Non-Linear IMCI
Aligning diagnostics with clinical practice
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Photo Credit: United Nations Photo
10 million children
1. Pneumonia
2. Diarrhea
3. Malaria
Detection

Treatment

Referral
INTEGRATED MANAGEMENT OF
CHILDHOOD ILLNESS

CHILD AGED 2 MONTHS UP TO 5 YEARS

ASSESS AND CLASSIFY THE SICK CHILD

Assess, Classify and Identify Treatment
Check for General Danger Signs............................2
Then Ask About Main Symptoms:
Does the child have cough or difficult breathing?........2
Does the child have diarrhea?.................................3
Does the child have fever?..................................4
Does the child have an ear problem?.........................5
Then Check for Malnutrition and Anaemia.................6
Then Check the Child’s Immunization Status.............7
Assess Other Problems..........................................7

TREAT THE CHILD
Teach the mother to give oral drugs at home:
Oral Antibiotic..................................................8
Ciprofloxin.........................................................8
Iron.................................................................9
Co-artemether....................................................9
Bronchodilator....................................................9

Teach the Mother to Treat Local Infections at Home
Clear the ear by dry wicking and give eardrops...10
Treat for mouth ulcers and thrush.......................10
Shoal the throat, relieve cough with safe remedy..10
Treat eye infection..............................................10

Give Preventive Treatments in Clinic
Vitamin A.........................................................11
Mebendazole.....................................................11

Give Emergency Treatment in Clinic only
Quinine for severe malaria...............................12
Intravenous Antibiotic......................................12
Diazepam for convulsions.................................12
Treat low blood sugar......................................13

TREAT THE CHILD, continued
Give Extra Fluid for Diarrhoea and Continue Feeding
Plan A: Treat for Diarrhoea at Home....................14
Plan B: Treat for Some Dehydration with ORS........14
Plan C: Treat for Severe Dehydration Quickly........15

Give Follow-up Care
Pneumonia......................................................16
Diabetes.........................................................16
Prolonged diarrhoea..........................................16
Malaria..........................................................17
Fever—malaria unlikely....................................17
Measles with eye or mouth complications.........17
Ear Infection....................................................17
Feeding problem..............................................18
Anaemia........................................................18
Palor..............................................................18
Very Low Weight.............................................18
Severe uncomplicated malnutrition................18

COUNSEL THE MOTHER
Assess the feeding of sick infants......................19
Feeding Recommendations................................20
Counsel the mother about feeding problems........21
Counsel the mother about her own health............22
Advise mother to increase fluids during illness....23
Advise mother when to return to health worker....23
Advise mother when to return immediately........23

SICK YOUNG INFANT AGED UP TO 2 MONTHS

ASSESS, CLASSIFY AND TREAT THE SICK YOUNG INFANT

Assess, Classify and Identify Treatment
Check for Severe Disease and Local Infection..........24
Then check for Jaundice.......................................25
Then ask: Does the young infant have diarrhoea?....26
Then check for Feeding Problem or Low Weight for Age..27
Then check the young infant’s immunization status...28
Assess Other Problems......................................28

Treat the Young Infant and Counsel the Mother
Intramuscular antibiotics..................................29
Treat the young infant to prevent low blood sugar...29
Keep the young infant warm on the way to hospital..30
Oral antibiotic.................................................30
Treat local infections at home...........................31
Correct positioning and attachment for breastfeeding.32
Teach mother how to express breast milk..............32
Teach mother how to feed by cup..........................33
Teach the mother to keep the low weight infant warm at home.33
Advise mother to give home care to the young infant..34

Give Follow-up Care for the Sick Young Infant
Local Bacterial Infection.................................35
Jaundice.........................................................35
Diarrhoea........................................................35
Feeding Problem...............................................36
Low Weight for age............................................37
Thrush............................................................37

Recording Forms:
Sick Child.................................................38
Sick young infant...........................................39
Does the child have diarrhoea?

**DEHYDRATION**

**LOOK AND FEEL:**
- For how long?
- Is there blood in the stool?

**Classify DIARRHOEA**
- Look at the child’s general condition. Is the child:
  - Lethargic or unconscious?
  - Restless and irritable?
  - Look for sunken eyes.
  - Offer the child fluid. Is the child:
    - Unable to drink or drinking poorly?
    - Drinking eagerly, thirsty?
  - Pinch the skin of the abdomen. Does it go back:
    - Very slowly (longer than 2 seconds)?
    - Slowly?

**SEVERE DEHYDRATION**
- If child has no other severe classification:
  - Give fluid for severe dehydration (Plan C) OR
  - If child also has another severe classification:
    - Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way
    - Advise the mother to continue breastfeeding
- If child is 2 years or older and there is cholera in your area, give antibiotic for cholera

**SOME DEHYDRATION**
- Give fluid, zinc supplements and food for some dehydration (Plan B)
- If child also has a severe classification:
  - Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way
  - Advise the mother to continue breastfeeding
  - Advise mother when to return immediately
  - Follow-up in 5 days if not improving.

**NO DEHYDRATION**
- Give fluid, zinc supplements and food to treat diarrhoea at home (Plan A)
- Advise mother when to return immediately
- Follow-up in 5 days if not improving.

**DEHYDRATION**
- Severe Persistent Diarrhoea
  - Treat dehydration before referral unless the child has another severe classification
  - Refer to hospital

**PERSISTENT DIARRHOEA**
- Advise the mother on feeding a child who has PERSISTENT DIARRHOEA
  - Give multivitamins and minerals (including zinc) for 14 days
  - Follow-up in 5 days

**DYSENTERY**
- Give ciprofloxacin for 3 days
  - Follow-up in 2 days

**DIARRHOEA**
- Dehydration present
- No dehydration
- Blood in the stool
It’s not used
Issues with IMCI

- Workflow
- Expertise
- Localization
- Training
Our Work

Workflow

Expertise

Localization

Training
Paper Workflow

Pneumonia Exam

Pneumonia Treatment

Dehydration Exam

Dehydration Treatment

...
Current Digital Workflow

1. General Exam
2. Pneumonia Exam
3. Dehydration Exam
...

Treatment
Future Workflow

General Exam

- Pneumonia
- Dehydration
- ...

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Future Workflow

General Exam

Pneumonia

Dehydration

…
Job Aids

• Breath Counts
• Diagnostic Tests
• Medical Terminology
Related Work

E-IMCI

- DeRenzi, et al. (2008)
- Increased Adherence

IMNCI on ODK Survey

- Waylon Brunette
Contacts

Jim Black  MD
• Experience as clinician in Mozambique
• Currently developing diagnostic peripherals for Series 40 Nokia phones

Amy Ginsburg  MD
• Extensive experience with IMCI
• Has close contacts with health workers in India
ODK Architecture

1. IMCI
   - Entry to .xlsx file

2. Linear .xlsx survey definition
   - Parse to JSON Object

3. ODK JavaScript Engine
   - Rendering

4. Android Platform
   - Store Results

5. Local SQL Database
   - Store Results
Our Work

Entry method that allows for simple description of a non-linear survey

IMCI
Entry to .xlsx file

Linear .xlsx survey definition

Parse to JSON Object

ODK JavaScript Engine

User Friendly Workflow

Android Platform

Rendering

Store Results

Local SQL Database

JSON representation that supports non-linear flow

Entry method that allows for simple description of a non-linear survey

User Friendly Workflow
Design and Evaluation

• Formative Usability Testing
  – Run through scenario cases using our tool

• Participants
  – MDs and nurses in town (PATH)
  – UW Students as a fallback
Plan for Next Quarter

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Deliverables:
- Spec
- Midterm paper and presentation
- Final paper, poster, and presentation
Questions?