Tanzania. Stunting, underweight status and wasting among children aged 0-59 months have reduced from 44%, 29% and 5% in 1999 to 38%, 22% and 3% respectively . Anaemia is also highly prevalent among under-fives with 72% of all 6-59 months children being anaemic. The main causes of anaemia are nutritional deficiency, intestinal worms and malaria.
Optimal breastfeeding can reduce under-five mortality by up to 13%35. The majority of Tanzanian babies are breastfed, for a median duration of 21 months.

In Tanzania, more than half of young women under the age of 19 are pregnant or already mothers, and the perinatal mortality rate is significantly higher for young women under the age of 20 (at 56 per 1,000 pregnancies) than it is for women aged 20-29 (at 39 per 1,000 pregnancies), and older women aged 30-39 (32 per 1,000 pregnancies). Obtaining permission to access services is a greater obstacle for young women age 15-19 than for their older counterparts. Young women age 15-19 also cited not knowing where to go as a barrier to accessing services.

Improved household water, sanitation and promotion of key hygiene behaviour changes will be critical to complement and strengthen the essential health package.

The following are the objectives for the MNCH Strategic Plan, which should be met by the end of the year 2015.

- *To reduce maternal mortality from 578 to 193 per 100,000 live births.*
- *To reduce neonatal mortality from 32 to 19 per 1000 live births*
- *To reduce under-five mortality from 112 to 54 per 1000 live births*

In addition, the mothers were requested where they delivered, at home (with local help of family), at home with a midwife, or at the hospital.

Table 15 Delivery analysis

	At home/ local help		At home with midwife		In hospital	
Village	**n**	**%**	**n**	**%**	**n**	**%**
Risavu	3	18%	0	0%	14	82%
Josho	15	26%	0	0%	42	74%
Upareni	5	13%	1	3%	34	85%
Mabatini	5	16%	1	3%	25	81%
Mbeya Kubwa	4	7%	2	3%	55	90%
Remiti	29	40%	0	0%	43	60%
Marfuriko	5	4%	0	0%	109	96%

In general, it can be concluded that most mothers deliver in hospital. The highest number of home deliveries was seen in Josho and Remiti. There is no background information available on why they choose or have to deliver at home. Several aspects might be considered: financial, cultural, female circumcision, etc, and needs more investigation.

It is also apparent that only a few deliveries are assisted by midwifes. Whether this means that there are no (local) midwifes available in the subvillages, or people chose not to get assistance by a midwife is unknown. This aspect needs also further investigation.
In Remiti, 40% of the deliveries is at home. As this is the case, one should investigate whether or not sufficient information and materials are available locally for safe home deliveries, and whether or not this needs improvement.

General conclusions and recommendations

- We recommend FD Kilimanjaro the addition of more fat, fibers (e.g. fruit and vegetables) and a vitamin C source to the school food program. We highly recommend to add a vitamin C source to the school meal, e.g. a ¼ orange, lemon or tomato. It should be further investigated whether trees or plants can be grown for this purpose at the agricultural project or at school. We recommend a shorter time of cooking the available vegetables so the nutrious parts of the food will remain.
- It is recommended to give follow-up to the education on female circumcisions in the Masai community.
- Based on the high incidence of anaemia, the MCC team discussed with TPC hospital the possibility of other worm infections as a possible additional cause for the anaemia. For 2013 we highly recommend to investigate, in close cooperation with TPC hospital (Mary Malamsha), the possible worm infections to a greater extend, and if there, to treat the children when infected. For this purpose we need additional assistance from TPC hospital for fresh faeces checks during the medical camp. Additional disposables (containers, slides and colouring agents) and a microscope should be brought to the medical camp.
- Although lots of efforts are taken to get more safe water sources in Mtakuja, still a high number of people are lacking close-by safe (drinking) water sources. Specifically the people from Remiti are asking for access to clean water sources, they are still using the canal water as their main water source.
- It is highly recommended to further investigate the quality of drinking water. We emphasize that in order to fight the health problems of children, there is a need for safe water. The quality and safety of available water sources (boreholes, canals, plantation) for drinking, washing, cooking and gardening is unknown and needs further investigation. Furthermore, we recommend investigation of the currently available drinking water, with special emphasis on the content of fluor because a high prevalence of children with fluorosis was noted at a high incidence in some of the subvillages (Mbeya Kubwa, Mafuriko and Remiti).
- In addition, analysis of pesticide residues in the different water sources is recommended. The canal water of the plantation is used intensively by the villagers. Based on the Material Safety Data Sheets available of pesticides at TPC, canal water and bore hole water can be analyzed, not only for the active substances but also for breakdown products and metabolites. One might consider to contact Ms. Hariet Hellar (hariet.hellar@out.ac.tz) , author of a publication on pesticide residues in TPC canal water (Hellar and Kishimba, Tanz. J. Sci. Vol 31(1) 2005). In this publication of 2005, indications were found for the occurrence of pesticide residues, but only the intake through drinking water was considered, not through other exposure routes, like through food and feed, washing, etc.
- We recommend to further support mother-child care in Mtakuja. Several topics can be considered:
  - Improvement of child food and education on breast feeding and additional feeding.
  - Better access for mothers and children to health care (e.g. through outreach programmes by TPC and KCMC)
  - Education of Community Health Workers for mother and child care: implement community based strategies to promote healthy behaviour during pregnancy, child birth, post partum period and childhood.
  - Investigation of presence and training of skilled birth attendants and mother and child care after birth.
- Knowledge of the parents and children of hygiene, tooth brushing and healthy food seems improved. Based on the conversations with the caretakers, we noticed that the information on hygiene and food shared with them in the past years was still present. The overall hygiene was better and most of the children are brushing their teeth at least twice a day. Less acute infections were seen in 2012 when compared to 2011, 2010 and 2009, partly due to better hygiene and part due to the anti-worm treatment given by MCC last year and the Governmental program.

- Although less acute worm infections were seen, it should be emphasized that an deworming program covering all children of at least 2 years and above the should be set up, since the governmental deworming program did not reach the whole group. A school based deworming program should be considered.
- Due to the dryness and increased costs for vegetables and fruits, it is difficult for caretakers to have good vitamin and iron sources in their daily food. Although lots of people will benefit from the farming project, setting up home gardening for woman in some of the sub villages might be encouraged, e.g. by water sources.
- We encourage the initiative of the prevention clinic in Mtakuja and the appointment of community health workers. Based on the results of the medical camp, the community health workers should be further trained. In order to have more training from the medical camps, but also to have more training possibilities in general, community health workers need more general knowledge of the English language.
- We recommend further investigations of the higher incidence of chronic health problems seen in Remiti and Josho (e.g. anemia and underweight) when compared to the other villages. Sub-village specific health improving activities should be set up.
- We recommend to further support the social program set up by Stella Msarikie of FD Kilimanjaro. Possibilities for supporting the day care for disabled children should be further investigated in close cooperation with CCBRT.

Last words:

We were delighted to see all the improvements in Mtakuja. The progress made in the agricultural project, like the building of new toilets and the availability of drinking water at the Mserekia school, the presence of the Community Health Workers, the development of local expertise. Witnessing the evolution of all programs is exciting.

Our special personal thanks goes to Gerbert Rieks and Stella Mserikie from FD Kilimanjaro, who organised the medical camp in close cooperation with MCC. We also would like to thank all translators, CCBRT, TPC hospital, and KCMC hospital for their cooperation and enthusiasm. We would love to work together with them next year.

We hope to return to Tanzania next year to see the further developments of the program in Mtakutja. We are looking forward to return to the children of Mtakuja in 2012!

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Amsterdam, 28 January 2013

Appendix I – medication

Medication	Units	Number received at start mission	From stock 2011	Number brought from NL	Bought during medical camp	Total medical camp	Number end medical camp	Used	Expiry date	Expiry date	In stock for 2013	Returned to NL	Composition
Zenergy Multivitamin	100 ml	1016				1016	444	572	mei-13		to TPC		Per 5 ml: Vit A 3000 UI, Vit D3: 400 IU, Vit B1 1.5 mg, Riboflavin: 0.5 mg, B6 1 mg, B12 2 mcg, Nicotinamide 20 mg, Vit C 10 10 mg
Multivitamin tabs	Tab	16000	7620		4000	27620	0	27620	aug-12	mrt-14	0		Thiamine 1 mg, Pyridoxine 0.5 mg, Riboflavine 1 mg, Vitc C 15 mg, Nicotinamide 7.5 mg, Cal-D-Pantothenate 1 mg
Ivermectine	tab	0	0	25		25	24	1	apr-13	nov-13	0	24	per tablet 6 mg ivermectine
Jodine solution	40 ml					0		0			0		Jodium
Iodine solution	40 ml	5	6			11	8	3	mei-13	feb-14	8		jodium
ORS	1L	10	0			10	6	4	apr-14		6		Glucose Anhydrous 13.5 g, Sodium chloride 2.6 g, Tri Sodium Citrate, Dihydrate 2.9 g, Potassium Chloride 1.5 g
Tinamid (worm tablets lintworm)	500 mg	20	0			20	18	2	apr-14		to TPC		Niclosamide 500 mg
Zoxan (eye/ear drops)	5 ml	20	7			27	17	10	feb-13	okt-13	17		Ciprofloxacin 0.3% w/w, Benzalkonium Chloride 0.01%
Ivymoicell (eye drops)	10 ml		0			0	8	?			8		hydroxyprophil, methylcellulose
Ivyfenicol (eye drops)	10 ml	10	9			19	15	4	apr-13	feb-14	15		chloramphenicol
Burnese (Antisept burn cream)	15 g					0	0	0			0		Acriflavaine 0.1 g, Thymol 5 mg
Alprim (Co-trimoxazole)	Tab					0	0	0			0		Sulfametoxazole 400 mg, Trimethoprim 80 mg
Gentalene-C cream	10 g	5	0			5	5	0	nov-13		5		Betamethasone 0.05%, Gentamicin 0.10%, Clotrimazole 1 %
Erythrokant (tab)/erytromycine	250 mg	300	0			300	300	0	sep-14		300		Erythromycin 250 mg
Albendazole (tab)	400 mg		0			0	0	0			0		Albendazole 400 mg
Alben (tab)	200 mg	2580	24			2604	976	1628	mrt-15	mrt-15	976		Albendazole 200 mg
Elycort (cream)	15 g		1			21	21	0	mrt-14		21		Hydrocortison 1%
Erocin dry mixture	100 ml		19			19	16	3	feb-13		16		Per 5 ml (na oplossen): erytromycin 125 mg
Bandage						0		0			0		
Zeep (Tetmosol)						0		0			0		
Amoxicillin tab	250 mg	900	0			900	0	900	dec-13		0		Amoxicillin 250 mg
Metronidazole	200 mg		186			186	0	186			0		Metronidazole 200 mg
Unistatin (nystatin)	30 ml	30	4			34	26	8	aug-12	jun-13	26		Nystatin 100 000 IU
Ferrous sulphate (Fesate)	200 mg					0		0			0		per tablet: 60 mg elementair ijzer
Ferrous sulphate	200 mg	10000	3000		20000	33000	0	33000	apr-14	nov-13	0		per tablet: 65 mg elementair ijzer,
Ferosoft syrup 120 ml	120 ml	86				86		86	okt-12		0		5 ml = 50mg elemental iron NB gratis gekregen van whole saler
Amoxicillin susp (Kemoxyl)	100 ml	48	0			48	17	31	dec-13		17		Per 5 ml: 125 mg amoxicillin
Amolin	100 ml	50	0			50	50	0	jun-13		50		Per 5 ml: 125 mg amoxicillin
Bumax silver	30 g	10				10	8	2	sep-13		8		1% silver sulfadiazine
Silverex silver	25 g	5				5	3	2	feb-13		3		1% silver sulfadiazine
Lucin 1% (hydrocortison crème)	15 g	20	10			30	9	21	dec-12	jan-15	9		Hydrocortison
Praziquantil (Bilharzia)	600 mg	20	99			119	100	19	apr-16	dec-12	100		Praziquantel 600 mg
Sulfran (trimethoprim) Syrup	100 ml		7		6	13	5	8	jan-14		5		per 5 ml:tripmethoprom 40 mg, sulphamethoxazole 200 mg
Co-trimoxazole	tablet		123			123	0	123	aug-12		0		80 mg trimethoprim, 400 mg sulfamethoxazole
Iron Syrup (Hemovit)	200 ml	250	0			250	0	250	apr-13		0		per 5 ml: 43 mg elemental iron, vit B12 50 mcg, Vit B6 0,5 mg, foliumzuur 1,5 mg, zinksulfaat 2,33 mg
Iron Syrup Ferosoft	120 ml				86	86	0	86	dec-12		0		per 5 ml: 50 mg elemental iron
						0		0			0		
Augmentin (Koact 625)	tablet	300	0			300	250	50	nov-13		250		per tablet: amoxi 500 mg, clavulaanzuur 125 mg
Gentiderm	10 g		18			18	18	0	jul-13		18		Betamethasone , Gentamicin, Clotrimazole
Miconazole crème (Dermidex)	15 g	20	0			20	7	13	jun-14		7		miconazole
Paracetamol	500 mg	100	0			100	100	0	jan-15		100		paracetamol 500 mg
Not ordererd													
cold liver oil Syrup (multivitamin)	170 ml	20	0			20	9	11	feb-14		9		
folic acid	tablet	3000	500			3500	3000	500	aug-13	okt-15	3000		
cotrimoxazol	tablet		150			150	122	28			to TPC		cotrim 480 mg
Lincosone	10 g		16			16	2	14	okt-12		2		Betamethasone , Gentamicin, Clotrimazole
Eye doctor													
Ivycrome eye drops: chromoglycat	10 ml	10	0			10	10	0	feb-14		10		sodium chromoglycate 2.0% ivycrom
Ivysolone eye drops: methyl cellulo	10 ml	10	0			10	5	5	feb-14		5		0.7% hydroxy methyl cellulose
prednisolone	5 ml	5	0			5	0	5	okt-13		0		prednisolone acetate 1%