

PNEUMONIA ROUNDTABLE INNOVATION EXHIBIT

best practice technologies for saving children's lives

The following products are a *selection* of current best practice in the prevention, diagnosis and treatment of the leading killers of children in the post-newborn period (pneumonia, diarrhea, malaria and malnutrition) and exciting innovations in the pipeline that show promise of improving on current best practice.

We encourage you to contact the innovators if you would like further information on any of the products listed below.

respiratory rate timers

Accurately counting the breaths a child takes in one minute is often the only way to diagnose pneumonia in resource poor settings. If the child has a cough and the respiratory rate is found to be above a certain number (e.g, above 50 breaths per minute for an infant aged 6 months), the child should receive treatment for pneumonia, or if severe (with chest in-drawing), be referred to a health facility. Often the only devices available to measure a child's breathing are "counting beads" or the official UNICEF "ARI Timer" which rely on health workers manually counting the child's breathing, however, there are many innovations in the pipeline including:



- University of Washington and PATH's "mPneumonia" Android smartphone application which includes the Integrated Management of Childhood Illness protocol with a software based respiratory rate timer (Amy Ginsburg: aginsburg@path.org)
- Malaria Consortium's Java phone application respiratory rate timer (Karin Källender: k.kallander@malariaconsortium.org)
- Philips Research's solar-powered "Breath Counter" (Pavan Dadlani: pavan.dadlani@philips.com)
- University of Melbourne's, Respiratory Rate Counter on a NOKIA cellphone (Jim Black: jim.black@unimelb.edu.au)
- GuardIt and Project HOPE's "INSPIRE" breath counter that also measures temperature and transmits data (Mike Script: michael_script@yahoo.com and Judith Moore: jmoore@projecthope.org)

pulse oximeters



Childhood pneumonia with hypoxemia, an abnormally low concentration of oxygen in the blood, has a very high risk of mortality. Hypoxemia is difficult to diagnose based on clinical signs. Pulse oximetry can accurately and reliably measure hypoxemia in a non-invasive manner to identify children in need of oxygen. Technologies that use pulse oximetry methods, however, are not readily available in low resource settings. Several new technologies are being developed to meet this need including:

- Boston University's solar powered, finger pulse oximeter on a cellphone (Muhammad Zaman: zaman@bu.edu)
- University of British Columbia and Lionsgate Technology's phone oximeter for sepsis which also measures heart rate, respiratory rate and peripheral blood flow (Mark Ansermino: mansermino@cw.bc.ca)
- PATH's "mPneumonia" Android smartphone application which includes a device driver for an off-the-shelf USFDA approved original equipment manufacturer pulse oximeter (Amy Ginsburg: aginsburg@path.org)

oxygen

Access to oxygen is lifesaving for children with severe pneumonia but oxygen is often unavailable in resource poor settings because the technologies are too expensive and/or not suited to local conditions. There is an urgent need for quality, affordable oxygen generators that do not rely on external power sources, such as:



- LifeLOG's "Oxybox" - a portable chemical oxygen generator with a facemask that requires no external power source but produces oxygen from a chemical reaction by the turn of a lever. The subject receives oxygen immediately once connected to a facemask or nasal cannula. The Oxybox can provide oxygen for up to 2 hours and the box itself is disposable or recyclable (Richard Imbuce: richi@optonline.net)

amoxicillin dispersible tablets



Children with suspected pneumonia require access to quality, affordable antibiotics in child-friendly formulations. Dissolved in breast milk or water, amoxicillin dispersible tablets can treat most cases of child pneumonia and are ideal for babies and small children. The scored tablets make for easy dosing and the blister packs keep the product stable. The WHO currently recommends amoxicillin dispersible tablets as the first-line treatment for child pneumonia. Please join **Dr. Hayallesh Tarekegn from UNICEF at 12:30 p.m.** for a demonstration of amoxicillin dispersible tablets. Examples of the product include:

- MicroLabs' 250mg amoxicillin dispersible tablets in scored, foil packs of 10 (N.K. Kothari: nkkothari@hotmail.com)
- Sandoz's "Ospamox" 500mg amoxicillin dispersible tablets in scored, blister pack of 12 (Charlie Hough: charlie.hough@novartis.com)

oral rehydration salts (ORS) and zinc dispersible tablets

ORS prevents death from diarrhea-induced dehydration and zinc tablets lessen the duration and severity of diarrhea, while offering some protection against future episodes. Together these treatments can prevent more than 90% of child diarrhea deaths. Typically, ORS is delivered in sachets of powder that must be mixed with water. The WHO recommends 20mg scored dispersible zinc tablets. Where coverage of both ORS and zinc are high, as in Bangladesh, child diarrhea deaths have fallen to just 6% of all under-five child mortalities. Examples of products that meet the WHO recommended ORS and zinc treatment standards include:



- Icddr,b's branded ORS in sachets of 200ml, manufactured in Bangladesh
- ACME Laboratories' "BabyZinc" vanilla flavored 20mg zinc dispersible tablets,

ready-to-use therapeutic food (RUTF)



Ready-to-use Therapeutic Food (RUTF) has revolutionized the treatment of severe malnutrition – providing foods that are safe to use at home and ensure rapid weight gain in severely malnourished children. These home-based treatments for severe acute malnutrition are improving the lives of hundreds of thousands of children a year. The advantage of RUTF is that it is a ready-to-use paste which does not need to be mixed with water. The product, which is based on peanut butter mixed with dried skimmed milk and vitamins and minerals, can be consumed directly by the child and provides sufficient nutrient intake for complete recovery. It can be stored for three to four months without refrigeration. Examples of RUTFs include *Mana Nutrition's RUTF* and *Plumpy Nut*.

mid-upper arm circumference (muac) measuring tape

This MUAC tape measures the mid-upper arm circumference of children aged 6 months to 5 years to assess severe, acute malnutrition. The tape has three colors, with the red indicating severe acute malnutrition, the yellow indicating moderate acute malnutrition and the green indicating normal nutritional status. It is also considered a good predictor of mortality risk. The MUAC tape measure is used on the left arm. With the arm bent and held against the torso, the summit of the shoulder to the tip of the elbow is measured; the mid-point is marked and is where the circumference measure is then taken.



long-lasting insecticide treated bed nets



Long-lasting insecticide-treated bed nets are one of the most effective and least expensive ways to prevent malaria. The insecticide is bound within the fibers that make up the netting and is 'slow released' over a 3-5 year period. With full coverage, sleeping under insecticide-treated bed nets reduces the death of children under five in sub-Saharan Africa by 18%. The WHO recommends that all people in malaria-prone areas should sleep under insecticide-treated bed nets and this is particularly important for children under five who carry the greatest burden of malaria deaths.

malaria rapid diagnostic tests

Malaria rapid diagnostic tests detect specific antigens (proteins) produced by malaria parasites that are present in the blood of infected or recently infected individuals. One finger prick from a rapid diagnostic test and ten minutes later, a child can be diagnosed with malaria and treated accordingly. These tests are an alternative to diagnosis based on clinical grounds or microscopy, particularly where good quality microscopy services are not readily provided.



artemisinin-based combination therapies



Artemisinin-based combination therapies (ACT) now constitute the only effective class of antimalarials in Africa where the malaria parasite has developed resistance to earlier generations of antimalarials, rendering them largely ineffective. Due to their high efficacy, fast action and the reduced likelihood of resistance developing, the WHO recommends these therapies for the treatment of uncomplicated malaria. In order to make best use of ACTs, it is critical to address issues of delivery, access and cost. Finally, it is particularly important that children receive ACTs within 24 hours of the onset of illness.

backpack plus

Backpack PLUS is an operating system for community health workers that includes the essential diagnostics, medicines and supplies as well as the training, supervision, incentives, and supply chain essentials for maximizing long-term impact. By training and equipping community health workers to focus on the leading drivers of child mortality – pneumonia, diarrhea, malaria and undernutrition - Backpack PLUS aims to maximize their impact on child mortality (Claire Qureshi: Claire.qureshi@mdgha.org).

note

We have not displayed the vaccines that target the leading causes of pneumonia (pneumococcal and Hib) or diarrhea (rotavirus), however, they are a critical part of the solution to child pneumonia and diarrhea deaths. Several manufacturers, including Roundtable participants GSK and Pfizer, are working in partnership with GAVI (www.gavi.org) to advance global efforts to make these vaccines available to the most vulnerable children.

SPECIAL thanks to all of the innovators who participated in the Exhibit and to Debbie Burgess, Amy Ginsburg, Camielle Noordam, Hayalnash Tarekegn and Kathryn Tiedje for their advice and guidance and to Jessica Johnston for coordinating the Exhibit.