

Background: In 2014, a working model of a medical device intended to rapidly determine temperature, respiratory rate, and heart rate in infants and children at risk for bacterial pneumonia was introduced to over 100 health care providers at 8 hospitals in Malawi. As part of this community based participatory design (CBPD) process, it was determined that this device could also be utilized for the assessment of newborns in need of resuscitation, and for longer term monitoring of vital signs in hospitals. Over the next year, the electronic component of this device was perfected and the exterior harness was envisioned to be capable of quickly capturing heart rate in neonatal patients.

Methods: The current design team has applied engineering principles to guarantee the safety and suitability for pediatric patients, practice green engineering guidelines to ensure durability and sustainability, and designed a model that both professionals and individuals with less intensive training can use effectively. Utilizing human factors design principles, the team has created a device that can be applied rapidly, adjusted to fit patients with a variety of physical morphologies and sizes, and does not irritate infant skin. The objective of the visual display is to provide essential information that permits the user to intervene as quickly as possible.

Findings: Biocompatible materials have been selected, reusable skin electrodes have been integrated, and a novel method for securing the device on the chest has been created. Radio frequency and electromagnetic safety testing is anticipated. The display for the user will be part of the device, and there is an option for wireless transmission of data for display on low cost handheld devices as well.

Interpretation: Through a CBPD process, an appropriate, affordable medical device will soon be ready for human testing in the US, and for follow up feedback in Malawi through the efforts of TEAM Malawi. This approach is expected to lead to a final product that meets the needs of the end user, at a cost that promotes sustainability.

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Client Evaluation of Peer Counselor Performance in a Rural PMTCT Program in Nigeria

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Background: PMTCT service scale-up in Nigeria has been challenging, particularly in rural areas where professional health workforce is limited and uptake is low. Engaging experienced HIV+ women to serve as lay peer counselors (PCs) is important in optimizing outcomes among PMTCT clients. MoMent Nigeria is a two-arm implementation research study investigating the impact of a structured, supervised peer counselling program on PMTCT outcomes in rural areas. Client-focused audits of PC activities were conducted to evaluate PC performance and for Quality Control (QC).

Methods: PC audits were conducted in batches over an 18-month period, among PC clients who were HIV+ women at different stages of the PMTCT cascade. A structured 19-item interviewer-administered questionnaire was used to survey clients. Interviewees were randomly selected from among clients engaged with PCs for ≥ 3 months. Descriptive statistics, Chi square comparison of proportions and tests of association were applied to the data.

Findings: Of 497 study clients enrolled, 92 (18.5%) were interviewed: 59 (64.1%) from intervention (structured, high supervision PC program) and 33 (35.9%) from control (loosely structured, limited supervision PC program) sites. Median age of evaluators was 29 years and 93% were married with a median of 2 children; $\sim 70\%$ were breastfeeding mothers. Over a quarter (26.1%) of clients did not know their PC's HIV status, which did not differ between the intervention and control arms (23.7 vs 30.3%, $p=0.98$). Monthly median number of PC visits to client's home did not differ either [3 (1-4) vs 2 (0-4), $p=0.84$]; 6.8% vs 18.2% of intervention vs control women received no visits from their PCs, respectively ($p=0.42$). Overall, 81.6% of all PC clients interviewed rated their PC support services as "Very Good" or "Excellent," with no difference between the two arms.

Interpretation: Overall, PCs were well-received among rural PMTCT clients, however PC disclosure to clients appears to be suboptimal. Although not significant, the proportion of clients not visited was higher among less supervised PCs which may be due to less oversight. While PCs are well-received, increased supervision may be useful for better psychosocial support and outcomes.

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Disparities in Availability of Essential Medicines to Treat Non-communicable Diseases in Uganda: A Cross-sectional Poisson Analysis Using the 2013 Service Availability and Readiness Assessment

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Background: The most widely endorsed methodology used to collect data on health system readiness is the Service Availability and Readiness Assessment (SARA), a comprehensive survey of health facility preparedness, developed by the World Health Organization. SARA data have not previously been used to model and analyze the predictors of readiness indicators measured in the survey. We sought to demonstrate that SARA data can be used in this way by modeling the availability of essential medicines for treating non-communicable diseases (EM-NCD).

Methods: We built a Poisson regression model using data collected at 196 Ugandan health facilities in the 2013 SARA survey. Our outcome of interest was the number of different EM-NCD available in each facility. Basic amenities, basic equipment, region, health facility type, managing authority, capacity for diagnosing NCDs, and range of HIV services were used as predictor variables.