



TUMIKIA

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Laboratory Technician Manual Endline Survey

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& TROPICAL
MEDICINE



Table of Contents

Section 1: Introduction.....	4
Introduction	4
The interventions	4
Evaluation methods	5
Lab technician roles.....	5
Teams	6
Work station location and logistics	6
Sample delivery to the lab	6
Sample numbers per day.....	6
Introduction	7
Arrival time	7
Team logistics.....	7
Establish destination	7
Pack supplies.....	7
Arrival at the workstation.....	7
Confirm all required materials per team.....	8
Section 3: Sample reception.....	9
Sample reception	9
Section 4: Labelling of slides.....	13
Labelling slides	13
Kato Katz Stool Examination.....	14
Section 5: Kato Katz stool examination.....	14
Preparation of cellophane and malachite green	14
Kato Katz procedure	14
Quality control	15
WHO reference epg threshold estimates:.....	15
Section 6: Recording results	16
Submitting data.....	22
Section 7: Quality control Technician and duplicate batch reporting.....	23
Process for slides selected for quality control technician.....	23
Process for batches selected for swap between partners	23
Quality Check & Duplicate Reading Workflow	24

This manual is to guide TUMIKIA laboratory technicians and laboratory supervisors during laboratory processes associated with the stool samples that arrive from the field during the cross-sectional surveys. These processes include sample receipt, through processing, reading and recording the results, and finally quality control. All of these processes and related forms are centred on the unique sample QR code used in the field.

The manual references three forms:

1. The Laboratory Sample Receipt Form
2. The Laboratory Kato-Katz Reporting Form
3. Laboratory Kato-Katz Quality Control Reporting Form

During Sample Receipt, batches of samples delivered from the field to the laboratory are logged by scanning the QR code on the sample pot using the Sample Receipt Form. These sample batches are linked to the field officer who collected them in the field, so that numbers can be cross-checked against the numbers of samples logged as collected in the field each day by each field officer. Anything note-worthy about any samples received is also documented in the form.

For each sample, two slides are prepared, with a QR code sticker attached to each slide with the sample ID plus "A" or "B". Following preparation of the Kato-Katz slides, they are read using a light microscope and the results are recorded directly into the Laboratory Kato-Katz Reporting form. This form is designed for technicians reading in pairs where one reads the A slides and another reads the equivalent B slides (it can be modified to allow technicians to read slides A and B of the same samples). Batches of up to 15 slides can be recorded using one form. The slide QR code is scanned before placing it on the microscope. As soon as the number of eggs for each species is read (hookworm, *Ascaris lumbricoides* and *Trichuris trichiura*) this is entered directly into the form on the smartphone. This process is repeated for each slide in the batch. Other species observed can also be recorded in the form. The form is programmed to randomly select 30% of slides per batch read to be given to the Quality Control Technician to be read as well. Additionally, 10% of batches are randomly selected by the form for a partner swap, where the technician reading the A slides swap with the technician reading the equivalent B slides, so these batches are double read.

The quality control technicians (supervisors) use the Laboratory Kato-Katz Quality Control Reporting Form to record the results of the 10% QC readings they perform. The form is intended to be used alongside the Laboratory Kato-Katz Reporting form, is virtually the same structurally, and the data from both forms can be merged for a comparison of the results of the original readings by the laboratory technicians with the results of the quality control technician.

The forms were designed by members of the TUMIKIA Project team and programmed by Dr William Oswald and Stefan Witek-McManus. The manual was produced by members of the TUMIKIA Project team.

Please contact Dr William Oswald (william.oswald@lshtm.ac.uk) if you have any questions about the Laboratory Forms.

Section 1: Introduction

TUMIKIA Project

Introduction

The Government of Kenya is committed to eliminating intestinal worms in Kenya. Approximately 15 million Kenyans are estimated to be infected with intestinal worms - hookworm, *Ascaris* and *Trichuris* - and more than 5 million of them are children. The current control strategy for intestinal worms recommended by the World Health Organization (WHO) is annual treatment of all school-aged children. In Kenya, the successful National School-Based Deworming Programme (NSBDP), jointly implemented by the Ministries of Health and Education with support from the Deworm the World Initiative at Evidence Action, covers a large number of school-aged children: 5.9 million children in 2012-2013 and 6.4 million children in 2013-2014.

Building on the success of the NSBDP the Government of Kenya is keen to expand coverage and reach other members of the community also infected with worms. The use of community health workers to deliver deworming treatment to community members is likely to be an effective strategy, while also strengthening current health systems. Knowing who to treat, for how long and how to reach them are vital for designing effective treatment programmes and will help us move closer to elimination of intestinal worms. The ultimate test is to investigate the effect of different deworming strategies within the ongoing national programme.

We want to learn whether combining school- and community-based deworming is a more effective method of controlling and ultimately eliminating intestinal worms in Kenya than school-based deworming alone. We will do this through the TUMIKIA Project, a cluster randomised trial conducted by The Kenya Medical Research Institute (KEMRI) in collaboration with the Ministry of Health and Ministry of Education, Science and Technology, the London School of Hygiene & Tropical Medicine alongside Deworm the World Initiative at Evidence Action and Imperial College London. This is a two-year study nested within the NSBDP.

TUMIKIA Project aims to determine whether combining **school and community based deworming** is more effective at controlling and eliminating **soil transmitted helminths** (STH or intestinal worms) in Kenya than school based deworming alone, and what frequency of deworming is required to stop transmission.

The interventions

To do this a comparison will be made between three different interventions. A total of 120 clusters (community units of approximately 1000 households, comprising varying numbers of villages) will be selected by chance into one of the three groups:

- 1. Base:** Annual school-based deworming (2-14 yrs)
- 2. Increased coverage:** Annual school- and community-based deworming (2-99 yrs)
- 3. Increased coverage & frequency:** Bi-annual school- and community-based deworming (2-99 yrs)

For all three groups, the school-based deworming (both annual and bi-annual) will be provided by the NSBDP, which targets all school-aged children (enrolled and non-enrolled) aged 2-14 for treatment with 400mg Albendazole distributed by trained teachers at primary schools. In groups 2 and 3, community-based treatment of **all** individuals not treated through the school-based deworming will be delivered household to household by trained community health volunteers (CHVs).

Evaluation methods

The primary outcome will be the prevalence of hookworm infection among all sampled individuals during 24 months of follow-up by means of repeat cross-sectional surveys. We selected hookworm among the three STH species because it was common in the study site and occurred at the highest prevalence. It is also the species which contributes most to morbidity, being responsible for the most DALYs lost. New populations of individuals will be selected for each survey (baseline, 12 months and 24 months) due to ethical considerations of treating those found infected during the surveys. Selected individuals will be asked to provide a stool sample which will be examined in duplicate within one hour of preparation using the Kato-Katz method. Individuals found infected will be revisited by the study team and treated with albendazole.

The main secondary outcomes include:

- Prevalence of *Ascaris lumbricoides* and *Trichuris trichiura* in an age-stratified sample, based on expert microscopy and (in a random subsample) PCR.
- Intensity of infection for each STH species, based on quantitative egg counts.

Lab technician roles

As a TUMIKIA lab technician your role is to assist with research evaluation activities. These include:

- Standard cross sectional surveys at 0, 12 and 24 months in 120 communities.
 - A random sample of 225 households (individual sampled at random from household)
 - Parasitological outcomes (stool sample), including levels of infection, will be assessed.
 - Household surveys will be conducted to collect information on sanitation and hygiene
- Intensive baseline and follow up surveys every 3 months in 6 communities.
 - A random sample of 225 households (individual sampled at random from household)
 - Parasitological outcomes (stool sample), including levels of infection, will be assessed.
 - 7-day whole stool collection will be carried out to assess worm burden
 - Household surveys will be conducted to collect information on sanitation and hygiene
- Additional activities in all communities:
 - Adherence and coverage of the strategies will be measured using routine and scheduled survey data.

- Feasibility and acceptability of using CHWs to deworm will be assessed by focus group discussions.
- The costs and cost-effectiveness of different deworming strategies will be conducted.

This SOP describes the standard cross sectional **endline surveys to be conducted for the TUMIKIA Project.**

Teams

- For the surveys there will be 12 teams each with 3 technicians.
- Two teams will share a car to get to the field grouped by location of their work station.
- **Each team will cover one cluster across three days** sampling a total of 225 individuals
- Each technician team will be linked to a field officer (FO) team (there are 12 FO teams of 9 people)
- The FO team will collect the samples in the communities through household visits

Work station location and logistics

- For each cluster we will select a lab close to the cluster or on the route back to the office
- As much as possible we will select a larger lab with a generator
- Your team will be based at that lab station for 3 days
- The team may have to move the microscopes and lab supplies to another lab after the 3 days
- The key labs we will try to use are: Kinango, Samburu, Taru, Mazeras, Kwale, Tiwi, Gombato, Msambweni, Magaoni, Kiconeni, Diani, Lunga Lunga, Vanga.

Sample delivery to the lab

- As soon as the required number of samples has been collected from communities they will be brought to their technician team, who will then read in afternoon/early evening
- The FO teams will start early morning and aim to be finished by 3pm to deliver the samples
- The latest that samples will be dropped at the lab is 5pm
- The technician teams will start later in the day (approx. 12) and will finish in the evening

Sample numbers per day

- This will be unpredictable, but in general, expect fewer samples on the first day in a cluster as the team will likely set up lots of call-backs for samples to collect on day 2
- Day 2 will be a combination of samples collected from day 1 call-backs & new day 2 samples
- Day 3 will be a combination of samples collected from day 2 call-backs & new day 3 samples

In addition to your team there will be 11 other teams in different clusters.

***Sample numbers will vary depending on clusters and numbers of call backs per day
Eg. the Field team may get far fewer samples on day 1 due to setting up call-backs,
and then days 2 and 3 the sample numbers will increase***

Section 2: Preparation for the field

Introduction

This is an intensive project with over 150 staff and multiple activities running concurrently, all dependent on each other. This section of the manual describes the processes to follow to ensure all appropriate preparations are made prior to the lab work.

Arrival time

The TUMIKIA office is at Diani Forest Lodge, Ukunda. The FO teams will leave here before 7.00 every morning. However the lab teams will not need to travel with them. The lab teams will start later in the day so as to give the FO teams time to collect the samples in the morning. The time the vehicle leaves the Ukunda office for the field lab depends on how far away the work station is. However on average the car will be setting out from the Ukunda office between 11 and 12.

Team logistics

There are four subcounties. Kinango and Matuga are north of the office, and Msambweni and Lunga Lunga are south of the office. The closer the lab team is to the FO team collecting the samples, the sooner the samples will be delivered. As such, instead of using three central labs, the labs will change by cluster. The teams will be required to stay in the field near to the lab for those three days and then either come back to the office to replenish supplies after the three days, or to move to an alternative lab. Unless stationed in a lab in Kwale town, Msambweni or Diani, cars **MUST NOT** come back to Ukunda during those three days in the evenings. As the day will finish late and it is not safe to travel back at night. Additionally this is not fuel efficient. Drivers will get a overnight allowance to stay in the field.

Establish destination

Make sure you establish the lab/dispensary you will be working in for the three days. You may work in a certain lab for 6 or even 12 days in a row if your team's clusters are close to that workstation. However, it may also be that the lab/dispensary changes every three days.

Pack supplies

The vehicle and any technician in your team coming from Ukunda will come with the supplies for the team for the full three day working period, having replenished from the store. A list of the approved workstations has been compiled and we are aware of which require jerry cans of water, or stools and can provide those when we know if you are going to be working in a lab which requires this.

Arrival at the workstation

On arriving at the workstation, identify the lab in-charge and explain your presence. They will already have given permission for the team(s) to work in the lab. Following this, identify a lab assistant to wash the sieves and templates. The team leader will be given 3000ksh for the lab assistant for three days (1000ksh per day). Pay this at the end of the day or the end of the three days. If there are two teams sharing a lab, they will share a lab assistant. The lab assistant pay form will be used to document the pay, they must sign for each of the three days, even if paid in a lump sum at the end of the day. The form has a space for (1) date, (2) name, (3) national ID, (4) phone number, (5) signature.

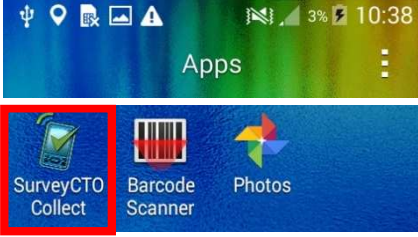
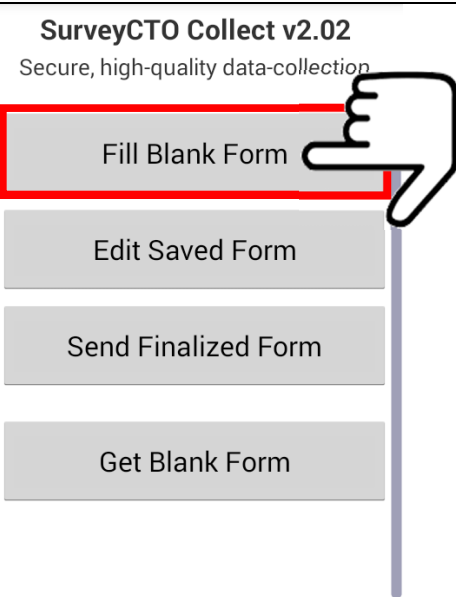
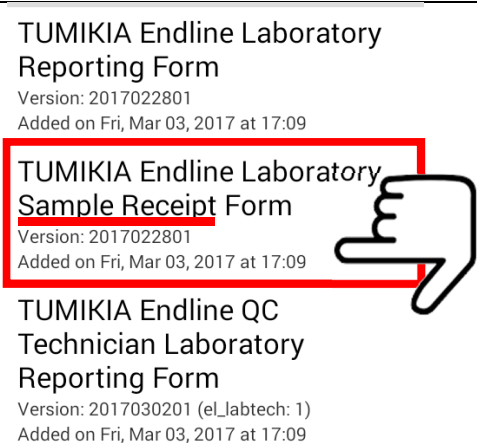
Confirm all required materials per team

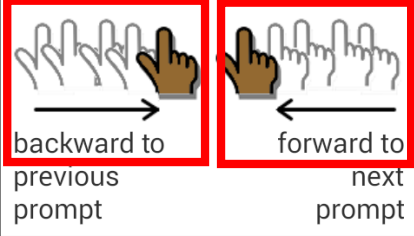



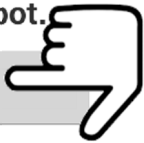
- 2 microscopes
- 1 cooler box
- 2 jerry cans (if required)
- 1 bucket
- 2 basins
- 20 Screens/sieves, stainless-steel, nylon or plastic: 60–105 mesh size
- 40 Templates
- 4 counters
- 2 slide boxes
- 1 box of spatulas, wooden or plastic
- 200 x Microscope slides (75 x 25 mm)
- 200 x Hydrophilic cellophane, 40–50 g, strips 25 x 30 or 25 x 35 mm soaked in Glycerol–malachite green
- 1 Flat-bottom jar with lid
- 1 Pair of forceps
- 1kg Newspaper
- 1 box gloves
- 2 toothbrushes
- 1 packet of labels
- 1 box of wooden spatulas
- 2 rolls toilet paper
- 2 towels
- 1 roll gauze
- 2 bin liners
- 1 lab coat
- 1 extension chord
- 3 or 5 litre JIK
- 5kg container of Omo detergent
- Plastic wallet (containing pencils, pens, erasers, sharpener, rulers, marker pens, scissors)
- 1000ksh for lab assistant
- lab assistant pay forms
- 2 phones with Survey CTO applications for recording receipt of samples and reading slides
- Charger cables for phones
- Airtime scratch cards for each team member – 200 per week for each team member
- 2 sets of 6 rolls of 50 stickers

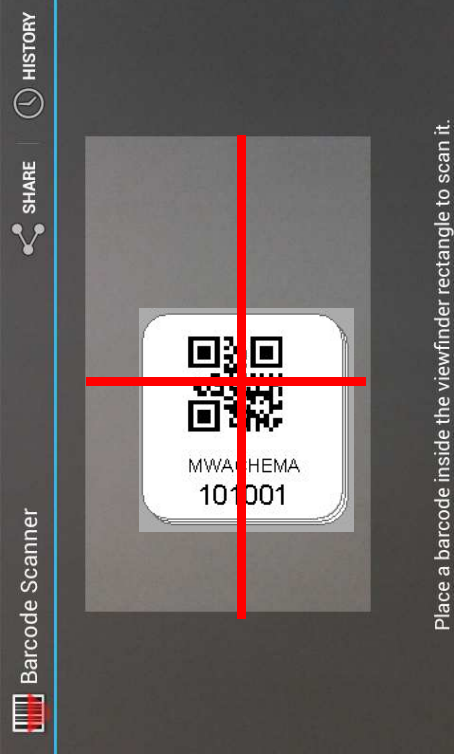


Section 3: Sample reception


Sample reception

In the laboratory, once a batch of samples is delivered by the field officer, the laboratory personnel should first confirm that all the samples tally with the number given by the field officer by physical count.

1		<p>We will be using the SurveyCTO Collect application to record receiving the sample by scanning the barcodes on each sample.</p> <p>You can find SurveyCTO Collect in the 'Apps' menu of the smartphone.</p>
2		<p>Once you open the <i>SurveyCTO Collect</i> application, a menu will be presented with the following options:</p> <ul style="list-style-type: none"> • <i>Fill Blank Form</i> to enter a new batch of slides • <i>Edit Saved Form</i> to modify previous data entered • <i>Send Finalized Form</i> to upload the data to our server • <i>Get Blank Form</i> to load the questionnaire on your phone (you will not need to do this as we will set up the smartphone for you) <p>Select Fill Blank Form to start entering new data.</p>
3		<p>Selecting <i>Fill Blank Form</i> will give you 3 options:</p> <ul style="list-style-type: none"> • Endline Laboratory Reporting Form • Endline Laboratory Sample Receipt Form • Endline QC Technician Laboratory Reporting Form <p>Click on TUMIKIA Endline Laboratory Sample Receipt Form.</p>

4	<p>You are at the start of TUMIKIA Endline Laboratory Sample Receipt Form. Swipe the screen as shown below to go backward and forward.</p> 	<p>Swipe to start the questionnaire. You can also swipe to go backward and forward.</p> <ul style="list-style-type: none"> To go backward: swipe from left to right To go forward: swipe from right to left
5	<p>Select your name from the list.</p> <ul style="list-style-type: none"> <input type="radio"/> Kamau Njenga <input type="radio"/> Masoud Mwalitseso <input type="radio"/> Mboza Omar Mwachuo <input type="radio"/> Technician not listed 	<p>Select your name from the list.</p> <p>If your name is not list, select “Technician not listed” and you will be prompted to type in your name on the next screen. Please enter your complete name.</p>
6	<p>Select the name of the field officer providing this batch.</p> <ul style="list-style-type: none"> <input type="radio"/> Omar Khamis Mwandaro <input checked="" type="radio"/> Abdalla Zani Omar <input type="radio"/> Abdullahi Mumbo Jeffa <input type="radio"/> Abubakar Hamisi Mwamoyo <input type="radio"/> Ali Idd Mshenga 	<p>Select the name of the FO who is providing the batch of samples.</p>
7	<p>Enter the number of pots received in the batch.</p> 	<p>Enter the number of pots received in the batch from the field officer.</p> <p>Please note, the maximum number of pots that can be received per batch is 20.</p>
8	<p>Barcode scans (1)</p> <p>Scan the sticker on the pot.</p> <p>Get Barcode</p> 	<p>Select “Get Barcode” to scan the sticker.</p>

9		<p>The phone's display will appear as shown on the left. The grey box will display the image captured by the phone's camera on the front side.</p> <p>Hold the phone level over the sticker so that it is centered in the image on the screen. Make sure you are not covering the camera.</p> <p>The phone will beep (if the sound is on) and the dots will turn from yellow to green when it has successfully read the sticker.</p> <p>It will then return to the previous screen but will display the captured barcode.</p> <p>Swipe left to proceed scanning the next pot. The sticker barcodes on each pot must be scanned to record that you have received the sample.</p>
10		<p>If for any reason, it cannot scan, enter the number on the sticker manually.</p> <p>Enter the FIRST THREE NUMBERS on the sticker (e.g. 101). This number corresponds to the cluster where the sample came from.</p> <p>Then enter the LAST THREE NUMBERS on the sticker (e.g. 001). These represent the sample number.</p>
11	<p>The barcode you entered is 101001</p> <p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p> 	<p>The Barcode you entered will be displayed. CONFIRM that it is the one you entered by selecting "YES".</p> <p>If the CODE is not what you entered, SELECT "NO".</p> <p>You will not be able to proceed until you correct the code. Swipe backwards and re-enter the number to make the correction.</p>

12	<p>Barcode scans (1)</p> <p>Anything to report about the pot?</p> <hr style="border: 1px solid #00aaff; width: 200px; margin-left: 0;"/>	<p>Use the keypad to type in any notes or observations about the sampling pot you have, or that the field officer mentioned about the samples.</p> <p>For example, if there looks to be too little stool to process a sample, you should still scan the pot and record this.</p>
13	<p>Barcode scans (2)</p> <p>Scan the sticker on the pot.</p> <div style="background-color: #cccccc; padding: 10px; text-align: center; width: fit-content; margin: 10px auto;">Get Barcode</div>	<p>This process should be repeated for each pot. The small number will tell you how many you have scanned so far.</p> <p>If you try to scan the same pot twice, an error message will show. You will not be able to proceed unless you go back</p>
14	<p>You have finished entering the pots for this batch. Please finalize and save the form.</p>	<p>Once you have finished entering the pots for the batch, it will display this message.</p> <p>Swipe left to proceed to the next screen.</p>
15	<p>You are at the end of TUMIKIA Endline Laboratory Sample Receipt Form.</p> <p>88-2017-Mar-4 11:07:28</p> <p><input checked="" type="checkbox"/> Mark form as finalized</p> <div style="background-color: #cccccc; padding: 10px; text-align: center; width: fit-content; margin: 10px auto;">Save Form and Exit</div> 	<p>This is the final screen of the form for each batch.</p> <p>The text in grey displays your technician ID number or your name and the time and date that you started registering the batch.</p> <p>If you have entered all the required information, then press “Save Form and Exit” to save the form and exit.</p> <p>The data will automatically be transmitted to our server if you are able to connect. Otherwise it will be saved on your phone.</p> <p>If you uncheck “Mark form as finalized” you will only be saving the form on your phone, but it will not be finalized or transmitted. Do not uncheck the box for this form!</p>

Section 4: Labelling of slides

Labelling slides

After sample reception and recording, **the team should work together** to carefully **match** the code on the stool sample pot to the codes in the lab and stick these (A&B) barcode labels on each of the slides.



The image on the left looks like the sticker that will be on the stool sample pot. The square at the top is a QR code that can be read by a smartphone to capture the information on the sticker. The text is the name of the cluster from where the sample was collected. The number is a unique identifier that links the collected sample with a household survey. The first three digits represent the cluster ID number, and the last three numbers represent the sample number.



You will have been provided with 2 sets of 6 rolls of 50 stickers that look like the images on the left.

Each set has either an A or B on the sticker. These should be used to label slides A and B respectively.

Each roll will correspond to the sample stickers from a single field officer (sample numbers: 1-30, 31-60, etc.), so you can organize the stickers by field officer to facilitate finding them later. Use the cluster name and the six-digit ID number to match the sticker on the sample pot to the stickers in your rolls.

It is critical that the number on the sampling pot matches the number on the sticker used to label the slide. Be careful not to mix up the pots, slides, and stickers!

Place the 2 labelled slides on the corresponding stool pot.

Section 5: Kato Katz stool examination

Kato Katz Stool Examination

This technique is used for the diagnosis of soil transmitted helminths and intestinal schistosomiasis. It is a technique for faecal examination and it is adapted by WHO for quantitative and qualitative diagnosis of intestinal infections. People infected with STH and Schistosomiasis pass eggs of the worms through faeces.

By examining under the microscope, one can see and count the number of each type of eggs present. The overall objective of this technique is to quantitatively diagnose STH (*Ascaris*, *Trichuris*, Hookworm) and *Schistosoma mansoni*. The TUMIKIA Project will only be detecting STH and not schistosomiasis. *Schistosomiasis haematobium* is prevalent at the coast but detection requires a urine sample. *Schistosoma mansoni* is not present at the coast.

Preparation of cellophane and malachite green

Always ensure that the cellophane to be used has been soaked in malachite green solution at least 24 hours before it will be used in the lab.

To make this:

- Add 3gms of malachite green to 100 ml of distilled water
- Mix well and store at room temperature

When you need to use this:

- Add 3 mls of the stock solution to a mixture of 100ml glycerol + 100ml of distilled water.
- Mix well

Kato Katz procedure

Samples should be fresh or stored at temperatures (23-28°C). As discussed above the team of nine FOs will bring variable numbers of stool samples per day, the minimum should be 40 samples and the maximum approximately 100 samples. This is between 80 and 200 slides to be read per day. A team of 3 technicians can manage this in an afternoon. The steps below must be followed to examine stool using Kato Katz:

1. Mix the stool sample so that the eggs are evenly distributed in the sample (if present).
2. Place a small mound of faecal material on newspaper or scrap paper and press the small screen on top so that some of the faeces are sieved through the screen and accumulate on top.
3. Scrape the flat-sided spatula across the upper surface of the screen to collect the sieved faeces.
4. Place the template with hole on the centre of a microscope slide and add faeces from the spatula so that the hole is completely filled, making sure there are no air bubbles in the hole.
5. Pass the side of the spatula over the template to remove excess faeces from the edge of the hole.

6. Remove the template carefully so that the cylinder of faeces is left on the slide.
7. Cover the faecal material with the pre-soaked cellophane strip. The strip must be very wet if the faeces are dry and less so if the faeces are soft. If excess glycerol solution is present on the upper surface of cellophane, wipe with toilet paper.
8. Invert the microscope slide and firmly press the faecal sample against the hydrophilic cellophane strip on another microscope slide or on a smooth hard surface. The faecal material will be spread evenly between the microscope slide and the cellophane strip. It should be possible to read newspaper print through the smear after clarification;
9. Carefully remove the slide by gently sliding it sideways to avoid separating the cellophane strip or lifting it off.
10. Place the slide on the bench with the cellophane upwards. Water evaporates while glycerol clears the faeces.

Reading the Slides

11. Read the slide within 30-40 min at ambient temperature.
12. **Hookworm eggs clear rapidly and will no longer be visible after 30-40 minutes**
13. **For all except hookworm eggs, keep the slide for one or more hours at room temperature to clear the faecal material prior to examination.**
14. The smear should be examined in a systematic manner and the number of eggs of each species recorded. Do not prepare any more than 10 slides at a time.
15. Read the slide for hookworm within 30 minutes of preparation and then re-read for *Ascaris lumbricoides* and *Trichuris trichuria* after 60 minutes. *Ascaris lumbricoides* and *Trichuris trichuria* will remain visible/recognizable for many months. Schistosoma eggs may be recognizable for up to several months.
16. The multiplication factors used to obtain the number of eggs/g from the number of eggs/slide are: multiplying the specific counts by a factor of 24 in order to obtain the number of eggs per gram of stool.

TWO SLIDES MUST BE PREPARED FOR EACH STOOL SAMPLE AND READ BY TWO INDEPENDENT TECHNICIANS (A+B) AS THEY ARE TO BE READ IN DUPLICATE

Quality control

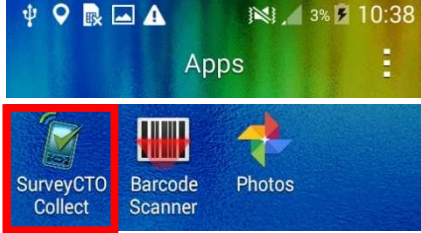
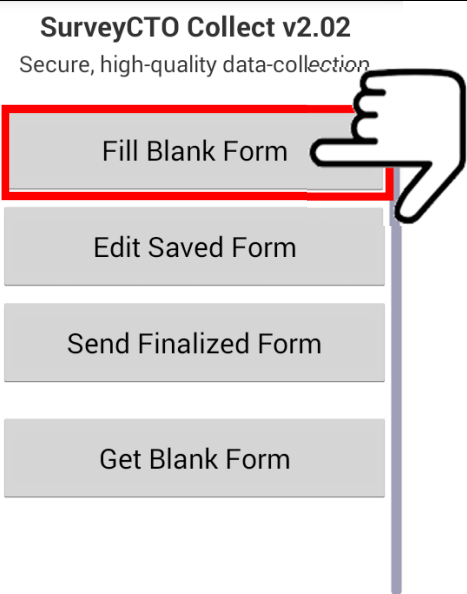
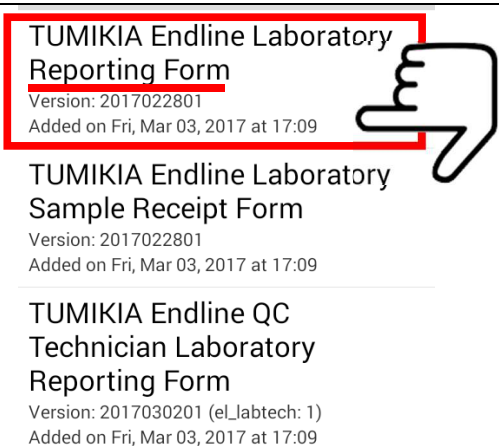
- Selected positive and negative specimens should be processed together with the test specimens for quality control purposes.
- Do not re-wash slides in the field. Keep all slides and return them (in a slide box).

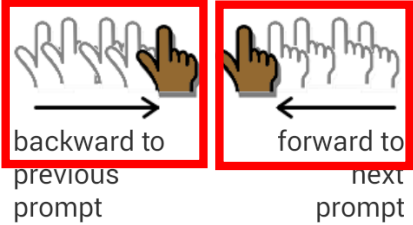



WHO reference epg threshold estimates:





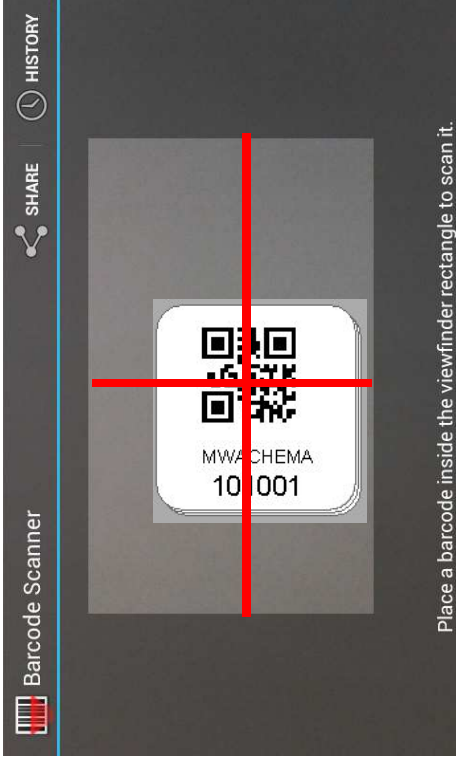
	Light intensity infections	Moderate intensity infections	Heavy intensity infection
<i>A. lumbricoides</i>	1-4,999 epg	5,000-49,999 epg	≥50,000 epg
<i>T. trichuria</i>	1-999 epg	1,000-9,999 epg	≥10,000 epg
Hookworm	1-999 epg	2,000-3,999 epg	≥4,000 epg
<i>S. mansoni</i>	1-99 epg	100-399 epg	≥400 epg
<i>S. japonicum</i>	1-99 epg	100-399 epg	≥400 epg









Section 6: Recording results

The results from reading the slides will be entered electronically using SurveyCTO on smart phones. Each team will be provided with two smartphones which have been installed with the SurveyCTO programme that allows electronic data entry.

1		<p>We will be using the SurveyCTO Collect application to record receiving the sample by scanning the barcodes on each sample.</p> <p>You can find SurveyCTO Collect in the 'Apps' menu of the smartphone.</p>
2		<p>Once you open the <i>SurveyCTO Collect</i> application, a menu will be presented with the following options:</p> <ul style="list-style-type: none"> • <i>Fill Blank Form</i> to enter a new batch of slides • <i>Edit Saved Form</i> to modify previous data entered • <i>Send Finalized Form</i> to upload the data to our server • <i>Get Blank Form</i> to load the questionnaire on your phone (you will not need to do this as we will set up the smartphone for you) <p>Select Fill Blank Form to start entering new data.</p>
3		<p>Selecting <i>Fill Blank Form</i> will give you 3 options:</p> <ul style="list-style-type: none"> • Endline Laboratory Reporting Form • Endline Laboratory Sample Receipt Form • Endline QC Technician Laboratory Reporting Form <p>Click on TUMIKIA Endline Laboratory Reporting Form.</p>

4	<p>You are at the start of TUMIKIA Endline Laboratory Sample Receipt Form. Swipe the screen as shown below to go backward and forward.</p> 	<p>Swipe to start the questionnaire. You can also swipe to go backward and forward.</p> <ul style="list-style-type: none"> To go backward: swipe from left to right To go forward: swipe from right to left
5	<p>Select your name from the list.</p> <ul style="list-style-type: none"> <input type="radio"/> Kamau Njenga <input type="radio"/> Masoud Mwalitseso <input type="radio"/> Mboza Omar Mwachuo <input type="radio"/> Technician not listed 	<p>Select your name from the list.</p> <p>If your name is not list, select “Technician not listed” and you will be prompted to type in your name on the next screen. Please enter your complete name.</p>
6	<p>Please select whether this is a first reading or a second reading.</p> <p><i>Select first reading for regular slide readings. For a second reading you will be given a batch of slides to read by your partner.</i></p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Regular reading <input type="radio"/> Second reading 	<p>Select whether this is a first or second reading of the slide.</p> <p>If no one has yet read this batch, select ‘Regular reading’. You should only select ‘Second reading’ if you are reading a batch of slides that you have swapped with your partner (refer to Step 18) for a duplicate reading.</p>
7	<p>Enter the number of slides to be read in this batch. Batches must be 15 slides or fewer.</p> <input style="width: 100px; border: 1px solid blue;" type="text"/>	<p>Enter the number of slides to be read in this batch.</p> <p>Batches must be fewer than 15 slides.</p>
8	<p>Select if you are slide reader A or B</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Reader A <input type="radio"/> Reader B 	<p>Select whether you are slide reader A or B.</p> <p>If you are Reader A, you should be scanning the slide stickers with an ‘A’ in the corner. Reader B should scan the ‘B’ slides.</p>

<p>9</p>	<p>Select if you are reading this batch of slides for all species, hookworm only, or Ascaris and Trichuris only.</p> <p><input checked="" type="radio"/> All species </p> <p><input type="radio"/> Hookworm only </p> <p><input type="radio"/> Ascaris and Trichuris only </p>	<p>In most cases you should select ‘All species’.</p> <p>All samples MUST be read for hookworm that day as hookworm eggs in the unprepared stool will disappear within 12 hours.</p> <p>It is also essential that slides are read for hookworm within 30 minutes of preparation.</p> <p>However, if it is very late, it is possible to read for <i>Ascaris</i> and <i>Trichuris</i> the following morning. In this case, you should select the “Hookworm only” option. You will then only be able to enter hookworm counts and other species will be skipped.</p> <p>Only if the slides have already been read for HK and you are now reading the slide for the missing AS and TR result, select “Ascaris and Trichuris only”.</p>
<p>10</p>	<p>Barcode scans (1)</p> <p>Scan the sticker on the pot.</p> <p>Get Barcode </p>	<p>Select “Get Barcode” to scan the sticker.</p>
<p>11</p>	 <p>Place a barcode inside the viewfinder rectangle to scan it.</p>	<p>The phone’s display will appear as shown on the left. The grey box will display the image captured by the phone’s camera on the front side.</p> <p>Hold the phone level over the sticker so that the barcode is centered in the image on the screen. Make sure you are not covering the camera.</p> <p>The phone will beep (if the sound is on) and the dots will turn from yellow to green when it has successfully read the sticker.</p> <p>It will then return to the previous screen but will be displaying the captured barcode.</p> <p>Swipe left to proceed scanning the next pot. Each pot must be scanned the sticker barcodes on each pot to record that you have received the sample.</p>

12		<p>If for any reason, it cannot scan, enter the number on the sticker manually.</p> <p>Enter the first three number on the sticker (e.g. 101). This number corresponds to the cluster where the sample came from.</p> <p>Then enter the last three numbers on the sticker (e.g. 001). These represent the sample number.</p> <p>Finally, enter the LETTER on the sticker (e.g. A).</p>
13	<p>101001A (1)</p> <p>The barcode you entered is 101001A</p> <p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p> 	<p>The Barcode you entered will be displayed. CONFIRM that it is the one you entered by selecting “YES”.</p> <p>If the CODE is not what you entered, SELECT “NO”.</p> <p>You will not be able to proceed until you correct the code. Swipe backwards and re-enter the number to make the correction.</p>
14	<p>101100A (1)</p> <p>Can you read the slide?</p> <p><input type="radio"/> Yes </p> <p><input checked="" type="radio"/> No </p>	<p>You will be asked to specify if you are able to read the slide.</p> <p>If you select “Yes” you will be taken to the next screen to enter the counts. If you select “No” you will be asked to specify why.</p>
15	<p>Slides (1)</p> <p>Why can't you read the slide?</p> <p><input type="radio"/> No stool to prepare slide </p> <p><input type="radio"/> Insufficient stool to prepare slide </p> <p><input type="radio"/> Too dark </p> <p><input type="radio"/> Other </p>	<p>If you cannot read the slide, select the reason why not.</p> <p>This means that for all samples that have been logged, a sticker for both Slide A and Slide B are scanned and either a result, or a reason why there is no result, is recorded in the survey.</p>

<p>16</p>	<p>Slides (1) > STH counts</p> <p>Enter hookworm count</p> <hr/> <p>Enter Ascaris count</p> <hr/> <p>Enter Trichuris count</p> <hr/>	<p>Read the slide according to the previous instructions and enter the count results:</p> <ul style="list-style-type: none"> ✓ Hookworm (HK) ✓ <i>Ascaris lumbricoides</i> (AS) ✓ <i>Trichuris trichiura</i> (TR) <p>You will not be able to proceed to the next page unless you have entered results for all 3 STH – if you selected all species in Step 9.</p>
<p>17</p>	<p>Slides (1)</p> <p>Put a check next to the other species that you are counting.</p> <p><input type="checkbox"/> No other species</p> <hr/> <p><input type="checkbox"/> <i>E. vermicularis</i></p> <hr/> <p><input type="checkbox"/> <i>Taenia</i> spp</p> <hr/> <p><input type="checkbox"/> <i>H. nana</i></p> <hr/> <p><input type="checkbox"/> <i>H. diminuta</i></p> <hr/> <p><input type="checkbox"/> <i>S. haematobium</i></p> <hr/> <p><input type="checkbox"/> <i>S. mansoni</i></p> <hr/> <p><input type="checkbox"/> Other</p>	<p>Select any other species observed. You will be prompted to enter their counts.</p> <p>If you observe any species not listed, select “Other” and enter the name of the species.</p> <p>Lastly, enter any notes on observations about the slide.</p>
<p>18</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Slides (2)</p> <p>Scan the sticker on the slide.</p> <p><i>Scan the slide sticker even if the slide was not prepared.</i></p> <div style="background-color: #cccccc; text-align: center; padding: 5px; margin-top: 10px;">Get Barcode</div> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Slides (2)</p> <p>You have already entered slide 101102A</p> </div>	<p>After entering this information and swiping left, the form will return to the barcode scanning screen, so you can scan the next slide and continue entering your reading results.</p> <p>Steps 10-17 will then repeat for the number of slides in the batch (Step 7).</p> <p>If you try to scan the same slide twice, the following error message will be displayed. You will not be able to proceed unless you go back.</p>
<p>19</p>	<p>Please give the following 1 slides to the quality control technician:</p> <p>,, 223005B</p>	<p>In most batches you enter, approximately 30% (1 in 3 slides read) will be randomly selected for a repeat reading by the quality control (QC) technician.</p> <p>Find these slides in the batch and take them to the quality control technician before swiping forwards.</p>

20	<p>Did you give your slides to the quality control technician?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>Record whether you gave all the selected slides to the quality control technicians.</p>
21	<p>Why were you not able to give your slides to the quality control technician?</p> <p><input checked="" type="radio"/> QC technician not available</p> <p><input type="radio"/> Other</p>	<p>If you did not give the selected slides to the quality control technician, record the reason why. If the reason is not listed, select "Other" and write the reason why.</p> <p>You have now finished the survey. The next screen you will see is Step 19.</p>
22	<p>This batch of slides has been selected for a double reading. Please ask your partner for the slides in this batch that they were reading. You should finalise this form and then use a new form and select "Second reading" to enter the readings of your partner's slides. Please give this batch of 5 slides to your partner reader for a second reading:</p> <p>132008B, 131196B, 301112A, 223045A, 405112A</p>	<p>In a small number of batches (on average 1 or 2 batches per day), the whole batch will be selected for a double reading by your partner.</p> <p>Gather this batch together and give it you your partner to double read. Your partner should also give you their batch for you to double read.</p> <p>Note that only one reader will be told that the batch is to be double read. It is your responsibility to confirm with your partner after reading each batch whether either reader was asked to also swap the batch.</p> <p>If your partner has already given some slides from their batch to the quality control technician, the batch swap should <u>still be completed with the remaining slides</u>.</p>
23	<p>Did you give your slides to your partner for double reading?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>Record whether you swapped ANY slides from the batch with your partner.</p>
24	<p>Why were you not able to give your slides to your partner for double reading?</p> <p><input type="radio"/> Partner's slides were selected for QC technician reading</p> <p><input type="radio"/> Other</p>	<p>If you did not swap the batch with your partner, record the reason why.</p> <p>If the reason is not listed, select "Other" and write the reason why.</p> <p>You have now finished the form. The next screen you will see is Step 19. The next batch you enter should be the batch you have just swapped.</p>

25	<p>You have finished entering slides for this batch. Please make sure the box by "Mark form as finalized" is checked then save the form and exit.</p>	<p>After you have completed readings for all the slides in the batch, the form will display this message.</p>
26	<p>You are at the end of TUMIKIA Endline Laboratory Reporting Form.</p> <p>Df-2017-Mar-4 20:17:33</p> <p><input checked="" type="checkbox"/> Mark form as finalized</p> <p>Save Form and Exit</p>	<p>This is the final screen of the form for each batch.</p> <p>The text in grey displays your technician ID number or your name and the time and date that you started entering each slide in the batch.</p> <p>If you have entered all the required information, then press "Save Form and Exit" to save the form and exit.</p> <p>If you uncheck "Mark form as finalized" you will only be saving the form on your phone, but it will not be finalized or transmitted. Do not uncheck the box for this form!</p>

Submitting data

The data will be saved on your phone and automatically be transmitted to our server when it is connected to WiFi. Where possible, this will be done at the laboratory using a mobile hotspot. However, the phones must still be checked in whenever the teams return to Ukunda between moving clusters so that any saved data not yet submitted is uploaded.

Section 7: Quality control Technician and duplicate batch reporting

Process for slides selected for quality control technician

Within most batches, 30% of slides will be randomly selected for a second reading by a quality control technician.

Once you have finished the first reading of the batch, any selected slides should be brought to the quality control technician who should then record the results of each selected slide using the “TUMIKIA Endline QC Technician Laboratory Reporting Form”.

NOTE: The form “TUMIKIA Endline QC Technician Laboratory Reporting Form” should only be used for recording the result of specific slides randomly selected for reading by the quality control technician.

This is not the same as the form “TUMIKIA Endline Laboratory Reporting Form”, which should be used by any technicians who is conducting the ‘normal’ first reading of each batch OR the second reading of any batch that has been selected for duplicate reading by opposite partners.

The form “TUMIKIA Endline QC Technician Laboratory Reporting Form” is identical to the form “TUMIKIA Endline Laboratory Reporting Form” as outlined in Section 6 of this SOP, with the exception of Steps 6, 8, 17 & 18 which do not apply. In addition, slides should be entered and read individually (not in batches); and no slides or batches will be selected for further re-reading.

Process for batches selected for swap between partners

Within some batches, both technicians should conduct a duplicate reading of all slides within the other batch (i.e. Reader A should read all ‘B’ slides and Reader B should read all ‘A’ slides).

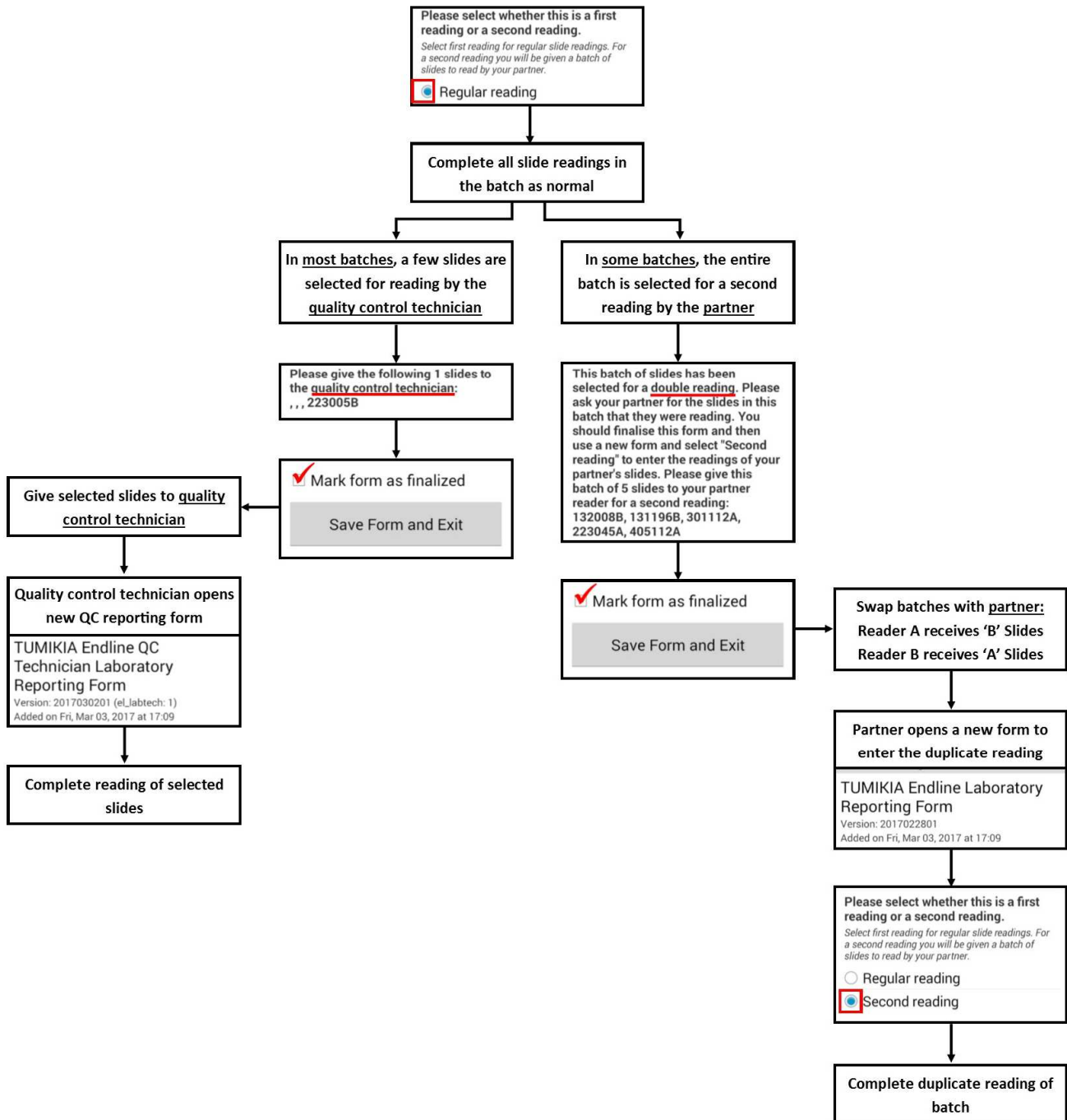
In 10% of batches, the survey will display a message to **ONE** reader saying that this batch has been selected for duplicate reading. This technician should then inform their partner that the batch is to be duplicate read, and swap the batch of slides between one another once both have finished **and finalised** their first reading.

Using a new form, both partners should then read the entire batch using “TUMIKIA Endline Laboratory Reporting Form in the same way, but selecting ‘Second Reading’ at Step 6 to confirm they are conducting a duplicate batch reading.

NOTE: If either partner is requested to give some slides to the quality control technician, this does NOT prevent the batch being swapped. Any randomly selected slides should be given to the quality control technician, and the remaining slides within the batch swapped between partners.

Quality Check & Duplicate Reading Workflow

The following flowchart outlines the key steps for slides selected for second reading by the quality control technician (left arm) or batches selected for duplicate reading by the partner (right arm).





TUMIKIA

TUANGAMIZE MINYOO KENYA IMARISHA AFYA

This manual was created by the London Applied & Spatial Epidemiology Research Group (LASER) based at the London School of Hygiene and Tropical Medicine as part of the TUMIKIA research project. TUMIKIA sought to determine whether combining school and community based deworming is more effective at controlling and eliminating soil transmitted helminths in Kenya than school based deworming alone, and what frequency of deworming is required to stop transmission. This research was a collaboration between LASER, Kenya Medical Research Institute and Kenya's Ministry of Health and Ministry of Education, Science & Technology.

For TUMIKIA research findings visit www.lshtm.ac.uk/laser



LASER combines expertise in the fields of spatial statistics and GIS technology, quantitative epidemiology and operational research to build the evidence-base around diseases of poverty and the communities they affect.

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