

Systems Mapping of Sexually Transmitted Infection Services at Three Clinical Sentinel Surveillance Sites in South Africa: Opportunities for Integrated Care

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Sexually transmitted infection (STI) service delivery in the context of integrated care and the South African HIV epidemic is complex. We aimed to document STI care and HIV testing processes in public health clinics in South Africa, revealing bottlenecks to patient flow and identifying opportunities for improvement. Clinic mapping, with semi-structured interviews and clinic observation, was conducted with facility representatives at three clinical sentinel surveillance sites. Facility surveys assessed patient volume and staffing. Identified challenges were associated with staffing allocations, and disruptions in patient flow resulted from poor clinic layout, inadequate lighting, and limited allocation of space for HIV testing and physical examination. Recommendations include staffing adjustments, reorganization of space to allow for designated service and waiting areas, sufficient supplies, and improved lighting. The facility reorganization component of South Africa's Ideal Clinic initiative provides a key opportunity for enacting many of these recommendations.

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Key words: clinic mapping, health services, patient care, sexually transmitted diseases, sexually transmitted infections

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Primary health care (PHC) in South Africa has emphasized decentralization and integration of services, including sexually transmitted infection (STI) and HIV care (Maharaj & Cleland, 2005; National Department of Health [NDOH], 2001). Service delivery has taken the form of a one-stop approach, whereby services are delivered at a single location. Recently, the South African government launched the Ideal Clinic Project to improve service efficiency and quality of clinical care by providing a measurement framework for well-functioning PHC facilities (NDOH, 2015). Within this context, documenting current patient flow processes at the facility level and identifying bottlenecks and needs, as well as opportunities for intervention, has the potential to improve services.

Quality STI service delivery is critical within the context of the South African HIV epidemic. The prevalence of curable STIs in general and high-risk populations is high (Johnson, Coetzee, & Dorrington, 2005), and research has suggested that STIs contribute significantly to the spread of HIV in South Africa (Johnson, Dorrington, Bradshaw, & Coetzee, 2012). Integration of HIV and STI services has been embraced as part of a national initiative (NDOH, 2001, 2015), and South Africa has adopted STI syndromic management guidelines (Johnson et al., 2012). Despite these efforts, health systems and structural barriers affecting quality of care remain, posing challenges toward global goals of HIV prevention and linkage to care (Joint United Nations Programme on HIV/AIDS, 2014). At the provider level in South Africa, there is a perception that PHC staff may be overburdened with new tasks without adequate authority or support to fulfill them (Gill & Sharron, 1999). From the patient perspective, factors including inconvenient clinic hours, long queues, and difficulty scheduling appointments have been identified as barriers to care affecting patient satisfaction and adherence to antiretroviral therapy (ART; Bogart et al., 2013; Miller, Kethapile, Rybasack-Smith, & Rosen, 2010; Orner et al., 2008; Wouters, Heunis, van Rensburg, & Meulemans, 2008).

Health services mapping can facilitate quality improvement projects; create a culture of ownership, responsibility, and accountability among staff; help staff relate to patients; and facilitate stakeholder

involvement (National Health Service Modernisation Agency, 2005). A variety of mapping techniques have been used in health care settings to improve operations and quality of care, including value stream mapping (King, Ben-Tovim, & Bassham, 2006; Lummus, Vokurka, & Rodeghiero, 2006; Supeekit & Kingphadung, 2009) and systems dynamics mapping (Brailsford, Lattimer, Tarnaras, & Turnbull, 2004; Forrester, 1961; Lane & Husemann, 2007). Lane and Husemann (2007) have developed a qualitative hybrid systems dynamics approach intended to generate discussion regarding opportunities to improve patient flow.

Our study aimed to (a) outline the care process and patient flow for individuals presenting with STI symptoms at public health centers in South Africa from the perspective of facility staff, (b) identify self-reported process times for each step in the care process, and (c) identify factors affecting patient flow and opportunities for improvement.

Methods

Study Design

Nested in a larger evaluation of STI services in South Africa (Kohler et al., 2015), we identified patient flow processes and opportunities to improve delivery of STI services using a hybrid form of qualitative mapping developed by Lane and Husemann (2007). The approach included preliminary mapping of STI patient flow coupled with semi-structured interviews and clinic observation (Stage I), followed by semi-structured validation interviews (Stage II). Stage I outlined patient flow for individuals presenting at the clinic, while Stage II interviews validated Stage I flow maps and explored opportunities to improve patient flow. During both stages, participants were asked to outline patient flow and identify alternative pathways (additional pathways to add to the patient flow map), dwell times (the average, self-reported time a patient spent in each step), blocking resources (factors inhibiting flow from one step to the next), conversion resources (factors facilitating patient flow), and any additional suggestions to improve patient flow. Data were

collected in November 2014, Monday through Friday, during clinic hours.

Population and Sample

Three clinical sentinel surveillance (CSS) sites, each representing a purposively selected geographic region (urban [Gauteng], rural/inland [North West], rural/coastal [KwaZulu-Natal]), were selected at the request of the NDOH. CSS clinics are public health facilities designated by the NDOH to have enhanced monitoring of STIs. Selected sites varied by catchment population, daily patient flow volumes, and physical clinic size. At each site, Stage I mapping and interviews were conducted with the Facility Manager or his/her delegate ($n = 3$), and a Stage II validation interview was conducted with a Deputy Facility Manager ($n = 1$) or professional nurse ($n = 2$).

Data Collection

Preliminary mapping (Stage I) outlined patient flow for individuals presenting with symptoms of male urethritis syndrome or vaginal discharge syndrome. Health facility informants were asked how patients entered the system and how they moved through the clinic during each step in the patient encounter. The interviewee was asked to identify services provided and which provider administered those services, and to estimate the total time required. Research staff toured the clinic with the informant and developed an initial map based on naturalistic observation and detailed notes. Descriptive facility surveys were also conducted to assess patient volume and staffing.

During Stage II interviews, informants were asked to review and validate the flow maps. Using the validated maps as a tool for discussion, informants were asked to identify variables preventing and facilitating patient flow and to rate identified time as appropriate, longer than necessary, or far longer than necessary. When challenges or excessive time durations were identified, the informant suggested opportunities for intervention and rated their importance. Stage II interviews were audio recorded and detailed notes were taken.

Data Analysis and Validation

Data collection produced two flow maps, observations, interview notes, and interview audio recordings for each site. Flow maps were cross-referenced with observation and interview notes to produce final maps. Notes and audio recordings were reviewed to identify needs and facilitators of clinic flow and develop recommendations.

Ethical Considerations

Our protocol was approved by the South African Human Sciences Research Council (REC 02/21/08/13) and received relevant National, Provincial, and Municipal Department of Health approvals. The University of Washington Human Subjects Division provided a nonresearch determination. Clinic managers consented to evaluation activities occurring at their facilities and individual informants were consented prior to interviews.

Results

Catchment areas of the three clinics ranged in size from 10,000-15,000 to 45,000-50,000 people (Table 1). Staff-reported patient flow (average number of clients served per day) ranged from 100-200 patients at the rural/inland site to 650-750 patients at the urban site. All three clinics reported that STI services were offered at all times when the clinic was open. Staffing structures in the rural/coastal and rural/inland facilities were similar, both relying heavily on professional and enrolled nurses, while the urban site employed additional support staff including auxiliary nurses and one pharmacy technician. The urban clinic was the largest in physical size (12 exam rooms), while both rural/inland and rural/coastal were markedly smaller (2 and 3 exam rooms). Patient flow for each clinic is depicted in Figure 1.

Description of Patient Care Flow Patterns

Urban clinic. The urban clinic's care process was divided into acute and chronic patient flows, with one wing devoted to acute and new patients and another to chronic patients. The acute pathway was for ailments such as the flu, STIs, and other easily treatable

Table 1. Site Overviews

| | Urban Clinic | Rural/Coastal Clinic | Rural/Inland |
|---|-------------------|----------------------|--------------------|
| Site characteristics | | | |
| Catchment size | 45,000-50,000 | 10,000-15,000 | 12,000-17,000 |
| Patients seen per day (all services) | 650-750 | 100-200 | 100-200 |
| Number of exam rooms | 12 | 2 | 3 |
| Physician | 1 (PT) | 1 (PT) | 1 (PT) |
| Professional nurses | 20 (FT) | 8 (FT) | 9 (FT) |
| Enrolled nurses | 3 (FT) | 3 (FT) | 1 (FT) |
| Nursing assistants | 4 (FT) | 0 (FT) | 0 (FT) |
| Total self-reported times (mean) | | | |
| Total wait time | 1 hour 20 minutes | 1 hour 50 minutes | 2 hours 30 minutes |
| Total triage time | 20 minutes | N/A | N/A |
| Total consultation time ^a | 30 minutes | 15-20 minutes | 30-50 minutes |
| Total on-site lab time | 15-30 minutes | 5 minutes | N/A |
| Total HCT time | 30 minutes | 20-40 minutes | 30 minutes |
| Bottlenecks: Areas identified as taking longer or far longer than necessary | | | |
| Registration | | | X |
| Waiting | X | X | |
| Movement between steps | | X | |
| Triage | X | N/A | N/A |
| Consultation | | | X |
| HCT | X | X | |

Note. PT = part time; FT = full time; N/A = not applicable; HCT = HIV counseling and testing.

a. Includes vitals, consultation, and provider-initiated counseling and testing (PICT) if offered.

conditions, while the chronic pathway was for anyone requiring ongoing care and medications. Following registration in the general waiting area, new patients presenting with STI symptoms proceeded to the acute patient waiting area where vital signs were taken by an enrolled auxiliary nurse. Patients were triaged by a professional nurse, and those whose symptoms were easily diagnosed (typically men, in the case of STIs) were assessed, treated, and discharged from the triage room. Those whose symptoms were not as easy to diagnose (typically women, in the case of STIs) were directed from triage to consultation for further examination. Medications were offered in the triage or consultation steps. HIV tests were offered in consultation as provider-initiated counseling and testing (PICT) or in an outdoor tent when requested upon arrival as voluntary HIV counseling and testing (HCT). Individuals requiring follow-up tests were directed to the laboratory test room to collect samples and were requested to return in 14 days for HIV test results. Patients requiring follow-up STI care or test results were asked to return in 7 days. A complete list of services with reported wait times is summarized in [Table 2](#).

Rural/coastal clinic. The rural/coastal clinic in KwaZulu-Natal used a single space for waiting and registration. Patients were seated according to arrival time and registered with an enrolled auxiliary nurse in the waiting area. Patients then proceeded to consultation for diagnosis and treatment as relevant. No separate triage space or process was used. HCT was offered in an outdoor tent by lay counselors either directly following registration, with referral to consultation for HIV-infected patients, or as PICT in the HCT area following consultation. When lay counselors were not available, HCT and PICT services were offered by a professional nurse in the consultation room. Anyone testing positive for HIV or who had a cough was screened for tuberculosis via a questionnaire and sputum collection in a designated cough area, then proceeded to the laboratory test room for samples and family planning consultation. Patients screened for tuberculosis were not isolated from the rest of the clinic after screening. STI patients were asked to return within 7 to 14 days for follow-up care and test results ([Table 3](#)).

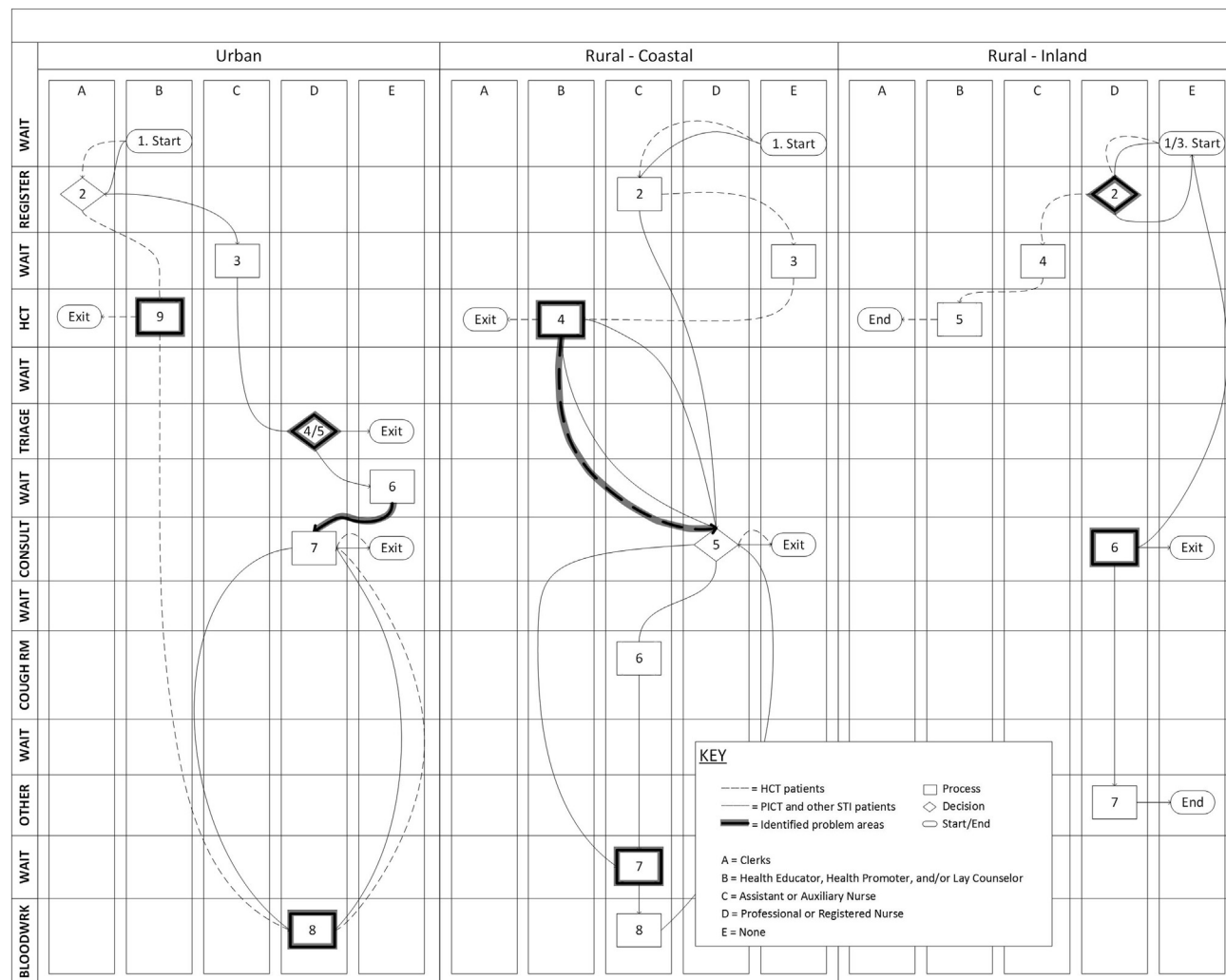


Figure 1. Description of patient care flow patterns at three clinical sentinel surveillance sites in South Africa. *Note.* PICT = provider initiated counseling and testing; HCT = HIV counseling and testing; STI = sexually transmitted infection.

Rural/inland clinic. At the rural/inland clinic in North West province, patients waited for registration adjacent to the main waiting room. After registering and returning to the waiting area for a second time, patients proceeded to consultation for diagnosis and treatment with a professional nurse. PICT and STI-related lab tests occurred in consultation. Patients could exit the flow process at this point. If a pap smear was needed, the patient would move to a maternity room or the clinic's boardroom, which was used due to limited space and poor lighting. Patients arriving for HCT registered and waited in an HCT

waiting area. HCT and related lab tests were conducted in a specific HCT room by a professional nurse (lab tests) or lay counselor (HCT). Patients were asked to return after 2 days for lab results sent to external facilities (Table 4).

Key Informant-Identified Needs and Opportunities for Intervention

Urban clinic. Key informants identified four primary factors affecting STI patient flow in the urban clinic: (a) lack of enough rooms for private triage

Table 2. Steps in the Patient Care Process, Urban Clinic

| Step/Area | Service Provider | Services Provided | Time (Mean) | Bottlenecks ^a |
|--|--|--|---|--------------------------|
| 1. Waiting | Health promoter or professional nurse | Health education & prevention | 30 minutes | |
| 2. Registration | Clerk | None | 15 minutes | |
| 3. Acute waiting | Enrolled auxiliary nurse | Vital signs | 20 minutes | |
| 4. Triage | Professional nurse | Preliminary assessment | 20 minutes | X |
| 5. Triage, continued | Professional nurse Professional nurse | Medication Rapid HIV test for PICT | N/A | X |
| 6. Waiting | None | None | 30 minutes | X |
| 7. Consultation | Professional nurse Professional nurse Professional nurse Professional nurse Professional nurse Professional nurse Professional nurse | Health education Exam (if relevant) Partner notification slips Medication Rapid HIV test Pre-/post-test PICT Referrals (ANC, medical male circumcision, on-going counseling) | 30 minutes | |
| 8. Lab tests | Professional nurse Professional nurse Professional nurse | HIV-related lab tests (e.g., CD4+ T cell, HIV staging) Syphilis test TB test | 15-30 minutes | X |
| 9. HCT | Lay counselor Lay counselor | Pre-/posttest counseling HCT/ PICT ^b HCT | 30 minutes | X |
| Total time (registration, waiting, consultation, PICT, other STI services) | | | 2 hours, 40 minutes–2 hours, 55 minutes | |
| Total wait time (PICT and other STI services) | | | 1 hour, 20 minutes | |

Note. PICT = provider-initiated counseling and testing; HCT = HIV counseling and testing; STI = sexually transmitted infection; ANC = antenatal care; TB = tuberculosis.

a. Defined as steps in the patient flow process taking longer or far longer than necessary as reported by participants.

b. Exact location of counseling depends on patient load and staffing.

services, (b) congested hallways blocking consultation rooms, (c) delays in processing of laboratory specimens, and (d) inadequate or inappropriate space for HCT. The clinic used a triage process to treat and release patients who could be processed quickly, but the clinic had one room available for triage services. Informants indicated the clinic could staff at least one additional triage room if space were available. Consultation rooms were located off a small hallway used as a thoroughfare for the rest of the clinic. Those waiting for services often sat on benches in the hallway, impeding movement and creating confusion for patients and providers. In inclement weather, HCT testing was moved into the hallway of the chronic care wing, physically blocking the hallway further. Delays in result turnaround time for specimens sent to an off-site laboratory were common,

limiting ability to initiate ART or syphilis treatment in a timely fashion and resulting in loss to follow-up. Key informants recommended additional laboratory capacity to process specimens more efficiently and reduce wait time for results, as well as development of a permanent, indoor space for HCT services.

Rural/coastal clinic. Informants identified three factors affecting patient flow in the coastal/rural clinic: (a) patients lost their places in line after HCT, (b) inadequate or inappropriate space for HCT, and (c) long wait times at the laboratory test room because of limited laboratory staff. Patients who used HCT after registration lost their places in line for other services, creating tension between patients and clinic staff. Services were offered in different locations without a clear flow path between

Table 3. Steps in the Patient Care Process, Rural/Coastal Clinic

| Step/Area | Service Provider | Services Provided | Time (Mean) | Bottlenecks ^a |
|--|--|--|---|---|
| Waiting | Enrolled auxiliary nurse or nutritional advisor | Health education & prevention Vital signs | 1 hour, 30 minutes | |
| Registration | Enrolled auxiliary nurse or professional nurse | Registration | 30 minutes | |
| Waiting | None | None | 20-40 minutes | |
| HCT room | Lay counselor Lay counselor Lay counselor | HIV test & HCT/PICT Pre-/posttest counseling HIV-related lab tests (e.g., CD4+ T cell) ^b | 20-40 minutes | X (and movement between HCT and consultation) |
| Consultation | Professional nurse Professional nurse Professional nurse Professional nurse Professional nurse Professional nurse | Health education Exam (if relevant) HIV test (PICT) ^c Pre-/post-test counseling ^c Partner notification slips Medication Referrals (pap smear, MMC, and warts) | 15-20 minutes | |
| Cough area | Enrolled nurse | TB test | 30 minutes | |
| Waiting | None | None | 20 minutes | X |
| Lab tests | Enrolled nurse Enrolled nurse Enrolled nurse | HIV-related lab tests (ex: CD4+ T cell) Syphilis test Family planning | 5 minutes | |
| Total time (registration, waiting, consultation, PICT, and other STI services) | | | 3 hours, 30 minutes–3 hours, 55 minutes | |
| Total wait time (PICT and other STI services) | | | 1 hour, 50 minutes | |

Note. PICT = provider-initiated counseling and testing; HCT = HIV counseling and testing; STI = sexually transmitted infection; MMC = male medical circumcision.

a. Defined as steps in the patient flow process taking longer or far longer than necessary as reported by participants.

b. HIV-related lab tests are often processed in the HCT room, but patients may be sent to lab if processing equipment in HCT room is not working.

c. PICT is typically offered in the HCT room (step 4). However, if lay counselors are not available, nurses will conduct HIV testing for PICT in the consultation room (step 5).

the two. Furthermore, HCT was offered in a temporary tent detached from the main clinic, which was unusable in rainy weather. The tent was also reported to jeopardize confidentiality, resulting in patients leaving prior to HCT for fear of being seen. Informants suggested the development of a permanent, private waiting space for HCT. Finally, after initial consultation, patients were sent to the lab test room to collect lab samples. The wait time was identified as unnecessarily long. Informants suggested adding additional staff to the laboratory test room to improve patient flow and reduce wait times.

Rural/inland clinic. Key informants identified three factors affecting patient flow in the rural/inland clinic: (a) lack of clerks to expedite registration, (b)

lack of enrolled auxiliary nurses to provide screening services, and (c) lack of examination beds for STI-related consultation services. In this facility, nurses acted as registration clerks, limiting their availability to provide direct services. The clinic had no auxiliary nurses and only one enrolled nurse on staff. This was perceived to increase the burden on professional nurses and slow patient flow. The consultation rooms used for STI care were small, beds were described as “worn out,” and lighting was poor. As a result, nurses moved patients to the clinic’s boardroom for physical examinations. This process constituted unnecessary movement and jeopardized patient confidentiality and infection control. Informants suggested the clinic (a) hire clerks or recruit community volunteers to conduct patient registration and

Table 4. Steps in the Patient Care Process, Rural/Inland Clinic

| Step/Area | Service Provider | Services Provided | Time (Mean) | Bottlenecks ^a |
|--|--------------------|------------------------------|---|--------------------------|
| Waiting | None | None | 2 hours ^b 10 minutes ^c | |
| Registration | Professional nurse | None | 10-15 minutes | X |
| Waiting (regular) | None | None | 30 minutes | |
| Waiting (HCT) | Engineering nurse | Health education | 30 minutes | |
| HCT | Lay counselors | HIV test (HCT) | 30 minutes | |
| | Lay counselors | Pre-/post-test HCT/PICT | | |
| | Professional nurse | HIV-related lab tests & HCT | | |
| Consultation | Professional nurse | Health education | 30-50 minutes | X |
| | Professional nurse | Vital signs | | |
| | Professional nurse | Exam (if relevant) | | |
| | Professional nurse | HIV test & PICT | | |
| | Professional nurse | HIV related lab tests & PICT | | |
| | Professional nurse | Syphilis test | | |
| | Professional nurse | Partner notification slips | | |
| | Professional nurse | Medication | | |
| | Professional nurse | TB screening | | |
| | Professional nurse | Referrals (pap smear & MMC) | | |
| Maternity or board room | Professional nurse | Pap smear | 15 minutes | |
| Total time (registration, waiting, consultation, PICT, and other STI services) | | | 3 hours 25 minutes–3 hours 50 minutes | |
| Total wait time (PICT and other STI services) | | | 2 hours 30 minutes | |

Note. PICT = provider-initiated counseling and testing; HCT = HIV counseling and testing; STI = sexually transmitted infection; TB = tuberculosis; MMC = male medical circumcision.

a. Defined as steps in the patient flow process taking longer or far longer than necessary as reported by participants.

b. PICT and other STI patients.

c. HCT patients.

enrolled auxiliary nurses to assist with vital signs to reduce wait times, (b) replace beds, and (c) improve lighting in consultation rooms.

Discussion

We compared staff-reported patient flow at three CSS sites in South Africa to identify opportunities for improved service delivery within the context of decentralization and integration of HIV and STI care. While included sites differed by geographic regions, average patient volumes, staffing levels, and physical size, all three clinics described the STI care process as using the one-stop approach outlined by the NDOH comprehensive PHC service package. The urban clinic used a dual-flow process that segregated acute and chronic services. All three clinics described the provision of promotion, preventative, and curative services, with the majority of services being offered in a single setting—the consultation

room. The clinics relied heavily on nursing staff for patient care, HIV testing, tuberculosis screening, and referrals for relevant services such as family planning and male medical circumcision. All three sites sent HIV-related laboratory tests off-site for processing.

We identified consistent themes related to delays and movement inefficiencies as a result of staffing allocations, clinic layout, and clinic infrastructure. Although the rural/inland clinic was the only site to explicitly identify challenges related to staffing, both the rural/inland and rural/coastal clinics relied heavily on professional nurses for tasks that could be completed by other staff, including patient registration, triage, vital signs, and laboratory specimens. In both clinics, these were steps in the patient visit for which challenges were identified. Although the rural/inland clinic reported using retired nurses to assist with health education, neither clinic reported employing enrolled auxiliary nurses for similar tasks.

In the case of staffing, informants at the rural/inland clinic recommended using volunteers for patient intake to alleviate the burden on professional nurses. While an abundance of literature exists about task-shifting responsibilities from physician to nurses or from nurses to lay health care workers for ART-related responsibilities (Callaghan, Ford, & Schneider, 2010), and similarly from physicians to midwives or nurses for noncommunicable disease diagnosis and management (Joshi et al., 2014), less information is available specific to shifting lower-level clinic tasks, but doing so is supported by work in Kenya and Zambia (Chiambe et al., 2009; Deo et al., 2012). In clinics where professional nurses have limited support, sharing administrative and triage duties with paraprofessional staff or additional health worker cadres, including enrolled nurses or enrolled auxiliary nurses, could reduce wait times in areas identified as being of greatest concern.

The second frequently discussed barrier to patient flow was inadequate space or space utilization. The negative effect of poor clinic layout has been identified as a barrier to patient flow elsewhere in South Africa (Sokhela, Makhanya, Sibiyi, & Nokes, 2013). A lack of adequate space within the clinics for waiting and triage led to backlogs in patient flow. Despite differences in total space, the urban and rural/costal clinics both used outdoor tents for the provision of HTC services. Tents and other outside spaces were unusable in inclement weather and compromised confidentiality. Patients seeking other services following HIV testing often lost their places in line, creating a disincentive for testing, increased wait times, and conflicts between patients and staff. Inadequate space and lighting for provision of essential physical examinations led to unnecessary movement between spaces and could result in issues related to infection control.

South Africa's 1994 transition to a primary health model emphasized decentralization and integrated, comprehensive care (McIntyre & Klugman, 2003; NDOH, 2001). These concepts have been further emphasized by the Ideal Clinic model, which was based on integrated chronic disease management and emphasized a single-room approach to delivery of care, including HIV

and STI services. Our study identified key opportunities to improve clinic efficiency and quality of care related to staffing, clinic layout, and allocation of space for health services, which have been prioritized under components 4 (Human Resources for Health) and 6 (Clinic Infrastructure) of the new Ideal Clinic model (NDOH, 2015). While it is challenging to address infrastructure through quality improvement processes without additional capital, as national, phased rollout is on-going, the timing of our study provides a unique opportunity to adjust these inefficiencies.

Limitations

We completed study activities at three purposively selected clinics, thus, findings from these sites may not be generalizable to the entire public health system. Some perspectives may also be lacking from the analysis; however, the similarity of the findings in such diverse settings suggests that these are common problems. All Stage I interviews and one of the validation interviews were conducted with managerial staff. It is possible that managers and professional nurses have different perspectives on the reality of patient flow, and patients may have a different perspective altogether, which was not captured. Lastly, patient flow has anecdotally been suggested to fluctuate according to the season and time of day. Data may not accurately reflect flow during other months.

Conclusions

Our evaluation provides timely information that can contribute to improvement of clinical services through government reorganization initiatives in South Africa. The results revealed multiple opportunities to improve STI care during the patient encounter. Service efficiency recommendations included maximizing the role of professional nurses to reduce patient wait time through engagement of other nursing and health worker cadres and prioritizing permanent space for HIV testing where possible. Quality of clinical care can be addressed

by creating sufficient space for waiting and triage to facilitate flow and avoid transmission of respiratory infections including tuberculosis, and to improve lighting and procurement of examination beds to ensure that physical examination can be conducted in all consultation rooms.

Key Considerations

- Challenges with staffing, clinic infrastructure, and clinic layout were the most frequently identified barriers to patient flow.
- Clinics could engage other nursing and health worker cadres, especially at patient intake, to maximize the role of professional nurses and reduce patient wait time.
- Clinical restructuring should take into account appropriate allocation of space for HIV testing and adequate lighting for patient exams.

Disclosures

The authors report no real or perceived vested interests that relate to this article that could be construed as a conflict of interest.

Acknowledgments

This study was funded by Cooperative Agreement U91HA06801 from the US Health Resources and Services Administration, HIV/AIDS Bureau's Global Health Systems Branch. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the government. The authors thank the I-TECH South Africa Study Team, Dr. Julia Dombrowski, and Dr. Matthew Golden for providing technical assistance. Additionally, the authors are grateful to the National Department of Health for their support and to the facility managers and staff who participated in study activities.

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