Community Care: Optimizing community services for an improved continuum of HIV care in South Africa

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Through operations research, Project SOAR will determine how best to address challenges and gaps that remain in the delivery of HIV and AIDS care and support, treatment, and prevention services. Project SOAR will produce a large, multifaceted body of high-quality evidence to guide the planning and implementation of HIV and AIDS programs and policies. Led by the Population Council, Project SOAR is implemented in collaboration with Avenir Health, Elizabeth Glaser Pediatric AIDS Foundation, Johns Hopkins University, Palladium, and The University of North Carolina.

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<td>Antiretroviral therapy</td>
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<td>CAC</td>
<td>Community adherence clubs</td>
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<td>CBO</td>
<td>Community-based organization</td>
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<td>CCMDD</td>
<td>Centralized chronic medicines dispensing and distribution</td>
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<td>CHW</td>
<td>Community health worker</td>
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<tr>
<td>DoH</td>
<td>Department of Health</td>
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<tr>
<td>HTS</td>
<td>HIV testing services</td>
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<tr>
<td>NGO</td>
<td>Nongovernmental organization</td>
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<td>PLHIV</td>
<td>People living with HIV</td>
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<td>PEPFAR</td>
<td>United States President’s Emergency Plan for AIDS Relief</td>
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<tr>
<td>STI</td>
<td>Sexually transmitted infection</td>
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EXECUTIVE SUMMARY

Community health workers, community-based care, and community outreach have long been recognized as essential to extending the reach of facility-based health care systems. Community health workers can support HIV care and treatment outcomes by providing household or community-based HIV education, HIV prevention promotion, and/or HIV testing services; delivering individual adherence support or counseling; providing home-based care; delivering food support; and managing community adherence clubs. In South Africa there is limited information about what services are available, where they are available, eligibility criteria, and how to access them. In addition, the effectiveness of these services during routine delivery to support HIV care and treatment outcomes has not been evaluated. This study, conducted by Johns Hopkins University in partnership with Aurum Institute under Project SOAR, sought to describe the reach and coordination of community services, assess for associations between specific community-based HIV-related services and facility-level HIV care and treatment outcomes, and develop a tool to assist community health workers and facility managers in identifying available services and gaps in services. The study was completed in Ekurhuleni district in Gauteng Province and the Rustenburg Sub-District of Bojanala district in the Northwest Province of South Africa. These two districts were selected due to high HIV prevalence and rural/urban mix.

In these districts we identified over 100 community-based organizations providing orphan and vulnerable children, adolescent, and adult HIV-related services. Most community-based organizations provided several services. Specific service delivery was influenced by funders (ward-level council or other funding that did not come through the district department of health or clinic), top down mandates, or the interests of the community-based organization leadership. Specific services changed frequently based on these factors. We found little communication between community-based organizations and the key stakeholders in planning and delivering HIV-related health services: the local facility managers and the district HIV coordinators. In addition, community-health workers felt disempowered by health facilities and thought that facility management questioned the use of community health workers.

Despite these challenges there was an association between the presence of adult-care related community-based organization services in a ward and improved retention in care 12 months after ART initiation in clinics located in wards with those services. We did not find a similar association between viral load suppression and community-based organization presence. In addition, we observed considerable facility to facility heterogeneity in HIV care outcomes. This heterogeneity was not explained by the patient-level, community-level, or community-service data that we collected, and likely reflected clinic-level factors.

Our findings suggest that even with limited coordination, community-based services may be improving the critical 90–90–90 HIV care outcome of retention in care. The contribution of community-based services may be increased with improved oversight and organizational structure, clearly defined complementary roles and responsibilities, and mutual respect between facility staff and community health workers. Our recommendations are to clearly define roles;
implement a structure for oversight and communication between the district, facility, and community-based organizations; and assure that community services are in line with best practices. This structure should include a clear approach to priority setting (possibly assisted with a landscape mapping tool), ongoing communication, and coordination of services.
BACKGROUND

HIV IN SOUTH AFRICA

Community health workers (CHWs) and community-based support can contribute to improved outcomes for people living with HIV (PLHIV) through aligning services to better provide person-centered care, as well as helping to address social and structural barriers to accessing services and adhering to care and antiretroviral therapy (ART) (Bemelmans et al. 2014; Ahmed et al. 2015; Lema et al. 2014; Uwimana et al. 2013). Specifically, CHWs and community-based services may be more in tune with local needs and may be better able to engage individuals in health services by reaching them in the community rather than expecting people with chronic conditions to seek facility-based services. At present, CHWs participate in multiple activities across United States President’s Emergency Plan for AIDS Relief (PEPFAR)-supported HIV programs in sub-Saharan Africa, including providing linkage to care and treatment, palliative care, food support, “loss to follow-up” tracing, home-based HIV care, and home-based HIV testing (Chang et al. 2017; Schneider, Hlophe, van Rensburg 2008; Rothman et al. 2018; Nance et al. 2017). However, in many of these programs, CHWs provide these services with limited accountability to the clinic where the patient is receiving care and treatment, or to the rest of the health system. In addition, CHWs are often not involved in systematically working with the community to identify needs and start developing solutions (De Neve et al. 2017). A lack of two-way communication can lead to poor coordination and failure of available services to reach those who may benefit the most, as well as duplication of services. In settings where community-based services have been best studied, the services have often been implemented as part of a research study and levels of oversight, coordination, and technical support exceed what is possible during routine service delivery (Uwimana et al. 2013; Schneider, Hlophe, van Rensburg 2008; Rothamn et al. 2018).

In South Africa and elsewhere in Africa, HIV programs are currently shifting focus to attempt to achieve the 90–90–90 goals of diagnosing 90 percent of PLHIV, getting 90 percent of those living with HIV into care and onto ART, and achieving virologic suppression for 90 percent of those in care by 2020 (UNAIDS 2014). These goals provide a target for health systems to work toward in order to reduce both HIV-related mortality and HIV incidence. They have also generated a new interest in the continuum of care and improving retention along the continuum. Specifically, improved strategies have been sought to increase HIV testing, entry-into-care from testing positive, retention in care, and ART adherence. The need to both improve patient outcomes across the HIV care continuum and reduce the burden on facilities has further increased calls for community-based approaches to HIV care delivery (Schneider, Okello, and Lehmann 2016; Decroo, Ford, Laga 2014; Decroo et al. 2013). Specifically in South Africa, there are more recent initiatives for differentiated HIV care (or “decanting”) to provide medication collection at community or commercial venues or alternative pick-up points in clinic facilities. Current implementation seeks to incorporate CHWs into this effort. In South Africa, CHWs have been tasked with distributing medications in clinic fastlanes, transporting medications from a clinic to community venues for distribution (either called chronic medication delivery or adherence
In this role, CHWs provide additional manpower for routine documentation and distribution activities, making the current differentiated care implementation in South Africa dependent on CHWs.

Several variations of community health services have been initiated in South Africa and elsewhere (Grimsrud et al. 2015). Many of these services are endorsed by national or provincial governments in South Africa and implemented with support from PEPFAR (Naidoo et al. 2018). In addition to assisting with differentiated care, CHWs provide HIV testing services (HTS) within health facilities—essentially working as a lay worker in the clinic. Whether providing HTS or assisting with other facility-based or community-venue based clinic extension services, most of these CHWs receive their “volunteer” stipends from community-based organization (CBOs) or nongovernmental organizations (NGOs), with a small proportion receiving stipends from the Department of Health (DoH). Depending of the nature of the CHW service, organizational entity may be entirely independent of the clinic, such as for community HIV testing, community education, home-based care, or support groups. Services directly related to clinic care, such as defaulter tracing and medication distribution, are generally organized at the health facility-level. Facility-level organization allows for flexibility in addressing facility needs, but also results in potentially undesirable heterogeneity between services available by facility catchment area (De Neve et al. 2017). The combination of small, very local CBOs providing services in the community not directly related to the clinic and heterogeneity in clinic-level use of CHWs leads to overall heterogeneity that may provide an opportunity to explore relationships between available community level services and facility-level continuum outcomes. This study, conducted by Johns Hopkins University in partnership with Aurum Institute under Project SOAR, sought to use this heterogeneity to describe community services and organization of CHWs, and assess for associations between CHW services and either retention in care or HIV viral load suppression. Through such an evaluation, it may be possible to identify the most promising strategies for expansion to additional clinic catchment areas.

This research had the following elements: (1) determine available community services by administrative ward; (2) assess communication lines between community services, clinics, and district level managers; (3) assess relationships between these services and the clinical outcomes of retention in care and viral load suppression; and (4) generate a list of components to assess for in community services and community-clinic communication.

**STUDY DEFINITIONS**

Community services: Services that are separate from traditional, clinic-based medical consultation or medication dispensing. These activities may occur in the community or in households. In some situations, activities may also occur at the clinic. For example, in South Africa, community adherence clubs often use clinic space to meet because that space is most reliably available. While this study focused on HIV services, CHWs may also be providing community services for preventive or other chronic illnesses.

Facility services: Medical consultation and medication dispensing that occurs at a health facility (e.g., clinic, health center, or hospital).
**CHWs:** A cadre of health care workers with less training than an enrolled or auxiliary nurse that provides health related services inside or outside of the clinic and are considered “volunteers” rather than employees of the DoH. South Africa does not have a specific curriculum for CHWs; many have been associated with NGOs in the past and had training based on a curriculum developed/adapted by the NGO.

**Ward-based outreach teams (WBOTs):** Teams of lay CHWs with oversight from an enrolled nurse and management from the local clinic. These teams are tasked with home visits for home assessments of household safety, chronic illness, maternal health, and child needs. In some catchment areas they also participate in HIV-related care.

**Community adherence clubs (CACs):** A group of patients who meet at an assigned time and place every two months to collect HIV and other chronic disease medications. CACs that meet in the community are often managed by CBOs or other non-DoH organizations. CACs that meet in the clinics are more frequently managed by DoH personnel. Both community and clinic-based CACs are run by lay health workers, who are often managed by CBOs and may be characterized as CHWs.

**Centralized chronic medicines dispensing and distribution (CCMDD):** This provides ART pick-up at sites away from public sector clinics. Most CCMDD distribution points are in commercial pharmacies.

**Retention in ART care:** As a working definition we defined retention in care as no gap greater than seven months in on-ART clinic attendance. This definition was used to account for the six-month visit for re-writing prescriptions. Some patients have limited records for pharmacy pick-up during the interviewing months.

**Worksheet:** A form for systematic collection of relevant information organized for simple analysis.
ORIGINAL CONCEPT AND RESPONSES TO INITIAL EXPERIENCES

The original concept of this study was to assess outcomes related to current HIV-related community-level service delivery to develop an approach to identifying available services and to determine which services were associated with improved client outcomes. We took this approach as opposed to implementing a specific pilot service intervention and assessing its effectiveness due to the large number of different CBOs and different services already being delivered. We had the hypothesis that multiple community-based services may, in combination, support the HIV care continuum. In addition, we hypothesized that local context may critically inform the most important services. Locally-based CBOs may be best positioned to assess and understand local community needs. We sought to determine how to catalogue available services and assess for potential effectiveness to add to knowledge regarding the role of community-based care. We believe our findings highlight the value in this approach, as they suggest that critical, and often missing elements, are appropriate management, coordination, and oversight of community service delivery. These issues are often absent as part of pilot projects and may be best assessed in evaluating routine delivery.

The methods we used were to identify currently available community-level services by clinic catchment area or administrative ward and modeling associations between the availability of specific services and clinic-level continuum of care outcomes, specifically the third 90 of retention in care (12 months after ART initiation) with an undetectable viral load. We choose these outcomes and this stage of the care continuum because it can be assessed with routine data. Population proportion receiving HIV testing and proportion of those with HIV initiated on ART cannot be calculated with routine clinic patient level data in the HIV electronic data system (TIER.net). We originally planned to use these findings to develop and test an approach for the health system (especially CHWs) to identify gaps in the most effective and useful services for a community.

In the process of completing these study components, we identified substantial challenges to effective delivery of community-level services to support HIV testing, treatment, and care. Specifically, we noted that communication and coordination between HIV care facilities and community services appeared to be limited, and clinic providers and managers appeared to find a limited role and value for community-level services. These general observations led to further investigation to understand communication and coordination between components of HIV care services. Communication that we observed was primarily from the clinic to the CBO to assist in performing an auxiliary role for the clinic. We did find communication channels from CBOs or CHWs to clinic leadership. This limited the potential of CHWs’ local understanding to inform tailored services. Furthermore, services provided by CBOs appeared to reflect national priorities.
by funders or specific interests of the CBO leadership (e.g., intimate partner violence). Essentially, either through instruction from clinics or funding sources, CBOs appeared to have little latitude in advocating for community needs or adapting to the local context. We believe that until there is engagement with CBOs for shared planning, a structured approach to needs assessment by CBOs is unlikely to lead to change in service availability or delivery. For this reason, we did not complete a needs assessment tool as planned. This decision was made following discussion with USAID.

With appropriate changes in oversight and communication, CBOs could have a role in needs assessment, feedback to clinics and the district, and health service delivery. The most important gaps that we identified were related to coordination and oversight of community services. Provincial oversight and funding of CBOs with required, structured clinic-CBO “clinic committee” meetings could be a first step.

After we identified these challenges to effective community-based service delivery and coordination with the whole health system, we shifted from tool or worksheet creation to describing the current state of communication and coordination to describe conditions that may be needed to make community-based services more effective.
METHODS

STUDY SETTING

The study was conducted in two districts in South Africa: the peri-urban Ekurhuleni District and the more rural Rustenburg Sub-District of Bojanala District. Both are PEPFAR focus districts representing two districts with the highest prevalence of HIV in South Africa. At the time of the study, Ekurhuleni had the second highest district-level HIV prevalence in South Africa at 14 percent (Shisana et al. 2014) while Bojanala had among the highest antenatal HIV prevalence at 37 percent (National DoH 2012). The high HIV prevalence and peri-urban and rural characteristics of the two areas were the reasons for the selection.

Bojanala District, including much of Rustenburg Sub-District, is a district in the Northwest Province and is primarily rural with agriculture and mining operations (Figure 1). There are 45 administrative wards and 18 public primary care or community care clinics in the Rustenburg Sub-District. Ekurhuleni is an administrative district of Gauteng Province and is situated east of the City of Johannesburg. There are 112 administrative wards and 100 public primary care and community care clinics in Ekurhuleni. The two areas have a combined population of 4.2 million inhabitants.

STUDY POPULATION

Community-based organizations

We interviewed key personnel from community-based organizations in both districts to identify services being delivered and the catchment area of delivery. We also sought to understand communication between the CBOs and other stakeholders in health services, oversight, and funding mechanisms.

Department of Health

We interviewed District DoH managers and clinic managers in both districts to gain perspectives on the roles, value, and lines of communication between the district management, clinics, and CBOs.
Facility outcomes
De-identified individual level data were abstracted from routine electronic DoH TIER.net data to determine health facility outcomes.

DATA COLLECTION/ABSTRACTION

CBO service delivery identification
We used structured interviews with key informants including: (1) facility managers or district/sub-district HIV coordinators for each health facility, (2) NGO directors or a member delegated by the director from NGOs involved in service delivery or health system strengthening, and (3) ward councilors and/or ward-based CHWs to identify the types and number of services. Questions focused on what services were available for HIV care and support; the personnel, resources, and materials used to provide the services; and the number and proportion of facility patients receiving them.

Ward characteristic abstraction
Ward level data regarding population, population density, median age, median household income, proportion with employment, proportion with household ownership, proportion of housing in informal settlements, proportion with piped water, proportion with indoor toilets, proportion with nine or more years of education, proportion born in South Africa, and dominant language were abstracted onto an Excel table from 2010 South African census data from the Wazimap.co.za website.

Facility outcomes abstraction
Facility level data were obtained via the DoH as part of a data sharing and technical support agreement between the DoH and the Aurum Institute. Data were de-identified and included the following fields at an individual patient level: age, date of first facility visit, age at ART initiation, prior ART exposure, ART regimen, last ART facility visit date, last CD4 count, and last HIV ribonucleic acid (RNA) level. Facility decanting data were abstracted from DoH PEPFAR reporting regarding number of patients in community adherence clubs, community chronic medicine dispensing, and facility-based medication fast lanes.

Communication assessment
We assessed the communication between community healthcare workers and facility-based staff with representatives of 15 CBOs in Ekurhuleni District that provide services closely linked to the HIV care continuum program indicators. For Bojanala District, six CBOs were identified for participation in the communication. However, due to challenges with scheduling interviews and the timing of this activity toward the end of the study, it was not possible to collect these data for this district. We conducted one-on-one structured close-ended interviews to assess communication practices followed by a group discussion to further clarify communication, funding, and oversight pathways with the director of each of the 15 CBOs. These CBOS provided HIV testing and/or community-based ART delivery. Among the 15 CBOs, all provided community-
based HTS through DOH funding, and 53 percent (8/15) provided services for community ART pick up points as part of differentiated ART delivery for stable patients (funded through the Aurum Institute).

**Research utilization**

In order to facilitate a systematic research utilization (RU) process, we applied the Project SOAR RU guidance tool (Table 1). Stakeholder analyses were performed to identify key stakeholders, and this was documented on a stakeholder matrix that was continuously updated as the study team explored the program landscape. For each stakeholder, the matrix captured information on: stakeholder knowledge on community-based services, area of programmatic expertise, level of influence in relation to successful delivery of community services, and when they would be engaged during the study’s life cycle. Stakeholder engagement across the different study phases was conducted using several approaches: one-on-one meetings, group meetings, emails, or telephone meetings. In-person meetings were documented using attendance registers and meeting summaries were developed.

**Table 1. Seven practices in the Project SOAR RU guidance tool**

<table>
<thead>
<tr>
<th>Practice</th>
<th>Aim</th>
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<tbody>
<tr>
<td>1 Identify key stakeholders</td>
<td>Understand stakeholder priority information needs and establish the audience(s) for study findings</td>
</tr>
<tr>
<td>2 Engage stakeholders during study design</td>
<td>Ensure that the methods, interventions, and data collection processes reflect and respond to the priorities and needs of the HIV program and services</td>
</tr>
<tr>
<td>3 Establish a study-specific advisory panel</td>
<td>Ensure that stakeholders remain engaged throughout the study process and will want to champion the use of findings once they become available.</td>
</tr>
<tr>
<td>4 Engage stakeholders during data collection</td>
<td>Reinforce stakeholder involvement and deepen their understanding of the research process and what the study is investigating.</td>
</tr>
<tr>
<td>5 Interpret findings and develop recommendations</td>
<td>Review preliminary analyses and offer insight into the local program context, which informs specific and realistic recommendations</td>
</tr>
<tr>
<td>6 Develop a plan to use findings and recommendations</td>
<td>Finalize plans on utilizing findings and recommendations that guide how to support the use of findings.</td>
</tr>
<tr>
<td>7 Implementation of the plan to use findings and recommendations</td>
<td>Integrate research findings into routine program delivery and track the uptake of research findings.</td>
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DATA ANALYSIS

CBO services
We organized services by type of service a CBO reported providing. However, we observed potential under and over-reporting of services by CBOs. As a result, we did not attempt to conduct analysis based on the specific service or reported reach (e.g., home-based follow-up to support retention in care), but rather we organized reported services into general categories (e.g., adult HIV care support, adolescent psychosocial HIV support, orphan and vulnerable children services). We believe that CBOs that reported some adult HIV care-related activities did provide services to adults, but the extent and actual delivery of all aspects of the reported adult care was not independently verified. Similarly, while multiple orphan and vulnerable children-related services were described, we grouped these CBO services into one category. We mapped adult community-based services to show geographic distribution, by ward, for overall adult HIV-related CBO services. We mapped CBO services to wards because the administration and government funding of most CBO activities generally was based on wards. Some CBOs served multiple wards while many reported only working within a single ward.

Communication activities involving CBOs
We used structured interviews to create diagrams of the most common communication pathways between health facilities, CBOs, and District management. We anticipated finding heterogeneity with some examples of successful coordination; however, when we investigated reported examples of effective coordination and communication, we failed to find these activities actually occurring in practice (e.g., “clinic committees”). Rather we found similar levels of limited communication involving CBOs in each ward and between each facility. Thus, we created a single general schematic to represent the majority of communication.

Facility level outcomes and associations with ward characteristics and CBO presence
To assess facility level outcomes, we included individuals who initiated ART between 1 January and 1 July 2016 to allow for ascertainment of one year in care and viral load outcomes. Earlier dates were not used due to continuous changes in CBO services and ART policy in South Africa. We determined the following outcomes on an individual patient basis: In care one year after ART initiation; HIV viral load <400 c/mL for all initiators; and HIV viral load <400 c/mL for those with viral load results. These were then used to determine the proportion for a ward (combining facility outcomes if multiple facilities were present in a ward).

Mixed-effects linear regression was used with ward-level retention in care or viral load <400 c/mL among those with viral load testing as the dependent variables. District was included as a random-effect to adjust for district-level variation. Each characteristic considered potentially predictive of ward-level outcomes was assessed in a univariable analysis. Characteristics with a p<0.1 in univariable analysis or that were considered important for study purposes were included in multivariable analysis (e.g., number of CBOs in a ward). Independent variables with p>0.1 in the multivariable analysis were removed in a step-wise manner.
Geographical variation in outcomes and services

We sought to assess for geographic clustering in ward performance and distribution of services. Health facilities, wards, and ward outcomes and characteristics were assigned GIS coordinates. ArcGIS software was used to map the services and outcomes and to provide a visual representation of services, local demographic factors, and outcomes, and to test for geographical clustering.

SERVICE LEVEL GUIDANCE AND TOOLS

We sought to develop a community-level service assessment tool. However, the challenges we faced determining services available when using a trained research team suggested that a CHW would have substantial challenges in accurately identifying what services were available in a community. We used the results of each component of the analysis to suggest factors to consider in deploying community resources.
RESULTS

SUB-DISTRICT MAPPING AND POPULATION DENSITY

In both districts there are areas of high population density and low population density (Figure 2). Note that the population density represented by shading differs by district in Figure 2 highlighting the much lower population density in Rustenburg Sub-District of Bojanala, even in the more urban areas.

COMMUNITY-BASED MAPPING

Community-based services depended on government, larger non-governmental service delivery organizations, and CBOs. Many of the actual on the ground community services are provided by CBOs. This includes managing HIV support groups, home-based care, “default tracing,” and CACs. The organization and funding mechanisms of CBOs were generally ward-based. Thus, a single CBO generally provided services within one or two wards. As a result, wards provided a useful approach to describing CBO coverage. CBO coverage ranged from zero to five in any given ward.
We found that there was at least one CBO in a greater proportion of wards in Bojanala, with CBOs in nearly all the wards that also had a health facility, compared to Ekurhuleni.

**Figure 3** Community-based organization presence by ward and proportion of patients remaining in ART care one year from ART initiation

Our CBO engagement and mapping identified a large number of CBOs providing services. Most CBOs provided a range of services including home-based care (generally helping with bathing and routine household cleaning chores), health promotion, and adherence support. Adherence support included facilitating traditional HIV support groups and CACs. Most of these CBOs only provided services in one or a few wards, and several wards had multiple CBOs providing services while other wards lacked CBOs (Table 2). Overall there did not appear to be district to district variation in the types of CBOs or services delivered between Ekurhuleni and Bojanala.
We observed no use of a standardized approach for the setting of health priorities and community health services. The nature of services delivered by CBOs were primarily guided by the funding sources or the personal priorities set by the founding members of the CBO. In addition, CBOs reported a lack of capacity to conduct structured community needs assessments. Conducting needs assessments was considered of low value by some CBO leaders due to funders predominantly dictating the scope of work to be conducted. Figure 4 represents how planning and decision-making occurred in theory. Figure 5 (next page) illustrates what we observed regarding communication.

Adding to the limited priority setting and coordination among CBOs and funders was limited coordination between government departments. Each department appeared to independently set priorities and release requests for

### Table 2  Number of CBOs providing a service and number of wards with that service, by district

<table>
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<tr>
<th></th>
<th>Ekurhuleni</th>
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<th>Bojanala</th>
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<tbody>
<tr>
<td></td>
<td>Number of</td>
<td>Number of wards with</td>
<td>Number of</td>
<td>Number of wards with</td>
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<td></td>
<td>CBOs providing</td>
<td>service (%)</td>
<td>CBOs providing</td>
<td>service (%)</td>
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<tr>
<td>Number of wards</td>
<td>services</td>
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<td>Community ART pick-up</td>
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<td>5 (4.5)</td>
<td>4</td>
<td>4 (8.9)</td>
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<td>13</td>
<td>12 (26.7)</td>
</tr>
<tr>
<td>Food support</td>
<td>2</td>
<td>2 (1.8)</td>
<td>2</td>
<td>2 (4.4)</td>
</tr>
<tr>
<td>Adherence support (group)</td>
<td>19</td>
<td>15 (13.4)</td>
<td>22</td>
<td>13 (28.9)</td>
</tr>
<tr>
<td>Health promotion</td>
<td>20</td>
<td>10 (8.9)</td>
<td>19</td>
<td>8 (17.8)</td>
</tr>
<tr>
<td>Home-based care</td>
<td>30</td>
<td>19 (17)</td>
<td>32</td>
<td>20 (44.4)</td>
</tr>
<tr>
<td>HIV testing</td>
<td>4</td>
<td>4 (3.6)</td>
<td>6</td>
<td>6 (13.3)</td>
</tr>
<tr>
<td>Mother-to-child transmission services</td>
<td>3</td>
<td>3 (2.7)</td>
<td>3</td>
<td>3 (6.7)</td>
</tr>
<tr>
<td>Orphans and vulnerable children services</td>
<td>32</td>
<td>19 (17)</td>
<td>34</td>
<td>19 (42.2)</td>
</tr>
<tr>
<td>Psychosocial counseling</td>
<td>2</td>
<td>2 (1.8)</td>
<td>8</td>
<td>7 (15.6)</td>
</tr>
</tbody>
</table>

### CBO PRIORITY SETTING AND FINANCING

We observed no use of a standardized approach for the setting of health priorities and community health services. The nature of services delivered by CBOs were primarily guided by the funding sources or the personal priorities set by the founding members of the CBO. In addition, CBOs reported a lack of capacity to conduct structured community needs assessments. Conducting needs assessments was considered of low value by some CBO leaders due to funders predominantly dictating the scope of work to be conducted. Figure 4 represents how planning and decision-making occurred in theory. Figure 5 (next page) illustrates what we observed regarding communication.
funding proposals. This was acknowledged by the different government departments and is an additional area identified for consideration in situation mapping to understand community-based services.

**COMMUNICATION BETWEEN ENTITIES**

Within these two districts there are several models of CHW organization and oversight. For example, facility-coordinated WBOTs, ward administrative council-financially supported CHWs, and NGO-affiliated CHWs are organized by administrative wards to provide a range of general health and social services (not specifically HIV services). Notably, during the course of this study, the National DoH acknowledged that the WBOTs were not delivering services at the desired level and the upper management of the WBOTs was re-organized, including moving WBOTs from one department to another in the national DoH.

The intended approach to communication and oversight between health stakeholders that we mapped through discussion with stakeholders may be summarized as follows: Oversight of CBOs comes from the District HIV/AIDS, STI, and TB coordinators in the DoH. Oversight includes registering CBOs and providing priorities for service delivery. Priorities may include providing CHWs to serve as WBOTs. Further communication occurs at the facility-level with facility committees that include facility management and representatives from CBOs (Figure 4). Funding for CBOs came from multiple sources, including the administrative wards, sub-contracting from larger NGOs, and donations from commercial companies and philanthropy.

What we found in place differed from the intended model of communication. Communication lines were the most robust between the CBOs and their funders. Communication was mainly through reports and face-to-face meetings, which ranged in frequency from weekly to monthly occurrences. In keeping with observations on CBO priority setting, the funders were considered the key stakeholders for which communication was prioritized (Figure 5).

CBO engagement with the facilities was less structured and of variable frequency, ranging from daily to quarterly meetings. Most of the CBOs reported that they were scheduled to meet at least monthly with the facility managers; however, participants cited ongoing challenges with meetings being cancelled due to a lack of commitment and leadership to champion these meetings. When more frequent contact occurred, it was usually the facility giving a CBO team a list of patients to
trace without additional meaningful exchange. The primary interface between the CBO leadership and the facilities was the reporting of statistics, which was limited to specific services (such as HIV testing and defaulter tracing) and required as the basis for remuneration and maintenance of funding. With regards to HIV testing services, all service providers are required to report their statistics to their local clinics, regardless of the funder. The numbers of people receiving HIV testing through CBOs are subsequently included in the local facility’s statistics in reports that are made to the district. Beyond the submission of reports there was limited communication between the CBOs and facilities. Two thirds of the CBOs interviewed mentioned that they had previously participated in clinic committees, which are structures that bring together facility and community-based structures/individuals to address the general needs of a catchment area (i.e., ward). However, at the time of the interviews none of the CBOs reported participation in any active clinic committee, and we found that clinic committees had not met at any facilities for several years. Furthermore, when we tried to organize meetings neither the facility managers nor the CBOs appreciated the value of such a forum. Participants highlighted operational challenges related to the lack of compensation for facility committee members and lack of political will to fund the committees. As a result, we were unable to restart the facility committee concept despite strong support from the District.

CBOs further reported that poor communication between CHWs and clinic staff led to disjointed coordination and recommendations between CHWs and clinic facilities. It was common for community members to be denied services after referrals by CHWs. This poor coordination resulted in loss of legitimacy for CHWs and further loss of trust from the communities that they served. Two CHWs from Ekurhuleni District narrated some of their experiences:

*At times we find people on ARVs who would have visited in the communities that we work in and they plan to leave in a month or two. However, in some instances they prolong their stay because the can’t find transport money. We discover that when we refer them to the clinic, they do not get the help they need and end up defaulting because the clinic nurses will demand a transfer letter.*

*When we go back to our clients’ houses for follow up [after referral for Pap smears] they complain immediately. They say that we advise them to go to the clinic for Pap smears, but they are demeaned by clinic staff when they get there. Sometimes they get there, they are told that they are late, they must come early. In other instances, the clinic staff complain that they have not bathed. Things like that, you see?*

In some situations, a better working relationship was observed between facility staff and CHWs. Some of this appeared highly positive. For example, differentiated care delivery was often assisted by CHWs. This included processes of distributing medications to patients, either at clinic fastlane queues or at community pick-up points, and assisting nursing staff when patients came to the clinic for annual laboratory testing or re-prescribing ART. For the latter, the CHWs would collect patient booklets at the clinic when they arrived in the morning, organize them, and then call patients in to see the nurse. In these roles, the CHWs worked often at the clinic as extensions of the clinic workforce and had supervision from the decanting champion nurse.
In a situation in which CHWs were working with the clinic but had less clear roles, the effectiveness appeared more variable. CHW teams were tasked by clinics to trace “defaulters,” patients missing appointments or medication pick-up. In this role, the CHWs felt unsupported by the clinic, reporting getting the same list of names over multiple days and inability to actually find the patients due to incorrect addresses.

Additional work is required to build on this rapid assessment on communication linkages, in particular, exploring models of clinic committees that are pragmatic and sustainable to promote communication and collaboration between clinics and CBOs. Findings from formative assessments in closely related Aurum studies (Asibambisane\(^1\)) conducted in Ekurhuleni and Bojanala have shown that the coordination of community and clinic services is also a challenge for facility-based outreach teams. In both districts, ward-based outreach teams are a direct extension of clinic services into the community, yet there are significant challenges with exchange of information, reporting, and regular meetings between the clinic-based and community-based staff.

**HIV CARE AND TREATMENT CONTINUUM OUTCOMES**

Within the two districts we studied, 120 wards had one or more clinic facilities. In those facilities, 72,402 adults initiated ART between 1 January and 1 July 2016. The median age of all patients in care on ART at these facilities was 33, and 68 percent were women (Table 3).

### Table 3  Clinic characteristics by district

<table>
<thead>
<tr>
<th>N (%), or median (IQR)</th>
<th>Ekurhuleni</th>
<th>Bojanala</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of facilities</td>
<td>97</td>
<td>28</td>
</tr>
<tr>
<td>Number of wards with facilities</td>
<td>72</td>
<td>16</td>
</tr>
<tr>
<td>Number of patients in care</td>
<td>108, 111</td>
<td>18, 301</td>
</tr>
<tr>
<td>Median age of patients in care</td>
<td>33 (27, 41)</td>
<td>34 (28, 42)</td>
</tr>
<tr>
<td>Women</td>
<td>73,515 (68)</td>
<td>12,811 (70)</td>
</tr>
<tr>
<td>Proportion in differentiated care</td>
<td>15.4 (8.8, 40.8)</td>
<td>not reported</td>
</tr>
</tbody>
</table>

There was considerable variation between wards based on population density, household income, and proportion of informal housing. The median number of CBOs operating in a ward was one (Table 4).

Within the 120 wards, the median proportion of adult ART initiators still in care after 12 months was 0.68, with 40 percent of wards retaining less than 65 percent of ART initiators at 12 months. There was considerable variation in 12-month retention in care by ward (or clinic for wards with one clinic) (Figure 6).

\(^1\)Asibambisane is a community-based study being conducted in Ekurhuleni and Bojanala Districts also with the aim of evaluating an integrated model of household contact tracing that utilized community healthcare workers. Findings referred to in this report are unpublished, and are based on data collected through key informant interviews and focus group discussions.
Table 4  Ward characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Median (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population, n</td>
<td>26,367 (22,258, 30,224)</td>
</tr>
<tr>
<td>Population density, median pop/km2</td>
<td>1862 (874, 5586)</td>
</tr>
<tr>
<td>Age, median in years</td>
<td>27 (26, 29)</td>
</tr>
<tr>
<td>Household income, ZAR</td>
<td>29,400 (20,400, 57,300)</td>
</tr>
<tr>
<td>Indoor toilet, percent</td>
<td>96 (87, 98)</td>
</tr>
<tr>
<td>Completed 9 years school, percent</td>
<td>78 (69, 82)</td>
</tr>
<tr>
<td>Informal housing, percent</td>
<td>12 (3.2, 29)</td>
</tr>
<tr>
<td>Born in South Africa, percent</td>
<td>91 (87, 94)</td>
</tr>
<tr>
<td>Piped water, percent</td>
<td>97 (95, 98)</td>
</tr>
<tr>
<td>Community-service CBO, n</td>
<td>1 (0, 2)</td>
</tr>
</tbody>
</table>

Figure 6  Histograms of number of wards by proportion retained in care and viral load

(a) Histogram of number of wards by proportion retained in care at 1 year after ART initiation.
Curves represent normal distribution.

(b) Histogram of number of wards by proportion with viral load ≤400 c/mL at 12 months.
Curves represent normal distribution.
Among those with a viral load result 12 months after ART initiation, a median of 0.51 had a viral load <400 (Table 5). There was also considerable variation within wards regarding viral load suppression among those with viral load results at 12 months (Figure 7).

Table 5  Ward-level retention in care and viral load suppression outcomes

<table>
<thead>
<tr>
<th>Wards with 1 or more facilities</th>
<th>Median (IQR) or n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In care 12 months after ART initiation</strong></td>
<td></td>
</tr>
<tr>
<td>Ward median</td>
<td>68 (64, 72)</td>
</tr>
<tr>
<td>35–50%</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>51–65%</td>
<td>32 (36.7)</td>
</tr>
<tr>
<td>66–75%</td>
<td>67 (55.8)</td>
</tr>
<tr>
<td>76–85%</td>
<td>17 (14.2)</td>
</tr>
<tr>
<td><strong>HIV RNA &lt;400 c/mL at 12 months among those in care</strong></td>
<td></td>
</tr>
<tr>
<td>Ward median</td>
<td>38 (34, 43)</td>
</tr>
<tr>
<td>20–29%</td>
<td>10 (8.3)</td>
</tr>
<tr>
<td>30–39%</td>
<td>64 (53.3)</td>
</tr>
<tr>
<td>40–49%</td>
<td>34 (28.3)</td>
</tr>
<tr>
<td>50–80%</td>
<td>12 (10.0)</td>
</tr>
<tr>
<td><strong>HIV RNA &lt;400 c/mL at 12 months among those with HIV RNA assay</strong></td>
<td></td>
</tr>
<tr>
<td>Ward median</td>
<td>51 (46, 62)</td>
</tr>
<tr>
<td>20–39%</td>
<td>11 (9.2)</td>
</tr>
<tr>
<td>40–49%</td>
<td>40 (33.3)</td>
</tr>
<tr>
<td>50–59%</td>
<td>32 (26.7)</td>
</tr>
<tr>
<td>60–80%</td>
<td>37 (30.8)</td>
</tr>
</tbody>
</table>

Mapping facilities based on viral load suppression or retention in care demonstrated some clustering in Ekurhuleni, with most of the best performing facilities in the north eastern part of the district (Figure 7). We did not observe clustering by viral load or retention in care performance in Bojanala (Figure 8).

**FACILITY-LEVEL HIV OUTCOMES, COMMUNITY SOCIOECONOMICS, AND COMMUNITY RESOURCES**

Mixed-effects linear regression was used to identify associations with viral load suppression and retention in care at the ward level. In a multivariable analysis, a higher proportion of female patients and higher median age in the ward were associated with viral load suppression. The number of CBOs was not associated with viral load outcome (p=0.2) (Table 6).
Figure 7 Proportion of public clinic patients with HIV RNA <400c/mL 1 year after initiation

Blue dots represent clinic location and HIV RNA outcomes. Ward shading represents number of CBOs.

Figure 8 Proportion of public clinic patients retained in care 1 year after ART initiation

Blue dots represent clinic location and HIV RNA outcomes. Ward shading represents number of CBOs.
Factors associated with retention in care one year after ART initiation were median age in the ward, this time a negative association with higher age, ward-level lower household income, and the presence of more CBOs in the ward (Table 7).

The pattern of ward characteristics, CBO presence, and facility-level outcomes can be viewed on maps of wards. The following maps represent characteristics by ward (median age in ward or number of CBOs) and facility-level outcomes (Figures 8 and 9).
### Table 7  Associations between remaining in care at one year and facility and ward factors (all adjusted for district)

<table>
<thead>
<tr>
<th></th>
<th>Univariable Coefficient</th>
<th>p</th>
<th>Adjusted Coefficient</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Facility</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>0.14 (-0.16, 0.44)</td>
<td>0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.005 (-0.0059, 0.016)</td>
<td>0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion decanted*</td>
<td>-0.00088 (-0.0039, 0.0021)</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD4 count</td>
<td>-0.015 (-0.066, 0.036)</td>
<td>0.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of ART patients</td>
<td>108 (100, 115)</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ward</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median age in ward†</td>
<td>-0.00071 (-0.0047, 0.0033)</td>
<td>0.7</td>
<td>0.0060 (-0.00010, 0.012)</td>
<td>0.05</td>
</tr>
<tr>
<td>Proportion informal settlements</td>
<td>0.0034 (-0.0017, 0.0064)</td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household income†</td>
<td>-0.00016 (-0.00034, 0.000015)</td>
<td>0.07</td>
<td>-0.00036 (-0.00062, -0.000097)</td>
<td>0.007</td>
</tr>
<tr>
<td>Proportion 9 or more years education</td>
<td>-0.018 (-0.031, -0.0043)</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion with toilet</td>
<td>-0.00018 (-0.00083, 0.00046)</td>
<td>0.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion with piped water</td>
<td>-0.00034 (-0.0029, 0.0022)</td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of CBOs present†</td>
<td>0.0079 (-0.0011, 0.017)</td>
<td>0.09</td>
<td>0.0048 (0.0028, 0.022)</td>
<td>0.01</td>
</tr>
<tr>
<td>Population density</td>
<td>-0.0023 (-0.012, 0.0078)</td>
<td>0.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

†Indicates statistically significant

*Decanted refers to shifted to community adherence club, community medication distribution, or clinic fast-lanes for ART collection. Also referred to as differentiated care.
COMMUNITY ASSESSMENT TOOLS

As previously described, an initial goal of this project was to develop a community services and needs assessment tool that could be used by CBOs, facilities, and CHWs. We were unable to develop such a tool due to (1) the limited communication and planning between CBOs, health facilities, and the district health department; (2) the difficulty in determining what services CBOs were actually providing and with what reach or coverage, despite considerable effort; and (3) the inability (due to 2, above) to determine which specific services were associated with improved HIV care outcomes at a facility level. Given this situation, we sought to improve communication and coordination of services and create a forum in which an assessment tool could be of value. We discussed our findings with the Ekurhuleni district and were asked by the district departments of health to facilitate re-establishing clinic committees. We attempted to re-establish these committees at three clinics and were unsuccessful at each because of a lack of interest by facility and CBO management for dialogue or coordination. The end result was that we neither had the needed information for tool creation nor interest from either facility or CBOs in using a tool or acting on findings.
LIMITATIONS AND CHALLENGES

As anticipated, we identified multiple services being provided by a host of organizations. Organization, reporting, and delivery systems differed by organization. Furthermore, we found that the District DoH and Department of Social Development, while nominally having oversight of the CBOs, lacked full knowledge of which CBOs were active and what their primary activities were. In short, a variety of services were available, but often to a small number of people with HIV and with little coordination with facility or the district.

This challenge limited conclusions from subsequent efforts. While we did find an association between CBO services in a ward and improved retention in care, we were unable to drill deeper and assess for associations with specific services or specific numbers of clients served.

Another limitation was the use of routine electronic facility reporting data. These data were likely incomplete and vary in quality by facility and sub-district. We believe that these data do provide a view into outcomes, but may lack precision in the exact proportions of patients in care or with viral load suppression. Furthermore, we selected to base viral load analysis on those patients with viral load results in the facility database. This may over-estimate virologic suppression, but it avoids mixing virologic failure, failure to capture existing viral load results, and loss from care (missed viral load testing).
RESEARCH UTILIZATION

The study team’s experiences with RU are outlined in alignment with Project SOAR’s seven-point framework.

PRACTICE 1: IDENTIFY KEY STAKEHOLDERS

The study team commenced the process by identifying and meeting up with the program managers responsible for community services in Ekurhuleni and Bojanala District. Key stakeholders were identified from the following institutions:

- DoH—custodians of healthcare service delivery and funders for community services
- Department of Social Development—custodians of all non-governmental organizations and funders for selected community services
- CBOs—recipients of funding for delivery of community services
- Aurum Institute—recipients of funding to provide technical assistance for HIV program delivery in the two study districts
- Facility managers—involved in identifying service gaps and coordinating clinical services

PRACTICE 2: ENGAGE STAKEHOLDERS DURING STUDY DESIGN

We engaged the District Research Committees and District Technical Committees to review the study protocol and for additional input. A key contribution from stakeholders at this stage was the suggestion to use wards as the primary unit of analysis in delineating facility catchment areas. Previously we sought to delineate clinic catchments areas, an area that has less of a clear definition. While the benefits of engaging stakeholders during study design cannot be understated, the process of obtaining input from the stakeholders was time consuming and led to a three month delay in commencing field work. Obtaining timely feedback and rescheduling of planned meetings accounted for most delays. Stakeholders mentioned that they had competing priorities; this study was rolled out at a time when the South African government was rolling out a new test and treat approach, in September 2016. An additional limitation at this stage was the failure of the study team to engage CBOs for input into the study design, which may have provided additional insights into the a priori planned interventions on worksheet development (which turned out not to be feasible).
PRACTICE 3: ESTABLISH A STUDY-SPECIFIC ADVISORY PANEL

Selected individuals from the stakeholder matrix were invited to participate in study advisory panels. A study advisory panel was selected for each district. Selection was primarily based on the level of interest, which was subjectively ascertained as the study staff interacted with various stakeholders. We also aimed to have at least one senior decisionmaker (from government) on the panel, who would provide guidance from a policy and planning point-of-view.

Study advisory panel for Ekurhuleni
1. Provincial Director ART Programme—Gauteng Department of Health
2. Programme Manager—Gauteng Department of Social Development
3. Secretary General—Gauteng NGO Forum
4. District Programme Coordinator HIV Programme—Ekurhuleni District

Study advisory panel for Bojanala
1. Programme Manager—North West Department of Social Development
2. Sub-district Programme Coordinator HIV Programme—Bojanala District
3. CBO Representatives—Tshuphe Hospice & Godisanang Orphans and Vulnerable Children
4. Local Municipality Representative

The study advisory panels in both districts only met once as a combined group. Subsequent to the initial meetings, there were challenges with convening panel members due to conflicts in scheduling. The study team resorted to maintaining communication and soliciting input through individually directed telephone calls and emails. In some instances, some of the panel members were participants in broader stakeholder engagement meetings.

PRACTICE 4: ENGAGE STAKEHOLDERS DURING DATA COLLECTION

In Ekurhuleni, the study team liaised closely with the NGO forums to facilitate engagement of CBOs for participation in the mapping exercises. The study team utilized NGO forum platforms to mobilize CBOs for participation, collection of contact details, and expanding the sampling frame through snowballing approaches. The study team regularly communicated progress to the NGO forum in order to assess the exhaustiveness of the data collected. In contrast, CBOs in Bojanala did not have collective administrative structures similar to Ekurhuleni. Therefore, we relied more on the government stakeholders (including facilities serving the catchment areas) to evaluate the exhaustiveness of data collection exercises on the level of community services. Given the exploratory nature of our data collection activities, this practice within the framework strengthened the internal validity of the service mapping activities conducted as part of this study.
PRACTICE 5: INTERPRET FINDINGS AND DEVELOP RECOMMENDATIONS

The interpretation of findings was closely linked to Practice 4 above on engaging stakeholders during data collection. Both processes were conducted simultaneously as data were collected. In addition, one large dissemination meeting was conducted in each of the districts, with the aim of an in-depth review of study findings from service mapping and development of recommendations. This was a pivotal stage for the study because during consultation with stakeholders, the *a priori* goal of developing worksheets to improve delivery of community services was not offered as a recommendation in any of the deliberations. Instead the key themes that emerged as recommendations (described on page 32) related to communication and coordination between HIV care facilities and community services, and a need for greater appreciation for the role and value of community-level services.

PRACTICE 6: DEVELOP A PLAN TO USE FINDINGS AND RECOMMENDATIONS

Stakeholders identified the need to resuscitate facility committees as a key study recommendation (described in the Discussion). The study team will draft a policy brief outlining recommendations on strengthening the communication and relationship between HIV care facilities and community service providers.

PRACTICE 7: IMPLEMENTATION OF THE PLAN TO USE FINDINGS AND RECOMMENDATIONS

No interventions were implemented as part of this study. The findings were communicated to the district departments of health.
DISCUSSION

We found an association between remaining in care 12 months after ART initiation (retention in care) and the presence of community-based HIV support services. We found no similar association between viral load suppression and community-based support services. Our finding of improved retention in care with the presence of CBOs in a ward, but not improved HIV viral load suppression, may be explained by some of the roles CBOs play. Some CBOs provide patient tracing and re-engagement services and home-based care services. These services may lead to greater retention in care, keeping individuals returning to the clinic, but may have less of an effect on daily adherence to pills. We believe that supporting retention and re-engagement in care are valuable roles for CHWs. We are unaware of similar studies based on routine care delivery that have sought to understand clinic performance based on patient-level, community-level, and community health services. Hence, ours is among the first studies that suggest a link between the presence of CBOs providing services in a community and ART retention among clients attending clinics in the same community.

We observed large variation in clinic outcomes not explained by factors that we measured such as presence of community services, surrounding community characteristics, clinic size, or patient demographics. In addition, there appeared to be geographic clustering of better outcomes, particularly in Ekurhuleni district. Differences in clinic staff and management and sub-district management teams may be important unmeasured factors leading to this variation.

A second important finding was that, in these two districts in South Africa, identifying what services were available in the community was challenging and coordination of services was limited. There were no comprehensive lists of service providers or what services were being provided. In addition, communication between health management at the clinic and district level and CBOs providing community-based services was weak. We found that CHWs felt marginalized and not respected by clinic staff. In alignment with this is that clinic managers did not view CHWs (outside of aiding with specific clinic activities) and the work of the CBOs as enhancing their services. These findings limited our ability to reach some of the study goals. The lack of communication and mutual cooperation also limits the ability of community health care workers to respond to community needs or to coordinate a response with other stakeholders.

Similar observations regarding limited coordination between community and facilities have been reported by others working in South Africa (De Neve et al. 2017). Specifically, several studies have evaluated WBOTs, a clinic extension service that is being implemented by the South African DoH to bring services to households (Khuzwayo and Moshabela 2017). WBOTs are seen as providing valuable services by some community members, but lack of a clear schedule of visits, inadequate number of teams for the population sizes, and limited services that they could provide (beyond assessment and referral) was felt to limit their value and overall effectiveness (Khuzwayo and Moshabela 2017). Reported limitations on WBOTs have included limited coordination between facilities and the WBOTs and inadequate coordination and oversight of WBOT teams and organizations that may employ them (Naidoo et al. 2018; Austin-Evelyn et al. 2017). The effect of
greater coordination on community services is unclear. However, coordination and oversight may improve the availability of a minimum level of community services.

The WBOT model may be one approach to improved integration between the formal health sector and CHWs. Improvements in oversight, coordination, and remuneration may provide an approach to standardized community-based programming in South Africa (Schneider, Hlophe, van Rensburg 2008). WBOTs, individually or with CAC teams, could replace some of the highly heterogeneous collection of CBO organizations currently providing an array of services. Based on our findings, this may increase the value of community-based services in South Africa and build on some of the more coordinated community-based activities. Coordination of activities, alignment of mission, and mandated interaction with clinics would likely allow for improved support of HIV needs. This may be best done with greater homogeneity in CBO services, structures, and teams as could potentially occur with a clear mandate and communication structure.

CHWs also appeared to effectively assist with documentation and other low-level tasks within clinic facilities. This may be a reasonable use, but makes use of CHWs as cheap labor rather than individuals connected with their community. It may be that CHWs could effectively serve roles as cheap labor and assistants imbedded within the community. It is possible that the association we observed between the presence of CBOs and improved retention in care was related to activities unattached to a clinic (as most of the CBOs activities were). Improved coordination of CHWs could be achieved through adopting the Global Health Workforce Alliance call for a coherent approach to CHWs based on three guiding principles: one national strategy, one national oversight authority, and one standardized monitoring and accountability framework. This is further described in the 2013 framework publication (Mogedal, Wynd, and Afzal 2013).

This study has the value of assessing current real-world community service delivery in two regions with a combined population of more than 4 million individuals. Using a large real-world setting and routine data also has some important limitations. First is that we did not feel we were able to truly determine all the activities each CBO was involved in and how many clients received the service. Another limitation is that routine facility data are imperfect, with missing data entry, potentially impacting our HIV care outcomes. We assumed the viral load data, when present, was accurate. To address the problem of missing results from completed tests, we based our viral load suppression analysis on patients with available test results.

The findings from this study suggest that the starting point for community services must be a robust organizational/coordination framework and buy-in or acceptance of a common vision for the potential value of CHWs and integration into existing health services. A structured organization may supersede specific services in effect on improving HIV outcomes. This is an aspect that can be missed by pilot studies that may be self-contained and may be able to reach certain delivery endpoints, but is not well suited to scale-up without the requisite systems-level structure. We believe that services that some of the CBOs currently provide appeared to be beneficial and likely improved retention in care. Further investing in the human resources and management infrastructure of WBOTs or other CHW cadres that can deliver home-based support, retention in care activities, home-based medication delivery, and community adherence clubs, among other services, may be a strategic and effective way to utilize community-based services to improve HIV outcomes. Such a framework may have greater buy-in from facilities and could be adaptable to changing needs and science around care in the community.
RECOMMENDATIONS

Given our findings of limited service coordination or awareness among stakeholders, we would recommend that the following key factors be in place to encourage the maximum impact of CBOs within ward health care systems in South Africa:

1. Management and coordination network (from the District).
   a. Single district-level oversight and coordination of CBOs (despite a variety of funding streams).
   b. Establish “clinic committees” to align community-based and facility-based health services available in a ward or clinic catchment area. These committees need to engender partnership between health facilities and CHWs and CBOs. Such committees could also form a mechanism for clinics and the district to assemble a list of active CBOs and services that they provide.

2. Provide a clear mandate of services to be provided, approach to service delivery and coordination, and population to be served (ideally provided at the district or province level).

3. Obtain buy-in from facilities to the value of community-based services to improve integrated comprehensive community/and facility health.

4. Develop appropriate reporting tools for feedback on service delivery and its constraints.

5. Include involvement of community representatives in coordinating committees.

6. Districts should monitor clinic committees to support ongoing activities.
REFERENCES


