Evaluating the accuracy and acceptability of pneumonia diagnostic tools for community health workers in low and middle income countries

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Session objectives

- Overview of project aims and objectives

- Research protocols and stages including preliminary findings of formative research with community health workers and device selection overview
Project overview

• Use of improved tools for measuring respiratory rate and oxygen saturation among community health workers: sub-Saharan Africa and Southeast Asia

• To identify the most accurate, acceptable, scalable and user-friendly respiratory rate timers and pulse oximeters to support community health workers (CHWs) and frontline health facility workers (FLHFWs) in the detection of the signs of pneumonia in four low-income countries – Cambodia, Ethiopia, South Sudan and Uganda.

• Timescales: November 2013 – June 2015 (6 research stages)
Project phases and objectives

Device selection

Accuracy evaluation

Field testing
Device selection process

- Landscape review
- Formative research with CHWs
- Device scoring process
- Stakeholder research
- Laboratory testing

200 potential devices

- 20 product attribute selected
- Scored & ranked + availability
- Acceptability and scalability measures
- Accuracy and robustness in field conditions
Formative research – Key themes

• A ‘felt’ need for tools to detect the signs of pneumonia was expressed by all CHWs

• Current barriers to pneumonia diagnosis and management
  ➢ Community level barriers – lack of trust
  ➢ Issues with current devices
    o Suitability; usability and durability

• Ideal device characteristics

• No experience of pulse oximetry amongst CHWs
Key themes: ‘Felt’ need

“I use my digital watch sometimes but that is just improvising. We need more reliable tools. I use it because I don’t want to dispense amoxyl without proof that a child has pneumonia.” - Village health team member, Uganda

“I had received a watch through ICCM programme three years ago, but now it is not working and I am using my own mobile phone.” - Health extension worker, Ethiopia
Key themes – Community barriers

“Parents like the timer and they trust what I say to them only if I have used the timer to assess their child.”
- Village health team member, Uganda

“When a child is restless or crying it is hard to count RR…thus I tell the parent to wait until the child calms down. But this takes several times and the parents lack patience, and sometimes ask to leave without getting treatment.” – phone
- Health extension worker, Ethiopia
Key themes – Device issues

“For me the UNICEF timer is time consuming and labour intensive.” - Village health team member, Uganda

“Yeah in area of pneumonia because the tools we are currently using are not working well, the respiratory timer makes a lot of noise which can scare away the child.” - Community drug distributor, South Sudan
Key themes – Device Issues

“I would make a device which would not malfunction immediately and doesn’t work with dry cells.”
- Health extension worker, Ethiopia
Key themes – Ideal device characteristics

“I would place it on the child’s chest or any part of the body and after a short while it would indicate whether or not a child has pneumonia, that way I would not have to count and the results would be accurate.”
- Village health team member, Uganda

“I will make a multi-functional and fast device, which limits my role only in registration and requesting information.”
- Health extension worker, Ethiopia
Device scoring process

Device availability
1 = not available
2 = available 6 months
3 = available

Total score
Attribute score
Score = 0-3
Attribute ranking
Score = 1-5

Example attributes: Usability; high level of decision support; automation of diagnosis; high accuracy of measured/calculated result
Possible devices for evaluation

Respiratory rate devices
Improved UNICEF timer
Counting beads
Mobile phone application – Smart phone
Mobile phone application – Feature phone

Pulse oximeters
Handheld device
Fingertip device
Mobile phone POx
Laboratory testing

• Working with TUV Rheinland
• Testing up to 12 devices
• Two main testing protocols:
  • Functional testing – can devices function correctly
  • Environmental testing – are devices fit for purpose
Device Selection

Accuracy Evaluation

Field Testing

Conducted in four hospital sites – one in each country
Field testing process

- Patient presents at workplace
- Informed consent & enrolment
- Device evaluation by CHW
- Medical outcome determined
- Caregiver interviewed

Conducted in home setting of CHW

- Patient suitability assessment
- Video recording also taken
- CHW / medical professional diagnosis
- Caregivers acceptability

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Pneumonia diagnostics project workflow

11/13-11/14
Device selection
- Landscape analysis
  - Landscape reports X 2
- Formative research (Stage 1)
  - Research report
- Device selection process
  - 12 Devices selected
- Stakeholder (Stage 2) research
  - Research report
- Laboratory testing
  - 6 Devices selected

11/14-2/15
Accuracy evaluation
- Accuracy evaluation (stage 3)
  - Evaluation report
- Country reports
  - Dissemination meetings

3/15-4/15
Field testing
- Pile sorting (Stage 4)
  - Select 3 devices
- Field testing (Stage 5)
  - Field test report
- Caregiver interviews (Stage 6)
  - Caregiver perceptions report

FINAL REPORT

Scientific Advisory Committee

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