TIMCI
Tools for Integrated
Management of
Childhood Illness

User Guide

medAL-reader - Clinical Decision Support Algorithm (CDSA)

Disclaimer:
All screenshots and specific clinial content included in this guide are GENERAL EXAMPLES, and may not be reflective of each country's specific algorithm. This guide is intended to be used as a reference resource outlining medAL-reader features and functions.
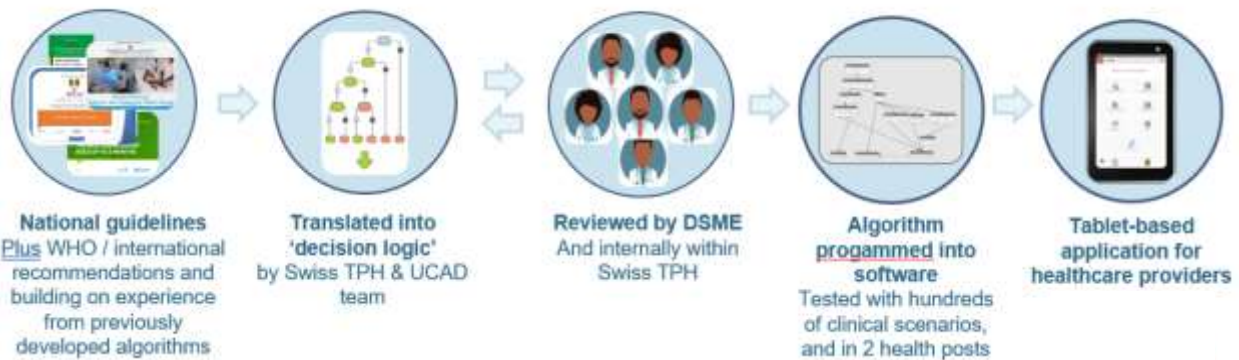
Contents

The function and basic structure of the medAL-*reader* CDSA will be described in this User Guide.

medAL-*reader*

medAL-*reader* is the name of the software used to complete a pediatric consultation for sick children aged 0 to <60 months.

The CDSA generates guideline-based diagnoses, treatments and managements for sick children (under 5 years of age) according to the clinical information entered by the User. These proposed diagnoses, treatments and managements are based on IMNCI and national clinical guidelines of the country.

Example. How the CDSA development process

National guidelines
Plus WHO / international recommendations and building on experience from previously developed algorithms

Translated into 'decision logic' by Swiss TPH & UCAD team

Reviewed by DSME And internally within Swiss TPH

Algorithm progammed into software Tested with hundreds of clinical scenarios, and in 2 health posts

Tablet-based application for healthcare providers

CDSA consultations follow a 11-stage structure that is meant to replicate and expand upon the structure of IMNCI.

The IMNCI components included in the CDSA, include:
Danger signs, cough/difficulty breathing, dehydration, diarrhea, fever, malaria, measles, ear problems, malnutrition, anaemia, HIV exposure, immunization, vitamin A & deworming
PLUS, the following additional concerns:
Ear/nose /mouth/throat problems, gastrointestinal problems, urine/genital problems, skin problems, (and in some countries musculoskeletal problems, accidents & injuries)

Example. Assess, Classify, Treat and Counsel/Follow-up Care for an IMNCI vs CDSA consultation
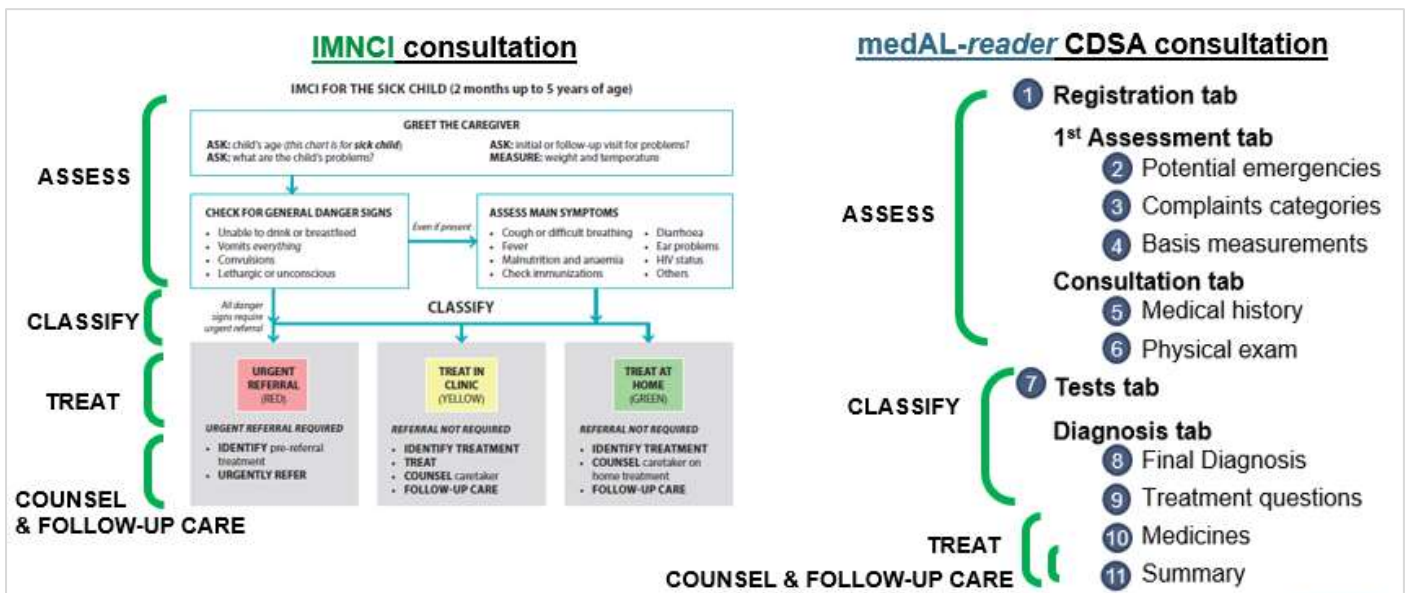
Example. 11 components of the CDSA consultation

1. Registration
2. Potential Emergencies
3. Complaint categories
4. Basic measurements
5. Medical history
6. Physical Exams
7. Tests
8. Final Diagnosis
9. Treatment questions
10. Medicines
11. Summary

All 11 components of a CDSA consultation will be reviewed in detail in this User Guide.

INITIAL SETUP

The initial setup of the CDSA will be described in this section.

Materials & Installations Needed

- Android tablet (running Android version 9 [minimum])
- Installed medAL-*reader* application
- Appropriate assignment of your Username to your health facility by your IT administrator.

Opening the application

Make sure your tablet is charged and unlock it (*Note: Tablet passcode will be provided by IT*).

Navigate to the *Apps* screen
  ➢ NOTE: This is done by swiping the screen from the bottom to the top while on the Android home screen.

Navigate until you find "medAL-*reader*" application and click on the Symbol to open the app.
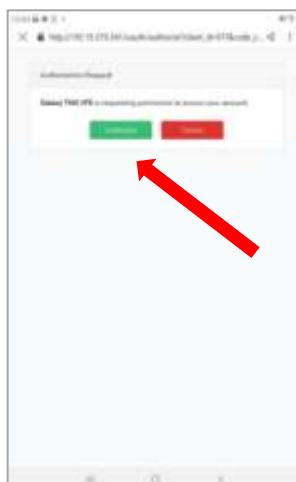

Initial setup of the application

You will need to login with the credentials:
  o Server URL: Will be provided by IT
  o Device Reference: Will be provided by IT

Example. Entering Server Reference and User ID

Once assigned to a Facility you will be able to choose your Username from the list.

NOTE: If your name does not appear in the list, enter your name as *Missing Staff Member* and request that your name be added through your IT manager.

Once selected, scroll down to confirm.

Re-logging In

Unlock the app each time by using the code given to you by the administrator.

KEY SYMBOLS / ICONS

The following are the most commonly used symbols and icons in the CDSA.

Symbol / Icon	Description
✱	**MANDATORY QUESTION** – cannot proceed to next page until question(s) are completed *(E.g., First Name, Date of Birth, etc.)*
i	**INFORMATION BUTTON** – provides a detailed overview of item *(E.g., Obstructed Breathing = guidance on how to assess for same)*
✱	**LIFE THREATENING EMERGENCY** – provides assessment / treatment guidelines for potential life-threatening emergencies *(E.g. "Severe respiratory distress", or "Shock", etc.)*
⚠	**POTENTIAL EMERGENCY** – signifies a potential life-threatening emergency is occurring or need for referral *(E.g. "Convulsing now", or "Obstructed airway", etc.)*
≡ ✚ ⌂	**HOME SCREEN** – brings you back to Main Menu
NEXT >	**NEXT** – allows you to save details & proceed to the next page of the consultation
SAVE	**SAVE** – allows you to update & save details entered
>	**MORE THAN -** *(E.g. 10 is > than 2)*
<	**LESS THAN -** *(E.g. 2 is < than 10)*

Any Word	**QUESTIONS / SYMPTOMS OUTLINED IN** PINK – indicate need for referral if present
(toggle off) (text field) Select ▾ ☐ Not feasible	**NOT SELECTED or UNANSWERED** – if the response/questions has not been answered yet, it will appear as such
Yes ✓ Measured **Estimated** **Present** Absent Yes **No** ☑ Not feasible	**SELECTED** – if the response/quesrtions have been selected, it appears as highlighted in **BLACK** or ticked with a black checkmark ☑

STARTING A CONSULTATION

There are three types of patients a consultation can be created for: (for ages 0 to <60 months)
  ➢ **NEW patient** - (*never registered at facility before this visit*)

  ➢ **RETURNING patient** - (*has been previously registered at this facility before this visit*)

 ➢ **ONGOING patient** - (*consultation is in progress and not completed yet*)

New Patient

IMPORTANT NOTE: When entering practice consultations or instructing colleagues how to use the CDSA please ensure all practice / scenario / demo Patient Names are entered as:

First Name: TEST
Last Name: TEST

This is to ensure there is no confusion in the data export between real and practice patients for your data management team.

New Patient
To create a consultation for a new patient, click on *New Patient* on the home screen.
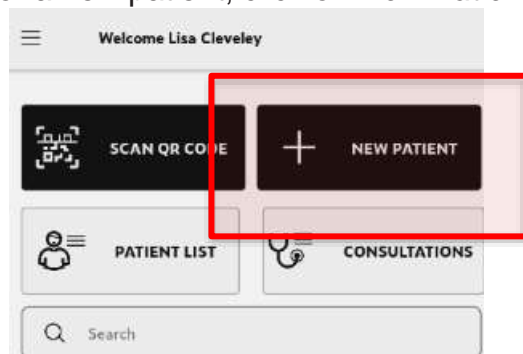
Returning Patient

To start a consultation for a previously registered patient: click *Patient List* (on the home screen); search the patient name you would like to add (or scroll down to find their name); click on their name; and click *NEW CASE* at the top of the screen.

This option can save the User time because the patient's name and demographics will automatically be entered. It will also link the consultations so all consultations under this child's name can be reviewed together. .

**Example.** How to add a consultation for a previously registered patient
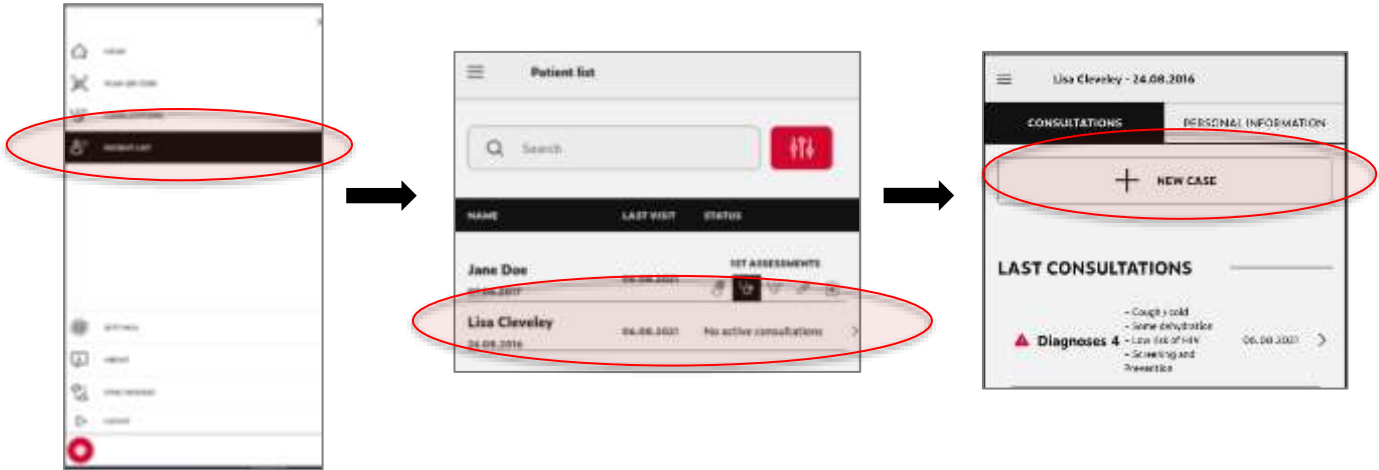
Updating/completing an ongoing Consultation

You can re-enter an ongoing consultation (that was paused & saved prior to completion) by: clicking on the *Consultations* button in the home screen; and selecting the patient's name to resume/re-enter the consultation where the User left off.

The need to pause a consultation could occur, for example, if the child has to go to the Laboratory. The consultation could therefore be paused to allow the User to see another child during this time.

Example. Opening an ongoing consultation.
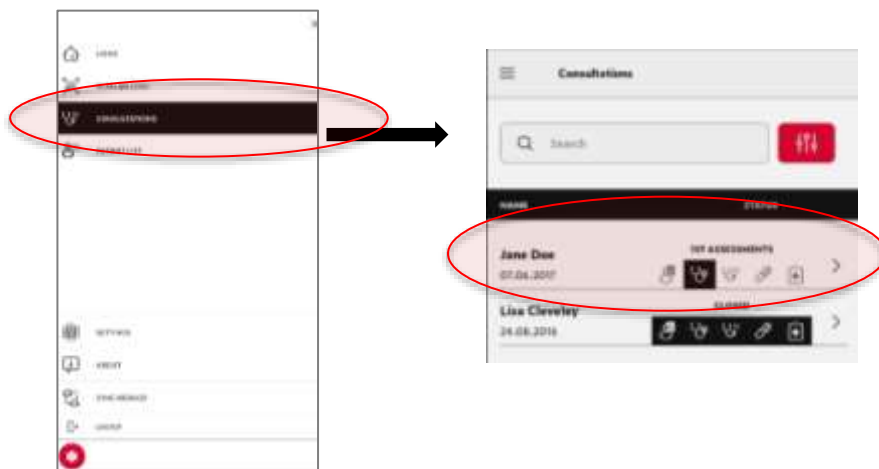
NOTE: In the Jane Doe example above, you can see the User was in the 1ˢᵗ Assessments tab of this consultation (black square). When they re-open this case, the app will return them directly to the 1ˢᵗ Assessments section where they left off.

Registration Tab

Each consultation will start with the **REGISTRATION** page.

All questions marked with a star* need to be completed (as these are mandatory questions), and once complete you will click *Next* to proceed.

Example.
Registration page

NOTE:
The patient's Name, Date of Birth and Age can be able to be seen at the top of every page throughout the consultation.

Name
If the child's name is Unknown, write UNKNOWN for their first and last name, until it can be updated to their correct given & surname.

Date of Birth
The patient's date of birth can be exact (exact day known by Caregiver) or estimated in Days or Months.

It is always preferrable to have the child/infant's EXACT date of birth. A Caregiver's best estimate can also be used if the exact DOB is not known. When estimating the patient's age, please use the following formats:
- If <2 months old: Give the estimated date of birth in DAYS
- If >2months old: Give the estimated date of birth in MONTH or DAYS (whichever is more reasonable).

What kind of consultation is this?
This question mimics the IMNCI question: (see below)

> Determine if this is an initial or follow-up visit for this problem.
> - If follow-up visit, use the follow-up instructions on TREAT THE CHILD chart.
> - If initial visit, assess the child as follows:

There are 2 drop-down responses to choose from:
- **FIRST / INITIAL consultation**
  - This means the patient is presenting on their own behalf.
  - Do NOT select this option if the patient was requested or instructed to attend a health center by a healthcare worker – this would be a follow-up instead.
- **FOLLOW-UP consultation**
  - This means the patient is presenting because they were instructed by your facility or another health center to return.

This question is important to answer correctly as it helps to ensure the most appropriate / accurate clinical questions are asked by the CDSA, therefore ensuring the most appropriate / accurate diagnoses, treatments and managements are proposed.
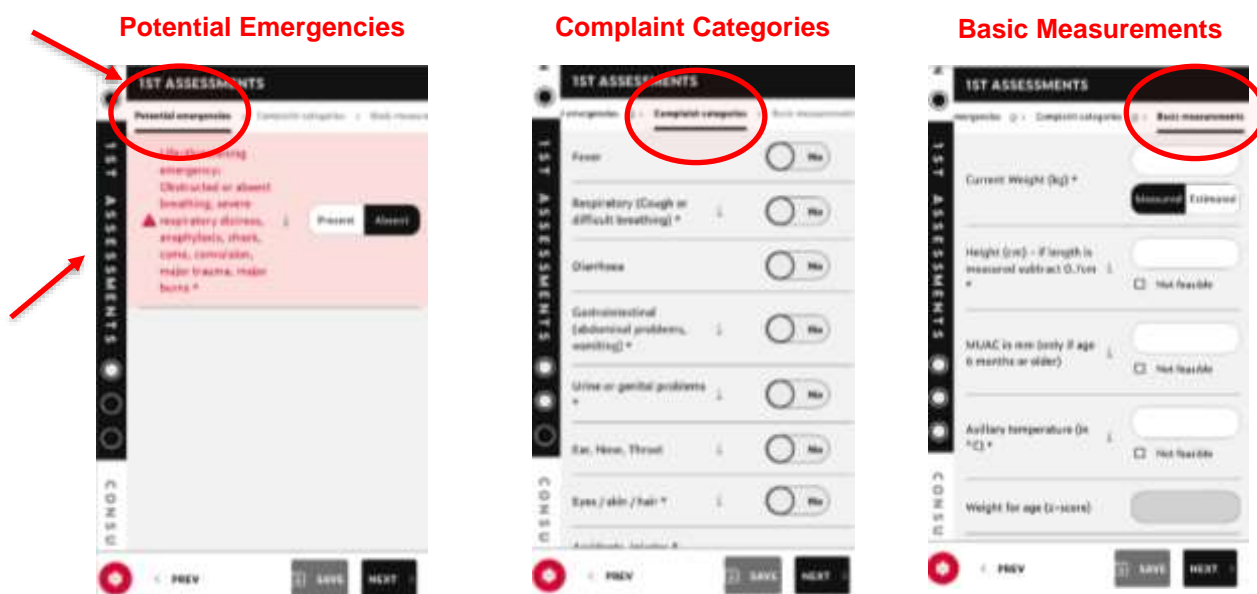
Once this page is complete, click *NEXT* to save and proceed to the next required page/tab.

1ˢᵀ Assessment Tab

The 1ˢᵗ Assessment Tab consists of 3 components (pages):
- *Potential Emergencies*
- *Complaint Categories*
- *Basic Measurements*

Example. Pages in 1ˢᵗ Assessment Tab

The Tab name (*1ST Assessment*) can be seen on the left-hand side or top of the screen [red-arrow above], and the Page names (*Potential Emergencies, Complaint Categories, Basic Measurements*) can be seen at the top of the screen [red circles above].

Potential Emergencies page

The purpose of this component is to indicate whether the child has a life-threatening emergency or not.

If child has a life-threatening emergency, this page will take you to IMMEDIATE guidance on how to assess / manage this emergency.

The **Life-threatening emergencies** include:
- Obstructed breathing
- Absent breathing
- Severe respiratory distress
- Anaphylaxis
- Shock
- Coma
- Convulsion
- Major Trauma
- Major Burn

REMINDER:
You can click the Emergency button on ANY page to access immediate life-threatening emergency guidance.

NOTE: How to navigate within the Life-Threatening Emergency guidance pages can be found later in the '***Emergency Button'*** section of this guide.

Once this page is complete, click *NEXT* to save and proceed to the next required page/tab.

Complaint Categories page

The purpose of this component is to determine the child's 'Reason(s) for Consultation' or the 'Chief complaints'.

The best way to determine the correct Complaint Categories affecting the child is to ask the Caregiver "**what the child's problems are?"** (as asked in IMNCI).

> *User:*   *"What are the child's problems?"*
> Caregiver: *"The child has this rash that started yesterday""*
>
> ➢ *The User would then select the Complaint Categories: SKIN*

Multiple systems/complaint categories can be selected as needed.

> User: *"What are the child's problems?"*
> Caregiver: *"The child feels hot, and they are crying when the urinate"*
>
> ➢ *The User would then select the Complaint Categories: FEVER & GENITOURINARY*

Regardless of the Complaint Categor(ies) selected, the patient will always be assessed for IMNCI concerns, so expect to see the following signs/symptoms to be asked about in all children (age-dependent):
IMNCI concerns always assessed by the CDSA: (age-dependent)

2-59 months

> *Danger signs, cough / difficulty breathing, diarrhoea, fever, malnutrition, pallor*

<2 months

> *Signs of severe illness (abnormal temperature, poor movement, severe chest indrawing, poor feeding, history of fever, convulsions, fast/slow breathing, low oxygen saturation); local skin infection; diarrhoea; feeding practices/problems; low weight-for-age; jaundice; vaccination status; HIV risk; birth history questions*

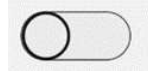**Example.** Complaint categories page

NOTE:
- Once selected the Complaint Category will turn black with a checkmark to signify *Yes* – it has been selected.

- All categories are defaulted to *No* otherwise unless selected.

Complaint Categories will differ between young infants (<2months) and older child (≥2 to <60months), so depending on the child's age, expect to see the following categories populate:

Example. Complaint categories for Young Infants (<2 month) and Older Children (≥2-<60 month)

<2month
- Yellow appearing skin or eyes (jaundice)
- Respiratory
- Diarrhea, abdominal or gastrointestinal
- Skin
- Eye complaint
- Ear or mouth complaint
- Feeding problem or weight concern
- Malformation of birth anomaly
- Injuries (birth or non-birth related)
- Fever or convulsions or lethargy
- Follow-up visit for previous problem
- Other

2-59 month
- Fever
- Respiratory (cough or difficulty breathing)
- Gastrointestinal (diarrhea, vomiting, feeding)
- Ear / Throat / Mouth
- Eye
- Neuro (headache, stiff neck, neck pain)
- Skin / hair
- Accident / Musculoskeletal (incl. burns, wounds, poison)
- Genitourinary *UTI, inguinal scrotal problems)
- Other

NOTE:
- The information button can be pressed for each Complaint Category to provide details/clarity on what is included in each umbrella category.

  Example.
  Info button for MOUTH, THROAT OR NECK PROBLEM Complaint Category

NOTE:
- It is NOT mandatory to select a Complaint Category
- IMNCI assesses one reason for consultation at a time, whereas the CDSA assesses ALL reasons for the consultation simultaneously (using a systems approach).

Once this page is complete, click *NEXT* to save and proceed to the next required page/tab.

Basic Measurements page

The purpose of this component is to document the child's weight, height, MUAC, temperature, etc.

Fill in each of these basic measurements and click *Next*.

ALL children need:
- ✓ Weight (kg)
- ✓ Temperature (Celsius)

OLDER children will need:
- ✓ Height (cm) – [only for 2-59 months]
- ✓ MUAC (cm) – [only for 6-59 months]
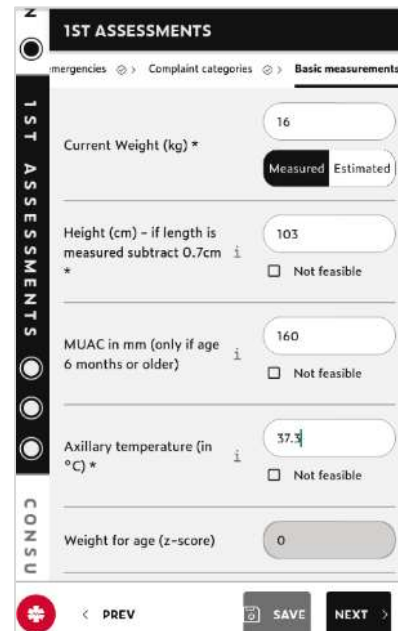
SOME children will need:
- ✓ Oxygen Saturation (SpO2%)

NOTE: If any measurement is Not Feasible to collect, click '***Not Feasible***'

Example.
Basic Measurements page

Weight (measured in kg)
- Must be measured same day of consultation
- Best if measured (instead of estimated)
- Used to calculate Drug calculations (e.g.. weight-based dosing); Malnutrition; and Weight-for-Age (which is also used to autocalculate Z-score)

➢ If weight cannot be measured and NEEDS to be estimated, click the '*Estimated*' button
  o The button will turn black to signify it was selected.

Height (measured in cm)
- If length measured (any age), subtract 0.7cm from the measure length to determine the height to enter
- Only measured for children above 2 months old
- Used to calculate Malnutrition; Weight-for-Age; and Weight-for-Height (which is also used to auto-calculate Z-score)

MUAC (measured in cm)
- Measured using the nationally accepted measuring tape
- Only enter for children 6 months old & above
- Used to calculate malnutrition

Temperature (measured in Celsius)
- Usually taken via axillary measurement
  o If taken rectally, subtract 0.5 degrees
- Used to calculate Fever

Oxygen saturation (SpO2%)
- Used to support assessment of Respiratory status

Once this page is complete, click *NEXT* to save and proceed to the next required page/tab.
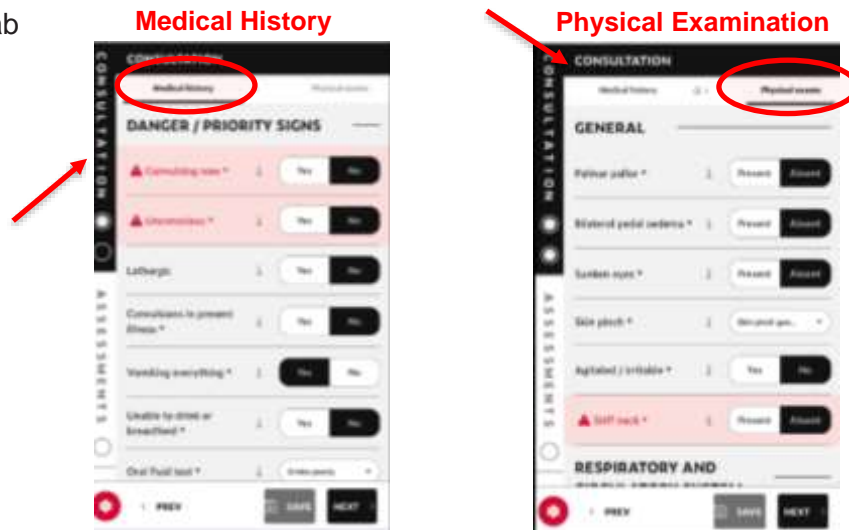
Consultation Tab

The Consultation Tab consists of 2 components (pages):
- *Medical History*
- *Physical Examination*

Example.
Pages in Consultation Tab

Medical History

Physical Examination

The Tab name (*Consultation*) can be seen on the left-hand side or top of the screen [red arrows], and the Page names (*Medical History & Physical Examination)* can be seen at the top of the screen [red circles].

Medical History page

The purpose of this component is to document and assess for pertinent patient symptoms and history specific to the patient's condition.

The responses in the *Medical History* page should be based on **what the Caregiver tells you**, or what you can see according to the child.

Example. Medical History page

- Questions outlined in pink – indicate NEED FOR REFERRAL.

  - When *YES* is answered (indicating severe illness), the app will take you to the Life-Threatening Emergency guidance 🔴

The Medical History questions are organized by system, and always appear in the following order:
- ❖ Danger Signs (asked first)
- ❖ General
- ❖ Respiratory & Circulatory
- ❖ Ear, Nose, Mouth & Throat
- ❖ Gastrointestinal
- ❖ Skin / Hair / Mucosae
- ❖ Eye / visual
- ❖ Exposures
- ❖ Comorbidities / past medical history

The Danger Signs assessed for in Medical History differ between young infants (<2months) and older child (>2 to <60months). Expect to see the following Danger Signs asked about in every child (age dependent):

Example. Danger Signs asked in Medical History per age group

Some Medical History question responses prompt additional questions.

E.g. Fever? (Yes/No)
  (if YES → Duration of Fever? will be asked)

E.g. Convulsions in present illness? (Yes/No)
  (if YES → Number of convulsions? will be asked)

NOTES:
- The [i] info buttons can be pressed at any time to provide details on each Medical History question (*E.g. "Oral fluid test"*)
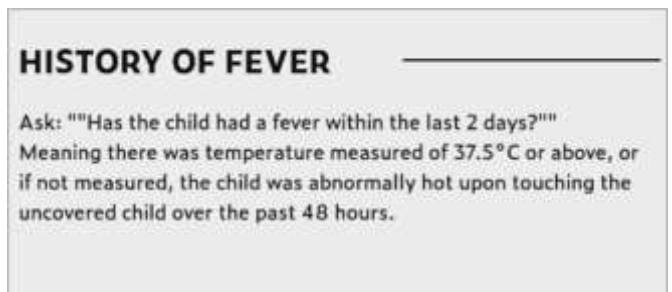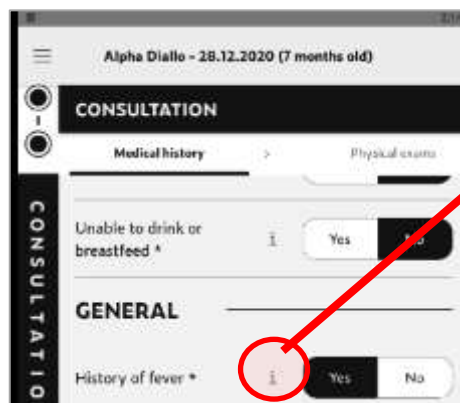
- You can/should go back and add a Complaint Category any time a new issue(s) comes up during the Consultation.

Example. Needing to add another Complaint Category mid-consultation

The mother remembers the child also has a sore throat in addition to their fever, so the User should go back and add MOUTH / THROAT / NECK PROBLEM as a Reason for Consultation (aka. Complaint Category) to ensure the child's sore throat is comprehensively assessed.

NOTE: After adding an additional Complaint Category, expect to likely see additional Medical History or Physical Exam questions populate that you will need to answer before you can proceed to the next page.

- You can/should return to the Medical History page if the child's condition changes during the consultation. If you need to UPDATE the previously entered data, press the 'SAVE' button once you have entered the updated information or you could lose the information (e.g. if the app suddenly closes).

    E.g. If you wanted to change the Number of Days the child had a fever, because the Caregiver remembered it was 5 days (instead of 3 days as previously entered).

    The User updates this information and presses SAVE to ensure it is updated in the algorithm.

Once this page is complete, click *NEXT* to save and proceed to the next required page/tab.

Physical Exam page

The purpose of this component is to assess for signs/symptoms specific to the patient's condition.

The responses to the questions asked in the *Physical Exam* page should be collected according to a **visual and physical assessment of the child** (NOT by asking the Caregiver).

Example. Physical Examination page

- The Physical Exam questions are organized according to the same systems used in Medical History

- Questions outlined in pink – indicate NEED FOR REFERRAL (same as in Medical History)

- Question responses may prompt additional related questions (same process as in Medical History)

    E.g. Palmar Pallor? (Yes/No)
        (if YES → Severe Palmar Pallor?)

- If an additional Complaint Category is added mid-consultation, additional new Physical Exam questions may populate (same as outlined in Medical History)
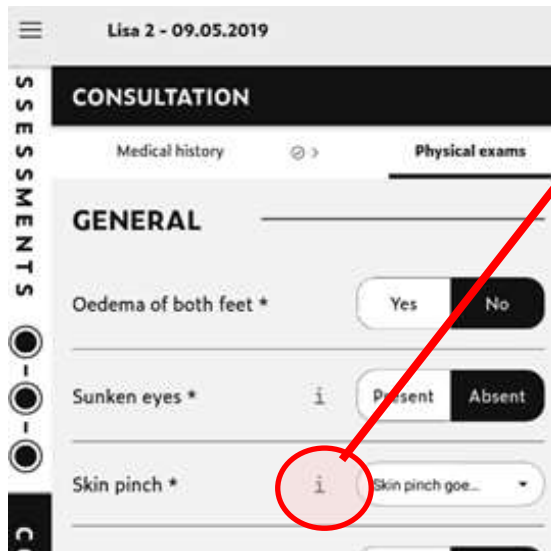
The Danger Signs assessed for in Physical Exam differ between young infants (<2months) and older child (>2 to <60months). Expect to see the following Danger Signs asked for every child (age dependent): (next page)

- **2-59 months:** *Palmor pallor, sunken eyes, stiff neck, skin pinch, agitated / irritable*

- **< 2 months:** *Respiratory rate, severe chest indrawing, assessment of movement, yellow skin/eyes and palms or soles; skin pustules or blisters; oxygen saturation*

Example.
Physical Exam Danger Signs assessed per age group.

NOTES:

- The [i] button can be pressed at any time to provide details on any Physical Exam (*E.g. "Skin pinch"*).

Once this page is complete, click *NEXT* to save and proceed to the next required page/tab.

Tests tab

The purpose of this component is to propose tests, investigations & assessments, according to the information entered throughout the consultation. The User can also add their own selected tests (if needed).

The User should also be aware that not every child will have a Test or Assessment proposed. Only tests that will help determine a correct/accurate diagnosis are proposed (and these are dependent on the child's clinical signs and symptoms).

If User needs to close the app (*e.g. to allow child to go to the laboratory),* they can save the consultation, and reopen when the child returns with their test results.
  - ➢ By pausing the consultation, this allows the User to maximize their time and see another child while they wait for the first child to return with their test results.

REMINDER: The User should always SAVE the consultation when EXITING, to ensure they can reopen the ongoing consultation later. *See processes outlined in "***Updating or Changing Data***" and "***Saving and Exiting a Consultation''*** for how to do same.

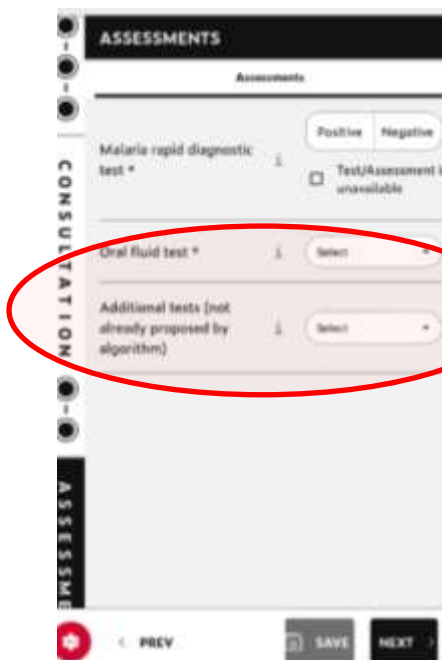**Example.**
Saving consultation before exiting
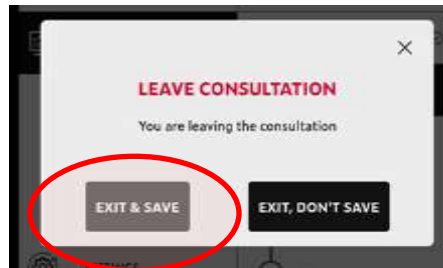
Adding additional tests

To add additional tests (not proposed by the algorithm), the User can select a test from the Drop-Down list labelled "***Additional tests not proposed by algorithm?".*** The requested test, PLUS space for the test's results will then populate.

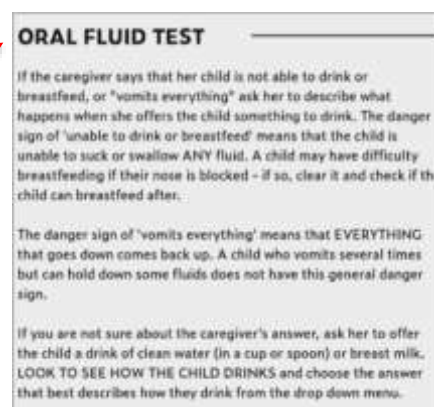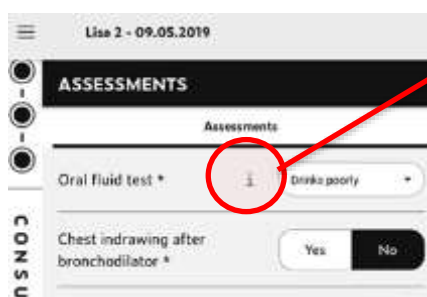**Example.** Tests page & location for adding additional tests

- NOTE: Additions are not mandatory – this section can be left unselect by the User
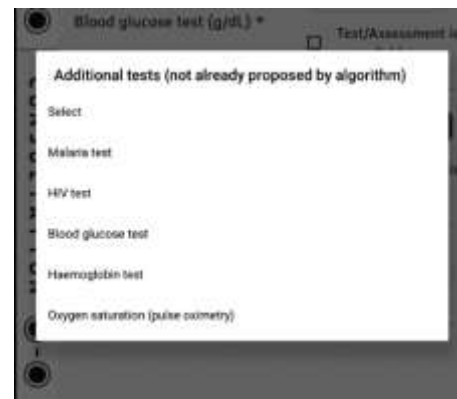
Note: The [i] info button can be pressed anytime to provide details on each of the assessments / tests (including how to conduct some tests) (*E.g. "Oral fluid test"*)

Example. Info Button for *Oral Fluid Test*

ORAL FLUID TEST

If the caregiver says that her child is not able to drink or breastfeed, or "vomits everything" ask her to describe what happens when she offers the child something to drink. The danger sign of 'unable to drink or breastfeed' means that the child is unable to suck or swallow ANY fluid. A child may have difficulty breastfeeding if their nose is blocked – if so, clear it and check if the child can breastfeed after.

The danger sign of 'vomits everything' means that EVERYTHING that goes down comes back up. A child who vomits several times but can hold down some fluids does not have this general danger sign.

If you are not sure about the caregiver's answer, ask her to offer the child a drink of clean water (in a cup or spoon) or breast milk. LOOK TO SEE HOW THE CHILD DRINKS and choose the answer that best describes how they drink from the drop down menu.

Once this Tab is complete, click *NEXT* to save and proceed to the next required page/tab.
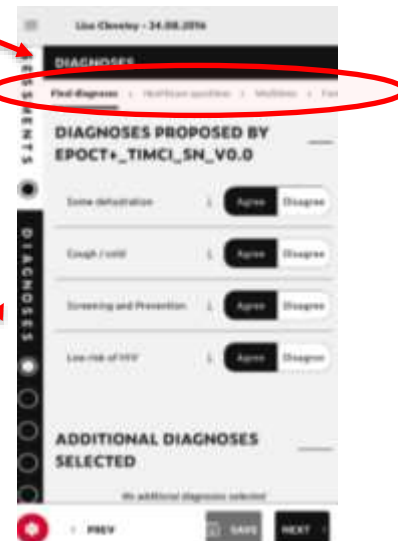
Diagnoses

The Diagnosis Tab consists of 4 components (pages):

- *Final Diagnoses*
- *Treatment Questions*
- *Medicines*
- *Summary*

The Tab name (*Diagnoses)* can be seen
on the left-hand side and top of the screen
[red arrows]; and the Page names (*Final Diagnoses;
Treatment Questions; Medicines; & Summary)*
can be seen at the top of the screen [red circle].

To be see all 4 pages at the top of the screen, the
User has to scroll across the top of the page
[red circle].

Example. Diagnoses tab

Final Diagnosis page

The purpose of this component is to confirm the Final Diagnosis/es that have been proposed
based on the patient data entered throughout the consultation.
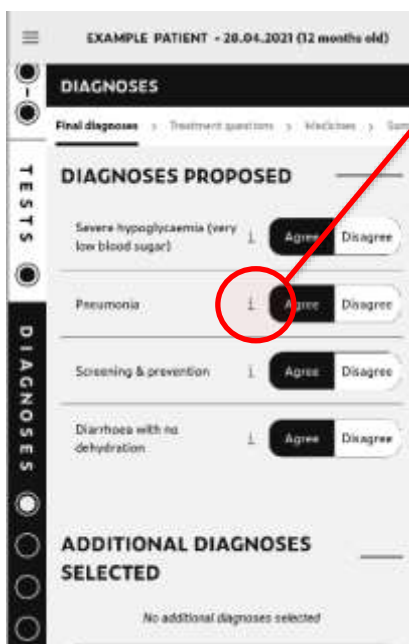
Proposed Diagnoses

The User must agree or disagree with each diagnosis(es).

The treatments for the Diagnosis(es) will then be shown on the
Medicines page.

The diagnosis criteria can be seen by pressing the [i] info button beside each Diagnosis.

Example. Final Diagnosis page

PNEUMONIA

Criteria for diagnosis – ALL OF THE FOLLOWING
– Cough or difficulty breathing
– Chest indrawing or fast breathing* with no signs of severe
pneumonia (danger sign, stridor in a calm child, SpO2 <90%,
severe difficult breathing requiring referral, and no severe acute
malnutrition)
– No wheeze, or wheeze and no improvement after bronchodilator

*Fast breathing:
40 breaths per minute or more in a child 12 months or older
50 breaths per minute or more in a child 2 to 11 months old

Pneumonia is an infection of one or both of the lungs. In children, it
is commonly caused viruses, but sometimes caused by a bacteria.
With the infection, small airways become swollen and produce
more mucus. This can reduce the amount of oxygen that goes to
the body. Pneumonia can appear after an upper respiratory tract
infection. The symptoms include fever, cough and fast/difficult
breathing, sometimes chest pain or abdominal pain.
Bacterial pneumonia is treated with antibiotics. The child may
continue to cough for up to 3 weeks after treatment, this can be
normal if the child is otherwise getting better. "

IMPORTANT:

If the User would like to disagree with a Diagnosis, the User
should ALWAYS confirm that the patient condition truly
does not match the Diagnosis criteria.

This can be done by pressing the Info Button (of this
Diagnosis) and reviewing the diagnosis criteria.

Adding a different Diagnosis (Additional or Manually)

To add a Diagnosis(es), there are 2 methods the User can use:

Example.
Adding additional
Diagnoses
[2 methods]

- Method 1: Select a diagnosis from the **Additional Diagnoses Selected** drop-down list by typing the first letter of the diagnosis you wish to enter.

- Method 2: Manually type in a diagnosis using the **Manually Added Diagnoses** box

  - NOTE: If the User Manually adds a Diagnosis, they will need to determine the Treatment (Medicines) linked to this diagnosis and their duration.

Diagnosis Exclusions

More acute diagnoses will supersede/exclude less acute diagnoses - meaning if a child has two diagnoses (on occasion), the less acute diagnoses may disappear once the more acute diagnosis has been agreed upon. This is because treatment / referral for the more acute conditions should not be delayed by the less acute diagnoses.

> *E.g. If child has two diagnoses (1)* **Severe Malaria** *and (2)* **Non-Severe Headache** → *ONLY Severe Malaria will populate.*
>
> *NOTE: Some of treatment for Severe Malaria (paracetamol) also treats the symptoms of Non-Severe Headache.*

Screening & Prevention diagnosis(es) [*e.g. Immunizations, deworming, Vitamin A]* will always be excluded by severe diagnoses to ensure referral or treatment is not delayed.

Once this page is complete, click *NEXT* to save and proceed to the next required page/tab.

Treatment Questions page

The purpose of this component is to ask conditioning questions to help determine the appropriate Treatment and Management for each Diagnosis.

Examples of conditioning questions could include availability of medicines at the facility, recent treatment, etc.

---

e.g. **Medicine availability**

"*Is amoxicillin available*" – if it is not, another medicine will be proposed instead.

"*IV fluid therapy possible at facility*?" – may be asked to determine feasible/appropriate fluid management or whether oral rehydration should be used instead.

---

e.g. **Recent treatment**

"*Deworming in last 6 months*?" - may be asked to determine whether deworming prophylaxis is needed.

"*Has the child already completed 3 days of malaria treatment?*" – may be asked to determine subsequent appropriate treatment

---

NOTE: Not every diagnosis will generate Treatment Questions; so, if no questions populate on this page, this is not an error.

Once this page is complete, click *NEXT* to save and proceed to the next required page/tab.

Medicines page

There are two purposes of this component:

1 To confirm which Medicines that will be provided as the TREATMENT(S) for the patient's Final Diagnosis(es), and

2 To allow the User to choose an AVAILABLE, APPROPRIATE, AND COST-EFFECTIVE formulation for each confirmed Medicine.

IMPORTANT: The medicine dosages are calculated according to the child's weight or age.

NOTE:
- When a Medicine is accepted this means it will be the ***prescribed medicine*** for that patient, (regardless of whether it is physically administered by the User or just given as a prescription for the caregiver to fill elsewhere).
- When Medicines are unavailable at the facility they can still be accepted by the User, therefore allowing the User to use the guidance outlined in the Summary page to dictate the specifics needed for a prescription. (See **Drug Prescriptions** for additional detail)

There are three headers that can be seen on this page: ***Proposed, Additional and Custom.***

Proposed Medicines
These medicines have been proposed by the algorithm according to the agreed upon Diagnoses.

Example. Medicines page & Agreeing with a Medicine
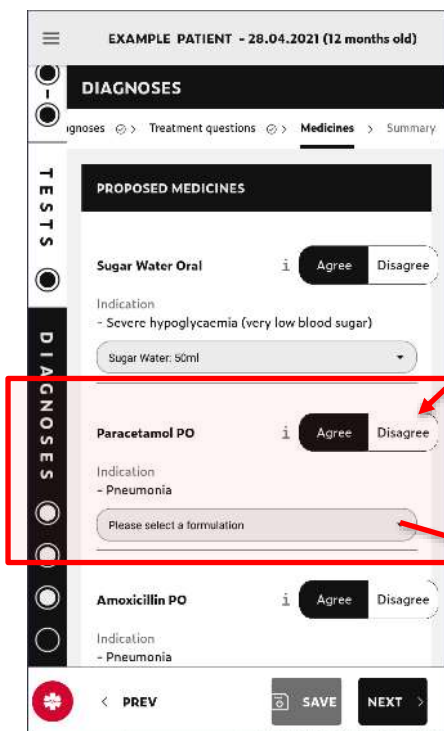
AGREE or DISAGREE

The User must agree or disagree with each proposed medicine.
- <u>If User agrees</u>, the User will then need to select the medicine formulation to be provided or prescribed.

- <u>If User disagrees,</u> the medicine and its prescribed dose/guidance will no longer be seen on the Summary page.
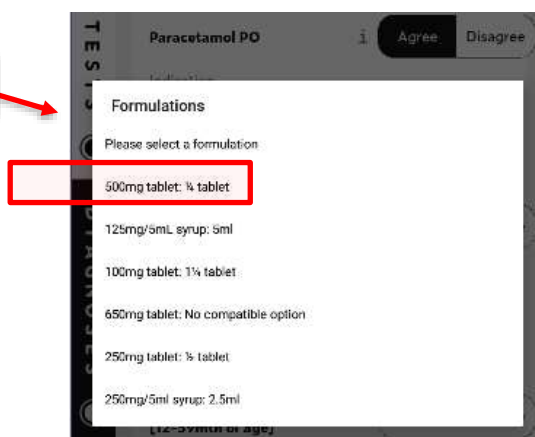
If a formulation option says, '***No compatible option'***, this means this formulation is **NOT SAFE** for this child's weight and a different formulation should be selected.

> NOTE: Tablets should also always be preferred over Syrups (due to cost-effectiveness and formulation stability).

Formulations are selected from a drop-down list. Formulations cannot be added manually, so if a formulation is missing, please Contact your Supervisor to report that it may need to be added.

Parenteral medicines

When selecting IM/IV treatments, ensure you select which ROUTE you want to give as the dilution and administration guidance will often differ between IM vs. IV routes.

Example. Selecting formulation for parenteral Ceftriaxone
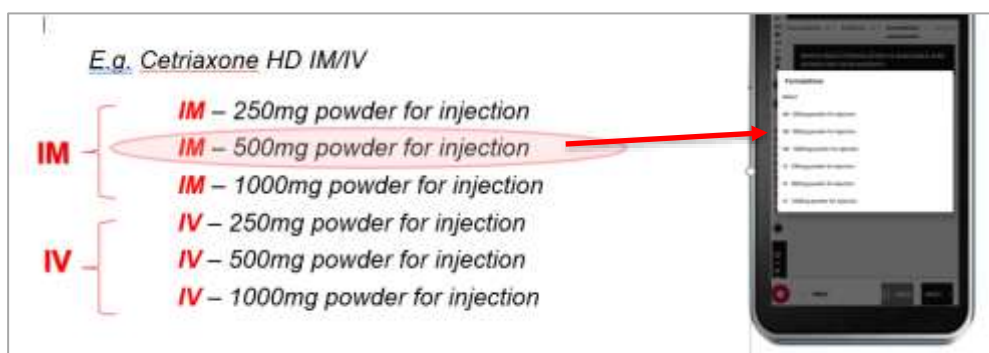
NOTE:

- The CDSA is meant to support safe practice, not replace the clinical judgement of a healthcare worker. If a proposed or available formulation is not guideline-based: Do NOT give this medicine even if it was proposed by the algorithm.

Additional Medicines

Users can add additional medicines from a drop-down list. The User will need to decide what Diagnosis each of these medicines is treating and the duration of treatment.

Example. Adding an additional medicine.
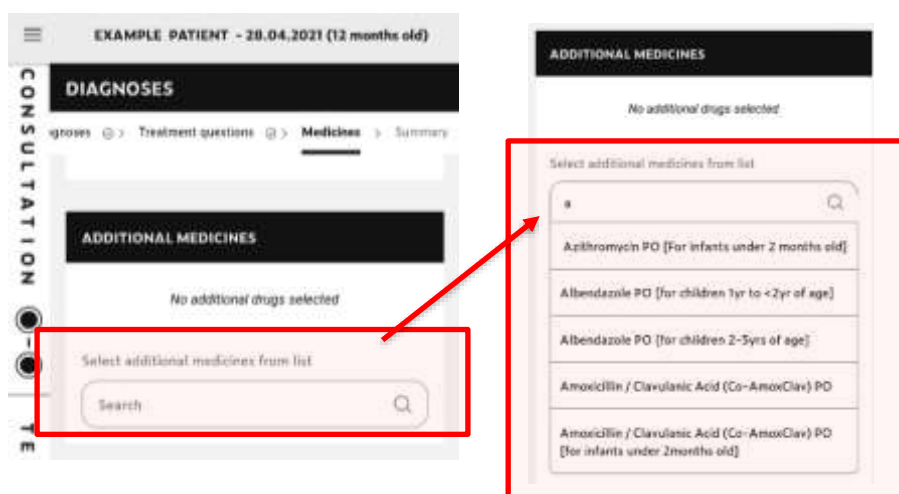
If the User wants to add a medicine, they can click the '***Select additional drugs from list'*** section and type the first letter of the Medicine they wish to select to initiate the Drop-Down list.

IMPORTANT: *If an age or weight is listed beside the Medicine,* it is <u>***VERY IMPORTANT***</u> the User selects the appropriate version (correct Age or Weight category) for that Medicine, or the dosing or dose limits may be inaccurate to the child.

Example. Selecting the appropriate Diazepam for a 11kg child

The User would need to select *'Diazepam (suppository) [for children 10-<14kg]'* to ensure the correct dose was proposed for a 11kg child.

Once the Medicine **A** is selected the following will also need to be selected/entered:

B Diagnosis(s) this Medicine is treating

C Appropriate Formulation for this Medicine

D Duration of treatment with this Medicine
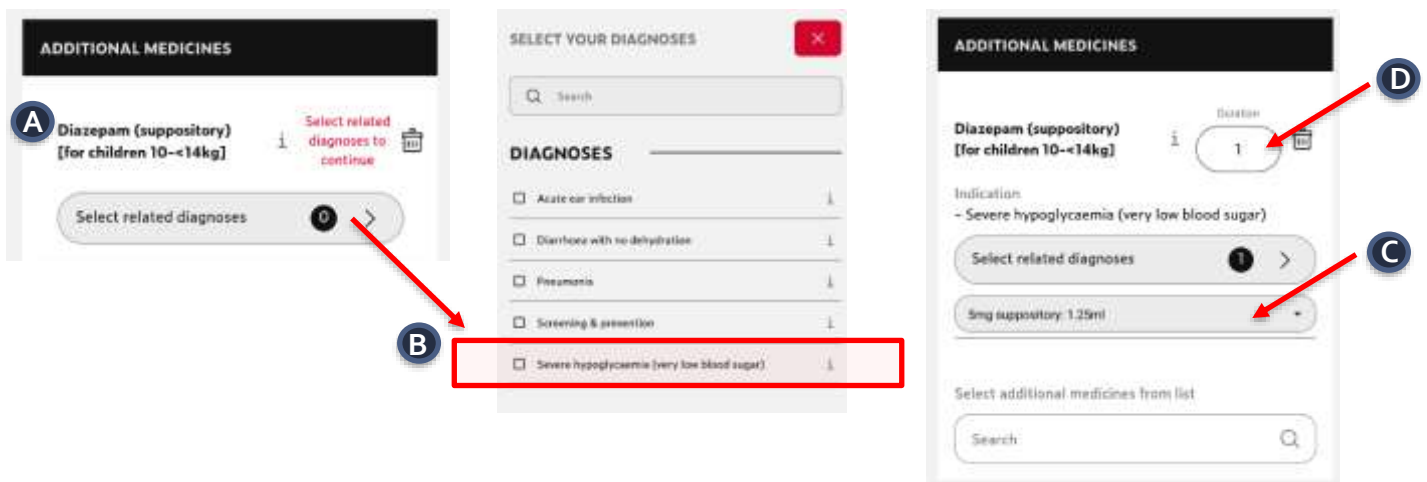
Custom Medicines

Users can also manually enter in a Medicine (if a Medicine has neither been proposed by the algorithm nor is it in the Additional Medicines drop-down list).

The following will also need to be selected/determined for all Custom Medicines:

A Medicine (Name; Route; Dose; Frequency)

B Diagnosis it is treating

C Duration
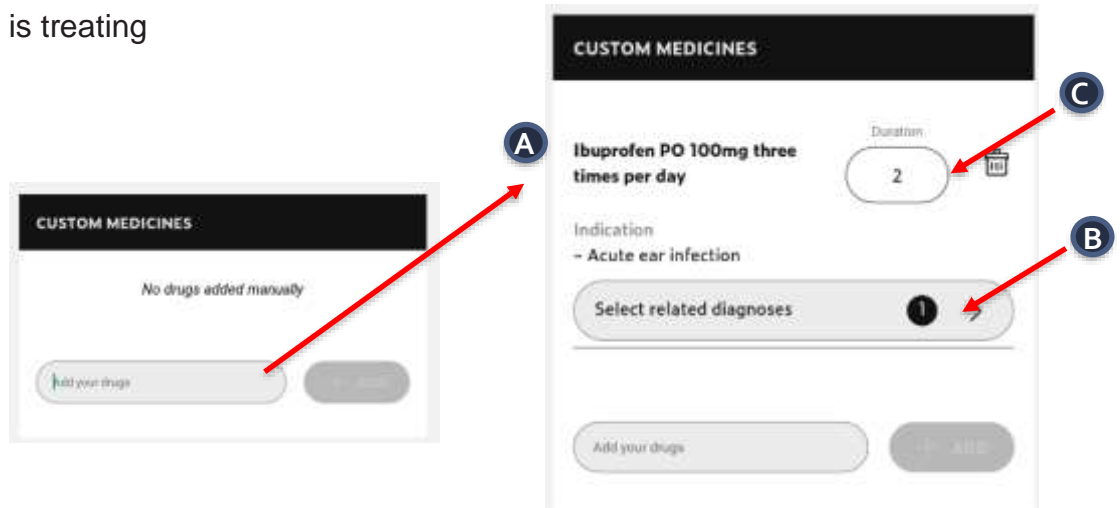
NOTE: It is best practice to include the Route, Dose and Frequency when prescribing.

Missing Medicines from the CDSA

If a Medicine is NOT listed in the drop-down the User has two options:

- **Option 1** – Do NOT give any medicine not listed in the CDSA. It may not be guideline-based or may not be safe for this child's weight/age, *e.g. Chloroquine*

    or

- **Option 2** - Contact your Supervisor to request that the missing Medicine needs to be added to the CDSA, and wait to give till this medicine is added to start administering it in practice - *e.g. Ibuprofen*

Drug Exclusions

Medicines will exclude other Medicines if one treats several proposed diagnoses.

> *E.g. If both Ampicillin (for severe Pneumonia) AND Amoxicillin (for uncomplicated ear infection) are proposed*
> > → *ONLY Ampicillin will populate in the Formulations page (as Ampicillin treats both infections).*

Drug Prescriptions

To be able to see prescription guidance, the User will need to AGREE with the Medicine (even if the medicine is not available at their facility).

Once this page is complete, click NEXT to save and proceed to the next required page/tab.

Summary page

This page provides a summary of the Final Diagnoses, and their respective Treatments (Medicines) and Managements.

NOTE:

- The User will not be able to make changes after this page. Ensure the consultation is accurate and up to date before pressing NEXT.
- Once FINISHED the consultation details can be reviewed by following the process outlined in the ***Reviewing completed Consultations*** section of the manual.

Example. Summary page

Summary includes:

- FINAL DIAGNOSIS: List of Final Diagnosis(es)

- TREATMENTS; List of detailed Medicines for each Diagnosis

- MANAGEMENTS: List of Management & Counselling for each Diagnosis

- COMMENTS

Final Diagnosis

The Final Diagnoses are listed at the top under the header Final Diagnosis. The info button of listed Diagnosis can be pressed to see the diagnosis criteria.

Treatments

The Medicines are all listed under a Treatment header. Each Medicine can be seen in their Collapsed and Expanded view.

- NOTE: All parenteral (IV, IM, SC) Medicines require the use of the Expanded view for clinical safety purposes.

Collapsed view (Treatments)

For each Medicine the following is outlined:

- Medicine Name
- Formulation
- Amount to be given
- Frequency
- Duration

Example. Collapsed view of Medicine

Expanded view (Treatments)

If the arrow to the right of the Medicine is clicked, the following additional information is shown:

- Indication
- Dose calculation
- Dose
- Route
- Administration guidance

Example. Expanded view of Medicine

Parenteral Medicines (SC, IM, IV routes)

All SC/IM/IV Medicines will show as "*Expand to see guidance*" in the collapsed view. This is for safety purposes.

In the expanded view all components will show:

- Medicine Name
- Indication
- Dose calculation
- Dose
- Route
- Formulation
- Frequency
- Duration
- Dilution guidance
- Amount to be given
- Administration guidance

Parenteral dilution guidance (Treatments)
How to dilute IV/IM/SC medicines will be outlined. This guidance should be followed BEFORE withdrawing the proposed amount to be given.

It is critical the guidance is followed for the specific route chosen (e.g. IM vs. IV), as the dilution volume and type of dilutant may differ between all parenteral routes.

Example. Ceftriaxone HD preparation (IM vs. IV) of a 1000mg vial

IV = Dilute with 9.6ml STERILE WATER

Ceftriaxone HD IV/IM
Please expand for instructions

i

Indication: SEVERE PNEUMONIA /VERY SEVERE DISEASE
Dose calculation: Dose range (90.0mg/kg) x weight (10kg) = 900.0mg

Route: IV
Formulation: IV – 1000mg powder for injection
Amount to be given: Give 9ml of 1000mg/10ml powder for injection

Preparation instructions: ***INSTRUCTIONS FOR IV: for IM select the IM formulation***

IV DILUTION: Inject 9.6ml (Sterile Water – NEVER lidocaine) into the 1000mg vial to produce 1000mg/10ml and withdraw proposed dose for administration

IM = Dilute with 3.6ml LIDOCAINE

Ceftriaxone HD IV/IM
Please expand for instructions

i

Indication: SEVERE PNEUMONIA /VERY SEVERE DISEASE
Dose calculation: Dose range (90.0mg/kg) x weight (10kg) = 900.0mg

Route: IM
Formulation: IM – 1000mg powder for injection
Amount to be given: Give 3.6ml of 1000mg/4ml powder for injection

Preparation instructions: ***INSTRUCTIONS FOR IM: for IV select the IV formulation***

IM DILUTION: Inject 3.6ml 1% Lidocaine (or Sterile Water if Lidocaine not available) into the 1000mg vial to produce 1000mg/4ml and withdraw proposed dose for administration.

Dilute WITH LIDOCAINE to reduce injection pain.

Vs.

> **Ceftriaxone example explanation:**
> *Both the type of dilutant (Sterile Water vs Lidocaine) and the volume of dilutant (9.6ml vs. 3.6ml) differ for IV administration vs. IM administration of Ceftriaxone, despite both using the 1000mg vial: powder for injection.*

Parenteral administration guidance (Treatments)
How to administer IM/IV medicines will be outlined

It is critical the administration guidance be followed for each specific route (IM vs. IV), as they will differ between the two routes. For all intravenous medicines, for example, the speed of administration will be included, whereas for intramuscular medicines, the location of injection may be recommended.

Example. Ceftriaxone HD administration (IM vs. IV) using a 1000mg vial

IV = Push over 2 to 5 minutes

Ceftriaxone HD IV/IM
Please expand for instructions

Administration instructions: IV: Administer over 2 to 5 minutes.

IM = Inject in muscle

Ceftriaxone HD IV/IM
Please expand for instructions

Administration instructions: IM: Administer via deep intragluteal injection. Do not administer more than 1 g at a single site.

Vs.

Managements & Counselling

The [i] button MUST be pressed to provide details on each recommended Management item.
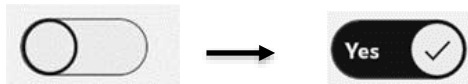
Example. Conjunctivitis management guidance
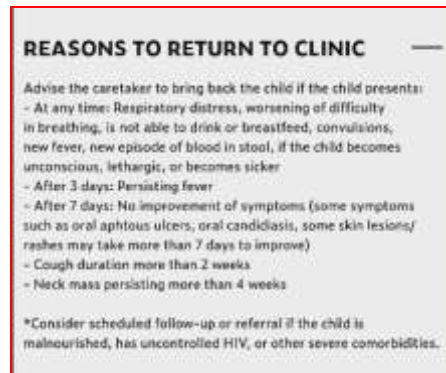
Comments

There is a section to write free-text COMMENTS
at the end of the consultation.

- Optional (can leave blank)
- The button beside Comments needs to be clicked
  to YES for the text box to appear.

Example. Comments

- Can be used to document place of referral,
  recent treatment or previous treatment, etc.
- The information entered in free text will NOT
  be used to determine diagnosis / treatment. Be aware
  it is for the healthcare provider's awareness only.

Once this page is complete, click NEXT to **SAVE & FINISH** the Consultation

NAVIGATION & IT ESSENTIALS

Accessing Home Screen

You can return to/ access the Home Screen at any time during a consultation.

➢ Click the [≡] icon in the left-hand corner.

➢ Followed by the [⌂ HOME] icon in the left-hand corner.

The Home Screen allows you to:
- Access previous consultations
- Access the Settings
- Exit your existing consultation to start a new one (*e.g. If current consultation is headed to the laboratory and will return*)
- Etc.

Saving New Data

When you enter new patient data, it will be *Saved* when you click on the next tab.

Saving & Exiting a Consultation

If exiting an ongoing consultation, click the *HOME* button, and choose whether to "*EXIT & SAVE*" or "*EXIT, DON'T SAVE*". **NOTE**: It is recommended to always *EXIT & SAVE* to avoid having to restart a patient consultation.

**Example.** How to EXIT & SAVE a consultation

Alternatively, long-holding the [SAVE] button will auto-save the consultation and bring the User to the HOME screen

Searching for a Patient

You can search for previously registered patients by going on the home screen and clicking on *Patient List* or *Consultations.* You then type the patient's name in the top search bar, and once you have located the patient's name, click on it to bring up their patient profile.

Example. How to search for a patient
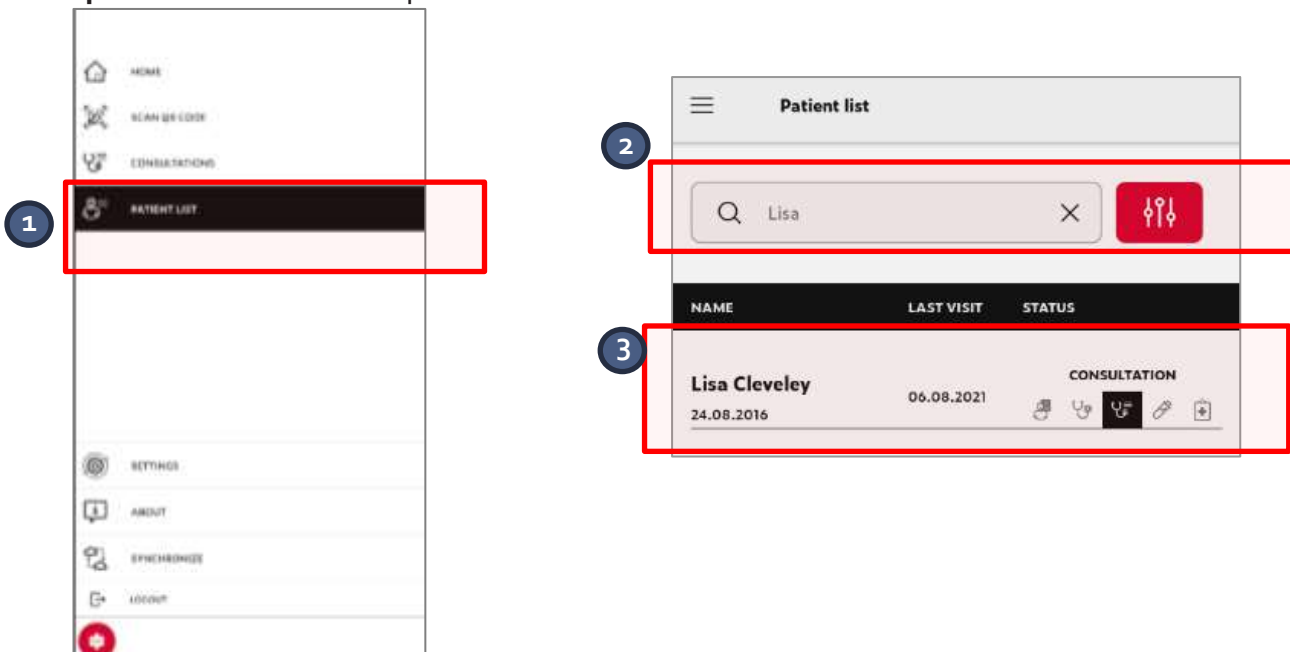
NOTE: This will only work for patients that have previously been registered by you at your facility.

Reviewing completed Consultations

You can review completed consultations by clicking on the *Patient List* or *Consultations* button in the home screen, then clicking the patient's name. **NOTE**: Users can only access past consultations that they themselves entered as the provider.

The patient's *Personal Information* should be reviewed to verify/confirm their identity through the use of at least 2 unique identifiers (e.g. Name, DOB, etc.).

Example.
Demographics visible at the top of a completed consultation

The details of the completed consultation will be viewable in two formats:
- Final Diagnosis tab – includes all Summary Page information
- Questions tab – includes all completed consultation questions & responses

Example. How to search & review both the Final Diagnosis and Questions tabs in a complete consultation


Navigating Forward & Backward

You can navigate **backward to past Tabs** by using the *PREV.* icon in left-hand corner at the bottom of each Tab. You can then also navigate **forward** again by pressing the *NEXT* button in right-hand bottom corner of each Tab.

Example. How to navigate forwards & backwards in the CDSA.

Navigate *backward* by using:
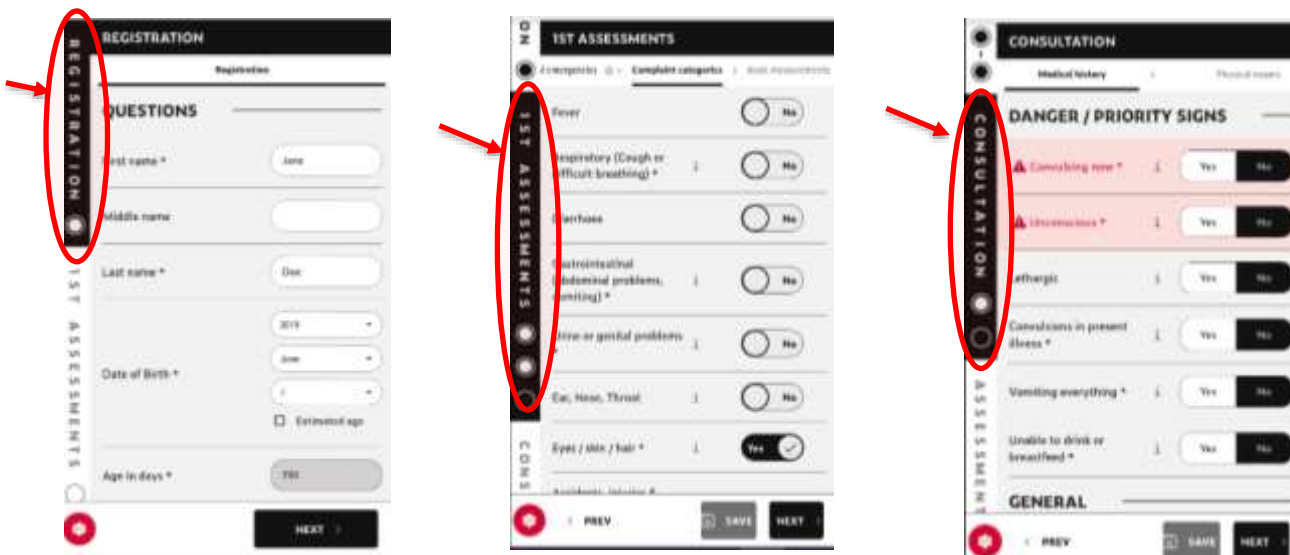
- **Labels**
- **Page Dots**
- ‹ PREV

LABELS

DOTS

PREVIOUS
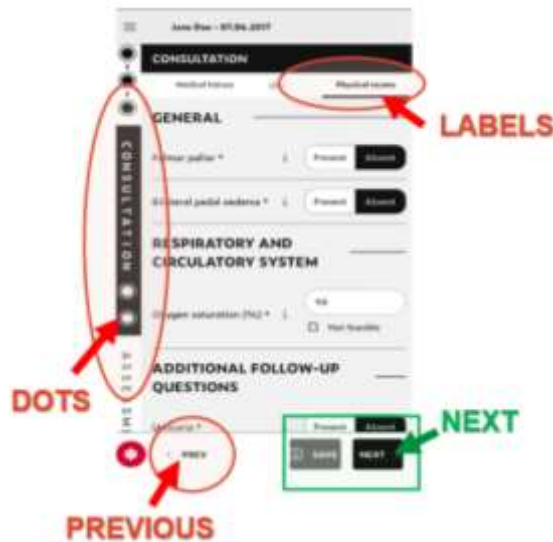
Navigate *forward* by using:

- NEXT ›

NEXT

Navigating between Tabs

There are 5 key Tabs: *Registration, 1ˢᵗ Assessment, Consultation, Tests, and Diagnoses.* To identify which Tab you are in, you can look at the left-hand side [red circles].

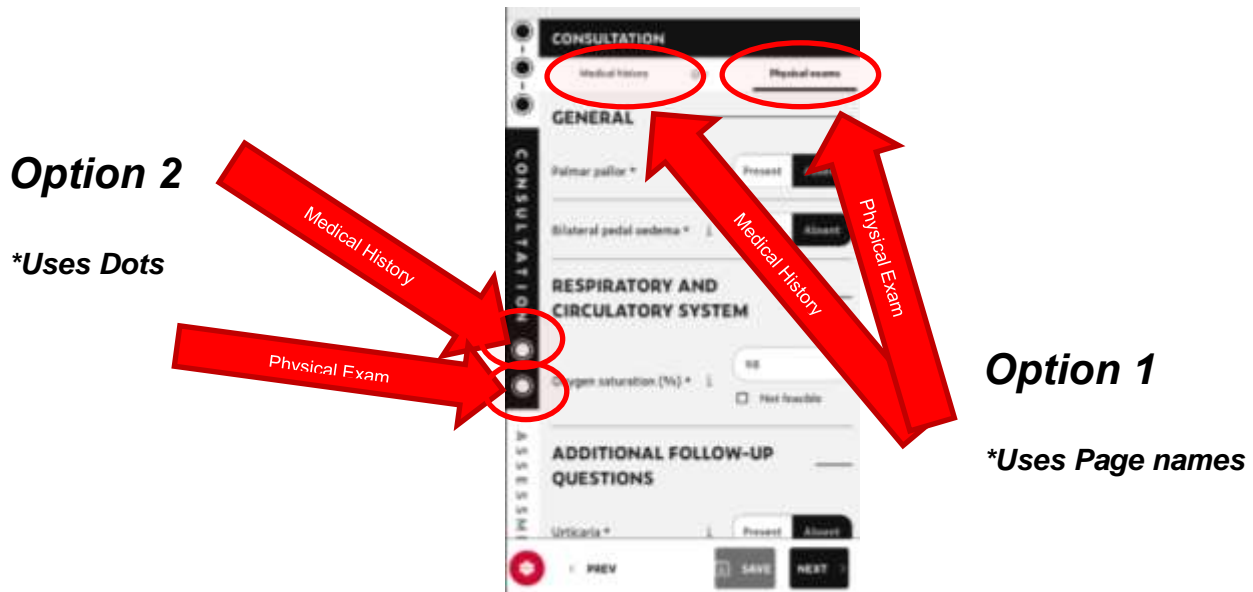**Example.** Registration, 1st Assessment, Consultation tabs

Navigating within a Tab (Pages)

You can also navigate **between Pages (within a Tab)** by either using the icons at the top of page [in each Tab] (*Option 1*) or by using the dots listed on the left-hand side (*Option 2*).
  ➢ See the picture of same on the next page.

NOTE: To go forward again to subsequent Tabs and Pages you need to press the *NEXT* button at the bottom of each page.

Example. Navigating within a Tab

Option 2

*Uses Dots

Medical History

Physical Exam

Medical History

Physical Exam

Option 1

**Uses Page names*

Emergency Button

If a child presents with a potentially life-threatening emergency, you can IMMEDIATELY access guidance on the necessary assessment / management of this emergency condition.

This guidance can be accessed from ANY screen, ANY time, for ANY patient within the App.

This includes in the middle of a current consultation, for a completely different child (if needed), or for another Healthcare Worker to use (if needed).

➢ Click the 🔴 button at the bottom left-hand corner of any page to access Emergency Guidance

Example. How to access the Life-Threatening Emergency button
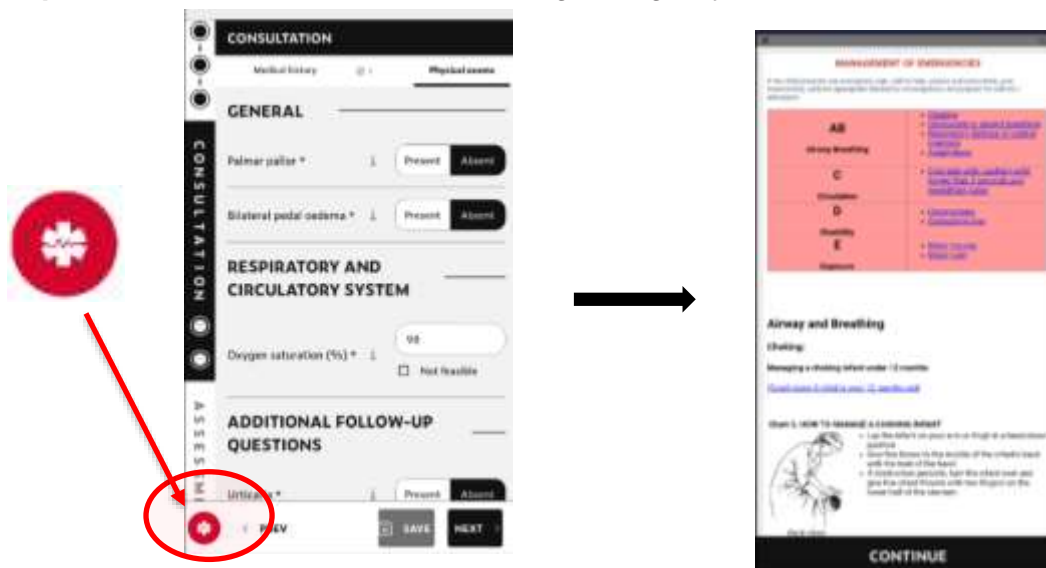
Note: This **Life-Threatening Emergency** button is to provide guidance ONLY.

This button:
- Does NOT save to the child's patient profile
- Does NOT impact the medAL-*reader* algorithm to provide diagnoses

You can navigate to the necessary guidance by either clicking on the exact Emergency you want to access *(e.g. Choking)* [**Option 1**], or by scrolling down manually down [Option 2].

Example. Navigating direct to Choking guidance
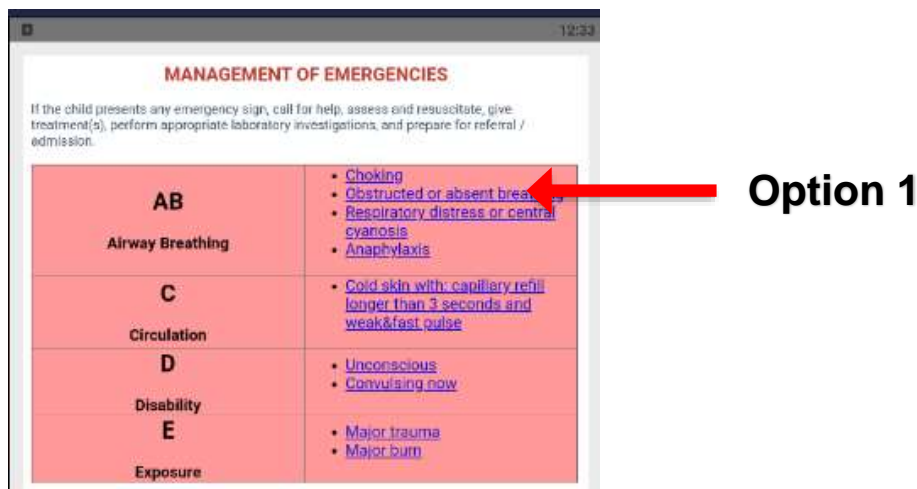
Data synchronization

Internet connectivity is essential to synchronize the data.

To ensure **SYNCRONIZATION occurs**: Go the medAL-*reader's* home screen, scroll down, hit the "*Synchronize*" button and follow the instructions.

The user should confirm there are ZERO cases requiring synchronization each day.

Updating application version

To ensure the most up to date version of the software is installed on your device, you will need to follow the next 9 steps on an X basis.
:

1) Go to the Play Store

2) Go to the medAL-reader app

3) Click on the three vertical points at the top right

4) Enable auto-update
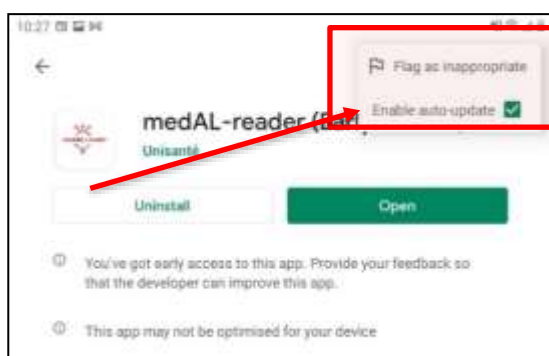
5) Go back to the main page
of the Play Store

6) Click on your account at the top right

7) Go to Settings

8) Go to Network preferences

9) Set App download preference and Auto-update apps to Over any network

Error/ Values Out of Range

If an inappropriate or out of range value is entered, the application will prompt you to confirm the value, or recollect the value to ensure it was correctly assessed.

Example. Recollection message for an elevated Respiration Rate
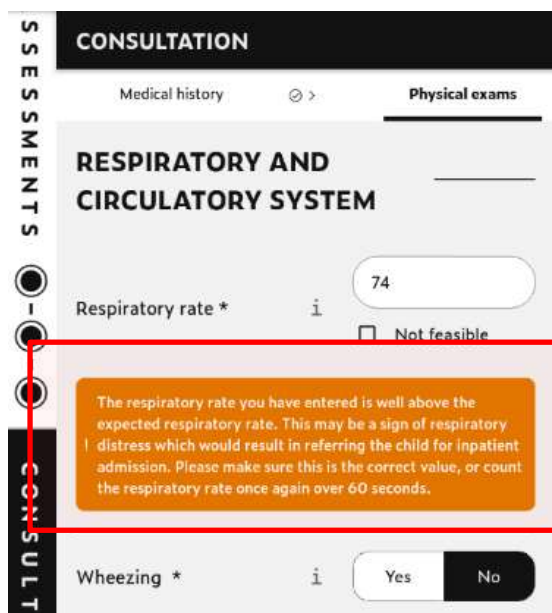
Example.
This Respiration Rate (74 breaths/min) is an elevated rate for a 4-year-old child (DOB: 24 August 2016).

A second measurement has therefore been prompted to ensure the first measurement was accurately entered.

Info Button Use

The $\boxed{i}$ button can be pressed for very useful details on clinical components within the CDSA.

Example. Info button for 'SKIN PINCH'""

Appendix 1: medAL-*reader* Troubleshooting Guide

medAL-*reader* does not launch
- Try to empty the cache (Android settings → Applications → medAL-*reader* → empty cache) and restart
- If that did not work, try emptying the storage and reinstalling the application (long-press on the app → Press "Uninstall" → Navigate in Google Play Store → Search and install medAL-*reader*)

medAL-*reader* loading but not starting
- Try to restart the application (Go to Android's home screen → press the "currently running apps" (physical) button → close all apps → restart medAL-*reader*)
- If that did not work, please try all the steps above (medAL-*reader* does not launch)

medAL-*reader* does not appear in the app list
- Ensure that the app is correctly installed by going in the Google Play Store → Search for "medAL-r*eader*" → Click on it → If "uninstall / Open" is displayed, then simply click on open. If it says "Install" press on it to install it.

medAL-*reader* Crashes when I try to do X
- Apply all steps from "medAL-*reader* does not launch"
- If that still does not work, please take a screenshot and explain all the details to reproduce the crash to your local IT coordinator so the problem can be reported to the IT team

I want to input a value that medAL-*reader* doesn't accept
- Check your value twice and make sure it is correct
- If it still doesn't seem incorrect, please contact your local IT coordinator and give them all the details so they can check with the IT team if this is an issue

I cannot find my name in medAL-*reader*
- It may be a cache issue, please try to apply all the steps from "medAL-*reader* does not launch"
- If that doesn't work, please contact your local IT coordinator so they can check if your username is correctly created in the Health Facility settings of medAL-*creator*.

I Forgot the PIN
- If you forgot the PIN needed at every launch of the application, please contact your local IT coordinator, they will give it to you

The Emergency content icon does not appear
- Kill the app (hit the "recent apps" physical key and swipe medAL-*reader* upwards) and reopen the app