Medical Checks for Children

Medical Report
Ninos de Guatemala 2015

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January 2016

medical checks for children

Introduction:
In the third week of November 2015 Medical Checks for Children (MCC) visited Guatemala for the first time to perform a medical camp in the schools of Ninos de Guatemala and the surrounding communities. The MCC team checked and treated free of cost 874 children in six days.

The MCC team consisted of nine members from The Netherlands: Nadine van Dijk (emergency doctor, medical-end-responsible), Iris van de Gevel (organization-end-responsible, toxicologist), Hedwig Gosselink (education advisor), Carolien Siersma (paediatrician), Janneke Boers (childrens nurse), Eveline Resing (general practitioner), Eugenie Gosselink (dental hygienist), Marielle Roskam (paediatrician in training) and Amy Gunning (surgeon in training).

The medical checks were organized in close cooperation with NGO Ninos de Guatemala (NdG) working to break the cycle of poverty in Guatemala by providing quality education. NdG has have opened two primary schools, Nuestro Futuro (NF) and El Porvenir (EP), in the towns of Ciudad Vieja and San Lorenzo de Cubo. In 2015, a middle, school program (basico) was started at the Nuestro Futoro school.
Technical equipment, medical supplies and toothbrushes were brought from the Netherlands by MCC team members. Medication was ordered by at a local pharmacy.

The cooperation with NdG (in persons of Nuria Elkout and Ambar Batta) existed out of the following (amongst others):

- Selection of translators/local helpers.
- Providing board and lodging of all MCC team members.
- Arranging transportation of the MCC team to the check locations.
- Announcement of the medical camp in the schools and community.
- 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.
- Give follow-up for the referred children to the private hospital “Hermano Pedro”.

Medical Checks for Children on location:
The medical checks were performed in six days in the two schools and the surrounding communities. 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. Urine test when indicated
6. Physical examination by a medical doctor
7. Giving medication (pharmacy)
8. Education on nutritious food and tooth brushing (a tooth brush 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 and infections.

Results medical camp

During the medical camp MCC saw 874 children. 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 (97%) brought a caretaker. 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 possible future medical (or dental camps), equal attention should be paid to the presence of the children's caretakers and the transfer of knowledge on health and food.

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

	15 Nov	16 Nov	17 Nov	18 Nov	19 Nov	20 Nov	Total
EP school	69	78	0	0	0	0	147
San Lorenzo community	49	128	0	0	0	0	177
NF school	0	0	53	58	58	52	221
Ciudad Vieja community	0	0	26	104	91	108	329
Total	**118**	**206**	**79**	**162**	**149**	**160**	**874**

In the data of EP school, all children attending classes in EP school are given, which includes EP Prepa, EP Parvulos and classes 1 to 5. In the data of NF school, all children attending classes in NF school are given, which includes NF Prepa, NF Parvulos, classes 1 to 6 and Basico 1 and 2. Separate analyses for the classes were not made, as the number of children in each class will be too low to make analyses. However, all children were recorded per class, in order to make it easy for NdG to find back the children.

Table 2: Summary of checked children per geographical location, age and gender

	Total		EP School		San Lorenzo Community		NF school		Ciudad Vieja community	
	Total=874		Total=147		Total=177		Total=221		Total=329	
Age	**N**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
<=1 year	85	10%	0	0%	31	18%	0	0%	54	16%
>1 en <5 years	161	18%	9	6%	52	29%	11	5%	89	27%
<5 years	244	28%	9	6%	81	46%	11	5%	143	43%
>=5 en <=10 years	413	47%	120	82%	51	29%	127	57%	115	35%
>10 years	217	25%	18	12%	45	25%	83	38%	71	22%
Gender										
Boy	423	48%	84	57%	82	46%	100	45%	157	48%
Girl	451	52%	63	43%	95	54%	121	55%	172	52%

Anaemia

In total 10% of the 874 children were anaemic (see table 3). The highest prevalence of anaemia was seen in the communities of San Lorenzo (15%) and Ciudad Vieja (12%). Most probably, the children of NdG schools benefit from the food program at the schools, however, the data might be biased since the younger children (below 5 years) which are most vulnerable for anaemia, are only seen in the communities, since they are too young to visit the schools.

MCC supports the fact that children benefit from the food given at the NF and EP school; a lot of effort is taken to give all school children a morning snack and a nutritious school lunch and something to drink.

All children with anaemia were treated with iron or multivitamin.

Only one child was seen with a Hb below 5 mmol/l (4.8). This child of 4 month was with multivitamin, and her mother was given iron.

Table 3: Prevalence of anaemia per geographical location by age and gender

	Total		EP School		San Lorenzo Community		NF school		Ciudad Vieja community	
	Total=874		Total=147		Total=177		Total=221		Total=329	
	N	%	n	%	N	%	N	%	n	%
Anaemia	87	10%	10	7%	27	15%	10	5%	40	12%
No anemia	784	90%	137	93%	150	85%	211	95%	286	87%
Unknown	1	0%	0	0%	0	0%	0	0%	1	0%
Hb <5,0 mmol	1	0%	0	0%	0	0%	0	0%	1	0%
Anaemia per age										
<=1 year	26	31%	0	0%	7	23%	0	0%	19	35%
>1 en <5 years	24	15%	0	0%	9	17%	1	9%	14	16%
<5 years	50	20%	0	0%	16	20%	1	9%	33	23%
>=5 en <=10 years	33	8%	10	8%	9	18%	7	6%	7	6%
>10 years	4	2%	0	0%	2	4%	2	2%	0	0%
Anaemia per gender										
Boy	50	12%	5	6%	10	12%	9	9%	26	17%
Girl	37	8%	5	8%	17	18%	1	1%	14	8%

Compared to other locations of MCC, the prevalence of anaemia is rather low. In Tanzania, Nepal or Bolivia a prevalence of above 50% is frequently seen. The WHO data for Guatemala show a higher prevalence. Underreporting could be due to the fact that we might not have seen the whole family of the school going kids; or that we did not see the most vulnerable children from these communities.

In e.g. the Netherlands, the prevalence of anaemia varies between 3 and 20 % depending on age and socio-economic status. If we consider this in the context of the data we see in the children of this medical camp we are surprised by low prevalence of anaemia seen. Are we not seeing the really poor kids from the communities? Are parents embarrassed to come with the sick kids? Are the really poor ones unaware of the possibility to apply for the NdG schools?

During the medical check-ups, we gave nutritional advise to all children and their guardians 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.
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.

Growth abnormalities

In total 7% of the children had underweight, 19% were stunted and 4% wasted. Details can be found in tables 4, 5 and 6.

Recent figures of the WHO and USAid show Guatemala to have the highest prevalence of stunting in the Americas at 49,8%; this put Guatemala in the top five of worst countries worldwide. The most vulnerable are the Mayan communities who live in the highlands, where stunting affects almost 70 percent of children under five. Nevertheless, underweight and wasting are rare at the population level. Stunting is inversely related to maternal education levels and wealth, higher among children living in the poorest households (70.2 percent) than among children in the richest households (14.1 percent) and higher in children whose mothers had no education (69.3 percent) than children with mothers who had secondary or higher education (14 percent) (USAid 2014).

For children under five in total 14% of the children are underweighted, 27% are stunted and 7% are wasted.
The children of Ciudad Vieja community present the worst values for underweight, stunting and wasting.

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 the communities and the homes of the children. Furthermore, advises on hygiene and anti-worm treatment, are of importance to prevent gastro-intestinal infections leading to growth abnormalities.

Table 4: Prevalence of weight/age at or under P3 (underweight) per geographical location by age and gender

	Total		EP School		San Lorenzo Community		NF school		Ciudad Vieja community	
	Total=874		Total=147		Total=177		Total=221		Total=329	
	N	%	n	%	n	%	n	%	n	%
Underweight	43	7%	1	1%	5	4%	5	4%	32	12%
No underweight	617	93%	128	99%	130	96%	133	96%	226	87%
Unknown	213	24%	18	12%	42	24%	83	38%	70	21%
Underweight children per age										
<=1 year	20	24%	0	0%	2	6%	0	0%	18	33%
>1 en <5 years	13	8%	1	11%	2	4%	0	0%	10	11%
<5 years	33	14%	1	11%	4	5%	0	0%	28	20%
>=5 en <=10 years	10	2%	0	0%	1	2%	5	4%	4	3%
>10 years	0	0%	0	0%	0	0%	0	0%	0	0%
Underweight children per gender										
Boy	19	6%	0	0%	1	1%	4	7%	14	10%
Girl	24	7%	1	2%	4	6%	1	1%	18	15%

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

	Total		EP School		San Lorenzo Community		NF school		Ciudad Vieja community	
	Total=874		Total=147		Total=177		Total=221		Total=329	
	N	%	n	%	n	%	n	%	n	%
Stunting	169	19%	20	14%	30	17%	39	18%	80	24%
No stunting	704	81%	127	86%	147	83%	182	82%	248	75%
Unknown	0	0%	0	0%	0	0%	0	0%	0	0%
Stunting children per age										
<=1 year	34	40%	0	0%	8	26%	0	0%	26	48%
>1 en <5 years	32	20%	1	11%	8	15%	1	9%	22	25%
<5 years	65	27%	1	11%	15	19%	1	9%	48	34%
>=5 en <=10 years	60	15%	16	13%	8	16%	16	13%	20	17%
>10 years	44	20%	3	17%	7	16%	22	27%	12	17%
Stunting children per gender										
Boy	72	17%	10	12%	13	16%	13	13%	36	23%
Girl	97	22%	10	16%	17	18%	26	21%	44	26%

Table 6: Prevalence of weight/length at or under P3 (wasting) per geographical location by age and gender

	Total		EP School		San Lorenzo Community		NF school		Ciudad Vieja community	
	Total=874		Total=147		Total=177		Total=221		Total=329	
	N	%	n	%	n	%	n	%	n	%
Wasting	20	4%	0	0%	5	5%	3	4%	12	6%
No wasting	438	95%	65	100%	102	95%	74	96%	197	94%
Unknown	415	47%	82	56%	70	40%	144	65%	119	36%
Wasting children per age										
<=1 year	9	11%	0	0%	2	6%	0	0%	7	13%
>1 en <5 years	8	5%	0	0%	3	6%	0	0%	5	6%
<5 years	17	7%	0	0%	5	6%	0	0%	12	8%
>=5 en <=10 years	3	1%	0	0%	0	0%	3	5%	0	0%
>10 years	0	0%	0	0%	0	0%	0	0%	0	0%
Wasting children per gender										
Boy	7	3%	0	0%	1	2%	2	6%	4	4%
Girl	13	6%	0	0%	4	7%	1	2%	8	8%

Deworming

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.

NdG implemented a deworming program in EP and NF school. There was insufficient information available on this program, not all children received a deworming tablet in the last 6 months, and no information was provided on what was given to the children.
Of all children checked in the medical camp, 30% of the children reported to have received deworming treatment in the last 6 months (see table 7). Only 67% of the EP school received a deworming tablet in the last 6 month, even a lower number was seen in NF school: 30%.

MCC stresses the importance of the implementation of a clear deworming programme in both schools. Furthermore, NdG might consider to invite children and parents of the surrounding communities to provide deworming tablets as well, as complete families might benefit from the deworming programme, which might improve the health status of the students as well.
The recommended drugs (albendazole 400 mg or mebendazole 500 mg) are effective, inexpensive and easy to administer by non-medical personnel. One tablet of 400 mg albendazole costs only 0.45 quetzal (equivalent to 0,05 eurocents).

Worm infections were suspected for several children.

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.

We have to note that not at all toilets of both EP and NF school soap is available for the children.

Table 7: Prevalence preventive anti-worm treatment in the last half-year per geographical location by age and gender

	Total		EP School		San Lorenzo Community		NF school		Ciudad Vieja community	
	Total=874		Total=147		Total=177		Total=221		Total=329	
	N	%	n	%	N	%	n	%	n	%
Anti-worm	261	30%	99	67%	31	18%	66	30%	65	20%
No anti-worm	610	70%	47	32%	145	82%	155	70%	263	80%
Anti-worm per age										
<=1 year	7	8%	0	0%	2	6%	0	0%	5	9%
>1 en <5 years	38	24%	5	56%	10	19%	1	9%	22	25%
<5 years	45	18%	5	56%	12	15%	1	9%	27	19%
>=5 en <=10 years	139	34%	83	69%	8	16%	25	20%	23	20%
>10 years	77	35%	11	61%	11	24%	40	48%	15	21%

Other diagnoses and referrals

Other diagnoses included skin problems (eczema, dermatomycosis, impetigo and other (84 children), clinical signs of vitamin deficit (20), physiological heart murmur (16), pathological heart murmur (5), psychomotoric retardation (4), epilepsy (3), pneumonia (3), ear problems (21), asthma/BMH (6), lice (25) and diarrhea (25). Details can be found in the table on diagnoses in the Annex.

All children were treated during the medical camp, if considered necessary.

It should be noted that we noted during the medical camp that parent buy over-the counter antibiotics (self-medication) quite easily, for any kind of suspected illness (stomach ache, cough, sore throat). What is clear, is that patients (and parents) practicing self-medication in low and middle income countries are often unaware of potential problems that may arise including side effects, antimicrobial resistance, or worsening of symptoms (Ramay, 2015, Pharmacol Toxicol 2015l 16:11). Additionally, self-medicating individuals don't have pertinent information regarding dosing instructions. In these cases self-medication may lead to irrational use, poor adherence to regimens, side-effects and overuse of antibiotics. In addition, the money spend to this self-medication might in some cases be better spend, e.g. to nutritious food. There might be a future role for the social workers of NdG to explain to the parents the risk of self-medicating and also to explain the facts that most of the illnesses self-medication is used for are self-limiting in nature. Parent-teachers classes, with a community outreach, to talk about these subjects could be an option.

A few children were referred to the private hospital "Hermano Pedro".

- 3 children were referred to the dentist for severe carries with pain or infection.
- 1 child needs orthopaedic shoes, based on a leg length difference and pain.
- 2 children were referred to get follow-up and medication for epilepsy.
- 1 child was referred to the hospital for a recurring urinary tract infection.
- 1 child was referred to the hospital for a possible cardiac rhythm problem.

Medical information of the above children was given to NdG, and NdG was requested to give follow-up to these children. MCC will support NdG in this.

The observation of a lot of carries (319 children) and carries with pain (77 children) (recorded numbers, but most probably an underestimation) was disturbing. We noticed the high sugar intake of children and adults in Guatemala (sugar is fortified with vitamin A). Also high fluor concentrations in drinking water might be a cause. We strongly recommend to invite a dental team to visit the NdG school, and open this dental camp for the surrounding communities. Not only treatment of carries with pain is recommended, but also more education on tooth brushing and dental hygiene.

All left over medication was donated to the public hospital in Antigua.

Conclusions and recommendations

In NF and EP schools and the surrounding communities we have seen 874 children during the medical camp. Overall, the condition of the children is rather good, with low prevalence of anaemia and growth abnormalities. However, there were several children identified with health issues who received treatment or referral to hospital. It is good to see that at the NdG schools there are programs in place on tooth brushing and hygiene, that there is a nutrition program at the school with a snack and lunch, and that there is support of the children by social workers.
Based on the children we have seen during the medical camp and the conversations with parents, translators, and social workers we have some recommendations for the future.

Considering the high incidence of carries and carries with pain, we strongly recommend to organize a dental camp for the children and the NdG schools, but also for the children in the surrounding communities. Not only treatment of carries with pain is recommended, but also more education on tooth brushing and dental hygiene.

MCC is very pleased with the deworming already given at the NdG schools. However, not all children of the schools received deworming in the last six months. NdG should set up a clear deworming program, so all children of the schools receive deworming medication every six m

onths. Even NdG might consider to provide the deworming medication in an outreach progr am to the community, as complete families might benefit from this, based on which the healt h studies of both studies and community might improve.
Costs for a deworming program are relatively low: one deworming tablet costs approximately 0.27 Guatemalan Quetzal (0.03 euro or 0.04 USD). This is 0.53 Guatemalan Quetzal for each child per year.
In addition, soap should be available at all students and teachers toilets at both NdG schools.

MCC is pleased with the different programs on education, health, hygiene as set up in the school. However, MCC is wondering if there might be more effort given to reach-out to the community. Students are living in the community and will return to the community after school. If the health and nutrition conditions in the community are poor, this will affect the students as well. Organizing educational programs on specific topics (self-medication, nutritious food, deworming, tooth brushing) for the parents and community residents might considered in order to improve the overall well-being of children in Ciudad Vieja and San Lorenzo de Cubo. Also educational programs on mother-child care might be considered, as the new-borns are the future students of NdG schools.

For future medical camps or dental camps, we would recommend to have translators or helpers of the NdG schools (social workers and teachers) in order to keep the knowledge in the schools and communities. One of the non-measured benefits of a medical or dental camp is the transfer of knowledge. Knowledge about the importance of hygiene, deworming, nutritious food, dental hygiene, etc.

A few children from the community were seen during the medical who need additional attention (social problems, poor conditions). We forwarded their names and contact information to NdG, and we hope that NdG will consider to give these children access to the NdG school and support them and their families.

Last words:
We are very grateful for all work performed by Ambar, Nuria, all NdG workers, translators, helpers and MCC team members during the medical camps in San Lorenzo and Ciudad Vieja. We could not have performed our work without their presence and hard work.
The cooperation with NdG and the hospital is of greatest importance for all the children that need additional help.

Although much improvement is still needed in the general health care of the children of de NdG school and surrounding communities, we feel confident that a lot will be achieved in the following years.

Nadine van Dijk and Iris van de Gevel

Annex 1 – Detailed tables

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

	Total		EP school		San Lorenzo community		NF school		Cuidad Vieja community	
	874		147		177		221		329	
	N	%	n	%	n	%	n	%	n	%
AIDS	2	0%	0	0%	1	1%	0	0%	1	0%
vitamin deficit (clinical signs)	20	2%	1	1%	1	1%	10	5%	8	2%
pneumonia (clinical)	3	0%	0	0%	3	2%	0	0%	0	0%
BHR/asthma	6	1%	0	0%	2	1%	2	1%	2	1%
dehydration : acute diarrhoea	2	0%	0	0%	1	1%	0	0%	1	0%
diarrhoea without dehydration	13	1%	2	1%	2	1%	3	1%	6	2%
constipation	7	1%	0	0%	4	2%	0	0%	3	1%
active worm infection	7	1%	0	0%	0	0%	2	1%	5	2%
otitis externa	1	0%	1	1%	0	0%	0	0%	0	0%
(adeno)tonsillitis	3	0%	0	0%	1	1%	2	1%	0	0%
sinusitis	1	0%	0	0%	0	0%	0	0%	1	0%
hearing impairment	1	0%	0	0%	0	0%	0	0%	1	0%
Ears - other	20	2%	3	2%	5	3%	3	1%	9	3%
cariës n.o.s.	319	36%	53	36%	52	29%	101	46%	113	34%
pain n.o.s	7	1%	2	1%	0	0%	4	2%	1	0%
fluorosis	5	1%	3	2%	2	1%	0	0%	0	0%
caries with pain	77	9%	16	11%	4	2%	27	12%	30	9%
wounds n.o.s.	1	0%	0	0%	0	0%	0	0%	1	0%
eczema n.o.s.	27	3%	2	1%	7	4%	4	2%	14	4%
dermatomycosis	13	1%	2	1%	3	2%	2	1%	6	2%
Impetigo/furunculosis	1	0%	0	0%	0	0%	0	0%	1	0%
Lice	25	3%	1	1%	2	1%	12	5%	10	3%
Skin problems other (psoriasis etc)	42	5%	2	1%	13	7%	15	7%	12	4%
psychomotoric retardation	4	0%	0	0%	2	1%	0	0%	2	1%
epilepsy	3	0%	0	0%	0	0%	0	0%	3	1%
migraine/headache	16	2%	1	1%	1	1%	6	3%	8	2%
physiological murmer	16	2%	3	2%	5	3%	1	0%	7	2%
pathological murmur (suspected)	5	1%	2	1%	2	1%	0	0%	1	0%
refractory problem	13	1%	3	2%	2	1%	4	2%	4	1%
strabismus	1	0%	0	0%	0	0%	0	0%	1	0%
cryptorchism	1	0%	1	1%	0	0%	0	0%	0	0%
inguinal hernia	1	0%	0	0%	0	0%	0	0%	1	0%
urinary infection	2	0%	0	0%	0	0%	1	0%	1	0%
chronic kidney path.	1	0%	0	0%	1	1%	0	0%	0	0%

	Total		EP school		San Lorenzo community		NF school		Cuidad Vieja community	
	874		147		177		221		329	
artralgia n.o.s.	2	0%	0	0%	1	1%	0	0%	1	0%
hip dysplasia	2	0%	1	1%	1	1%	0	0%	0	0%
old fracture	1	0%	0	0%	1	1%	0	0%	0	0%

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

	Total		EP school		San Lorenzo community		NF school		Ciudad Vieja community	
	874		Total= 147		Total= 177		Total= 221		Total= 329	
	N	%	n	%	n	%	n	%	n	%
ferro	33	4%	6	4%	10	6%	4	2%	13	4%
mother iron	24	3%	0	0%	9	5%	0	0%	15	5%
multivitamins	227	26%	22	15%	38	21%	60	27%	107	33%
anti-worm	521	60%	46	31%	113	64%	150	68%	212	64%
acute worm	7	1%	0	0%	0	0%	2	1%	5	2%
amoxicillin	3	0%	0	0%	3	2%	0	0%	0	0%
augmentin	2	0%	0	0%	0	0%	1	0%	1	0%
paracetamol	12	1%	1	1%	2	1%	2	1%	7	2%
eardrops	3	0%	1	1%	1	1%	1	0%	0	0%
hydrocortisone cream	19	2%	1	1%	4	2%	4	2%	10	3%
dactarin cream	12	1%	1	1%	3	2%	3	1%	5	2%
dactacort cream	4	0%	2	1%	0	0%	0	0%	2	1%
fusidin cream	4	0%	0	0%	0	0%	0	0%	4	1%
eyedrops	1	0%	1	1%	0	0%	0	0%	0	0%