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Testing **systems strategies** which use real-time **routine health data** to **optimize** the delivery of **integrated mental healthcare** in low-resource settings.
The treatment gap for people with mental disorders exceeded 50% in ALL countries of the world in 2010

CHALLENGE:
Gaps in Care Cascade Performance

In countries like Mozambique, treatment gaps often exceed 90%

In the United States, where $10k is spent per capita on healthcare, 56% of adults with MI do not receive treatment.

78% of severely depressed youth receive no or inadequate treatment.

In Mozambique, 5 of the top 15 causes of years lived with disability for those aged 15-49 are mental, neurologic, or substance use disorders.

Source: https://vizhub.healthdata.org/gbd-compare/
CHALLENGE:
Lack of trained human resources

30 million Mozambicans

18 Mozambican Psychiatrists = 1 per 1.7 million people

300 Technicians of Psychiatry = 1 per 100,000 people
HOW TO OVERCOME THE CHALLENGES?

• Field of global mental health has focused on increasing **access** to primary mental healthcare, primarily through development and testing of novel task-shifting / task-sharing clinical interventions.

• Little to no attention to **implementation strategies to improve quality** of MH care delivered by task-shared MH providers with limited training, resources, and supervision across LMICs.
HOW TO OVERCOME THE CHALLENGES?

90% OF ALL living with HIV will know their HIV status

90% OF ALL living with HIV will receive sustained antiretroviral therapy

90% OF ALL receiving antiretroviral therapy will have durable viral suppression
HOW TO OVERCOME THE CHALLENGES?

CHALLENGE:
Gaps in Global Mental Health Implementation Science Literature

Mozambique context:

- 181/189 countries globally in Human Development Index
- 12% HIV prevalence of adults
- Life expectancy of 60
- $500 GDP per capita (<$2 / day)
- 10% of children die before age 5 in Sofala Province
SAIA-MH
Systems Analysis & Improvement Approach
Mental Health

Adaptation and pilot study: NIMH R21, 2018-2021
Original SAIA-HIV Trial

Systems Analysis and Improvement to Optimize pMTCT: a cluster randomized trial

NICHD R01 2013-2016

- Facility based cRCT across Mozambique, Kenya, Cote-D’Ivoire
- Significant effects on antiretroviral therapy coverage and screening of HIV-exposed infants
SAIA-MH PILOT/DEVELOPMENTAL R21

Objective: Adapt and pilot a multi-component implementation strategy – The Systems Analysis and Improvement Approach (SAIA) – for mental health systems optimization

Design: Pre-post design from September, 2018 – August, 2019 (6 months control; 6 months intervention (6 monthly change cycles)).

Units: All outpatient MH patients in 4 Ministry of Health clinics; total of 810 patients with 3,234 individual outpatient MH visits

Analysis: Clustered GLM assessing odds of achieving cascade steps pre-vs. post-intervention adjusting for patient age and sex
SAIA-MH PILOT/DEVELOPMENTAL R21

SAIA-MH includes:

- Step 1: Cascade Analysis
- Step 2: Map existing processes
- Step 3: Use data to identify and implement system change
- Step 4: Assess change effect on cascade
- Step 5: Repeat analysis and improvement cycle

Facility-level learning collaboratives
Enhanced local clinical consultation
Facilitation in quality improvement
**SAIA-MH PILOT/DEVELOPMENTAL R21**

SAIA-MH includes:

<table>
<thead>
<tr>
<th>Distinct SAIA-MH Implementation Strategy coded to ERIC</th>
<th>Individual, organizational, or contextual barrier(s) addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>External facilitation</td>
<td>Lack of knowledge of quality improvement and SAIA-MH implementation strategy</td>
</tr>
<tr>
<td>Provide ongoing clinical consultation</td>
<td>Clinical knowledge gaps; gaps in clinical evaluation and reporting</td>
</tr>
<tr>
<td>Organize service provider implementation team meetings</td>
<td>Limited teamwork: lower-level providers afraid to innovate without approval; siloing of services and providers; issues with role clarity</td>
</tr>
<tr>
<td>Step 1: Cascade analysis (ERIC: Audit and feedback; Model and simulate change; facilitate relay of clinical data to providers)</td>
<td>Lack of knowledge of problems; no data for prioritization; data only collected/reported but limited feedback; limited accountability</td>
</tr>
<tr>
<td>Step 2: Process mapping (ERIC: Conduct local needs assessment; assess readiness for change and identify barriers/facilitators; conduct local consensus discussions)</td>
<td>Lack of consensus on current system; limited teamwork; limited discussion on full system, goals, barriers, and facilitators; hard to conceptualize potential modifications</td>
</tr>
<tr>
<td>Steps 3–5: Conduct cyclical tests of change (ERIC: Conduct cyclical small tests of change; tailor strategies; develop a formal implementation blueprint; purposely reexamine the implementation)</td>
<td>Limited culture of quality; providers rigidly follow guidelines with no ability to innovate and improve</td>
</tr>
</tbody>
</table>
SAIA-MH PILOT/DEVELOPMENTAL R21

Diagnostic Steps

- D1: Total positive for CMD in community
- D2: Diagnosed with CMD
- D3: Diagnosed with CMD and prescribed treatment
- D4: Diagnosed with CMD, prescribed treatment, given a follow-up date
- D5: Come back for follow-up within 60 days

Follow-up Steps

- F1: Total follow up visits
- F2: Returned on time
- F3: Returned on time and adherent
- F4: Returned on time, adherent, and with functional improvement

Steps analyzed as part of the study
**Step 1:** Describe MH cascade performance and identify priority areas for improvement

- MH Cascade Analysis Tool (MHCAT) provides a ‘systems view’ of the sequential, linked MH cascade steps
- Guides targeting and evaluation of improvement efforts

### INITIATION CASCADE

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Schizophrenia Patients in Care</th>
<th>Follow-up Patients Expected to Visit During Report Period</th>
<th>Return for Follow-up</th>
<th>Return for Follow-up On Time</th>
<th>Return for Follow-up On Time and Adherent</th>
<th>Return for Follow-up On Time and Adherent and Function Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>New Schizophrenia Diagnoses</td>
<td>40</td>
<td>32</td>
<td>30</td>
<td>27</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>New Diagnoses with Medication Prescribed</td>
<td></td>
<td></td>
<td>8</td>
<td>2</td>
<td><strong>1</strong></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>New Diagnoses given Medication and Follow-up Date</td>
<td></td>
<td></td>
<td>7</td>
<td>1</td>
<td><strong>0</strong></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Return for Follow-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>1</strong></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Return for Follow-up On Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>1</strong></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Return for Follow-up On Time and Adherent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>9</strong></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Return for Follow-up On Time and Adherent and Function Improvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>4</strong></td>
<td></td>
</tr>
</tbody>
</table>
**Step 2:** Process Mapping

A method for health care teams to jointly describe their facility’s patient care pathway

- Builds common understanding
- Improved communication/ problem solving
**Steps 3-5:** Continuous Quality Improvement

- Define & implement facility-specific workflow adaptations
- Monitor changes in performance; initiate additional iterations
- Repeat analysis and improvement cycle
Example systems modifications tested in pilot:
• 63% of systems modifications targeted medication adherence (F3)

<table>
<thead>
<tr>
<th>System Barrier</th>
<th>Type of Change</th>
<th>Specific Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients returning late with poor adherence</td>
<td>Service re-organization</td>
<td>Provide additional 5 days of “buffer” medication or mark consultations 5 days early</td>
</tr>
<tr>
<td>Certain patients chronically miss visits leading to poor adherence</td>
<td>Service re-organization / new intervention</td>
<td>Encourage family/friend participation in consultations; integrate psychologist to provide problem-solving therapy for targeted patients</td>
</tr>
<tr>
<td></td>
<td>Overall (n=810)</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total visits</td>
<td>3234</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>377 (46.5%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>428 (52.8%)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>5 (0.6%)</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>29 (± 16)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>5 (0.6%)</td>
<td></td>
</tr>
<tr>
<td>Homeless</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>539 (66.5%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>210 (25.9%)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>61 (7.5%)</td>
<td></td>
</tr>
<tr>
<td>Suicidal ideation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>728 (89.9%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>50 (6.2%)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>32 (4.0%)</td>
<td></td>
</tr>
<tr>
<td>HIV status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV+</td>
<td>268 (33.1%)</td>
<td></td>
</tr>
<tr>
<td>HIV-</td>
<td>280 (34.6%)</td>
<td></td>
</tr>
<tr>
<td>Missing / Never Tested</td>
<td>262 (32.4%)</td>
<td></td>
</tr>
</tbody>
</table>

Note: “Use of a sex binary and/or gender binary categorization in surveys and graphics does not capture the diverse range of identities and can inflict harm and be alienating to transgender and gender non-conforming individuals”.

The Mozambican health system uses sex binary categorization in their health records currently.
SAIA-MH PILOT/DEVELOPMENTAL R21

Pilot Results

Time period
- Baseline
- Intervention

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Baseline (%)</th>
<th>Intervention (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D3: Diagnosed and prescribed treatment</td>
<td>67.0%</td>
<td></td>
</tr>
<tr>
<td>D4: Diagnosea, prescribed treatment, given follow-up date</td>
<td>62.5%</td>
<td></td>
</tr>
<tr>
<td>D5: Returned for follow-up in 60 days</td>
<td>41.2%</td>
<td></td>
</tr>
<tr>
<td>F1: All follow-up visits</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>F2: Return on time</td>
<td>45.6%</td>
<td></td>
</tr>
<tr>
<td>F3: Return on time and adherent</td>
<td>14.2%</td>
<td></td>
</tr>
<tr>
<td>F4: Return on time, adherent, and with function improvement</td>
<td>4.2%</td>
<td></td>
</tr>
</tbody>
</table>
Baseline: 1 in 24 patients (4.2%) have function improvement
6 months of SAIA-MH: 1 in 8 patients (13.1%)
SAIA-MH PILOT/DEVELOPMENTAL R21

“Before SAIA we were working very hard, but the cascade shows we are not getting results. Now we are focusing our energy and making progress”

~ Psychiatric Technician, Clinic X
NEXT STEPS (NIMH R01 cRCT)

Systems Analysis and Improvement Approach to Optimize the Task-Shared Mental Health Treatment Cascade (SAIA-MH): A Cluster Randomized Trial

NIMH R01 2021-2026

• Facility based cRCT across 16 Ministry of Health clinics in Sofala and Manica Provinces, Mozambique

• Goal: Improve LTFU; Visit **adherence**; Medication **adherence**; **function improvement**

• Evaluate costs, cost-effectiveness; CFIR barriers/facilitators to optimize strategy; routine maintenance (2 year intensive, 1 year maintenance)
NEXT STEPS (NIMH R01 cRCT)

NIMH R01 2021-2026

- Longitudinal SEM, monthly mechanism measurement at provider level

- Evaluation of both **left side** (mechanisms activated by SAIA-MH); **right side** (mechanisms with most effect on outcomes); and **total effect of mechanism**

- Goal: Improve SAIA-MH strategy, will be combined with CFIR QUANT->qual
BASELINE DATA (NIMH R01 cRCT)

- Total Consults (N=4315): 100%
- Attended On Time (N=2846): 66%
- Attended On Time and Adherent (N=1564): 36%
- Attended On Time, Adherent, and Function Improvement (N=484): 11%

16 MoH Clinics March – September, 2022
NEXT STEPS (SPECIFICATION; OTHER CASCADES)

The Systems Analysis and Improvement Approach: specifying core components of an implementation strategy to optimize care cascades in public health

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Abstract

Background: Healthcare systems in low-resource settings need simple, low-cost interventions to improve services and address gaps in care. Though routine data provide opportunities to guide these efforts, frontline providers are rarely engaged in analyzing them for facility-level decision making. The Systems Analysis and Improvement Approach (SAIA) is an evidence-based, multi-component implementation strategy that engages providers in using facility-level data to promote systems-level thinking and quality improvement (QI) efforts within multi-step care cascades. SAIA was originally developed to address HIV care in resource-limited settings but has since been adapted to a variety of clinical care systems including cervical cancer screening, mental health treatment, and hypertension management, among others, and across a variety of settings in sub-Saharan Africa and the USA. We aimed to extend the growing body of SAIA research by defining the core elements of SAIA using established specification approaches and thus improve reproducibility, guide future adaptations, and lay the groundwork to define its mechanisms of action.

Methods: Specification of the SAIA strategy was undertaken over 12 months by an expert panel of SAIA researchers, implementing agents and stakeholders using a three-round, modified nominal group technique approach to match core SAIA components to the Expert Recommendations for Implementing Change (ERIC) list of distinct implementation strategies. Core implementation strategies were then specified according to Proctor’s recommendations for specifying and reporting, followed by synthesis of data on related implementation outcomes linked to the SAIA strategy across projects.

Results: Based on this review and clarification of the operational definitions of the components of the SAIA, the four components of SAIA were mapped to 13 ERIC strategies. SAIA strategy meetings encompassed external facilitation,
NEXT STEPS (SPECIFICATION; OTHER CASCADES)

SAIA
Systems Analysis and Improvement Approach

Applying Systems Engineering to Optimize Complex Care Cascades

Designed by faculty at the University of Washington, the Systems Analysis and Improvement Approach (SAIA) is a multi-step, evidence-based implementation strategy to systematically identify and address bottlenecks in health care delivery systems and prioritize solutions.

Website

https://www.saia-strategy.com/
Cascade Analysis: An Adaptable Implementation Strategy Across HIV and Non-HIV Delivery Platforms

Anjuli D. Wagner, PhD, MPH, a Sarah Gimbel, PhD, MPH, RN, a,b Kristjana H. Ástþórsdóttir, PhD, MPH, a Peter Cherutich, PhD, MBChB, MPH, a Joana Coutinho, BSN, c Jonny Crocker, PhD, MSEE, c,d Emilia Cruz, e Fatima Cuembelo, MMed, MPH, f Vasco Cumbe, MD, MSc, PhD, g,h McKenna Eastment, MD, MPH, i Jennifer Einberg, MS, MBA, j Florence Floriano, BSN, k Douglas Gaitho, MMed, MBChB, l Brandon L. Guthrie, PhD, MPH, m,n Grace John-Stewart, MD, MPH, PhD, o Alex H. Kral, PhD, MPH, p Barrot H. Lambdin, PhD, MPH, q,m,n Shan Liu, PhD, SM, q Martin Maina, Bcom, q Nelia Manasco, PhD, q Mika Matsuzaki, PhD, MPH, MS, q Loris Mattox, BA, q Nancy Mburu, BA, q R. Scott McClelland, MD, MPH, q, o, t Mark A. Micek, MD, MPH, q Ana Olga Mocumbi, MD, PhD, FESC, u Alberto Munando, v Ruth Nduati, MMed, MBChB, MPH, u, x Irene N. Njuguna, PhD, MBChB, MPH, w, x Geoffrey Oluwole, BS, MSc, y Laura B. Oyiengo, MMed, MD, y Keshet Ronen, PhD, MPH, z Caroline Soi, PhD, MSc, MBChB, w Bradley H. Wagenaar, PhD, MPH, x, z George Wanjie, MPH, w Lynn D. Wenger, MSw, MPH, w, x and Kenneth Sherr, MPH, PhD u,w,x

Background: Cascades have been used to characterize sequential steps within a complex health system and are used in diverse disease areas and across prevention, testing, and treatment. Routine data have great potential to inform prioritization within a system, but are often inaccessible to frontline health care workers (HCWs) who may have the greatest opportunity to innovate health system improvement.

Methods: The cascade analysis tool (CAT) is an Excel-based, simple simulation model with an optimization function. It identifies the step within a cascade that could most improve the system. The original CAT was developed for HIV treatment and the prevention of mother-to-child transmission of HIV.

Results: CAT has been adapted 7 times: to a mobile application for prevention of mother-to-child transmission; for hypertension screening and management and for mental health outpatient services in Mozambique; for pediatric and adolescent HIV testing and treatment, HIV testing in family planning, and cervical cancer screening and treatment in Kenya; and for naloxone distribution and opioid overdose reversal in the United States. The main domains of adaptation have been technical—estimating denominators and structuring steps to be binary sequential steps—as well as logistical—identifying acceptable approaches for data abstraction and aggregation, and not overburdening HCW.

NEXT STEPS (SPECIFICATION; OTHER CASCADES)
NEXT STEPS (SPECIFICATION; OTHER CASCADES)

A Cascade of Care Model for Suicide Prevention

Emily E. Haroz, PhD, MA, MHS, a,b Ilina M. Sarapik, MA, a Leslie B. Adams, PhD, MPH, b
Paul S. Nestadt, MD, b,c Alison Athey, PhD, b Kiara Alvarez, PhD, c,d Eric P. Slade, PhD, d,e
Mary Cwik, PhD, MA, f Alan L. Berman, PhD, f Holly C. Wilcox, PhD g, h

Figure 1. An approximate Cascade of Care for individuals at risk of suicide.
SUMMARY

• SAIA-MH is a promising strategy to rapidly improve MH care cascade performance in low-resource settings

• Particularly urgent given the poor baseline care cascade performance (~10% of visits with function improvement)

• SAIA-MH is an efficient strategy in resource-limited settings given it utilizes existing resources to improve quality / efficiency

• Field of global mental health urgently needs more studies testing strategies to improve quality and efficiency of routine MH care delivery.

• The SAIA implementation strategy appears feasible across various disease conditions and cascade, with significant effectiveness data to be generated in the next few years.
Big thanks to our funders and collaborators:
- NIMH
- Mozambican MOH
- Vasco Cumbe
- Alberto Muanido
- Isaias Ramiro
- Entire CSM team in Mozambique
- Kenneth Sherr
- Sarah Gimbel
- Steve Gloyd
- MH providers in Mozambique
- MH patients
- UW faculty

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Discussion, questions?

Aptly named Mount Mystery, North Cascades, WA