Impact of Integrated Management of Infectious Diseases (IMID) training and Onsite Support (OSS) on Emergency Triage, Assessment and Treatment (ETAT) of seriously ill patients in Uganda: A randomized controlled trial

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Mombasa, Kenya

Stephen N. Kinoti, Sarah M. Burnett, Ibrahim Kirunda, Martin Mbonye, Sarah Naikoba, Kelly S. Willis, Marcia Weaver
IDCAP’s Innovation in Training
The IDCAP Capacity-Building Package

• Focus on mid-level practitioners

• Integration across infectious disease

• On-site support (OSS) component

Photo Credit: Charles Steinberg
IDCAP Design: Structure of the Evaluation

Year 1     Year 2     Year 3

INTERVENTION ARM

IMID  
OSS

CONTROL ARM

IMID  
OSS
Stratified, Randomized Selection

For health facilities:

**Inclusion criteria:**
- Health center IV (HCIV) or comparable facility such as small general hospital or non-governmental organization clinic
- Accredited antiretroviral therapy (ART) site actively providing ART or scheduled to be active by April 2010
- Working laboratory defined as on-going performance of the following six laboratory tests: HIV rapid test, hemoglobin, peripheral blood smear or rapid test for malaria, sputum microscopy for acid-fast bacteria, stool analysis, urinalysis
- Staff included at least 2 non-physician clinicians (NPCs) actively engaged in patient care.

**Exclusion criteria:**
- Current participation in Ministry of Health quality improvement program
- Past or current partnership with United States Department of Defense
- Patient population included primarily prisoners
For non-physician clinicians (2 per health facility):

**Inclusion criteria:**
- Clinical officer, registered nurse, or registered midwife based at participating health facility
- Active inpatient or outpatient care of patients of any age with malaria, tuberculosis, and HIV/AIDS

**Exclusion criteria:**
- None
IDCAP On-Site Support: Multidisciplinary Topics

• Emergency Care
• Fever Case Management
• Comprehensive HIV Care
• PMTCT Guidelines
• Paediatric ART
• Monitoring ART
• TB Suspects
• TB Treatment
OSS Module: Emergency Triage, Assessment and Treatment

- Specific staff to triage
- Duty Rosters
- Allocation of Space for Emergency Care
- Provision of Essential Emergency Care Commodities & Supplies
- Posting of Clinical Decision Guides
- Weekly Review of Performance
- Continuous Quality Improvement
## Triage: Sorting Patients into Priority Groups

<table>
<thead>
<tr>
<th>Priority</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P1</strong></td>
<td>Emergency</td>
</tr>
<tr>
<td></td>
<td>Need immediate treatment</td>
</tr>
<tr>
<td></td>
<td>Call senior health worker</td>
</tr>
<tr>
<td><strong>P2</strong></td>
<td>Priority</td>
</tr>
<tr>
<td></td>
<td>Given priority in the queue</td>
</tr>
<tr>
<td></td>
<td>Rapidly assess and treat</td>
</tr>
<tr>
<td><strong>P3</strong></td>
<td>Queue</td>
</tr>
<tr>
<td></td>
<td>Non-urgent</td>
</tr>
<tr>
<td></td>
<td>Can wait in the queue</td>
</tr>
</tbody>
</table>
PI: ABCD Emergency Signs

A  Airway
B  Breathing
C  Circulation Coma Convulsion Confusion
D  Dehydration (severe)

Pain & Fever (life-threatening)

Don’t Ever Forget Glucose!!!!!
P2: Priority Signs

**T**  • Tiny Baby <6 mo; Temperature; Trauma

**P**  • Pallor (severe); Poisoning; Pain (severe)

**R**  • Respiratory distress: Restless, irritable; Referral (urgent)

**M-O-B**  • Malnutrition–visible; Oedema of both feet; Burns
Triage

- Recognizing danger signs is the responsibility of every member of the clinic team

  - What is the triaging process like at your clinic?
  - How do you know that it is effective?
  - Who are the members of the service team?
  - Are they all able to:
    - Triage
    - Are they able to do or Direct emergency cases to right care
    - Does the facility have emergency response guidelines; job aids on walls; emergency trays with right drugs and tools?
    - How is the patient flow?
Monitoring ETAT Performance

Regular monthly reviews:

- What proportion of OPD pts are triaged P1, P2, P3?
- What proportion of P1s received appropriate emergency treatment?
- What proportion of P2s were retained, admitted or referred for care?
- What are the ETAT process barriers to quality care have been addressed and improved?
  - Who does triage in this station?
  - Is triage done 24 hours a day every day?
  - Are the emergency stations stocked with essential equipment and drugs daily
  - How are patients handed over from OPD to retention area, admission or referral
  - What are the outcomes of those retained or admitted?
IDCAP ETAT Evaluation Objectives

• Determine the impact of IMID and OSS on ETAT of patients with serious illness and emergencies
Methods

• **Design:** A mixed design with pre-post and cluster randomized control

• **Intervention:** IMID training through delivery of a core course and two booster courses and Onsite Support for ETAT, Improvements in the processes of care through CQI

• **Measurement of key indicators on ETAT:** triage; assessment (retained, admitted or referred); treatment according to ETAT guidelines; outcomes
# Medical Form 5

**Patient Record Form**

**Name of Health Facility:**

**Date:**

**OPD Number:**

**Patient's Surname:**

**Other Names:**

**New Attendance:**

**Re-attendance:**

**Parish:**

**Village:**

**Age:**

**Gender:**

**Weight:**

**History & Exam Findings**

- **Date of History of Fever:**
- **Incubation Period:**
- **History of Cough:**
- **Weight Loss:**
- **Height:**
- **Skin Taint:**
- **Temp Infection:**

**Other History**

**Findings on Examination**

**Lab Requests & Results**

- **HIV Test:**
- **Hepatitis B Test:**
- **TB Test:**
- **New Case:**
- **TB Infected:**
- **TB Lab Name:**

**Muscle Related Lab Numbers:**

**HIV/AIDS:**

**HIV/AIDS Test:**

**Other Lab Tests + Results:**

**Results:**

**Diagnosis**

- **Malaria:**
- **Asthma:**
- **HIV/AIDS:**
- **Hepatitis B:**
- **TB:**

**Drug & Dosage**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Amount</th>
<th>Route</th>
<th>Days</th>
<th>OS</th>
<th>Notes</th>
</tr>
</thead>
</table>

**Dispensary**

- **DA:**
- **OS:**

**References**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
</table>

**Medical Form 5**

**Integrated Disease Capacity Building Evaluation**

**An Accorda Initiative**

This form was adapted with modifications from the Infectious Disease Research Collaboration (Uganda Malaria Surveillance Project)
IDCAP Facility-level Performance

*Triage – Quality of Data*

![Chart showing triage performance across different conditions and time periods.](chart.png)
IDCAP Facility-level Performance

Outpatients Triaged

IDCAP
Integrated Infectious Disease Capacity Building Evaluation

OSS Intervention

Phase A
Phase B

Phase A Course
Phase B Course
ETAT OSS

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IDCAP Facility-level Performance

Outpatients Triaged – Crude Percentages

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Post IMID</th>
<th>Post OSS</th>
<th>Base</th>
<th>Post IMID</th>
<th>Post OSS</th>
<th>Base</th>
<th>Post IMID</th>
<th>Post OSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency (P1)</td>
<td>2,517</td>
<td>348</td>
<td>2,702</td>
<td>9,235</td>
<td>1,508</td>
<td>4,235</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Priority (P2)</td>
<td>3,387</td>
<td>961</td>
<td>7097</td>
<td>12,996</td>
<td>3,665</td>
<td>7,861</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queue (P3)</td>
<td>17,816</td>
<td>9,992</td>
<td>99,543</td>
<td>58,848</td>
<td>18,808</td>
<td>102,160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not triaged</td>
<td>54,099</td>
<td>8,500</td>
<td>14,529</td>
<td>94,611</td>
<td>9,363</td>
<td>35,889</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Outpatient Triage
### Regression Results

<table>
<thead>
<tr>
<th>% of Outpatients Triaged</th>
<th>% of P1 patients</th>
<th>% of P2 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RR (CI)</td>
<td>RR (CI)</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effect of IMID</td>
<td>1.10 (0.67, 1.84)</td>
<td>0.23 (0.04, 1.31)</td>
</tr>
<tr>
<td>Effect of OSS</td>
<td><strong>1.52 (1.20, 1.91)</strong>*</td>
<td>1.24 (0.83, 1.88)</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effect of IMID</td>
<td>1.15 (1.00, 1.33)</td>
<td>0.53 (0.17, 1.64)</td>
</tr>
<tr>
<td>Effect of OSS</td>
<td>1.06 (0.95, 1.20)</td>
<td>0.61 (0.31, 1.23)</td>
</tr>
<tr>
<td><strong>Combined Effect of IMID</strong></td>
<td>1.03 (0.86, 1.24)</td>
<td>0.39 (0.13, 1.21)</td>
</tr>
<tr>
<td><strong>Change in Int vs. Control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMID to OSS</td>
<td><strong>1.42 (1.10, 1.85)</strong>*</td>
<td>2.03 (0.90, 4.56)</td>
</tr>
</tbody>
</table>

*p < .01
<table>
<thead>
<tr>
<th>Covariates</th>
<th>% of Outpatients Triaged</th>
<th>% of P1 patients</th>
<th>% of P2 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RR (CI)</td>
<td>RR (CI)</td>
<td>RR (CI)</td>
</tr>
<tr>
<td>Age (Under/Over 5)</td>
<td>1.03 (0.99, 1.08)</td>
<td>0.62 (0.49, 0.79)*</td>
<td>0.63 (0.49, 0.80)*</td>
</tr>
<tr>
<td>Facility Level (HC IV vs. Hosp)</td>
<td>0.81 (0.60, 1.11)</td>
<td>0.29 (0.14, 0.59)*</td>
<td>0.60 (1.19, 1.92)</td>
</tr>
<tr>
<td>Facility type (Govt vs. NGO)</td>
<td>0.91 (0.69, 1.21)</td>
<td>4.01 (2.35, 6.82)*</td>
<td>1.44 (0.50, 4.14)</td>
</tr>
<tr>
<td>Baylor supported (Intense CQI)</td>
<td>0.86 (0.64, 1.15)</td>
<td>0.71 (0.33, 1.50)</td>
<td>0.29 (0.11, 0.73)*</td>
</tr>
<tr>
<td>Previous CQI experience</td>
<td>1.00 (0.88, 1.13)</td>
<td>1.75 (0.77, 4.01)</td>
<td>3.73 (1.37, 10.16)</td>
</tr>
<tr>
<td>Data Entry Assistant Stationed</td>
<td>1.69 (1.19, 2.40)*</td>
<td>2.31 (0.92, 5.82)</td>
<td>1.30 (0.88, 1.92)</td>
</tr>
</tbody>
</table>

*p < .01
IDCAP Facility-level Performance

**P1 Patients Managed According to ETAT**

- **Base**
- **Post IMID**
- **Post OSS**

**Intervention**

- Under 5
- Over 5

**Control**

- Under 5
- Over 5

Integrated Infectious Disease Capacity Building Evaluation
IDCAP Facility-level Performance

P1 & P2 Patients Admitted, Retained or Referred

- Base
- Post IMID
- Post OSS

- Intervention
- Control

- Under 5
- Over 5

An Accordia Initiative
Integrated Infectious Disease Capacity Building Evaluation
## P1 & P2 Patient Management

### Regression Results

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Effect of IMID</th>
<th>Effect of OSS</th>
<th>% of P1 patients managed according to ETAT standards</th>
<th>OR (CI)</th>
<th>% P1 &amp; P2 patients who were retained, admitted, or referred</th>
<th>OR (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effect of IMID</td>
<td>1.94 (0.68, 5.54)</td>
<td>0.96 (0.48, 1.94)</td>
<td></td>
<td>3.01 (1.22, 7.46)</td>
<td>1.39 (1.00, 1.92)</td>
<td></td>
</tr>
<tr>
<td>Effect of OSS</td>
<td>0.96 (0.48, 1.94)</td>
<td>0.96 (0.48, 1.94)</td>
<td></td>
<td>1.39 (1.00, 1.92)</td>
<td>1.39 (1.00, 1.92)</td>
<td></td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Effect of IMID</td>
<td>0.87 (0.60, 1.26)</td>
<td>0.96 (0.59, 1.58)</td>
<td></td>
<td>1.20 (0.84, 1.71)</td>
<td>1.49 (1.06, 2.08)</td>
<td></td>
</tr>
<tr>
<td>Effect of OSS</td>
<td>0.96 (0.59, 1.58)</td>
<td>0.96 (0.59, 1.58)</td>
<td></td>
<td>1.49 (1.06, 2.08)</td>
<td>1.49 (1.06, 2.08)</td>
<td></td>
</tr>
<tr>
<td><strong>Combined Effect of IMID</strong></td>
<td>1.06 (0.69, 1.64)</td>
<td></td>
<td></td>
<td>1.47 (0.92, 2.33)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Change in Int vs. Control</strong></td>
<td></td>
<td></td>
<td></td>
<td>1.00 (0.42, 2.37)</td>
<td>0.93 (0.58, 1.50)</td>
<td></td>
</tr>
<tr>
<td>Post IMID to Post OSS</td>
<td>1.00 (0.42, 2.37)</td>
<td></td>
<td></td>
<td>0.93 (0.58, 1.50)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .01*
# P1 & P2 Patient Management

## Regression Results - Covariates

<table>
<thead>
<tr>
<th>Covariates</th>
<th>% of P1 patients managed according to ETAT standards</th>
<th>% P1 &amp; P2 patients who were retained, admitted, or referred</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR (CI)</td>
<td>OR (CI)</td>
</tr>
<tr>
<td>Age (Under/Over 5)</td>
<td>0.34 (0.26, 0.45)*</td>
<td>0.46 (0.35, 0.60)*</td>
</tr>
<tr>
<td>Facility Level (HC IV vs. Hosp)</td>
<td>3.43 (1.49, 7.89)*</td>
<td>4.16 (2.14, 8.09)*</td>
</tr>
<tr>
<td>Facility type (Govt vs. NGO)</td>
<td>1.52 (0.81, 2.87)</td>
<td>1.16 (0.45, 3.00)</td>
</tr>
<tr>
<td>Baylor supported (Intense CQI)</td>
<td>0.82 (0.33, 2.03)</td>
<td>1.38 (0.72, 2.66)</td>
</tr>
<tr>
<td>Previous CQI experience</td>
<td>0.79 (0.48, 1.28)</td>
<td>1.09 (0.48, 2.51)</td>
</tr>
<tr>
<td>Data Entry Assistant Stationed</td>
<td>1.51 (0.83, 2.77)</td>
<td>1.20 (0.78, 1.85)</td>
</tr>
</tbody>
</table>

*p < .01
ETAT Conclusions

• OSS led to improved triage for outpatients.
• Preliminary analyses of patient with a more specific definition shows an effect of IMID and OSS combined
• IMID and OSS combined appears to have had an effect on the percentage of patients admitted, retained or referred
ETAT Conclusions

• Having a Data Entry Assistant on-site improved triage
• Under 5’s more likely to be:
  – classified as P1 or P2
  – managed P1 cases according to ETAT standards and
  – be admitted, retained, or referred for further care
• Hospitals are more likely to:
  – receive P1 patients or classify patients as P1
  – managed P1 cases according to ETAT standards and
  – admit, retain or refer P1 & P2 patients for further care
ETAT Recommendations

ETAT in Uganda and the region can be strengthened through a combination of IMID, data entry assistants to support outpatient data collection, and on-site training, coaching to ensure compliance with standards for emergency care, and CQI. IDCAP tested the pure effect of training and support. We would recommend provision of essential commodities and supplies in a scale up activity.

Thank you – Asante sana
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• Mobile Team Coordinator: Milly Namaalwa
• Medical Officers: Drs. Aldo Burua, Julius Mugaya, George Alumai, Ronald Tusiime, Juliet Tumwikirize
• Clinical Officers: Moses Kairanya, Geoffrey Kintu, Sylvia Nakibuuka, Rosette Birungi, Vicky Abenakyo,
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• District Contact Persons and Health Officers