
D-TREE
INTERNATIONAL

D-tree International

- NGO, founded by Marc Mitchell, Lecturer in Harvard School of Public Health
- Headquarters in Boston, USA
- Registered as NGO in Tanzania, with Tanzanian Offices in Mikocheni, Dar es Salaam, Tanzania
- Projects also in Malawi and India

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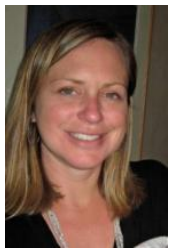
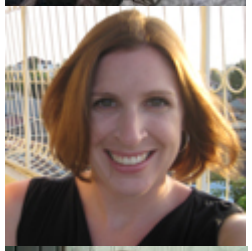
D-tree Team





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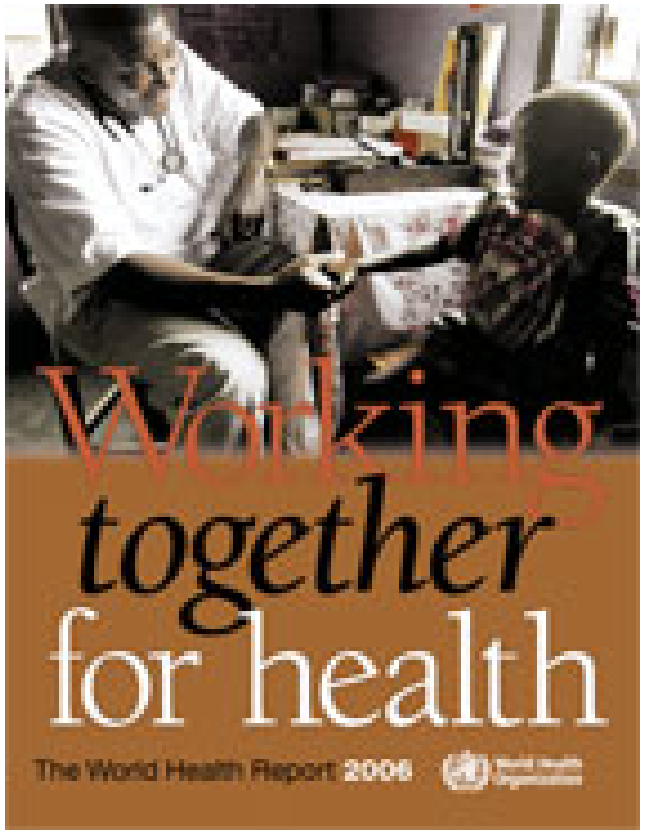
The Problem



"[There is] an estimated shortage of almost 4.3 million doctors, midwives, nurses and support workers worldwide. The shortage is most severe in the poorest countries, especially in sub-Saharan Africa, where health workers are most needed. "

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D-tree Proposition

- Standards of care can nevertheless be guaranteed if health workers follow **clinical guidelines**

- Adherence to clinical guidelines can be achieved by implementing the logic of the guidelines in **interactive applications**, and making them available to health workers on mobile devices

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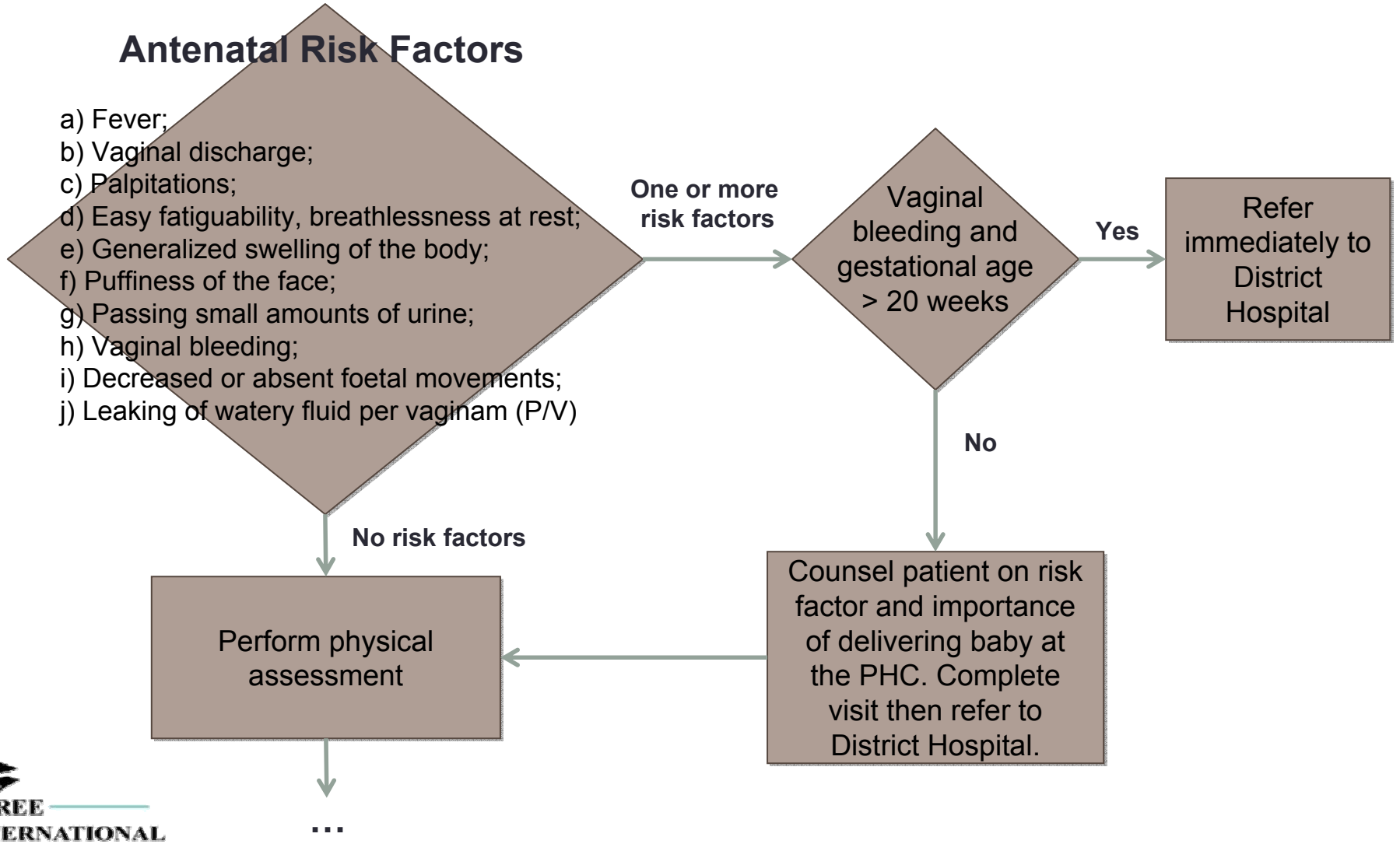
Example: Community Health Worker visits pregnant woman



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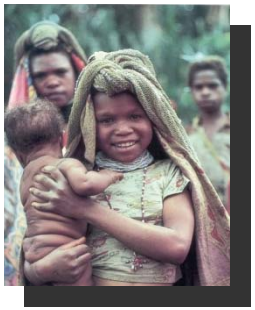
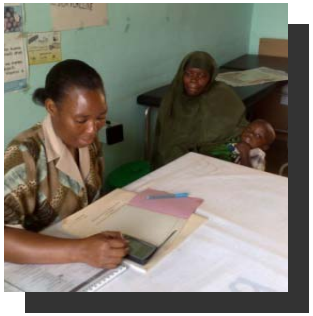
Technology can be used to support front line workers throughout the health system

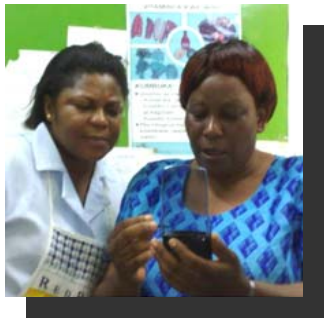


client
(basic phone)
information
alerts
reminders

CHW
(java phone)
pt. registration
pt. record
protocols
scheduling
training
alerts
reminders
msg to clinic



clinic
(smart phone)
pt. registration
pt record
protocols
scheduling
training
alerts
reminders
telemedicine



supervisor
(phone or netbook)
messaging
exception rules
for supervision
surveillance
learning
notifications
alerts

manager
(laptop)
exception rules
for supervision
surveillance
learning
data queries

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Applications

- Community
  - Maternal and Child Health (Ante-natal, Post-natal, Neo-natal)
  - TB screening
  - Home based care
  - Orphans and Vulnerable Children
  - Family Planning
- Facility
  - Childhood Malnutrition
  - IMCI
  - Maternal and Child Health (Ante-natal, Post-natal, Neo-natal)
  - Active Management of Third stage of labor
  - Immediate Newborn Assessment

IMCI -> e-IMCI

Integrated Management of Childhood Illnesses

A set of clinical protocols to diagnose and treat children 0-5 years for

- Pneumonia
- Malaria
- HIV/AIDS
- Diarrheal Disease
- Malnutrition
- Ear infections

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e-IMCI Improves Adherence

	Paper	e-IMCI
Study 1:	**(n=299)**	**(n=359)**
ask about all 5 symptoms	**61%**	**84.7%**
Study 2: (preliminary)	(n=471)	(n=460)
complete assessment: cough	55%	91%
Breast Feeding?	80%	93%
Feeding change?	45%	81%

DeRenzi, B., Lesh, N., Parikh, T.S., Sims, C., Mitchell, M., Maokola, W., Chemba, M., Hamisi, Y., Schellenberg, D., and Borriello, G. e- IMCI: Improving Pediatric Health Care in Low-Income Countries. ACM Conference on Computer-Human Interaction (CHI), April 5-10, 2008, Florence, Italy.

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Improved IMCI

- Swiss TPH developed updated algorithm
- D-tree coded algorithm in application
- Harvard and Swiss TPH performing research studies

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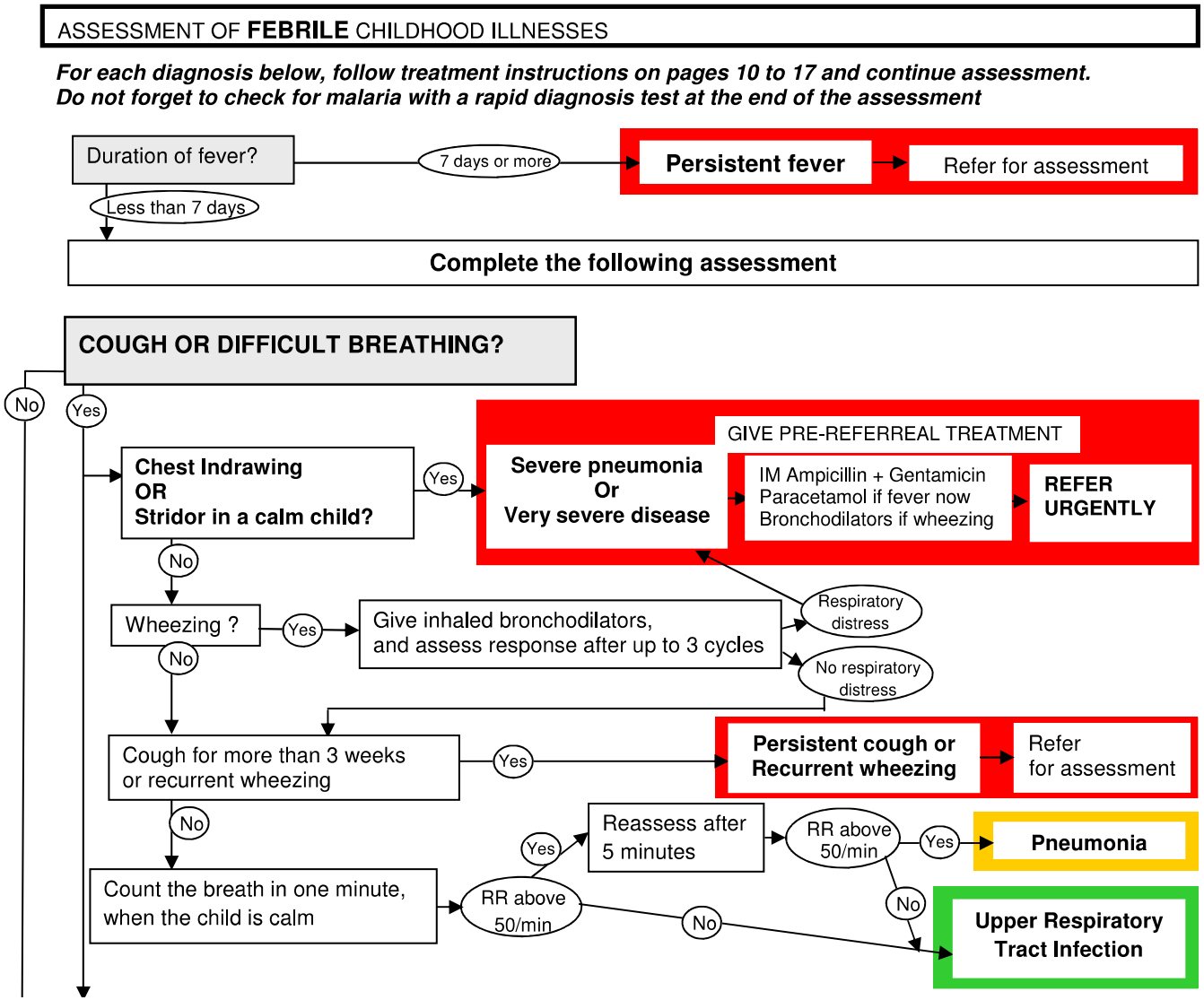
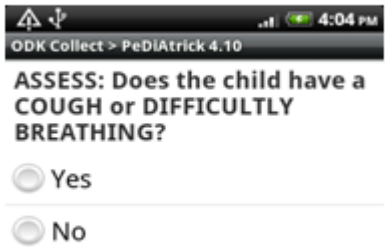
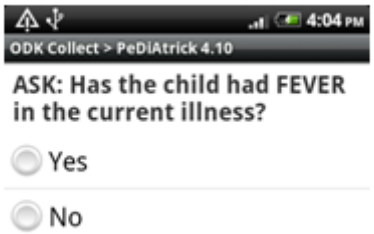
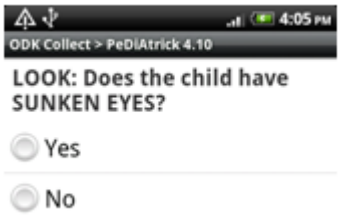
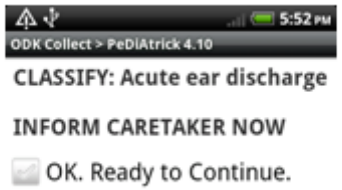
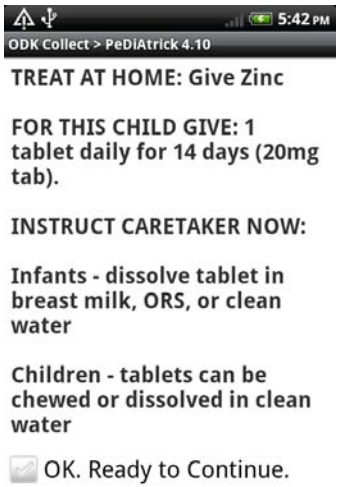

ASSESSMENT OF FEBRILE CHILDHOOD ILLNESSES
For each diagnosis below, follow treatment instructions on pages 10 to 17 and continue assessment.
Do not forget to check for malaria with a rapid diagnosis test at the end of the assessment
Duration of fever?
7 days or more
Persistent fever
Refer for assessment
Less than 7 days
Complete the following assessment
COUGH OR DIFFICULT BREATHING?
No
Yes
Chest Indrawing
OR
Stridor in a calm child?
Yes
GIVE PRE-REFERREAL TREATMENT
Severe pneumonia
Or
Very severe disease
IM Ampicillin + Gentamicin
Paracetamol if fever now
Bronchodilators if wheezing
REFER URGENTLY
No
Wheezing ?
Yes
Give inhaled bronchodilators,
and assess response after up to 3 cycles
Respiratory distress
No respiratory distress
No
Cough for more than 3 weeks
or recurrent wheezing
Yes
Persistent cough or
Recurrent wheezing
Refer
for assessment
No
Reassess after
5 minutes
RR above
50/min
Yes
Pneumonia
Yes
Count the breath in one minute,
when the child is calm
RR above
50/min
No
No
Upper Respiratory
Tract Infection











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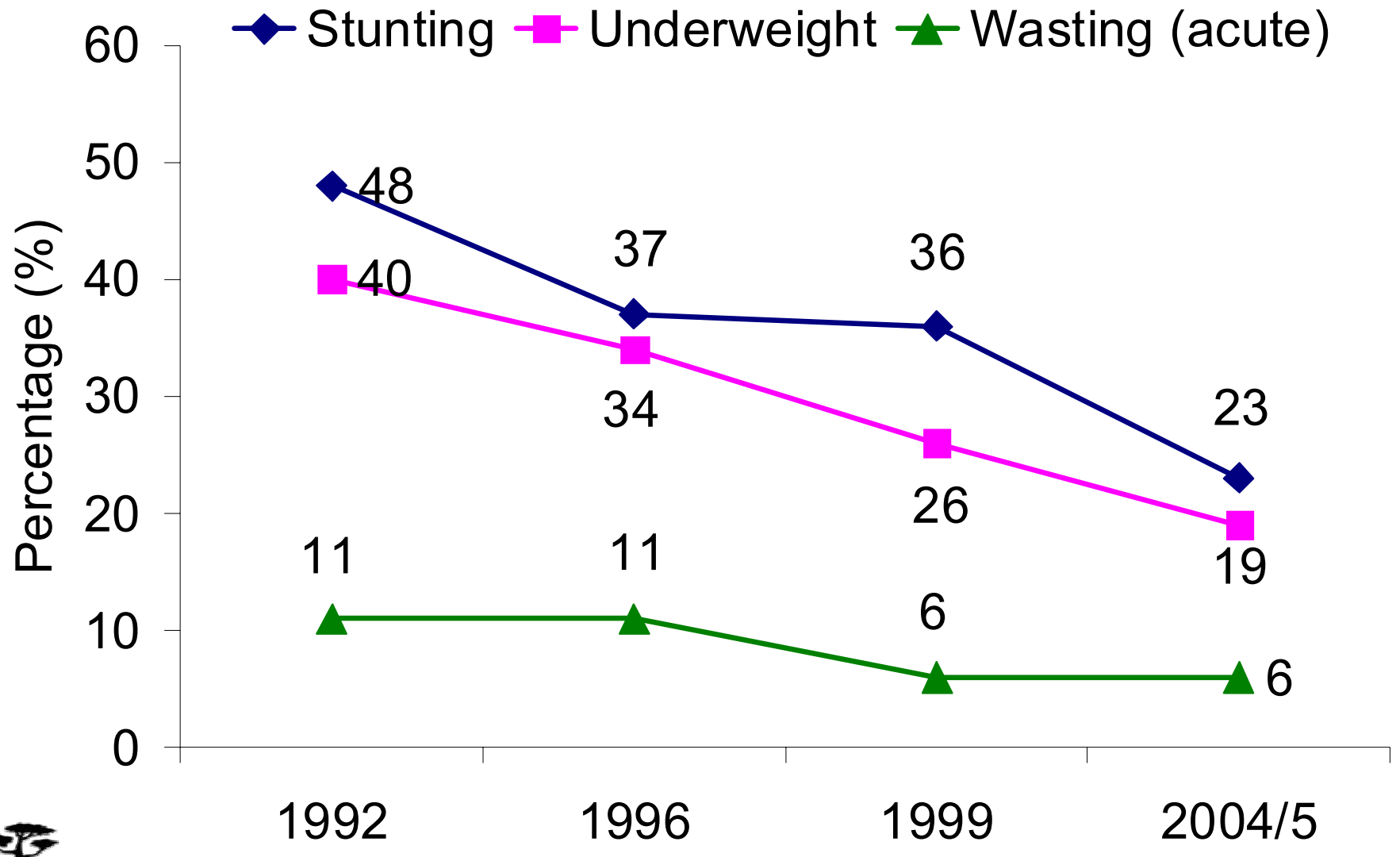
Malnutrition: Zanzibar

- Malnutrition is an important public health problem in Zanzibar, especially for children under five years.
- Malnutrition is responsible for one third of deaths in children under five years
- Severe acute malnutrition (SAM) is the deadliest form of malnutrition.
- Up to 50% of children with SAM will die if they do not receive correct treatment

Malnutrition in children <5 yr in Zanzibar



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Malnutrition in Zanzibar

- Prevalence of malnutrition Zanzibar has sharply declined in last decade
- However, prevalence of acute malnutrition (wasting) is double that on the mainland (6.1 % vs 3%)
- 5.4% children in Zanzibar have moderate acute malnutrition (MAM). This is about **8,345 children**
- 0.7% children in Zanzibar have severe acute malnutrition (SAM). This is about **1,080 children**

Problems with past approaches to treating malnutrition

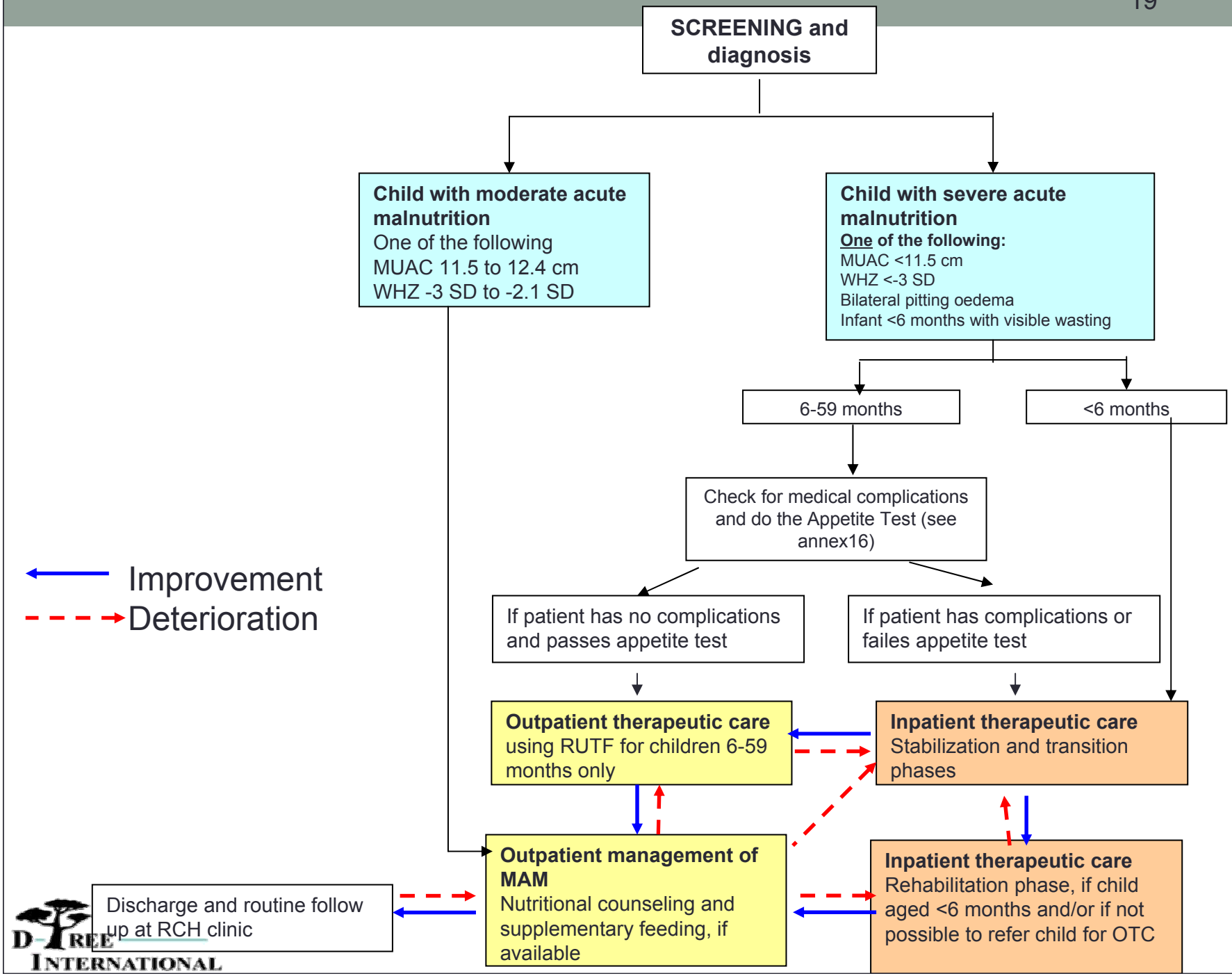
In past, SAM has been managed at health facilities through inpatient therapeutic care.

Problems have included:

- **Few children with SAM are identified** because screening at community/facility level has been rare or absent
- Many families are **unable to go with their children** to hospital for several weeks to complete treatment
  - No money
  - Have to earn money
  - Have to look after other children.
- Hospitals and PHCCs **not able to cope** with large numbers of inpatients

Problems with past approaches (Cont')

- High risk of **cross-infection** during inpatient treatment because children are mixed with other sick children and adults during their stay in hospital.
- Many children **discharged early** because caretakers want to go home as soon as they see their child beginning to get better
- **Relapses are common** because there is no continuation of care in the community.



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Diagnosis methods

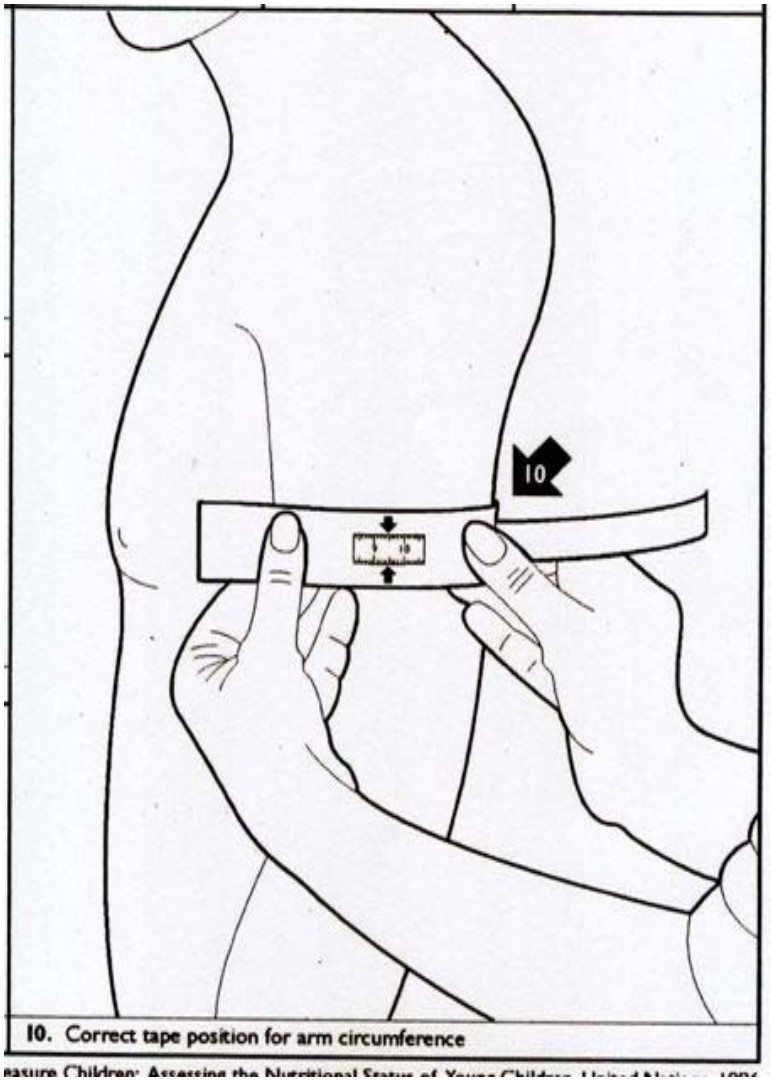
Children aged 6-59 months are screened using:

- **Mid-upper arm circumference (MUAC)**
- **Weight-for-height z-score (WHZ) (optional)**
- **Bilateral pitting oedema.**
- **Medical history and examination to check for medical complications**

Children aged <6 months are screened using

- **Bilateral pitting oedema**
- **Visible signs of acute wasting.**
- MUAC should not be used for children <6 months

Mid-upper arm circumference



10. Correct tape position for arm circumference

- The child's arm should then be relaxed, falling along the body.
- Place the MUAC tape around the mid-point of the arm so that it is flat around the skin not too tight or too loose.
- Take the measurement.

Colour	Range	Status
	≥12.5 cm	Normal
	11.5 - 12.4 cm	MAM
	<11.5 cm	SAM

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Ready to Use Therapeutic Food

- Nutriset France produces 'PlumpyNut®' and has national production franchises in Niger, Ethiopia, and Zambia
- Another producers of RUTF is Valid Nutrition in Malawi, Zambia and Kenya. In Tanzania, "Power Food"
- Ingredients for lipid-based RUTF: Energy and nutrient dense: 500 kcal/92g
  - Peanuts (ground into a paste)
  - Vegetable oil
  - Powdered sugar
  - Powdered milk
  - Vitamin and mineral mix (special formula)

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Dietary Treatment

- Children receive a weekly ration of RUTF that provides 200 kcal/kg/day.
- RUTF contains all of the energy and nutrients to meet the nutritional needs of the child and does not require any cooking or preparation.
- It has a similar nutritional content to F100 but greater energy and nutrient density.

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Quantity of RUTF:

- Using the RUTF table in Annex 6 determine the amount of RUTF required for the child's current weight, taking into account the number of weeks before the next distribution.
- Give the required RUTF ration to the caretaker
- Record amount of RUTF given on the OTC Card

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Medical Treatment

- Routine medicines are given to all new enrollments to the OTC (see Table 4).
- The protocol has been adapted so that where possible medicines are given as a single dose treatment so that the health worker can observe their administration to avoid problems with compliance.
- The one exemption is the antibiotic: the first dose should be given in front of the health worker who explains to the parent/caretaker how to continue treatment at home.
- Additional medicines may be prescribed to treat other medical problems.

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Medical Treatment cont…

- Children who have been referred from ITC or another outpatient care site are not given routine medicines that have already been administered to them, but will continue their treatment that was started earlier.

- Check the child's RCH Card 1 (or exercise book used to record treatment) for details of the medications that have already been given, and where applicable, continue with the remaining schedule of medications and supplements according to this protocol.

Vitamin A

- Give a single dose on enrollment (100,000 IU for children 6-11 months and 200,000 IU for children 12-59 months)
- Do not give vitamin A if child received in the last month
- For children who had oedema and were initially treated in ITC, give a single dose of vitamin A on discharge from OTC.
- Refer any child with signs of vitamin A deficiency to inpatient care, as the condition of their eyes can deteriorate very rapidly. Give a single dose to the child before referral, and record on the RCH Card 1 or exercise book.

Antibiotics

- Give oral amoxicillin 25mg/kg/12 hourly for a period of 7 days to be taken at home

- The first dose should be taken during the enrollment under supervision of the health care provider and an explanation is given to the caretaker on how to complete the treatment at home.

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Malaria Treatment

- Screen all children for malaria
- Treat malaria according to the Zanzibar malaria treatment guidelines.
- Caretakers/mothers of children with SAM should be advised to obtain an insecticide impregnated bed nets to prevent malaria

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De-worming Treatment

- Give a single dose of mebendazole or albendazole at the 2nd visit, i.e., after 7 days (1 week). Do not give to children less than 1 year old
- For mebendazole give 500 mg for children aged 12-59 months
- For albendazole give 200 mg for children aged 12-23 months or 400 mg for children aged 24-59 months

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Measles Vaccination, Iron and Folic acid

Measles Vaccination

- First check measles vaccination status from RCH Card 1.

- Children aged 6-59 months who have no record of measles vaccination are given a measles vaccination on week 4 of treatment

Iron and folic acid

- Do not give iron and folic acid routinely. There is adequate iron and folic acid in RUTF to treat mild anaemia and folate deficiency in a severely malnourished child.

- Children with severe anaemia should be referred to ITC.

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Nutrition, health, and hygiene education

- When a child is first enrolled in the programme, it is essential to ensure that information about how to give RUTF, how to take the antibiotic at home and basic hygiene are clearly understood.

- No other health education messages should be given on the first visit to avoid overloading the caretaker with new information.

- It is also important to encourage caretaker to return to the clinic at any time between OTC visits if their child's condition deteriorates.

- Key messages to be given to caretakers at the OTC are given in Annex 21.

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Nutrition, health, and hygiene education cont..

- Additional health, nutrition and hygiene messages can be provided during follow-up visits to the OTC site each week.
- Health workers should conduct group health/nutrition education with all patients attending weekly follow-up visits.
- The messages should include breastfeeding and complementary feeding, nutritional care of sick children and basic hygiene.

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Follow-up visits

- The patients should attend the OTC every week (or fortnightly, if there are reasons why weekly attendance is not possible) to have a medical check-up and to receive their weekly supply of RUTF.

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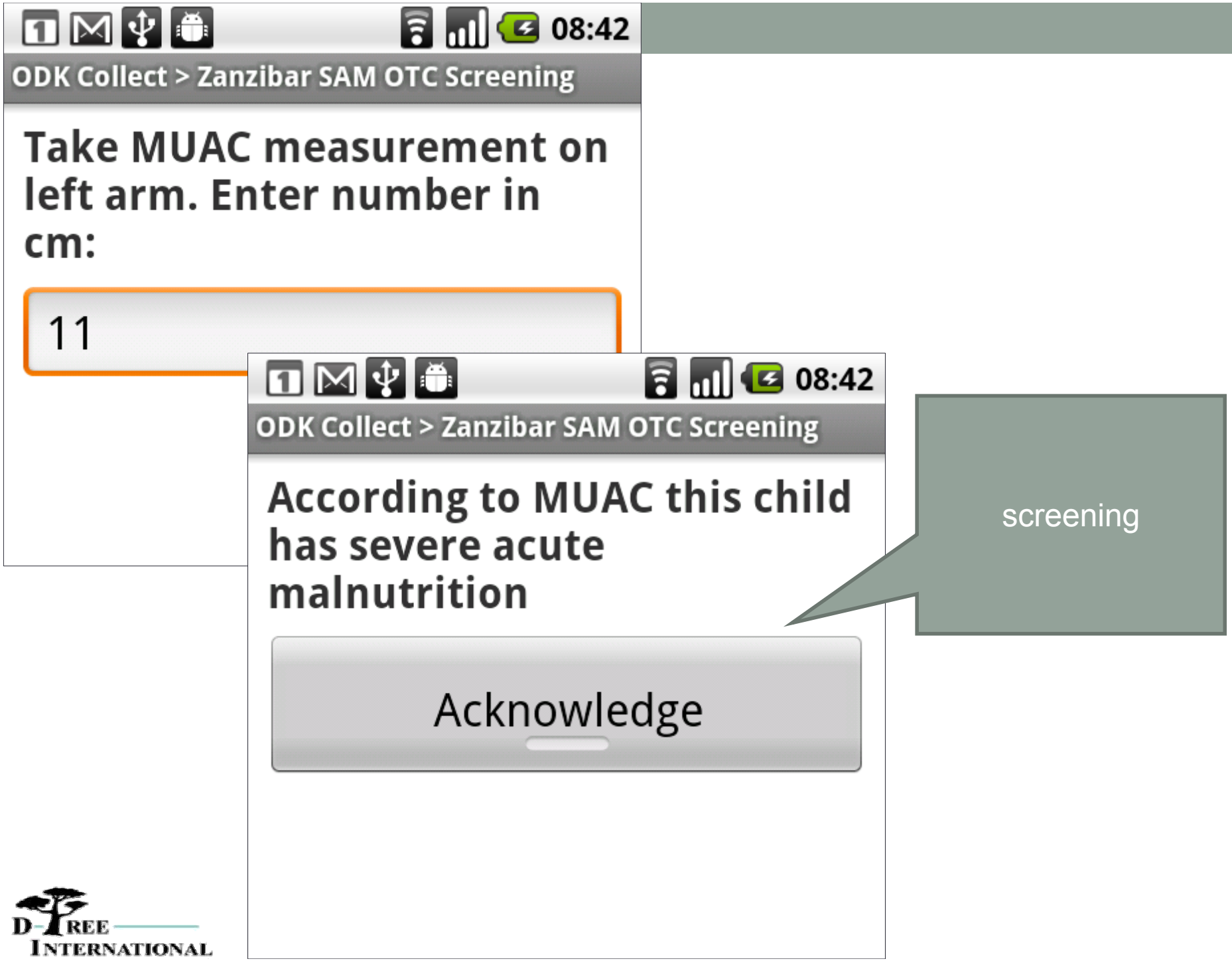

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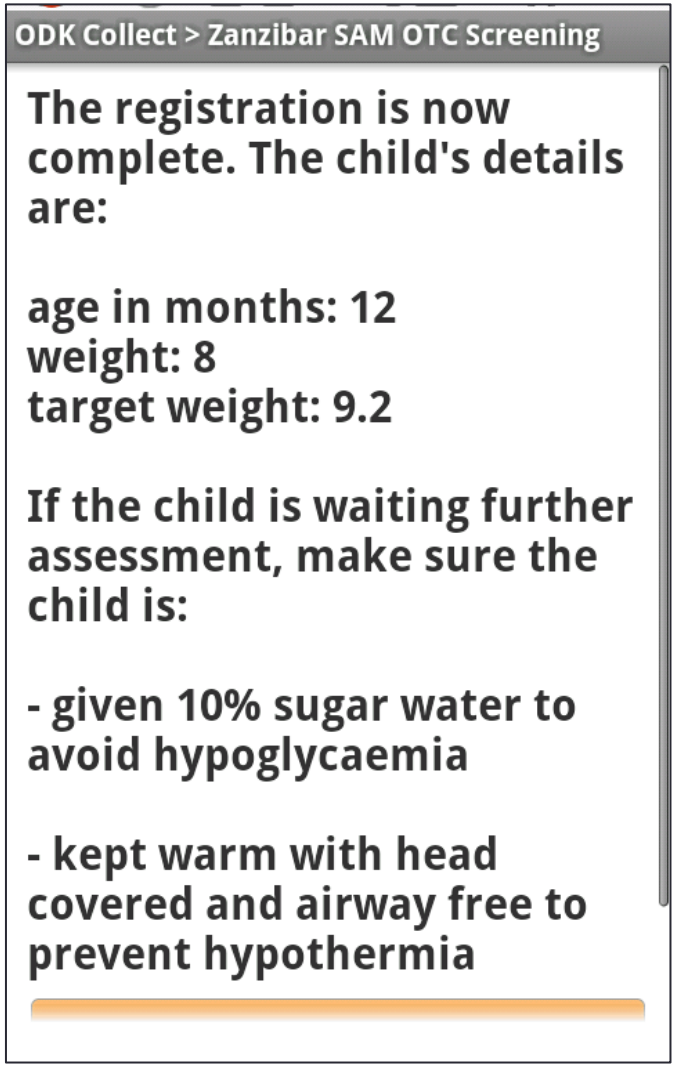

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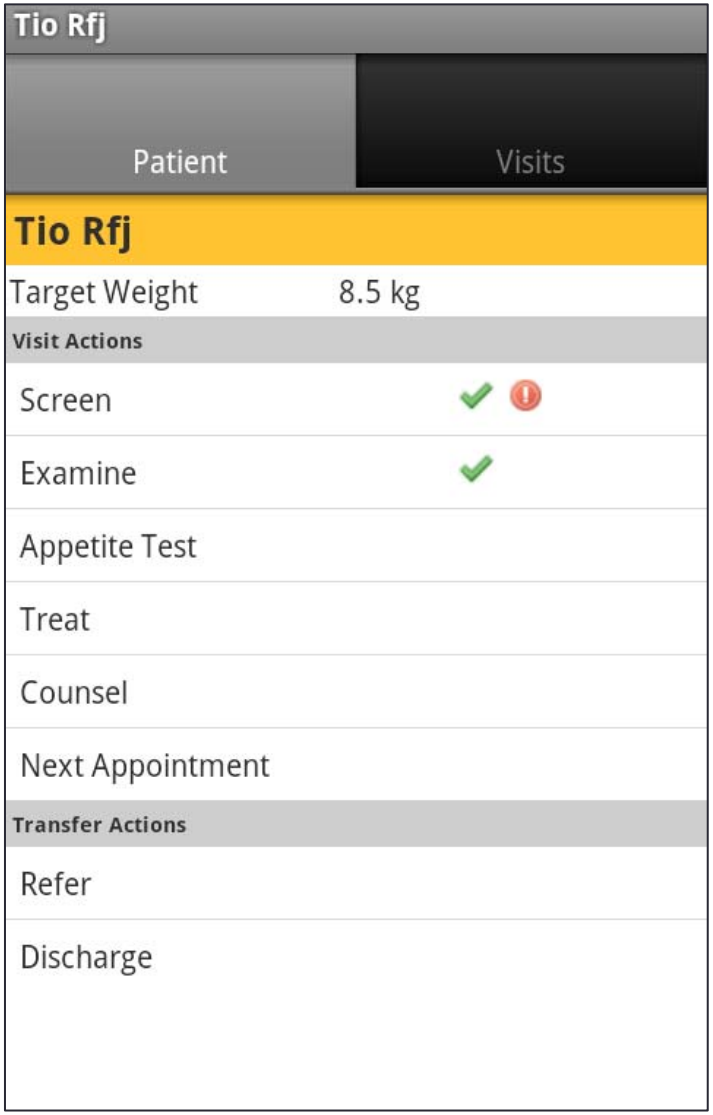

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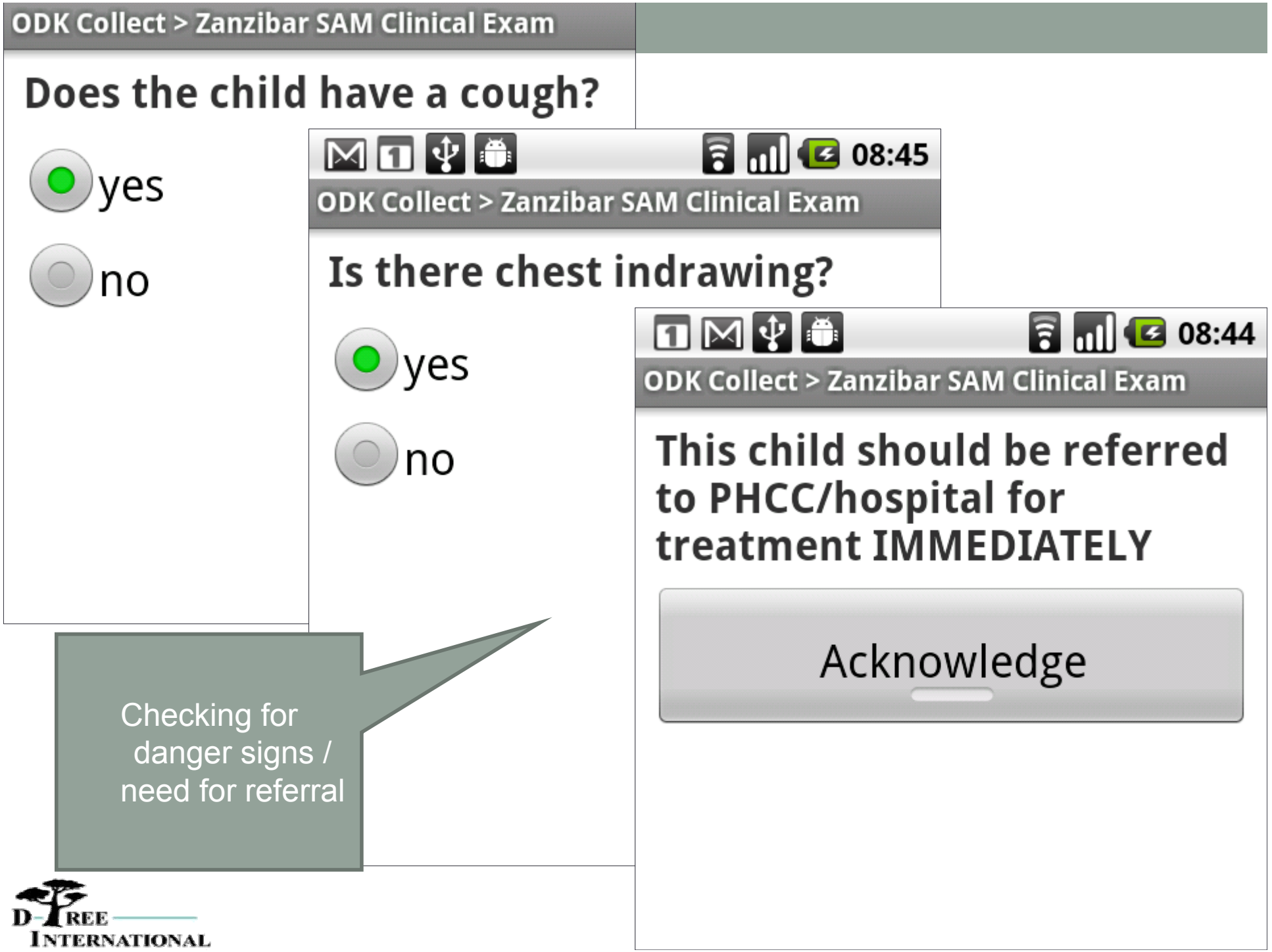

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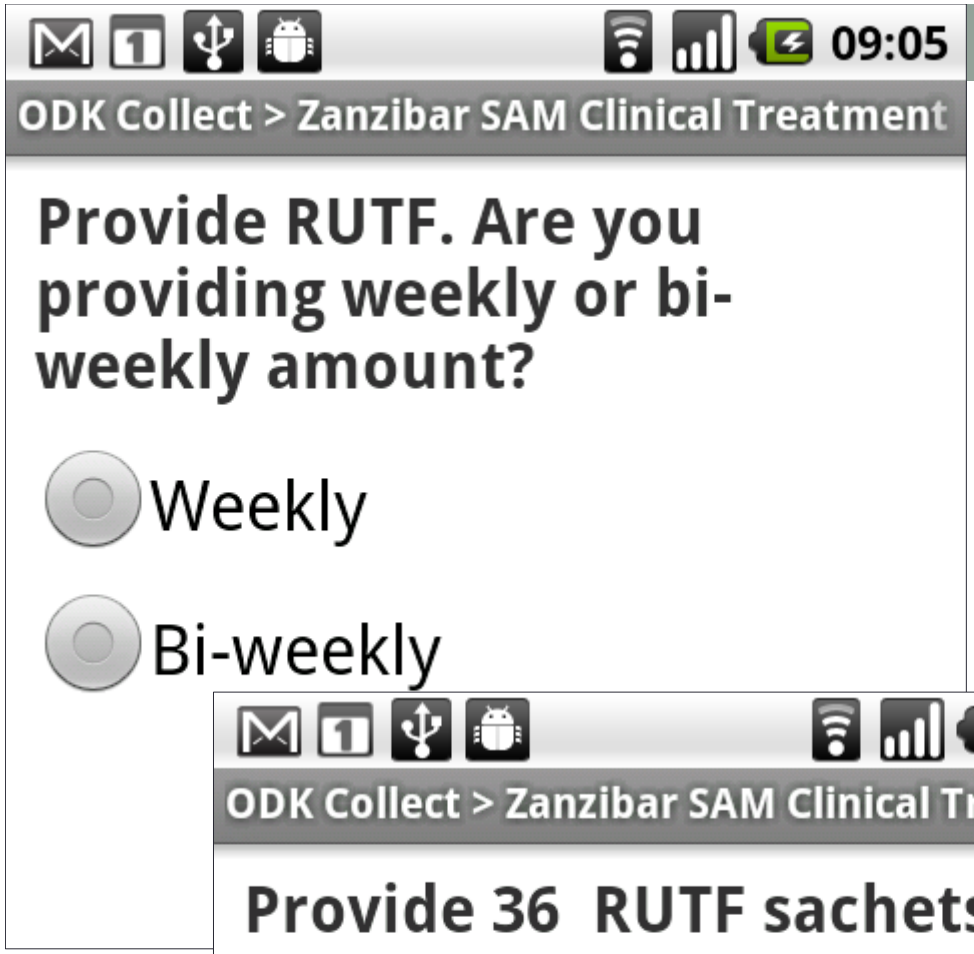

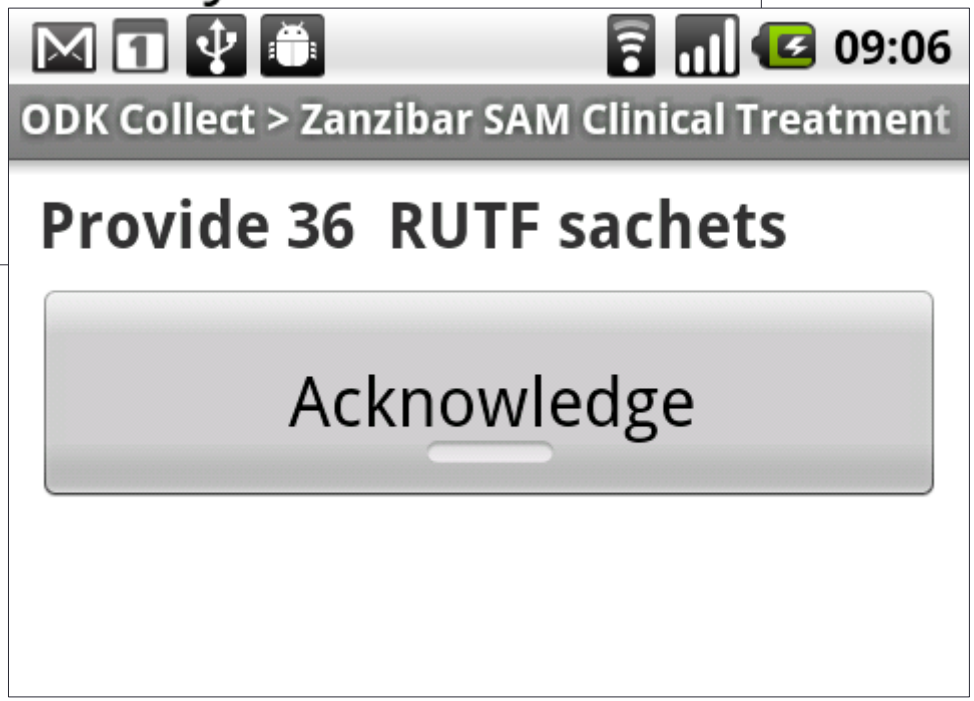

Assisting the provider with proper dosage for RUTF, Vitamin A, Amoxycillin, etc.

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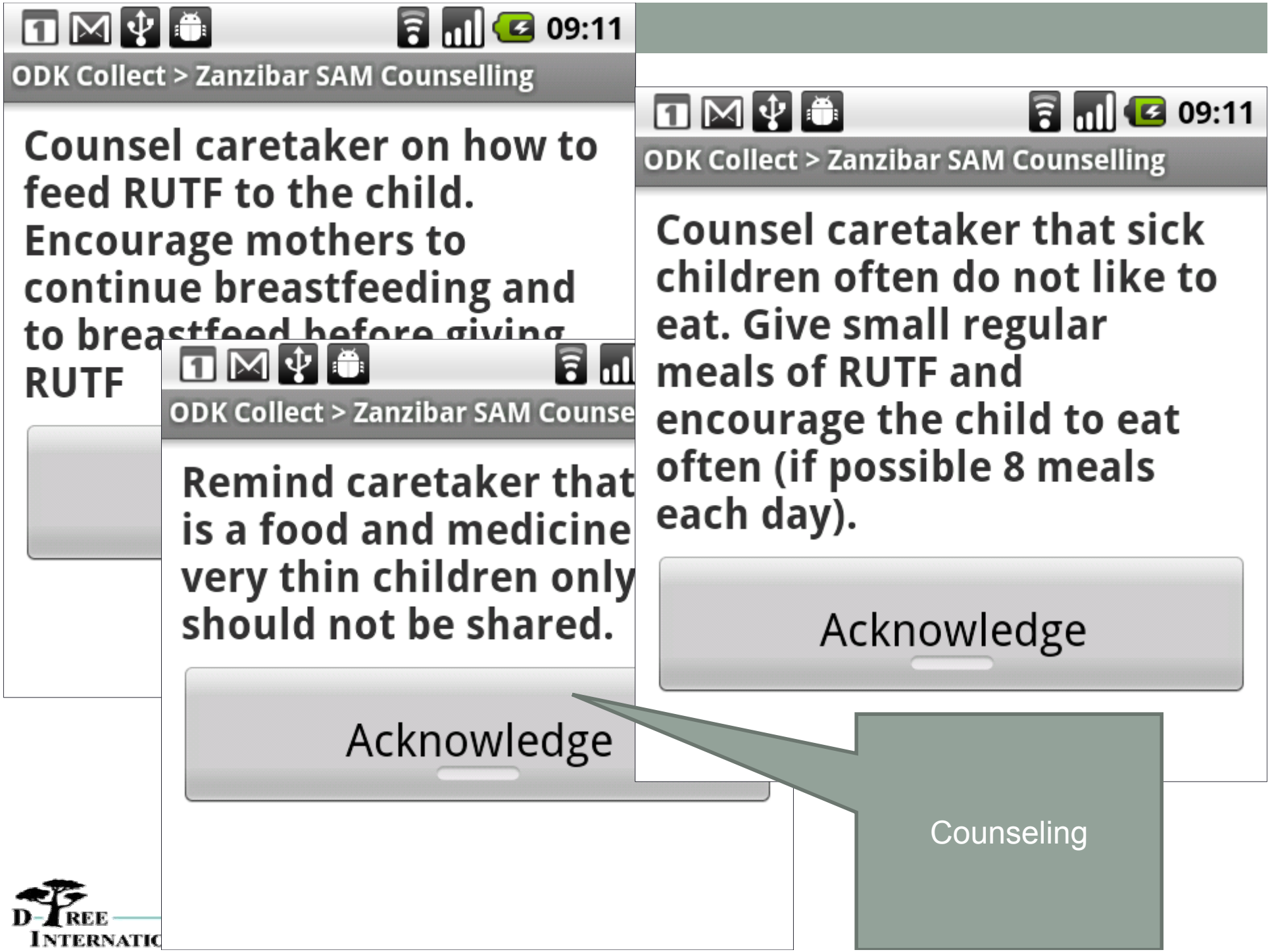

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Patient			Visits
6:	7.7 kg	✓ ⊕	2011-02-18
5:	7.2 kg	⊕	2011-01-28
4:	7.0 kg	⊖	2011-01-14
3:	7.1 kg	⊕	2010-12-29
2:	6.6 kg	⊕	2010-12-15
1:	6.5 kg		2010-12-02

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Conclusion

- Mobile device can assure that nurses are able to follow complex guidelines

How did you feel when you were providing care to the patients by using the phone?
`.. «**simplifies** communication between me and the client»
... «**simplifies** the work compared with using paper forms»
... «at first she thought she would never to understand the phone, but then after several practice it is very **simple** and understandable»

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