



**OPERATIONS RESEARCH SUMMARY**

**Quality Assurance Project II**

**Computer-Based versus Standard Training in Integrated Management of Childhood Illness: Uganda**

Uganda was one of the first African countries to adopt the Integrated Management of Childhood Illness (IMCI) guidelines sponsored by the World Health Organization (WHO) and UNICEF. As in most developing countries, health worker training in Uganda was the major component of the WHO implementation strategy for IMCI. The standard training approach is quite expensive (\$350–450 per trainee): it is classroom-based, instructor-led, and includes a practicum, is lengthy (11 days), and requires several facilitators as instructors (6 per 20 trainees).

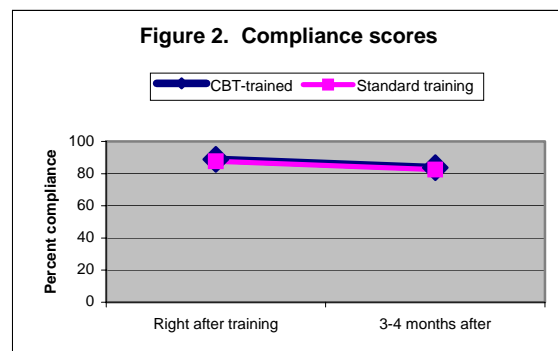
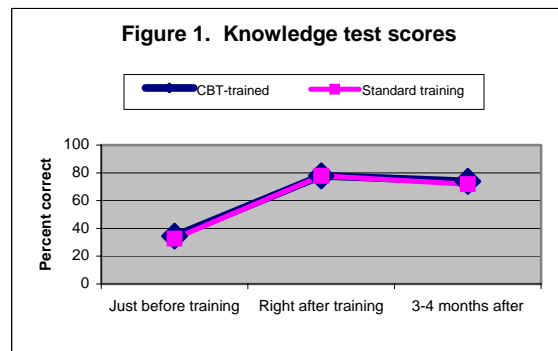
This study<sup>1</sup> investigated the cost-effectiveness of a computer-based training program (CBT) compared to the standard approach. The nine-day CBT program substitutes for much of the standard approach, but still requires, like the standard approach, clinical practice with facilitators (4 per 20 trainees), videos from WHO, job aids, and one computer per two trainees. Prior exposure to computers is not required. This study randomly assigned 120 Ugandan clinicians and nurses who desired IMCI training to the standard or CBT program. The effect of the training on each participant was assessed by three indicators of knowledge and practice:

- Test of IMCI knowledge three times: (pre-training, right after training, 3-4 months after training);
- Observed compliance with the IMCI guidelines (right after training, 3-4 months after training);
- Regular application of the IMCI guidelines in normal practice (3-4 months after training);

**Overall findings**

**Knowledge and practice:** The two groups performed nearly identically. Average knowledge scores were the same just before training, right after, and later (Figure 1). Average compliance in the two groups was also the same right after training and 3-4 months later (Figure 2). Finally, the facilitators judged whether the trainees were applying the IMCI guidelines regularly 3-4 months after the training and concluded that more CBT-trained health workers were using the guidelines regularly (44%) than those trained by the standard approach (34%), although the difference was not statistically significant.

**Training cost:** The CBT cost was considerably less than the standard course because it took less time and used fewer facilitators. The variable cost per trainee of the standard course was \$472 versus \$335 per trainee for the CBT course. Variable costs included allowances, transport, room and board for trainees and facilitators, plus fuel, stationary, and photocopying. But costs are excluded for development of software, computer lab, chartbooks, certain costs that were identical for both



groups (e.g., follow-up visits), and the opportunity cost of taking health providers from normal duties. CBT variable costs would have increased by \$75 per trainee if computers had been rented.

## Methods

Clinicians and nurses (120) who provided child healthcare and desired IMCI training volunteered for the study. After stratification by type (clinician, registered nurse, enrolled nurse), they were randomly assigned to either the standard or CBT training group.

The knowledge test had 20 multiple-choice questions on assessment (8), classification (3), treatment (3), need for immunization (2), need for vitamin A (1), and caretaker counseling (3). Compliance for each trainee was defined as the percentage of tasks performed to IMCI standard on two sick children as judged by trained clinical observers. Regular application of the IMCI guidelines after 3-4 months was assessed by the course facilitators based on observations of trainees in using the IMCI chartbook, recall of basic steps in the protocol during cases, anxiety, and other indicators.

## Results

**Results by IMCI function:** Knowledge scores were about the same for the two training groups for each IMCI function (assessment, classification, treatment, and counseling). All four functions had similar scores 3-4 months after training, ranging from 68% to 79% correct answers. Similarly, compliance scores later were about the same for both groups, although assessment compliance was somewhat higher in the CBT: 37% versus 26%. Classification compliance was lower in the CBT group: 68% versus 81%.

Although the knowledge scores were roughly equal across the four knowledge functions, the compliance score was not. After 3-4 months, compliance scores (of both groups combined) were substantially higher for classification (74%) and treatment (62%) than for assessment (32%) or counseling (30%). Possible explanations are that trainees took shortcuts in assessment, such as not doing nutritional assessments and respiration counts; and trainees said it was contrary to Ugandan culture to ask caretakers to repeat information, one of the IMCI counseling guidelines.

**Results by health worker characteristic:** Health worker characteristics were not generally associated with the results. One notable exception – male trainees in the CBT training group had significantly higher knowledge scores 3-4 months after training than males in the standard group, while there was little difference in the scores of females in the two training groups.

## Conclusion

The study demonstrated that computer-based training of IMCI was as effective as standard training, but at considerably less cost. The trainings had equivalent effects on trainees' knowledge and practice, including retention after 3-4 months. The CBT course was shorter, cost less, and did not use as many scarce facilitators. The trainees were enthusiastic about the CBT course, commenting on the various ways it was user-friendly. However, the feasibility of implementing the CBT approach is still not clear due to the trend towards decentralization of training, and the growing complexity and constant changes in medical knowledge.

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<sup>1</sup> The complete study is reported in: Tavrov P, Kekitiinwa Rukyalekere A, Maganda A, Ndeezi G, Sebina-Zziwa A, and Knebel E. A Comparison of Computer-based and Standard Training in the Integrated Management of Childhood Illness in Uganda. May 2002. *Operations Research Results* 2(5). Published for USAID by the Quality Assurance Project, University Research Co., LLC, Bethesda, MD. QAP publications are available at [www.qaproject.org](http://www.qaproject.org).