

External Quality Assessment Scheme

Parasites in faeces Round 1, 2023

Specimens

Please find enclosed 3 faecal samples S001, S002 and S003, each 1 mL. The samples have been fixed with 10% formalin.

Caution

The samples are of human origin and must be handled with the same care as patient samples, i.e. as potential transmitters of serious diseases. The samples are fixed with formalin.

Background information

Sample S001

Malnourished immigrant child with diarrhea.

Sample S002

Patient with immunosuppression and weight loss.

Sample S003

Organic farmer with no symptoms.

Examinations

Parasites in faeces

Storage and use

After arrival, the samples should be stored at +2...8 °C. Mix the samples well before handling. Samples should be concentrated using either ether or ethyl acetate (see the instructions on page 2). Examine the samples by microscope.

Result reporting

Please enter the results via LabScala (www.labscala.com).

Both Protozoa and Worm eggs menus are mandatory. Negative result can be found from both menus. If protozoa is not included in your test selection, choose option "Protozoa not in test selection" from the Protozoa dropdown list.

Please follow the described guidelines for amounts (see the table below).

Findings/amounts		
1+	= Little	≤2 parasites / 10 fields, magnification of 400 ≤2 ova / specimen, e.g., 22x22 mm cover slip
2+	= Moderate	3-9 parasites / 10 fields, magnification of 400 3-9 ova / specimen, e.g., 22x22 mm cover slip
3+	= Plenty	≥10 parasites / 10 fields, magnification of 400 ≥10 ova / specimen, e.g., 22x22 mm cover slip

Pathogenic findings will be scored.

2023-02-21

INSTRUCTIONS

Product no. 5440
LQ769423011-013/US

Subcontracting: Sample pretesting

If the kit is incomplete or contains damaged specimens, please report immediately to info@labquality.fi.

The results should be reported no later than **March 16, 2023.**

The expected results of the round are published in LabScala in the View Reports section by March 21, 2023.

Inquiries

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Formalin-ethyl acetate concentration of faecal samples

Concentration of faecal samples removes the fat and other debris from the sample and makes microscoping and detection of parasite structures easier. For good quality diagnostics concentration is an essential part of faecal sample preparation. With clearly diarrhoeal samples the concentration can be replaced by simple centrifugation (10 min at 500 g) and microscopy of the pellet.

Fixing the stool specimens:

- a stool sample for detection of parasites should be representative; slimy, bloody or otherwise aberrant parts of the stool should be collected
- the sample is fixed with 10% formalin (one part faeces, three parts 10% formalin) by mixing it very thoroughly after taking the sample
 - fixation of parasites with formalin takes 1-4 hours, after that the sample is usually not infective anymore
 - the sample could be kept at room temperature before concentrated

Concentration of the sample in the laboratory:

- the formalin fixed sample is mixed thoroughly (with a thick wooden stick or equivalent) to make the sample as homogenous as possible
- the sample is sieved through a wet gauze (gauze bandage or wire gauze, pore size 0.1-1 mm) to a suitable container after which 3-4 mL of the sieved sample is poured to a conical 15 mL tube
- 4 mL of 10% formalin and 2 mL ethyl acetate are added to the tube
- the tube is closed and shaken vigorously for at least 30 seconds
- the cap is removed carefully to avoid spills
- the tube is centrifuged for 2 (-10) min at 500-550 g
- Four layers should be formed: from the top the first layer is pure ethyl acetate, the second is faecal debris in ethyl acetate, the third is formalin and the fourth layer on the bottom is the pellet with the parasite ova and cysts
- the debris layer is detached from the tube walls with an applicator stick and thereafter the three uppermost layers are discarded by decanting
- the inside of the tube is cleaned thoroughly with a cotton swab; the pellet should not be touched
- 0.9% NaCl is added to the pellet so that amount of liquid equals the amount of pellet (usually approximately 0.5 mL), depending on the size of the pellet
- the sample is ready for microscopical examination

T. Meri/S. Jokiranta 08/2012

Literature:

Garcia, L.S and Bruckner, D.A.: Diagnostic Medical Parasitology. ASM Press, Washington, D.C., 3rd edition or newer.
Zaman, V. and Keong, L.A.: Handbook of Medical Parasitology. Churchill Livingstone, Edinburgh London Melbourne and New York. 2nd edition or newer.

Parasites in faeces

S001



S002



S003

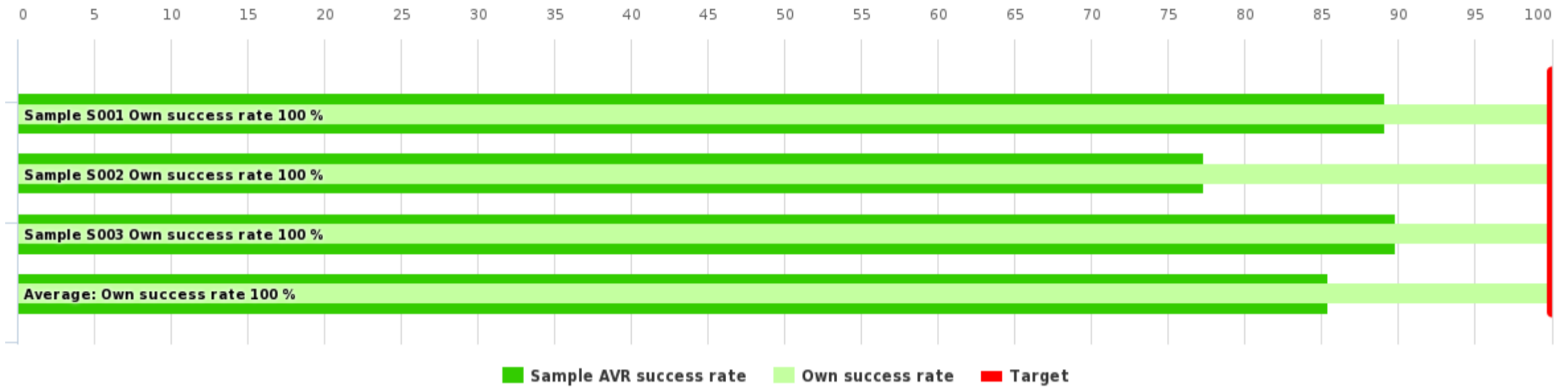


Client report

	No of participants	No of responded participants	Response percentage
Parasites in faeces, February, 1-2023	67	64	95.5 %

Summary

Overall success rate by samples

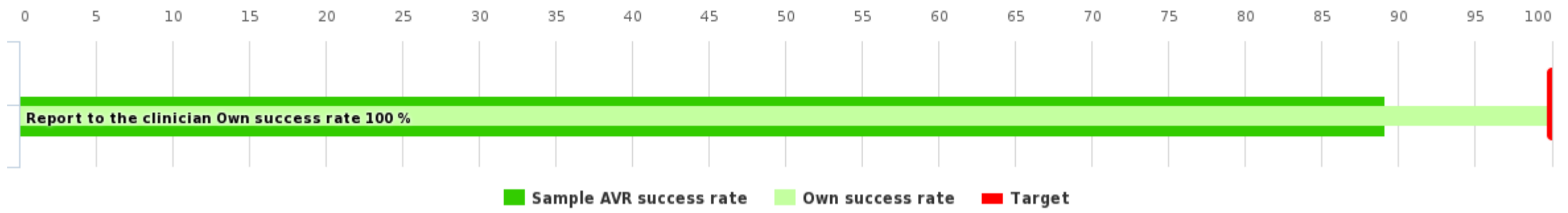


Summary	Own score	Max score	Own success rate	Difference	AVR success rate
Sample S001	4	4	100 %	10.9 %	89.1 %
Sample S002	8	8	100 %	22.7 %	77.3 %
Sample S003	12	12	100 %	10.2 %	89.8 %
Average:			100 %	14.6 %	85.4 %

History	Test nr.	Own success rate	Difference	AVR success rate
History not found				

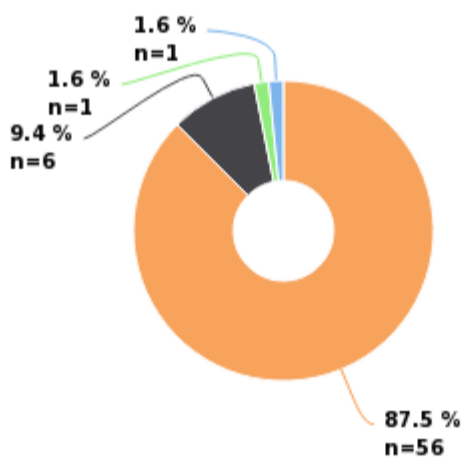
Sample S001 | Giardian lamblia, Trichuris trichiura

Sample S001 success rate



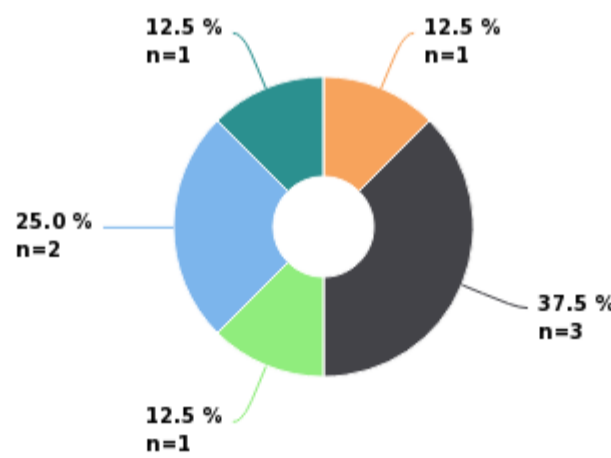
Sample S001 results	Responded	AVR success rate	Count
	Report to the clinician	89.1 %	142
	Further action	-	43

Sample S001 Protozoa: Giardian lamblia



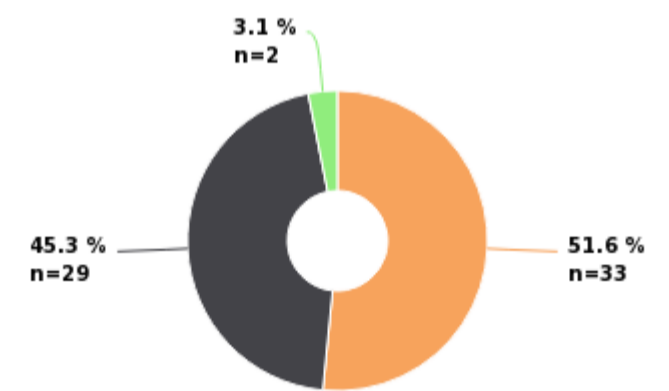
- Giardia lamblia (G. intestinalis/duodenalis)
- Negative for protozoa
- Protozoa not in test selection
- No reported finding

Sample S001 Protozoa



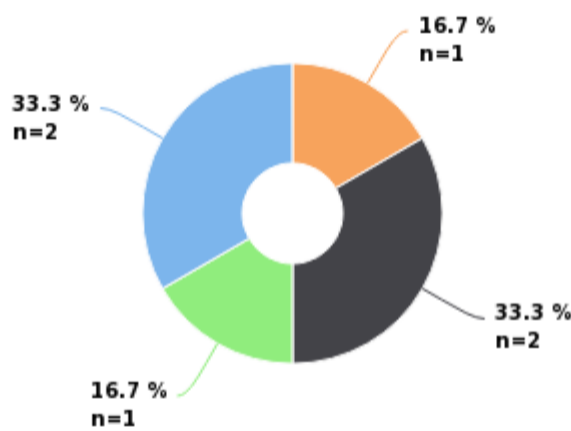
- Balantidium coli
- Blastocystis sp.
- Entamoeba coli
- Entamoeba histolytica/dispar
- Entamoeba sp.

Sample S001 Worm eggs: Trichuris trichiura



- Nematoda, Trichuris trichiura (whipworm)
- Negative for worm eggs
- No reported finding

Sample S001 Worm eggs: Other findings



- Cestoidea, Dibothriocephalus latius (Diphyllobothrium latum)
- Nematoda, Ascaris lumbricoides (roundworm)
- Nematoda, Capillaria philippinensis
- Nematoda, Strongyloides stercoralis

LABORATORY SPECIFIC SCORING TABLE

Finding group	Finding	Own score	Max score	Own success rate	Difference	AVR success rate
Protozoa: Giardian lamblia	Giardia lamblia (G. intestinalis/duodenalis)	4	4	100 %	10.9 %	89.1 %
Worm eggs: Trichuris trichiura	Nematoda, Trichuris trichiura (whipworm)	-	-			-
Total:		4	4	100 %	10.9 %	89.1 %

REPORT TO THE CLINICIAN

Finding group	Finding	Finding count	Little (+)	Moderate (++)	Plenty (+++)	AVR success rate
Protozoa: Giardian lamblia		64				89.1 %
	⊙ Giardia lamblia (G. intestinalis/duodenalis)	56	5	⊙ 29	22	

	Negative for protozoa	6				
	Protozoa not in test selection	1				
	No reported finding	1				
Protozoa		8				-
	Balantidium coli	1			1	
	Blastocystis sp.	3	2	1		
	Entamoeba coli	1		1		
	Entamoeba histolytica/dispar	2	2			
	Entamoeba sp.	1	1			
Worm eggs: Trichuris trichiura		64				-
	<input checked="" type="radio"/> Nematoda, Trichuris trichiura (whipworm)	33	<input checked="" type="radio"/> 33			
	Negative for worm eggs	29				
	No reported finding	2				
Worm eggs: Other findings		6				-
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	1		1		
	Nematoda, Ascaris lumbricoides (roundworm)	2	2			
	Nematoda, Capillaria philippinensis	1	1			
	Nematoda, Strongyloides stercoralis	2		2		
Total:		142				89.1 %

SCORING SUMMARY

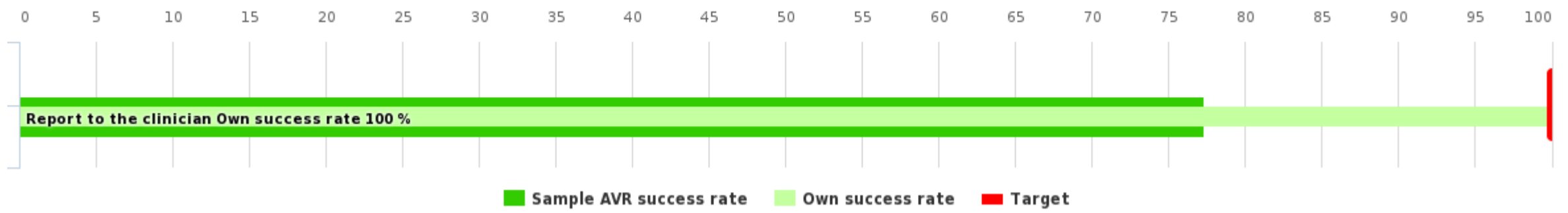
Finding group	Finding	Finding score
Protozoa: Giardia lamblia		
	Giardia lamblia (G. intestinalis/duodenalis)	4
	Negative for protozoa	0
	Protozoa not in test selection	4
	No reported finding	0
Protozoa		
	Balantidium coli	-
	Blastocystis sp.	-
	Entamoeba coli	-
	Entamoeba histolytica/dispar	-
	Entamoeba sp.	-
Worm eggs: Trichuris trichiura		
	Nematoda, Trichuris trichiura (whipworm)	-
	Negative for worm eggs	-
	No reported finding	-
Worm eggs: Other findings		
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	-
	Nematoda, Ascaris lumbricoides (roundworm)	-
	Nematoda, Capillaria philippinensis	-
	Nematoda, Strongyloides stercoralis	-
Total:		

FURTHER ACTION

Result	Result count
<input checked="" type="radio"/> Not referred for further action	32
Referred for further action	5
Referred for further action for examination of protozoa	5
New sample requested	1
Total:	43

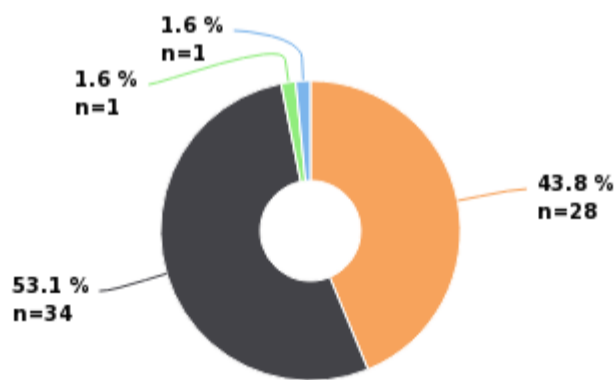
Sample S002 | *Balantidium coli*, *Ascaris lumbricoides*, *Ancylostoma duodenale*/*Necator americanus*, *Trichuris trichiura*, *Strongyloides stercoralis*

Sample S002 success rate



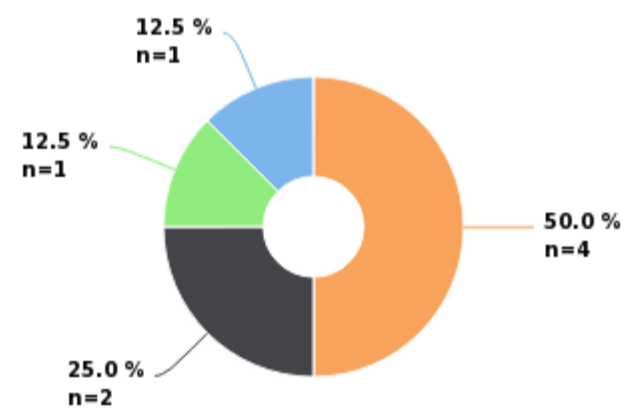
Sample S002 results	Responded	AVR success rate	Count
	Report to the clinician	77.3 %	343
	Further action	-	45

Sample S002 Protozoa: *Balantidium coli*



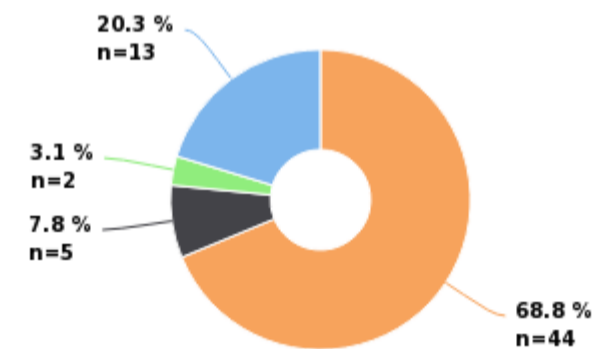
- Balantidium coli
- Negative for protozoa
- Protozoa not in test selection
- No reported finding

Sample S002 Protozoa



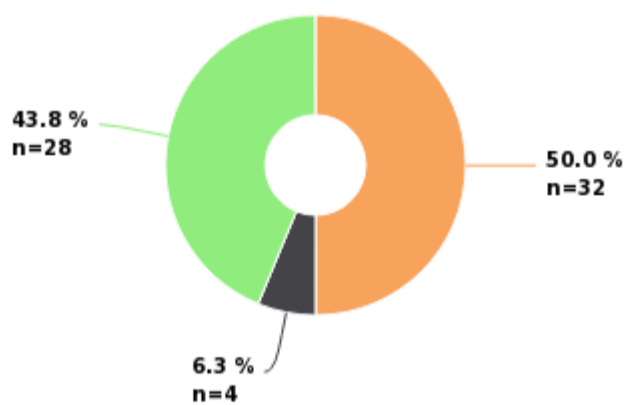
- Blastocystis sp.
- Endolimax nana
- Entamoeba - precysts
- Entamoeba hartmanni

Sample S002 Worm eggs: *Ascaris lumbricoides*



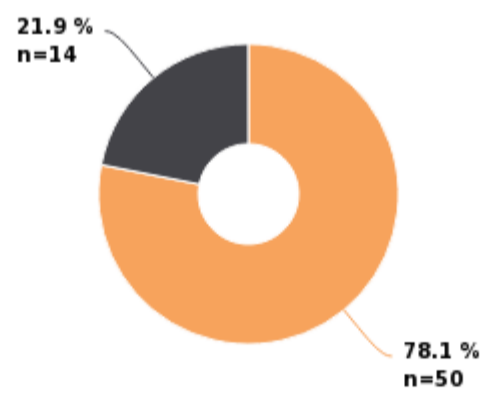
- Nematoda, *Ascaris lumbricoides* (roundworm)
- Nematoda, *Ascaris* sp.
- Negative for worm eggs
- No reported finding

Sample S002 Worm eggs: *Ancylostoma duodenale*/*Necator americanus*



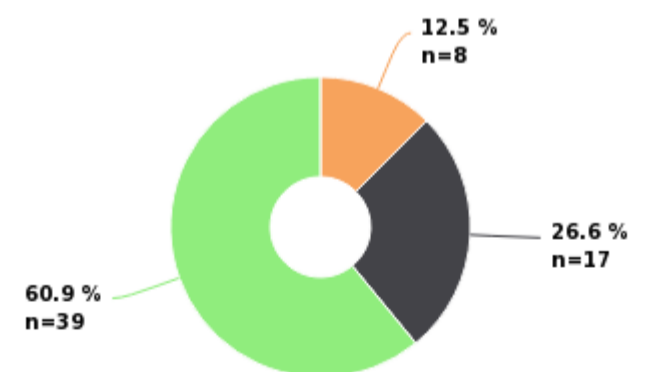
- Nematoda, *Ancylostoma duodenale*/*Necator americanus* (hookworm)
- Nematoda, Hookworm, larvae
- No reported finding

Sample S002 Worm eggs: *Trichuris trichiura*



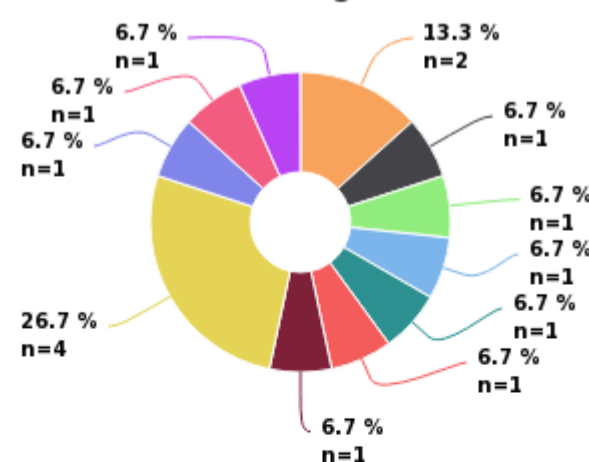
- Nematoda, *Trichuris trichiura* (whipworm)
- No reported finding

Sample S002 Worm eggs: *Strongyloides stercoralis*



- Nematoda, *Strongyloides stercoralis*
- Nematoda, *Strongyloides stercoralis*, larvae
- No reported finding

Sample S002 Worm eggs: Other findings



- Nematoda, Hookworm, larvae
- Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)
- Cestoidea, Hymenolepis diminuta
- Cestoidea, Taenia solium
- Cestoidea, Taenia sp.
- Cystoisospora belli (former Isospora belli)
- Nematoda, Capillaria philippinensis
- Nematoda, Trichostrongylus sp.
- Trematoda, Fasciola hepatica
- Trematoda, Other trematoda
- Trematoda, Paragonimus sp.

LABORATORY SPECIFIC SCORING TABLE

Finding group	Finding	Own score	Max score	Own success rate	Difference	AVR success rate
Protozoa: Balantidium coli	Negative for protozoa	-	-			-
Worm eggs: Ascaris lumbricoides	Nematoda, Ascaris lumbricoides (roundworm)	4	4	100 %	23.4 %	76.6 %
Worm eggs: Ancylostoma duodenale/Necator americanus	No reported finding	-	-			-
Worm eggs: Trichuris trichiura	Nematoda, Trichuris trichiura (whipworm)	4	4	100 %	21.9 %	78.1 %
Worm eggs: Strongyloides stercoralis	No reported finding	-	-			-
Total:		8	8	100 %	22.7 %	77.3 %

REPORT TO THE CLINICIAN

Finding group	Finding	Finding count	Little (+)	Moderate (++)	Plenty (+++)	AVR success rate
Protozoa: Balantidium coli		64				-
	Balantidium coli	28	1	8	19	
	⊙ Negative for protozoa	34				
	Protozoa not in test selection	1				
	No reported finding	1				
Protozoa		8				-
	Blastocystis sp.	4	2	2		
	Endolimax nana	2	1	1		
	Entamoeba - precysts	1	1			
	Entamoeba hartmanni	1		1		
Worm eggs: Ascaris lumbricoides		64				76.6 %
	⊙ Nematoda, Ascaris lumbricoides (roundworm)	44	18	20	⊙ 6	
	Nematoda, Ascaris sp.	5	2	2	1	
	Negative for worm eggs	2				
	No reported finding	13				
Worm eggs: Ancylostoma duodenale/Necator americanus		64				-
	Nematoda, Ancylostoma duodenale/Necator americanus (hookworm)	32	24	8		
	Nematoda, Hookworm, larvae	4	4			
	⊙ No reported finding	28				
Worm eggs: Trichuris trichiura		64				78.1 %
	⊙ Nematoda, Trichuris trichiura (whipworm)	50	19	25	⊙ 6	
	No reported finding	14				
Worm eggs: Strongyloides stercoralis		64				-
	Nematoda, Strongyloides stercoralis	8	7	1		
	Nematoda, Strongyloides stercoralis, larvae	17	14	3		
	⊙ No reported finding	39				
Worm eggs: Other findings		15				-
	Nematoda, Hookworm, larvae	2	2			
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	1			1	
	Cestoidea, Hymenolepis diminuta	1	1			
	Cestoidea, Taenia solium	1	1			
	Cestoidea, Taenia sp.	1	1			
	Cystoisospora belli (former Isospora belli)	1	1			
	Nematoda, Capillaria philippinensis	1	1			
	Nematoda, Trichostrongylus sp.	4	3		1	
	Trematoda, Fasciola hepatica	1		1		
	Trematoda, Other trematoda	1			1	
	Trematoda, Paragonimus sp.	1			1	

Total:		343			77.3 %
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SCORING SUMMARY

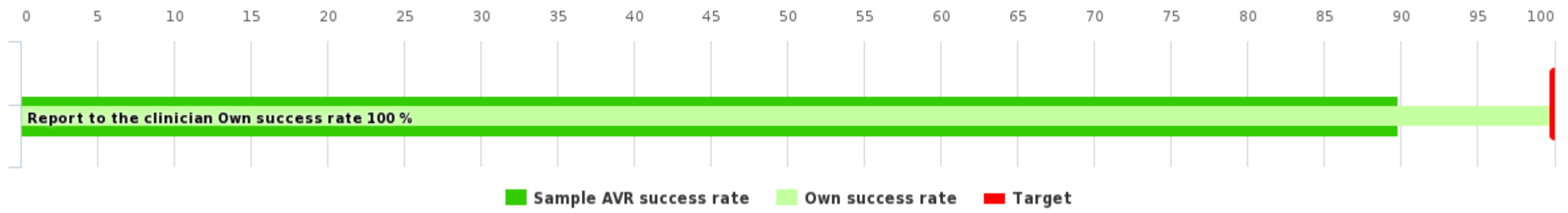
Finding group	Finding	Finding score
Protozoa: Balantidium coli	Balantidium coli	-
	Negative for protozoa	-
	Protozoa not in test selection	-
	No reported finding	-
Protozoa		
	Blastocystis sp.	-
	Endolimax nana	-
	Entamoeba - precysts	-
	Entamoeba hartmanni	-
Worm eggs: Ascaris lumbricoides		
	Nematoda, Ascaris lumbricoides (roundworm)	4
	Nematoda, Ascaris sp.	4
	Negative for worm eggs	0
	No reported finding	0
Worm eggs: Ancylostoma duodenale/Necator americanus		
	Nematoda, Ancylostoma duodenale/Necator americanus (hookworm)	-
	Nematoda, Hookworm, larvae	-
	No reported finding	-
Worm eggs: Trichuris trichiura		
	Nematoda, Trichuris trichiura (whipworm)	4
	No reported finding	0
Worm eggs: Strongyloides stercoralis		
	Nematoda, Strongyloides stercoralis	-
	Nematoda, Strongyloides stercoralis, larvae	-
	No reported finding	-
Worm eggs: Other findings		
	Nematoda, Hookworm, larvae	-
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	-
	Cestoidea, Hymenolepis diminuta	-
	Cestoidea, Taenia solium	-
	Cestoidea, Taenia sp.	-
	Cystoisospora belli (former Isospora belli)	-
	Nematoda, Capillaria philippinensis	-
	Nematoda, Trichostrongylus sp.	-
	Trematoda, Fasciola hepatica	-
	Trematoda, Other trematoda	-
	Trematoda, Paragonimus sp.	-
Total:		

FURTHER ACTION

Result	Result count
<input checked="" type="radio"/> Not referred for further action	32
<input type="radio"/> Referred for further action	9
<input type="radio"/> Referred for further action for examination of protozoa	2
<input type="radio"/> New sample requested	2
Total:	45

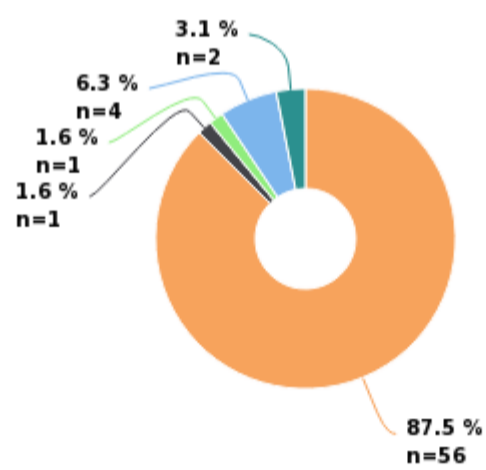
Sample S003 | *Ascaris lumbricoides*, *Trichuris trichiura*

Sample S003 success rate



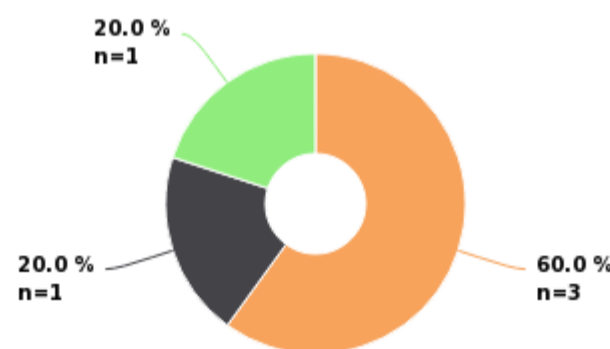
Sample S003 results	Responded	AVR success rate	Count
	Report to the clinician	89.8 %	200
	Further action	-	40

Sample S003 Protozoa: Negative



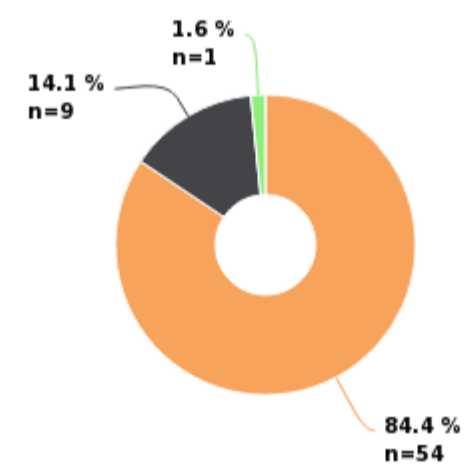
- Orange: Negative for protozoa
- Dark Grey: *Balantidium coli*
- Light Green: *Giardia lamblia* (G. intestinalis/duodenalis)
- Blue: No pathogenic findings
- Teal: Protozoa not in test selection

Sample S003 Protozoa: Other findings



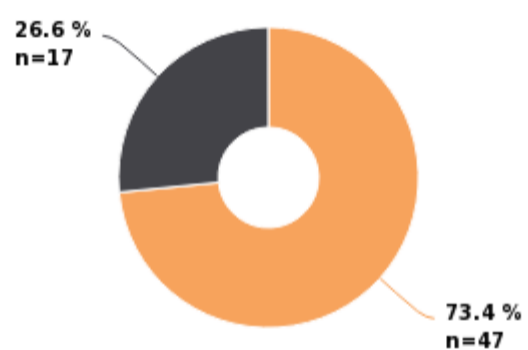
- Orange: Blastocystis sp.
- Dark Grey: Chilomastix mesnili
- Light Green: Entamoeba - precysts

Sample S003 Worm eggs: *Ascaris lumbricoides*



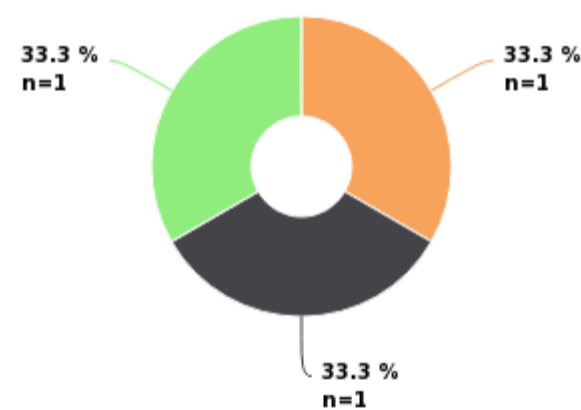
- Orange: Nematoda, *Ascaris lumbricoides* (roundworm)
- Dark Grey: Nematoda, *Ascaris* sp.
- Light Green: No reported finding

Sample S003 Worm eggs: *Trichuris trichiura*



- Orange: Nematoda, *Trichuris trichiura* (whipworm)
- Dark Grey: No reported finding

Sample S003 Worm eggs: Other findings



- Orange: Cestoidea, *Diphylobothrium latum*
- Dark Grey: Nematoda, *Capillaria philippinensis*
- Light Green: Nematoda, *Toxocara canis*

LABORATORY SPECIFIC SCORING TABLE

Finding group	Finding	Own score	Max score	Own success rate	Difference	AVR success rate
Protozoa: Negative	Negative for protozoa	4	4	100 %	2.4 %	97.6 %
Worm eggs: <i>Ascaris lumbricoides</i>	Nematoda, <i>Ascaris lumbricoides</i> (roundworm)	4	4	100 %	1.6 %	98.4 %
Worm eggs: <i>Trichuris trichiura</i>	Nematoda, <i>Trichuris trichiura</i> (whipworm)	4	4	100 %	26.6 %	73.4 %
Total:		12	12	100 %	10.2 %	89.8 %

REPORT TO THE CLINICIAN

Finding group	Finding	Finding count	Little (+)	Moderate (++)	Plenty (+++)	AVR success rate
Protozoa: Negative		64				97.6 %

	<input checked="" type="radio"/> Negative for protozoa	56				
	Balantidium coli	1	1			
	Giardia lamblia (G. intestinalis/duodenalis)	1			1	
	No pathogenic findings	4				
	Protozoa not in test selection	2				
Protozoa: Other findings		5				-
	Blastocystis sp.	3	3			
	Chilomastix mesnili	1		1		
	Entamoeba - precysts	1	1			
Worm eggs: Ascaris lumbricoides		64				98.4 %
	<input checked="" type="radio"/> Nematoda, Ascaris lumbricoides (roundworm)	54	9	24	<input checked="" type="radio"/> 21	
	Nematoda, Ascaris sp.	9	3	2	4	
	No reported finding	1				
Worm eggs: Trichuris trichiura		64				73.4 %
	<input checked="" type="radio"/> Nematoda, Trichuris trichiura (whipworm)	47	<input checked="" type="radio"/> 40	6	1	
	No reported finding	17				
Worm eggs: Other findings		3				-
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	1	1			
	Nematoda, Capillaria philippinensis	1	1			
	Nematoda, Toxocara canis	1		1		
Total:		200				89.8 %

SCORING SUMMARY

Finding group	Finding	Finding score
Protozoa: Negative		
	Negative for protozoa	4
	Balantidium coli	0
	Giardia lamblia (G. intestinalis/duodenalis)	0
	No pathogenic findings	4
	Protozoa not in test selection	4
Protozoa: Other findings		
	Blastocystis sp.	-
	Chilomastix mesnili	-
	Entamoeba - precysts	-
Worm eggs: Ascaris lumbricoides		
	Nematoda, Ascaris lumbricoides (roundworm)	4
	Nematoda, Ascaris sp.	4
	No reported finding	0
Worm eggs: Trichuris trichiura		
	Nematoda, Trichuris trichiura (whipworm)	4
	No reported finding	0
Worm eggs: Other findings		
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	-
	Nematoda, Capillaria philippinensis	-
	Nematoda, Toxocara canis	-
Total:		

FURTHER ACTION

Result	Result count
<input checked="" type="radio"/> Not referred for further action	31
Referred for further action	5
Referred for further action for examination of protozoa	2
New sample requested	2
Total:	40

Report Info

PARTICIPANTS

Altogether 67 laboratories from 16 countries participated in this EQA round.

REPORT INFO

On the front page you can see summaries of overall success rate and sample specific success rates which have been calculated from the scores. The reported results and the scores are presented in the same report but in separate tables.

Results from the "Report to the clinician" part are divided into protozoa and worm eggs categories. The findings reported by the participants have been grouped into tables according to the expected (pathogenic) findings of each sample. If a laboratory has reported multiple findings, the additional findings have been grouped separately. The additional findings are not scored. The reported results and the scores are presented in the same report but in separate tables. The reported amounts of findings are also presented in the same "Report to the clinician" table but these results are not scored.

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For information on report interpretation and performance evaluation, please see the "EQAS Interpretation guidelines" in LabScala User instructions. In case you have any questions regarding the reports, please contact the EQA Coordinator.

SCORING

The scoring is based on pathogenic findings. However, all findings in the samples, including non-pathogenic protozoan findings, are reported, and commented. Pathogenic findings can be scored when at least 60% of the participants have reported the correct/expected result and when there are at least three reported results. The report includes a sample specific scoring summary. Laboratory's scores have been converted to percentage (own success rate, % from maximum scores) with a target at 100%. Own success rate is compared with the success rate of all results.

The following general rules are applied:

4 points is reached by reporting the expected result

1-3 points is given to results that are partly correct/insufficient regarding the expected finding

0 points is given for an incorrect/false result

GLOBAL REPORT

	No of participants	No of responded participants	Response percentage
Parasites in faeces, February, 1-2023	67	64	95.5 %

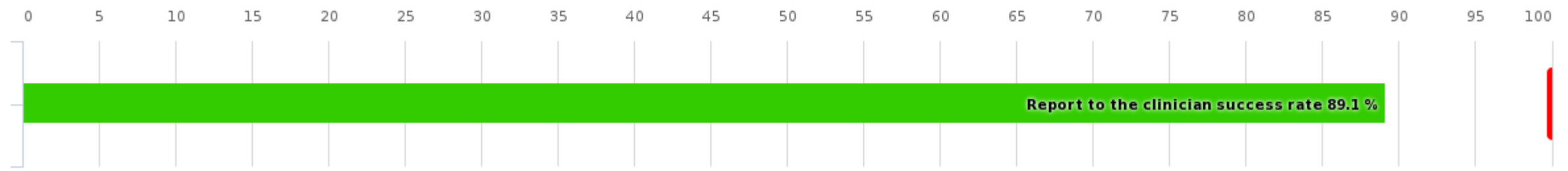
Summary



Summary	AVR success rate
Sample S001	89.1 %
Sample S002	77.3 %
Sample S003	89.8 %
Average:	85.4 %

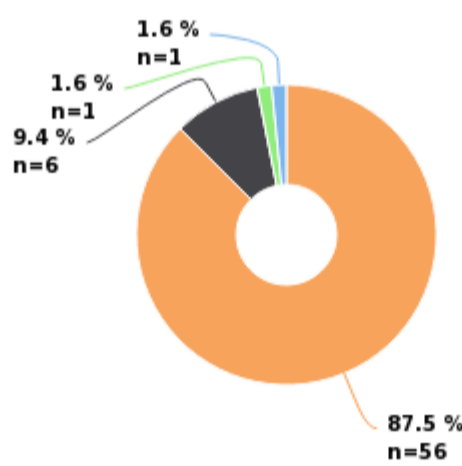
Sample S001 | Giardia lamblia, Trichuris trichiura

Sample S001 success rate



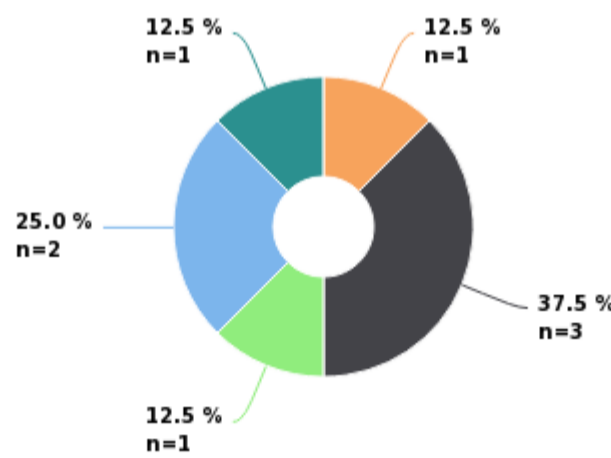
Sample S001 results	Responded	AVR success rate	Count
	Report to the clinician	89.1 %	142
	Further action	-	43

Sample S001 Protozoa: Giardia lamblia



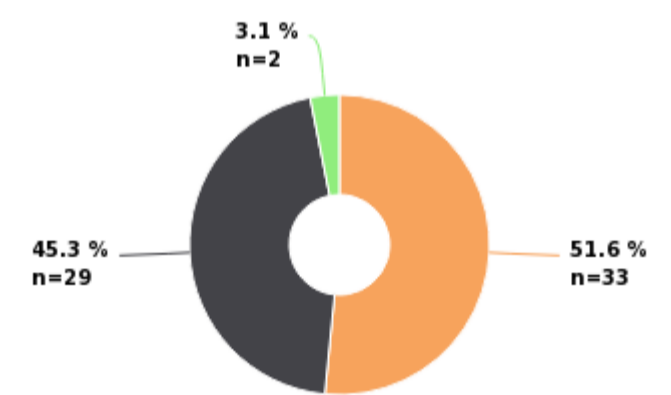
- Giardia lamblia (G. intestinalis/duodenalis)
- Negative for protozoa
- Protozoa not in test selection
- No reported finding

Sample S001 Protozoa



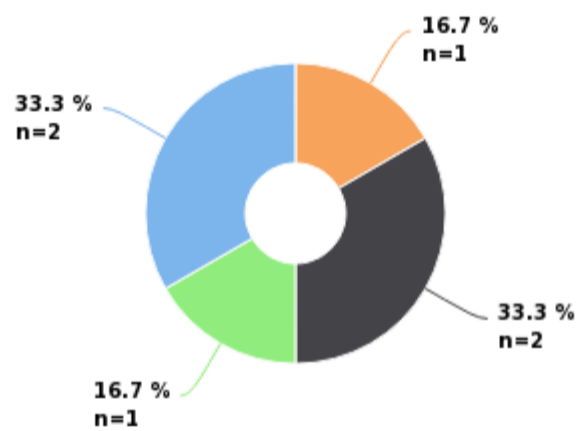
- Balantidium coli
- Blastocystis sp.
- Entamoeba coli
- Entamoeba histolytica/dispar
- Entamoeba sp.

Sample S001 Worm eggs: Trichuris trichiura



- Nematoda, Trichuris trichiura (whipworm)
- Negative for worm eggs
- No reported finding

Sample S001 Worm eggs: Other findings



- Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)
- Nematoda, Ascaris lumbricoides (roundworm)
- Nematoda, Capillaria philippinensis
- Nematoda, Strongyloides stercoralis

REPORT TO THE CLINICIAN

Finding group	Finding	Finding count	Little (+)	Moderate (++)	Plenty (+++)	AVR success rate
Protozoa: Giardia lamblia		64				89.1 %
	Giardia lamblia (G. intestinalis/duodenalis)	56	5	29	22	
	Negative for protozoa	6				
	Protozoa not in test selection	1				
	No reported finding	1				
Protozoa		8				-
	Balantidium coli	1			1	
	Blastocystis sp.	3	2	1		
	Entamoeba coli	1		1		

	Entamoeba histolytica/dispar	2	2		
	Entamoeba sp.	1	1		
Worm eggs: Trichuris trichiura		64			-
	Nematoda, Trichuris trichiura (whipworm)	33	33		
	Negative for worm eggs	29			
	No reported finding	2			
Worm eggs: Other findings		6			-
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	1		1	
	Nematoda, Ascaris lumbricoides (roundworm)	2	2		
	Nematoda, Capillaria philippinensis	1	1		
	Nematoda, Strongyloides stercoralis	2		2	
Total:		142			89.1 %

SCORING SUMMARY

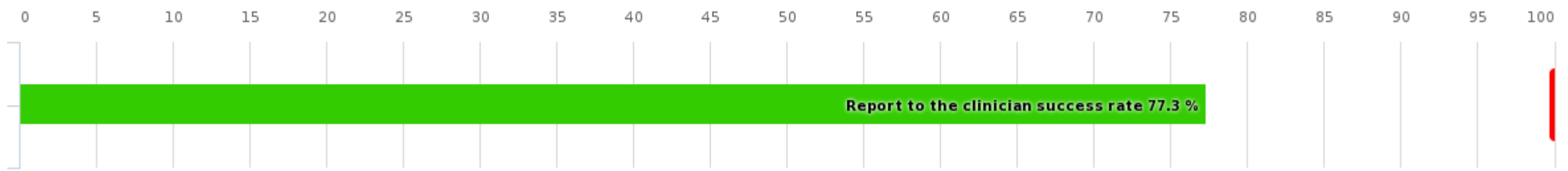
Finding group	Finding	Finding score
Protozoa: Giardian lamblia		
	Giardia lamblia (G. intestinalis/duodenalis)	4
	Negative for protozoa	0
	Protozoa not in test selection	4
	No reported finding	0
Protozoa		
	Balantidium coli	-
	Blastocystis sp.	-
	Entamoeba coli	-
	Entamoeba histolytica/dispar	-
	Entamoeba sp.	-
Worm eggs: Trichuris trichiura		
	Nematoda, Trichuris trichiura (whipworm)	-
	Negative for worm eggs	-
	No reported finding	-
Worm eggs: Other findings		
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	-
	Nematoda, Ascaris lumbricoides (roundworm)	-
	Nematoda, Capillaria philippinensis	-
	Nematoda, Strongyloides stercoralis	-
Total:		

FURTHER ACTION

Result	Result count
Not referred for further action	32
Referred for further action	5
Referred for further action for examination of protozoa	5
New sample requested	1
Total:	43

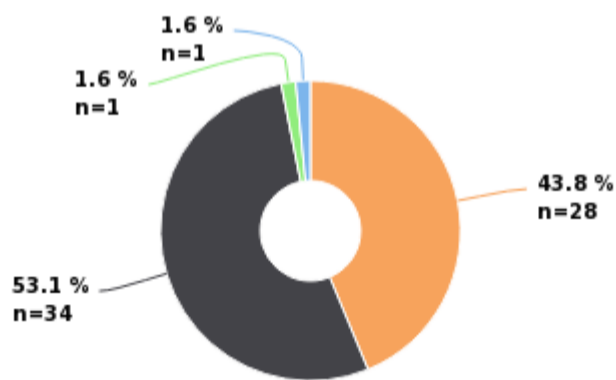
Sample S002 | *Balantidium coli*, *Ascaris lumbricoides*, *Ancylostoma duodenale*/*Necator americanus*, *Trichuris trichiura*, *Strongyloides stercoralis*

Sample S002 success rate



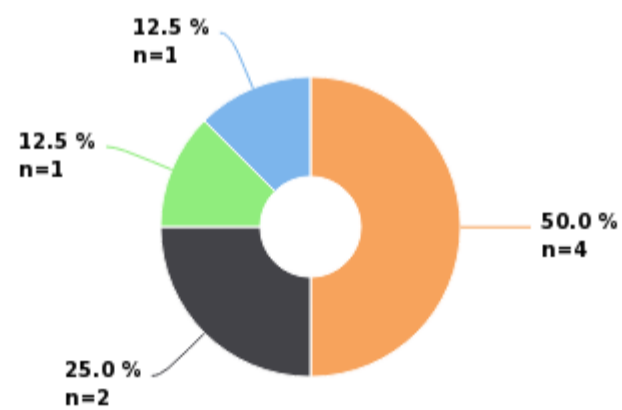
Sample S002 results	Responded	AVR success rate	Count
	Report to the clinician	77.3 %	343
	Further action	-	45

Sample S002 Protozoa: *Balantidium coli*



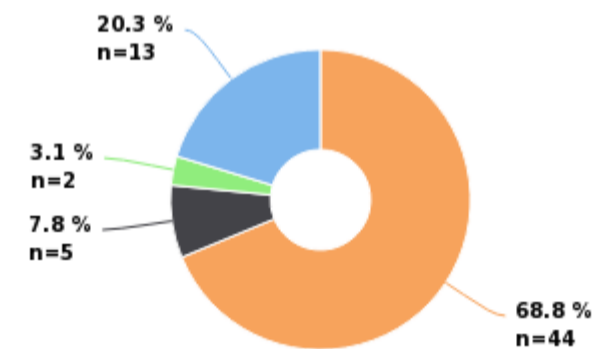
- Balantidium coli
- Negative for protozoa
- Protozoa not in test selection
- No reported finding

Sample S002 Protozoa



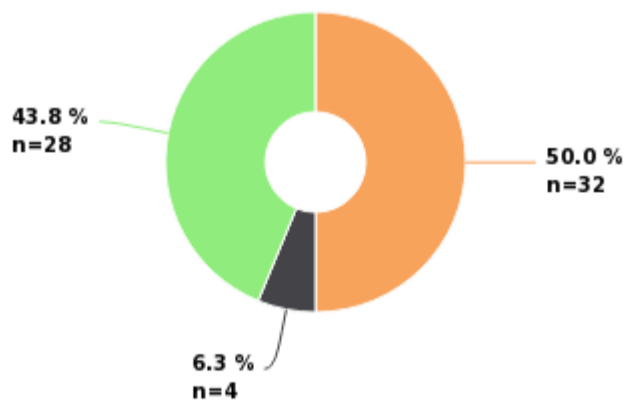
- Blastocystis sp.
- Endolimax nana
- Entamoeba - precysts
- Entamoeba hartmanni

Sample S002 Worm eggs: *Ascaris lumbricoides*



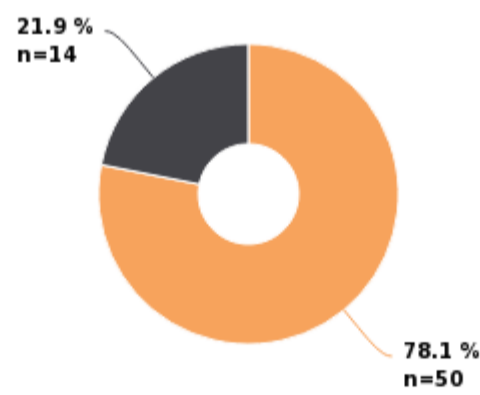
- Nematoda, *Ascaris lumbricoides* (roundworm)
- Nematoda, *Ascaris* sp.
- Negative for worm eggs
- No reported finding

Sample S002 Worm eggs: *Ancylostoma duodenale*/*Necator americanus*



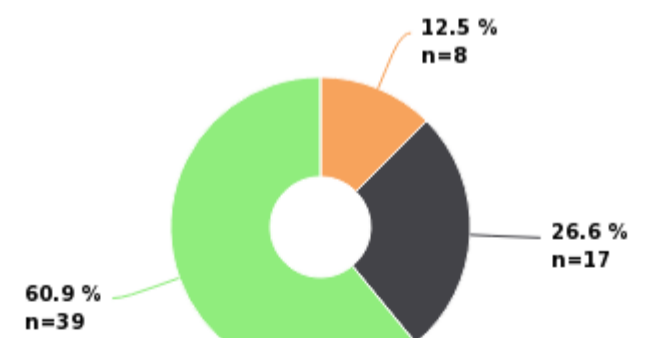
- Nematoda, *Ancylostoma duodenale*/*Necator americanus* (hookworm)
- Nematoda, Hookworm, larvae
- No reported finding

Sample S002 Worm eggs: *Trichuris trichiura*



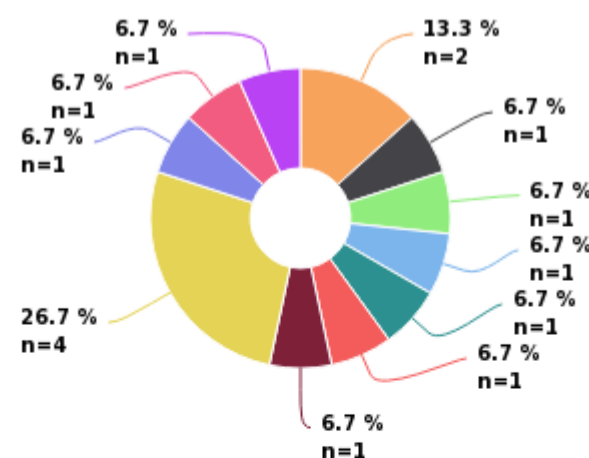
- Nematoda, *Trichuris trichiura* (whipworm)
- No reported finding

Sample S002 Worm eggs: *Strongyloides stercoralis*



- Nematoda, *Strongyloides stercoralis*
- Nematoda, *Strongyloides stercoralis*, larvae
- No reported finding

Sample S002 Worm eggs: Other findings



- Nematoda, Hookworm, larvae
- Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)
- Cestoidea, Hymenolepis diminuta
- Cestoidea, Taenia solium
- Cestoidea, Taenia sp.
- Cystoisospora belli (former Isospora belli)
- Nematoda, Capillaria philippinensis
- Nematoda, Trichostrongylus sp.
- Trematoda, Fasciola hepatica
- Trematoda, Other trematoda
- Trematoda, Paragonimus sp.

REPORT TO THE CLINICIAN

Finding group	Finding	Finding count	Little (+)	Moderate (++)	Plenty (+++)	AVR success rate
Protozoa: Balantidium coli		64				-
	Balantidium coli	28	1	8	19	
	Negative for protozoa	34				
	Protozoa not in test selection	1				
	No reported finding	1				
Protozoa		8				-
	Blastocystis sp.	4	2	2		
	Endolimax nana	2	1	1		
	Entamoeba - precysts	1	1			
	Entamoeba hartmanni	1		1		
Worm eggs: Ascaris lumbricoides		64				76.6 %
	Nematoda, Ascaris lumbricoides (roundworm)	44	18	20	6	
	Nematoda, Ascaris sp.	5	2	2	1	
	Negative for worm eggs	2				
	No reported finding	13				
Worm eggs: Ancylostoma duodenale/Necator americanus		64				-
	Nematoda, Ancylostoma duodenale/Necator americanus (hookworm)	32	24	8		
	Nematoda, Hookworm, larvae	4	4			
	No reported finding	28				
Worm eggs: Trichuris trichiura		64				78.1 %
	Nematoda, Trichuris trichiura (whipworm)	50	19	25	6	
	No reported finding	14				
Worm eggs: Strongyloides stercoralis		64				-
	Nematoda, Strongyloides stercoralis	8	7	1		
	Nematoda, Strongyloides stercoralis, larvae	17	14	3		
	No reported finding	39				
Worm eggs: Other findings		15				-
	Nematoda, Hookworm, larvae	2	2			
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	1			1	
	Cestoidea, Hymenolepis diminuta	1	1			
	Cestoidea, Taenia solium	1	1			
	Cestoidea, Taenia sp.	1	1			
	Cystoisospora belli (former Isospora belli)	1	1			
	Nematoda, Capillaria philippinensis	1	1			
	Nematoda, Trichostrongylus sp.	4	3		1	
	Trematoda, Fasciola hepatica	1		1		
	Trematoda, Other trematoda	1			1	
	Trematoda, Paragonimus sp.	1			1	
Total:		343				77.3 %

SCORING SUMMARY

Finding group	Finding	Finding score
Protozoa: Balantidium coli		
	Balantidium coli	-
	Negative for protozoa	-
	Protozoa not in test selection	-
	No reported finding	-
Protozoa		
	Blastocystis sp.	-

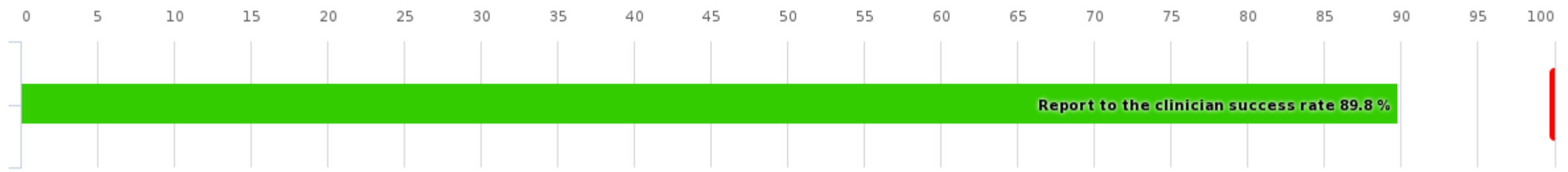
	Endolimax nana	-
	Entamoeba - precysts	-
	Entamoeba hartmanni	-
Worm eggs: Ascaris lumbricoides		
	Nematoda, Ascaris lumbricoides (roundworm)	4
	Nematoda, Ascaris sp.	4
	Negative for worm eggs	0
	No reported finding	0
Worm eggs: Ancylostoma duodenale/Necator americanus		
	Nematoda, Ancylostoma duodenale/Necator americanus (hookworm)	-
	Nematoda, Hookworm, larvae	-
	No reported finding	-
Worm eggs: Trichuris trichiura		
	Nematoda, Trichuris trichiura (whipworm)	4
	No reported finding	0
Worm eggs: Strongyloides stercoralis		
	Nematoda, Strongyloides stercoralis	-
	Nematoda, Strongyloides stercoralis, larvae	-
	No reported finding	-
Worm eggs: Other findings		
	Nematoda, Hookworm, larvae	-
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	-
	Cestoidea, Hymenolepis diminuta	-
	Cestoidea, Taenia solium	-
	Cestoidea, Taenia sp.	-
	Cystoisospora belli (former Isospora belli)	-
	Nematoda, Capillaria philippinensis	-
	Nematoda, Trichostrongylus sp.	-
	Trematoda, Fasciola hepatica	-
	Trematoda, Other trematoda	-
	Trematoda, Paragonimus sp.	-
Total:		

FURTHER ACTION

Result	Result count
Not referred for further action	32
Referred for further action	9
Referred for further action for examination of protozoa	2
New sample requested	2
Total:	45

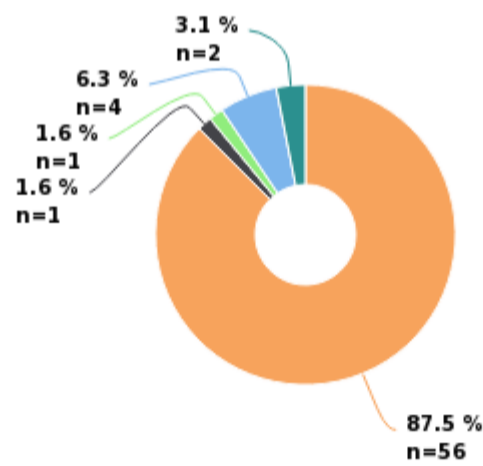
Sample S003 | *Ascaris lumbrocoides*, *Trichuris trichiura*

Sample S003 success rate



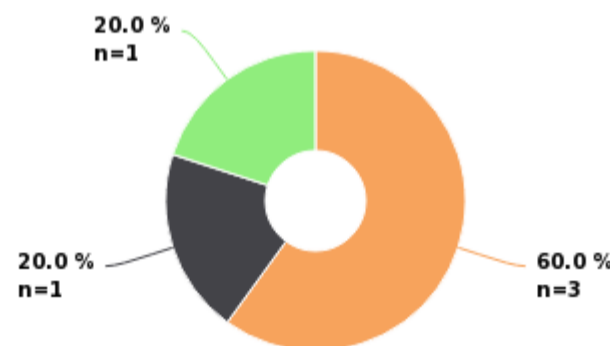
Sample S003 results	Responded	AVR success rate	Count
	Report to the clinician	89.8 %	200
	Further action	-	40

Sample S003 Protozoa: Negative



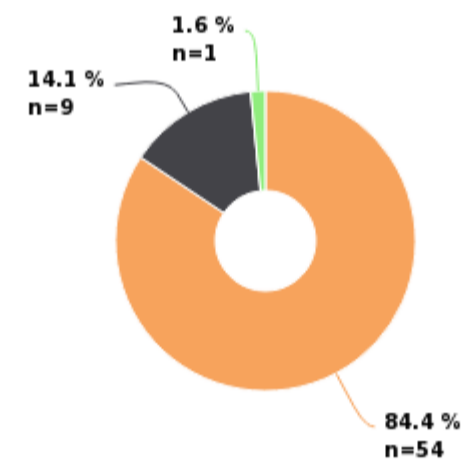
- Negative for protozoa
- Balantidium coli
- Giardia lamblia (G. intestinalis/duodenalis)
- No pathogenic findings
- Protozoa not in test selection

Sample S003 Protozoa: Other findings



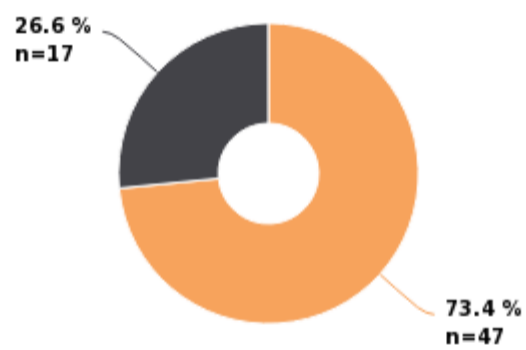
- Blastocystis sp.
- Chilomastix mesnili
- Entamoeba - precysts

Sample S003 Worm eggs: *Ascaris lumbricoides*



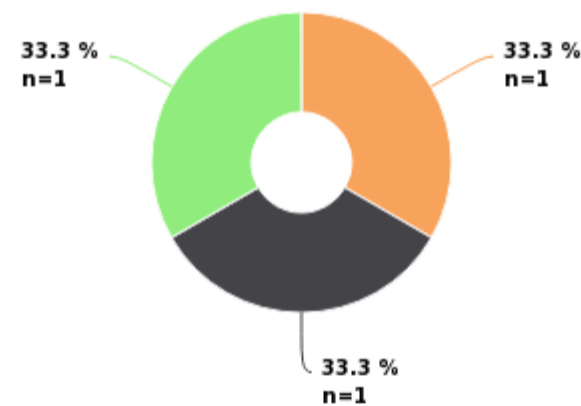
- Nematoda, Ascaris lumbricoides (roundworm)
- Nematoda, Ascaris sp.
- No reported finding

Sample S003 Worm eggs: *Trichuris trichiura*



- Nematoda, Trichuris trichiura (whipworm)
- No reported finding

Sample S003 Worm eggs: Other findings



- Cestoidea, Diphylobothrium latum (Diphyllobothrium latum)
- Nematoda, Capillaria philippinensis
- Nematoda, Toxocara canis

REPORT TO THE CLINICIAN

Finding group	Finding	Finding count	Little (+)	Moderate (++)	Plenty (+++)	AVR success rate
Protozoa: Negative	Negative for protozoa	56				97.6 %
	Balantidium coli	1	1			
	Giardia lamblia (G. intestinalis/duodenalis)	1			1	
	No pathogenic findings	4				
	Protozoa not in test selection	2				
Protozoa: Other findings		5				-
	Blastocystis sp.	3	3			
	Chilomastix mesnili	1		1		

	Entamoeba - precysts	1	1			
Worm eggs: Ascaris lumbricoides		64				98.4 %
	Nematoda, Ascaris lumbricoides (roundworm)	54	9	24	21	
	Nematoda, Ascaris sp.	9	3	2	4	
	No reported finding	1				
Worm eggs: Trichuris trichiura		64				73.4 %
	Nematoda, Trichuris trichiura (whipworm)	47	40	6	1	
	No reported finding	17				
Worm eggs: Other findings		3				-
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	1	1			
	Nematoda, Capillaria philippinensis	1	1			
	Nematoda, Toxocara canis	1		1		
Total:		200				89.8 %

SCORING SUMMARY

Finding group	Finding	Finding score
Protozoa: Negative		
	Negative for protozoa	4
	Balantidium coli	0
	Giardia lamblia (G. intestinalis/duodenalis)	0
	No pathogenic findings	4
	Protozoa not in test selection	4
Protozoa: Other findings		
	Blastocystis sp.	-
	Chilomastix mesnili	-
	Entamoeba - precysts	-
Worm eggs: Ascaris lumbricoides		
	Nematoda, Ascaris lumbricoides (roundworm)	4
	Nematoda, Ascaris sp.	4
	No reported finding	0
Worm eggs: Trichuris trichiura		
	Nematoda, Trichuris trichiura (whipworm)	4
	No reported finding	0
Worm eggs: Other findings		
	Cestoidea, Dibothriocephalus latus (Diphyllobothrium latum)	-
	Nematoda, Capillaria philippinensis	-
	Nematoda, Toxocara canis	-
Total:		

FURTHER ACTION

Result	Result count
Not referred for further action	31
Referred for further action	5
Referred for further action for examination of protozoa	2
New sample requested	2
Total:	40

Report Info

PARTICIPANTS

Altogether 67 laboratories from 16 countries participated in this EQA round.

REPORT INFO

On the front page you can see summaries of overall success rate and sample specific success rates which have been calculated from the scores. The reported results and the scores are presented in the same report but in separate tables.

Results from the "Report to the clinician" part are divided into protozoa and worm eggs categories. The findings reported by the participants have been grouped into tables according to the expected (pathogenic) findings of each sample. If a laboratory has reported multiple findings, the additional findings have been grouped separately. The additional findings are not scored. The reported results and the scores are presented in the same report but in separate tables. The reported amounts of findings are also presented in the same "Report to the clinician" table but these results are not scored.

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SCORING

The scoring is based on pathogenic findings. However, all findings in the samples, including non-pathogenic protozoan findings, are reported, and commented. Pathogenic findings can be scored when at least 60% of the participants have reported the correct/expected result and when there are at least three reported results. The report includes a sample specific scoring summary. Laboratory's scores have been converted to percentage (own success rate, % from maximum scores) with a target at 100%. Own success rate is compared with the success rate of all results.

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0 points is given for an incorrect/false result

External Quality Assessment Scheme

Parasites in faeces Round 1, 2023

Specimens

Samples of this EQA round were formalin fixed faecal samples. Based on the quality controls conducted by the sample material manufacturer, pre-testing and the results obtained in the round, the sample lots are to be considered as homogeneous, stable and suitable for external quality assessment. The materials were sent without temperature control packaging.

The content of the samples was as follows:

Sample S001 (LQ769423011)

Expected findings: *Giardia lamblia* (moderate), *Trichuris trichiura* (little).

Background information: Malnourished immigrant child with diarrhea.

Sample S002 (LQ769423012)

Expected findings: *Balantidium coli* (moderate), *Ancylostoma duodenale/Necator americanus* (hookworm) (little), *Ascaris lumbricoides* (moderate), *Trichuris trichiura* (moderate), *Strongyloides stercoralis* (little).

Background information: Patient with immunosuppression and weight loss.

Sample S003 (LQ769423013)

Expected findings: *Ascaris lumbricoides* (plenty), *Trichuris trichiura* (little).

Background information: Organic farmer with no symptoms.

Report info

Please see the description of the data analysis on the last page of the laboratory-specific reports and global reports. It is important to read the Final report first, because it contains important information of the samples and results in each round.

Comments – Expert

Sample S001: *Giardia lamblia* (moderate), *Trichuris trichiura* (little)

Sample S001 contained a moderate amount of *Giardia lamblia* cysts and a small amount of *Trichuris trichiura* eggs. 89% (56/63) of the laboratories reported *Giardia lamblia* and 52% (33/64) *Trichuris trichiura*.

Giardia lamblia has at least two synonym names, *G. intestinalis* and *G. juvenalis*. *Giardia* is one of the most common protozoan findings in faecal samples, thus it was not a surprise that laboratories had identified it quite well. Cysts of giardia measure 8–14 µm and contain a longitude axoneme as well as up to four nuclei inside cysts.

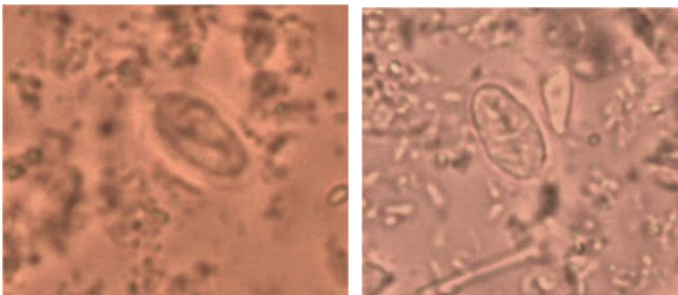


Figure 1. Cysts of *Giardia lamblia* in the sample S001.

2023-04-13

FINAL REPORT

Product no. 5440

Subcontracting: Sample pretesting

Samples sent	2023-02-21
Round closed	2023-03-16
Expected results	2023-03-21
Final report	2023-04-13

Request for correction

Typing errors in laboratory's result forms are on laboratory's responsibility. Labquality accepts responsibility only for result processing. Requests must be notified by writing within three weeks from the date of this letter.

Authorized by

EQA Coordinator
Jaana Paakkanen
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University of Helsinki and
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Finnish Accreditation Service
PT02 (EN ISO/IEC 17043)



Eggs of *Trichuris trichiura* are oval shaped and measure 50–55 µm. The most typical feature of eggs are knobs in each end. The amount of eggs was not extremely high in the sample, but participants had found it quite well.

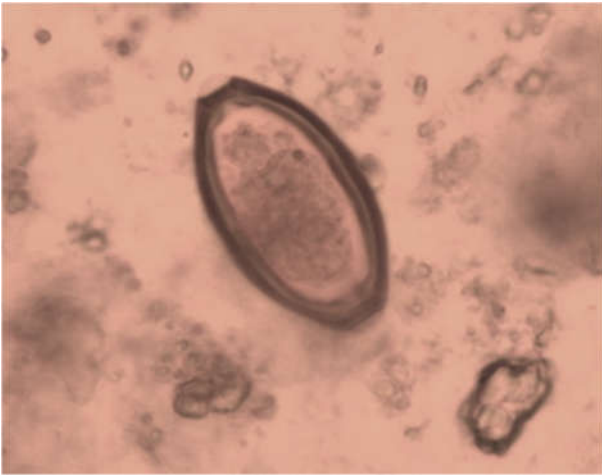


Figure 2. Typical egg of *Trichuris trichiura* in the sample S001.

Sample S002: *Balantidium coli* (moderate), *Ancylostoma duodenale/Necator americanus* (hookworm) (little), *Ascaris lumbricoides* (moderate), *Trichuris trichiura* (moderate), *Strongyloides stercoralis* (little)

Sample S002 contained a moderate amount *Balantidium coli*. The sample also included the following worm eggs: *Ancylostoma duodenale/Necator americanus* (hookworm) (little), *Ascaris lumbricoides* (moderate), *Trichuris trichiura* (moderate), *Strongyloides stercoralis* (little). 44% (28/63) of the laboratories reported *B. coli*, 77% (49/64) reported *A. lumbricoides* or *Ascaris* sp., 56% (36/64) reported hookworm, 78% (50/64) *T. trichiura* and 39% (25/64) reported *S. stercoralis*.

This sample contained an almost unrealistic amount of findings. The most prominent was the ciliate *Balantidium coli*, which has occurred in these EQA samples quite often during last years. In patient samples *B. coli* is very seldom seen, but without experience it would be even harder to recognize. Trophozoite stages of *B. coli* stain dark with iodine and are large, 40 µm x 200 µm. Cyst stages are rounder with a diameter of 50-70 µm. Laboratories had identified *B. coli* from the sample quite well.

Other findings from the sample were worm eggs or larvae. After careful microscoping, laboratories could find *Ascaris lumbricoides*, *Trichuris trichiura*, hookworm and larvae of *Strongyloides stercoralis*. Whipworm and roundworm are worldwide the most common worm parasites infecting humans, and thus quite often seen in the patient samples too.

Hookworms are less common. Eggs of hookworm have a very thin shell, and they measure 60–74 µm. Often the difficult part in finding hookworms is to spot them, after which they can be measured and separated from eggs of *Trichostrongylus* spp., which measure 75–95 µm in length.

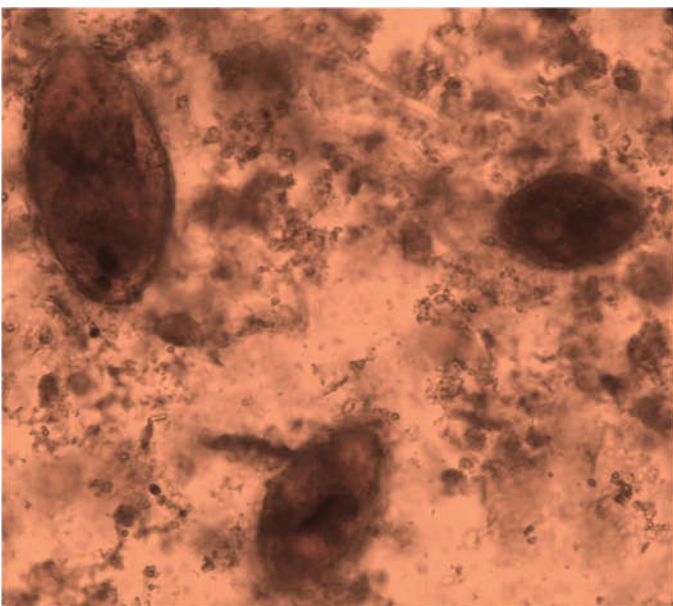


Figure 3. Three *Balantidium coli* trophozoites in the sample S002.

The first stage rhabditiform larvae of *Strongyloides stercoralis* are 180—380 μm long, with a short buccal canal. Differentiation from larvae of hookworm is based on length of the buccal canal, which in hookworms is long. Also, the genital primordium is different. In *S. stercoralis* it is big, whereas in hookworm larvae small.

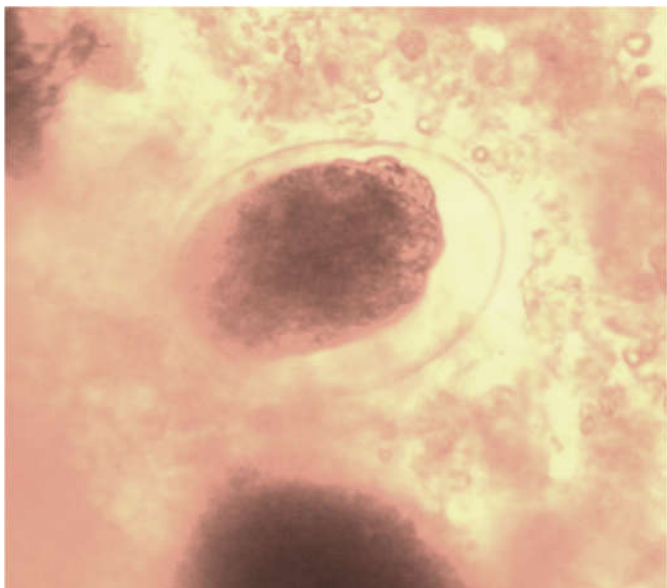


Figure 4. Hookworm egg is hiding in the sample S002.

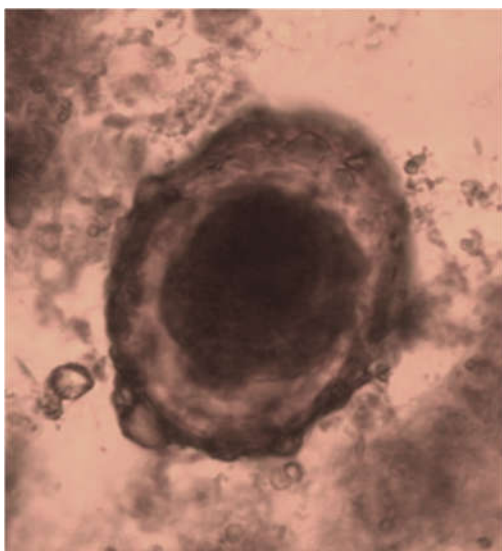


Figure 5. *Ascaris lumbricoides* egg in the sample S002.



Figure 6. *Trichuris trichiura* in the sample S002.



Figure 7. Larvae of *Strongyloides stercoralis* in the sample S002.

Sample S003: *Ascaris lumbricoides* (plenty), *Trichuris trichiura* (little)

Sample S003 contained plenty of *Ascaris lumbricoides* and a small amount of *Trichuris trichiura*. 98% (63/64) of the participants reported *Ascaris lumbricoides* and 73% (47/64) *Trichuris trichiura*.

90% (56/62) of the participants whose test selection included Protozoa reported the sample as negative for Protozoa.

Laboratories had identified both worm eggs well, which is not so surprising, as both were present in the sample S002 and *T. trichiura* also in the sample S001.

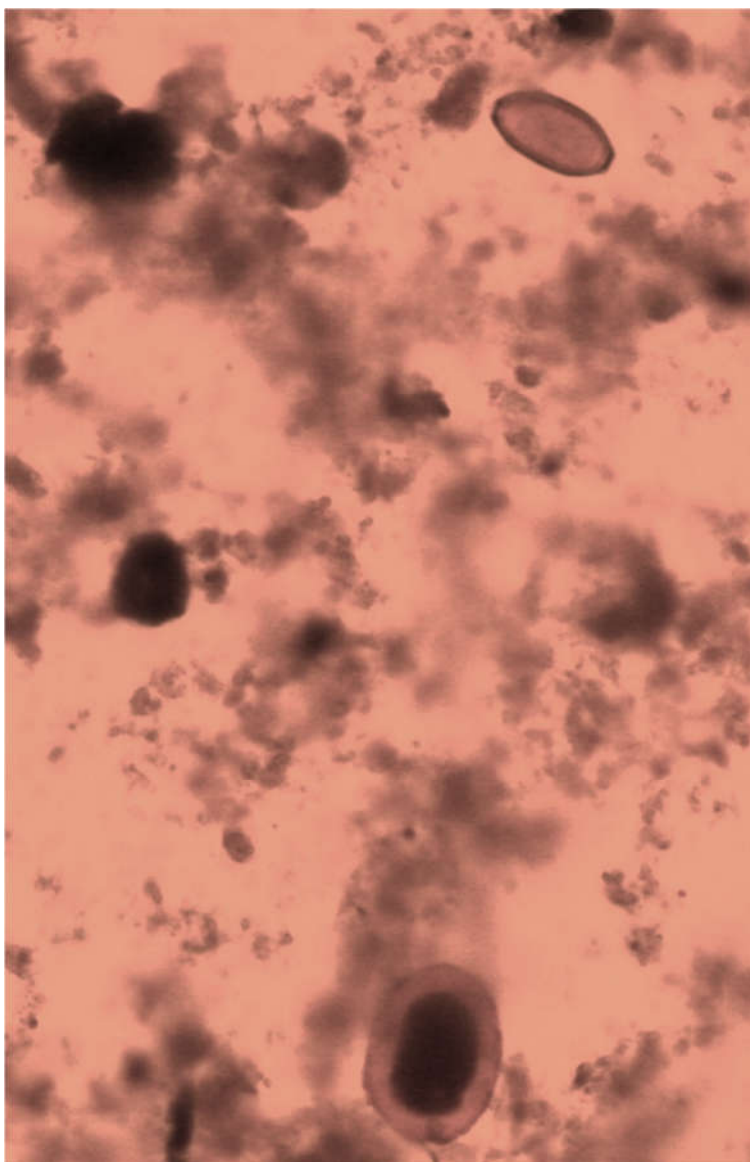


Figure 8. Both findings from the sample S003.

Prenalytics

The percentage of laboratories concentrating faecal samples in this round was 39% (25/64). 61% (39/64) responded that they do not concentrate faecal samples. It is strongly recommended that all the laboratories analyzing faecal samples include concentration to the sample handling process.

Mix up of samples: No probable mix up of the samples.

Exceptions in scoring

The following findings were not scored as the success rates were below 60%:

- Sample S001: *Trichuris trichiura*.
- Sample S002: *Balantidium coli*, *Ancylostoma duodenale*/*Necator americanus* (hookworm) and *Strongyloides stercoralis*.

End of report

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