A Mixed Methods Evaluation of a Multi-Country, Cross-Sectoral Knowledge Transfer Partnership to Improve Health Systems Across Africa

Erika Linnander, Katherine LaMonaca, Marie A. Brault, Medha Vyavahare, and Leslie A. Curry

Yale Global Health Leadership Institute, New Haven, CT, USA and Yale School of Public Health, New Haven, CT, USA

ABSTRACT
Providing access to essential medicines is foundational to the achievement of global health targets. Although public-private partnerships might improve the performance of national supply chains, the complexities of knowledge transfer processes and health system contexts pose challenges to partnership evaluation and the generation of evidence about successful supply chain strengthening efforts. We report results from an ongoing evaluation of Project Last Mile (PLM), focusing on the unique benefits and challenges of using a mixed methods approach. PLM is a public-private partnership among The Coca-Cola Company, the Coca-Cola Foundation, the United States Agency for International Development, The Global Fund, and the Bill and Melinda Gates Foundation that transfers Coca-Cola’s logistics, supply chain, and marketing expertise to ministries of health in Africa, with the goal of improving health systems. We provide early results from South Africa, where PLM has partnered with the National Department of Health to provide catalytic support to their Central Chronic Medicines Dispensing and Distribution initiative. We describe strengths and challenges of applying a mixed methods approach to the evaluation of complex health systems strengthening intervention that aims to transfer private-sector knowledge to public health ministries. Findings and reflections might be of use to global health researchers seeking to evaluate complex multi-country partnerships for health systems strengthening, as well as for practitioners seeking novel approaches to address persistent supply chain challenges in resource-limited settings.

KEYWORDS
Health systems strengthening; mixed methods evaluation; supply chain

Overview
Providing access to essential medicines is foundational in the achievement of global health targets (Cameron, Ewen, Ross-Degnan, Ball, & Laing, 2009; Kangwana et al., 2009; Koppel et al., 2005; MDG Gap Task Force, 2013; United Nations, 2014). Supply chain weaknesses result in stock-outs of priority commodities in more than 40% of health facilities in sub-Saharan Africa (Harding et al., 2014; Leung, Chen, Yadav, & Gallien, 2016; Pronyk et al., 2016; Wagenaar et al., 2014), where estimates suggest that fewer than one half of children receive essential medications, and only one third of women receive medicines to manage the leading causes of maternal death (United Nations, 2012). The problem is compounded by the growing burden of non-communicable, chronic disease in many low- and middle-income countries (LMICs; World Health Organization, 2015), with many conditions requiring treatment that includes consistent and extended—often lifelong—access to medication. In South Africa, for example, improved treatment has transformed HIV/AIDS into a lifelong chronic condition, resulting in increased pressure on the medical supply chain (Levitt, Steyn, Dave, & Bradshaw, 2011).
To address widespread and persistent gaps in national supply chain systems, the global health community is looking across industry and sector boundaries for global supply chain solutions (Dalberg Global Development Advisors & the MIT-Zaragoza International Logistics Program, 2008) from private-sector organizations operating outside of health care. Despite the wealth of experience and knowledge that many private sector organizations could offer, transferring knowledge across organizational boundaries remains challenging (Argote & Ingram, 2000; Easterby-Smith, Lyles, & Tsang, 2008; Modi & Mabert, 2007; Szulanski, 1996; Van Wijk, Jansen, & Lyles, 2008). Given the multitude of factors that affect knowledge transfer among organizations, the national and sub-national context in which public supply chain improvement partnerships occur, and the complex nature of the Project Last Mile (PLM) framework (Hawe, 2015; Lamont et al., 2016; Moore et al., 2015; Swanson et al., 2012), a mixed methods research approach is best suited to adequately capture implementation successes and challenges and to evaluate the impact of knowledge transfer efforts across sectors.

In this article, we describe the rationale and use of a mixed methods approach in the evaluation of PLM. Specifically, PLM is a public-private partnership among The Coca-Cola Company, the Coca-Cola Foundation, the United States Agency for International Development (USAID), The Global Fund, and the Bill and Melinda Gates Foundation to transfer Coca-Cola’s logistics, supply chain, and marketing expertise to ministries of health in Africa, with the goal of improving health systems. We also provide early results from South Africa, where PLM has been partnered with the National Department of Health (NDoH) to provide catalytic support to their Central Chronic Medicines Dispensing and Distribution (CCMDD) initiative. We anticipate that the results of this study will be useful to global health researchers seeking to evaluate complex multi-country partnerships for health systems strengthening, as well as for practitioners seeking novel approaches to address persistent supply chain challenges in resource-limited settings.

Study Setting

In South Africa, PLM partnered with the National Department of Health (NDoH) to provide support to their Central Chronic Medicines Dispensing and Distribution (CCMDD) initiative. The CCMDD program aims to improve access to chronic medicines and reduce wait times at public health facilities through the creation of medication pick-up points (PuPs) in convenient community locations outside of health facilities. From April through October 2016, PLM worked with local partners to develop a business model for the CCMDD and designed mapping and planning tools to spur acceleration towards CCMDD’s goals. The PLM team—led in South Africa by a recently retired Coca-Cola executive with significant experience in Africa and Asia—directly leveraged specialized expertise from the Coca-Cola ecosystem to accomplish these aims, with emphasis on route-to-market, distribution, retail/franchise management, and business planning.

Method

Ethics Statement

The research protocol was reviewed and approved by the Yale University Human Subjects Research Committee [Protocol # 1106008643]. Mindful of the potential conflicts of interest posed by the funding structure supporting this project, we used several established techniques for explicit critical reflection: (a) data collection and analysis were performed by a multidisciplinary team representing public health, anthropology, and health management, and members were explicitly encouraged to challenge discrepant views and diverse perspectives (Barry, Britten, Barber, Bradley, & Stevenson, 1999); (b) at the onset of the project, we discussed preconceptions and concerns regarding the inherent ethical challenges of working with Coca-Cola, as well as the potential for Coca-Cola to gain public and policy credibility through the project (Guillemin & Gillam, 2004); (c) we actively engaged in reflexivity to explore and challenge our preconceptions throughout data collection, analysis, and synthesis (Lincoln & Guba, 1985); and (d) in the analysis phase, we systematically considered competing or alternative conclusions from the data (Malterud, 2001).

Unique Contributions of a Mixed Methods Approach

We designed this study as a longitudinal, convergent mixed methods evaluation, an approach that was distinct from the dominant monitoring and evaluation frameworks used by each of the PLM partner organizations. To build support for the study design among partner organizations unfamiliar with this approach, we drew upon the methods literature in several areas. First, evolving methods for health services research (Johnstone, 2004)
increasingly demonstrate the value of mixed methods to study clinical or quality issues (Koppel et al., 2005), organizational performance (Curry et al., 2011), and implementation of innovations (Robertson et al., 2010). PLM’s delivery model includes each of these focal areas, specifically concentrating on improving access to medicines by increasing public sector capacity through technical training and implementing best practices in organizational management. Second, experts call for mixed methods in the study of complex interventions (Campbell et al., 2000; Craig et al., 2008; Lewin, Glenton, & Oxman, 2009), or interventions comprising multiple components that may act both independently and interdependently (Pain & Peters, 2012). PLM involves a complex, multi-pronged intervention framework that is tailored to each country according to national context and both government and development partner priorities for investment in health systems improvement. Integrating quantitative and qualitative data can allow researchers to determine the effectiveness of the intervention as well as to examine whether the intervention was delivered as intended, describe implementation processes, and generate an understanding of why the intervention failed to work or was altered during implementation. In PLM’s case, quantitative metrics are essential for measuring change according to established key performance indicators, whereas the qualitative data provide critical insights about how the intervention is progressing in each unique setting. Finally, mixed methods can ensure valid measurement of complex constructs involving both outcomes and processes (Fulop, Allen, Clarke, & Black, 2001; O’Cathain, Murphy, & Nicholl, 2007). The scientific community has shown increasing interest in using mixed methods in randomized controlled trials for this purpose, where the quantitative arm measures defined outcomes and the qualitative arm provides insights before, after, or throughout study implementation (Lewin et al., 2009; Murtagh et al., 2007). For PLM, stakeholders are interested in learning about both PLM’s national impact in supply chain performance metrics (outcomes) as well as how PLM successfully translates Coca-Cola’s private sector ways-of-working to public sector ministries (processes).

Overall Study Design

The PLM evaluation is a longitudinal, convergent mixed methods intervention design, which tracks measures repeatedly over time to document change. Monitoring and evaluation activities are conducted at defined, predetermined points for each country program, although specific project implementation timelines can vary by country, typically ranging from six months to two years. In the pre-implementation stages, we track investment in project development and work with project partners to shape the country-specific monitoring and evaluation framework by co-designing metrics and establishing timelines. During project implementation, we track project activities, measure changes in performance metrics, and conduct key informant interviews to understand the process of change. Following principles of participatory evaluation, evaluation activities are integrated into program implementation rather than conducted as an independent research endeavor (Milstein, Wetterhall, & CDC Evaluation Working Group Members, 1999; USAID Center for Development Information & Evaluation, 1996). More information on the study design and conceptual framework is available in Appendix A.

South Africa Sub-Study

The evaluation of PLM in South Africa provides an example of how the global mixed methods monitoring and evaluation framework is adapted to a unique country setting. The PLM delivery lead provided quantitative data, including reports on major activities and milestones (inputs), progress toward deliverables (outputs), and quantitative outcomes (impact) of CCMD program growth. In particular, the project delivery lead provided raw CCMD performance data collected by the South African National Department of Health, including a weekly summary of the number of patients enrolled in CCMD, number of facilities enrolled in CCMD, number of active districts, number of pick-up points, and weekly number of parcels being issued to patients. We aggregated, cleaned, and analyzed these data to identify changes in CCMD program performance over time.

In August 2016, we conducted a field visit that included in-depth qualitative interviews with project stakeholders and observations to learn about PLM’s context and processes within the CCMD initiative as well as to identify early stage progress, successes, and challenges. We conducted 13 in-depth interviews with individuals from PLM partner organizations and project stakeholders. We used a purposive sampling approach with snowball sampling to identify individuals who had an in-depth understanding of the CCMD program and partnership with PLM. We conducted most interviews in person; however, when in-person interviews were not possible, interviews were conducted using Skype. The standard interview guide included questions about each interviewee’s involvement with CCMD and PLM, as well as their assessments of CCMD and the PLM partnership, including program changes, successes, and challenges. All interviews were audio-recorded after obtaining verbal
In addition to the in-depth interviews, we conducted more than 10 hours of semi-structured observations at several sites, including a dispensing and distribution center, public and private pick-up points, and rural health clinics. At each location, we were able to speak with staff involved in the CCMDD program, including pharmacists and pharmacy assistants. We recorded observational data using an observation guide.

The interview transcripts and recorded observational data were imported into the qualitative analysis software, Atlas.ti, version 7.5 to facilitate organization, coding, and retrieval of quotations. We used the constant comparative method (Glaser & Strauss, 1967) to conduct a line-by-line review of our interview transcripts and identify key themes emerging from the interviews. Three members of the research team (MB, KL, LC) worked collaboratively to develop the code sheet, which was refined over the course of coding interviews and reapplied to all interviews once finalized. Subsequently, two members of the research team (MB, KL) independently coded transcripts with two analysts coding each transcript and coming together to compare coding decisions. Disagreement was resolved by negotiated consensus.

For the global evaluation, as well as the sub-study on South Africa reported here, integration of quantitative and qualitative approaches occurs at three levels: study design, methods, and interpretation and reporting (Fetters, Curry, & Creswell, 2013). We are using a convergent design in which the quantitative and qualitative data are being collected simultaneously. The data are analyzed separately and then merged after data collection has been completed. Integration through methods occurs after the two databases are brought together for analysis using an embedding technique, in which the data are linked at multiple points for analysis and comparison at key junctures in the study. Qualitative data provide short-term insights to program staff regarding the context of implementation and help inform the long-term development of the intervention for future sites. Finally, at the reporting level, the data are integrated via narrative, using a contiguous approach to reporting both the quantitative and qualitative data in a single document.

**Results**

The quantitative and qualitative data provide complementary insights into the implementation of the program to date. The quantitative metrics include a range of indicators of improved access (pick-up points for medications), reach (patients enrolled) and scope (medicine parcels). The qualitative data comprise the experiences and perspectives of a wide range of stakeholders regarding the process by which the quantitative metrics are changing over the course of program implementation. Because qualitative data are more effective than are quantitative data for characterizing real world dynamic processes and implementation of complex interventions, the key informant interviews provide essential inputs that complement the quantitative measures of progress metrics.

**Quantitative Changes in Performance**

During the initial phase of the PLM team’s collaboration with the NDoH, the CCMDD program experienced a large increase in the number of pick-up points, including both governmental and external pick-up points. The number of alternative pick-up points enrolled in the program rose from approximately 180 in April 2016 to 411 in October 2016, an increase of nearly 130%. Figure 1 displays CCMDD size and scope before and during PLM. Figure 2 displays CCMDD active districts before and during PLM.
During the period of PLM involvement, we observed accelerated CCMDD growth as reflected in increasing numbers of patients enrolled in CCMDD, the number of facilities participating in CCMDD, the volumes of medicine parcels distributed to patients in a four-week period, and the number of active districts in CCMDD. In particular, the total number of enrolled patients increased by 91% during the first six months of the PLM partnership, compared to the 67% growth seen in the six months prior to PLM’s involvement. During this same time, the number of active districts and number of parcels issued grew twice as fast as in the six months prior to PLM’s work, and the number of enrolled facilities also saw accelerated growth.

**Qualitative Insights**

The qualitative data characterize in detail central aspects of the implementation of PLM and CCMDD in South Africa. Strengths associated with PLM implementation, as well as contextual challenges to anticipate in future efforts, are summarized in Table 1 and described in detail below.
Table 1. Strengths and Challenges Associated with PLM Implementation in South Africa

<table>
<thead>
<tr>
<th>Strengths and successes</th>
<th>PLM’s investment in engaging and aligning with CCMDD</th>
<th>PLM’s novel private-sector approaches and ways of working, including:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Fresh approaches to creative problem-solving</td>
<td>• Ability to define and articulate a CCMDD business model</td>
</tr>
<tr>
<td></td>
<td>• Strategic use of data</td>
<td>• New tools and approaches</td>
</tr>
<tr>
<td></td>
<td>• Improved inter- and intra-sectoral coordination and communication within and across organizational boundaries</td>
<td></td>
</tr>
<tr>
<td>Contextual challenges to anticipate and overcome</td>
<td>Initial skepticism of private sector engagement and lack of understanding of PLM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perceived resource constraints for CCMDD program expansion and ongoing operations</td>
<td></td>
</tr>
</tbody>
</table>

PLM Strengths and Successes in Facilitating the Implementation of CCMDD

Key informant interviews identified three fundamental assets that PLM contributed to the CCMDD effort: (a) the ability to engage and align with CCMDD stakeholders, (b) the infusion of unique private-sector approaches to problem-solving within the CCMDD, and (c) the improvement of inter- and intra-sectoral collaboration and communication.

Participants highlighted the value of the PLM team’s initial engagement with CCMDD stakeholders. The PLM delivery lead made multiple visits with stakeholders at different levels of the system to learn from their experiences and observe the challenges that they faced with the CCMDD. These visits enabled PLM to identify unique contributions that they might offer without duplicating the efforts of others. Despite initial uncertainty and skepticism over the role of PLM, participants reported that PLM is both fully integrated into the NDoH and responsive to partner organization needs, as exemplified by the following statement:

... you have to figure out who’s who in the zoo. That’s one thing that PLM did pretty well. They spent quite a lot of time the first couple of months just getting out there, meeting the different teams, the different organizations. They’ve been really great at keeping the communication channels open. One thing you can always be assured of is if you need something fairly quick ... CCMDD Project Last Mile has become my first port of call. (Partner Organization Representative A)

Nearly all participants reflected on the value of the PLM team’s infusion of novel private-sector approaches, which included (a) a fresh approach to creative problem-solving, (b) the ability to articulate a CCMDD business model, (c) the use of data for strategic decision-making, and (d) the codification of new concrete tools and approaches for CCMDD expansion.

The PLM team provided an innovative and creative approach to problem-solving, with participants describing examples in which the PLM team was able to address the complexity and challenges of CCMDD in bold and new ways. Because the PLM team had few preconceptions about what was possible in the public sector, stakeholders reflected that the PLM team was in a position to ask difficult questions, to suggest alternative solutions to problems, and to challenge the status quo. Related to PLM’s fresh approach was their ability to summarize and communicate aspects of CCMDD as a product to generate buy-in from other private-sector pharmacy partners. PLM’s ability to effectively explain and promote CCMDD to other potential private-sector partners was seen as a unique skill-set that facilitated CCMDD progress:

... They also brought in some new ideas ... [PLM] and the colleagues also bring a different experience and different background from [our organization] ... we’ve been around for 22 years in the country ... but you still have a certain way of thinking, where they come with a more of a private sector background and have different frameworks. (Partner Organization Representative B)

The PLM team also defined and articulated a business model for the CCMDD program. CCMDD seeks to engage local businesses, including large chain pharmacies and grocery stores, to establish pick-up points, or PuPs, allowing individuals to retrieve their medications at convenient times and in non-stigmatizing locations outside of health clinics. PLM’s ability to distill and articulate a value proposition to these potential business partners has opened doors for expansion. As one participant described:

His [PLM delivery lead] business experience and his logistics experience means he’s able to, in simple terms, explain the value add of CCMDD. He would have done exactly the same when we were implementing new route to market models in
Coke. It’s how do you articulate something into the language of ... who you are trying to get to buy in [from]. (PLM Project Management Team Member)

The strategic use of data was also regarded as a unique and valuable input. The PLM team works with a subcontractor to map districts and generate data to allow for the identification of the most appropriate locations to establish PuPs based on patient density. Participants viewed the generation and dissemination of data to inform PuP locations and distribution as essential to their efforts to develop and understand the PuP network. A project director from a partner organization noted that the generation, analysis, and use of data required a change in mindset that began with the PLM project:

When you look for pick-up points, you need to look and think, and not all that information is always available ... The scientific analysis they [didn’t] happen. This is only starting to happen since Project Last Mile came ... If I’ve got so many patients, what would be the ideal number of pickup points in this place? ... It’s maybe a mindset change of people in the district that they now realize. We need to think of it differently ... (Partner Organization Representative C)

Finally, the PLM team contributed new tools and approaches for use by public pharmacy support teams in identifying, enrolling, and managing external pick-up points. Participants described a toolkit or set of resources regarding PuPs creation and management that PLM is helping to develop with the goal of standardizing processes and enabling more districts to create new PuPs. In addition to this assistance with logistical considerations, the PLM team has worked with the NDoH to ease regulatory restrictions that might limit PuPs to locations that already have formal pharmacies:

They [district health management team] were pretty much at a point where they were hitting their ceiling in terms of what they could achieve ... Project Last Mile has really stepped up in trying to build a district start-up pack ... for the overall CCMDD program, which covers not just the business case and the private sector investment case, but it’s a slightly broader look at how should a district actually go about doing these things, which I thought was pretty great because ... it was about ... interpreting what the department needed, figuring out what the real gap was, simple as it may sound, and running with it, and building it as they go ... (Partner Organization Representative A)

In addition to contributing unique private-sector inputs, PLM has supported the CCMDD program by facilitating communication and coordination within and across sectors. The PLM delivery lead promoted communication between and within entities at the NDoH, district-level departments of health, private-sector partners, nongovernmental organization (NGO) partners, and funding agencies, among others. Stakeholders viewed PLM as neutral and well-informed, making the program an appropriate conduit for providing information and disseminating feedback to other partners. Participants valued the PLM team’s efforts to advance the efficiency of meetings and other forms of communication and attributed increased trust among partners to this improved communication, as exemplified by the following account:

[One of] the most significant elements of the partnership is that PLM has the ability to cut across all NGOs, all service providers, and all functions within the National Department of Health, which gives us a really good insight at a holistic level and a high level around all the element that are involved in the pick-up points, adherence groups, and the enforcement. The biggest advantage that PLM has right now is the potential to be able to speak to multiple stakeholders, but also share information received from multiple stakeholders and then consolidate that into a single message. The other big element ... is that because PLM is effectively housed in the National Department of Health, it’s seen as an integrated partner. There’s no restriction or firewall on shared information, access to information when it’s available. (PLM Delivery Team Lead)

Contextual Challenges to Anticipate and Overcome in Future Sites

Participants described several factors in the CCMDD operating context that might affect the PLM team in future work. These challenges include initial skepticism and lack of understanding of PLM, persistent communication and coordination challenges across silos, several specific resource constraints related to CCMDD operations, and limited patient and clinician buy-in to the CCMDD model. Although these challenges might not have significantly impacted PLM in the design phase of the partnership with NDoH, participants believed that these issues did affect the functioning of CCMDD. As the PLM team continues to work with CCMDD, these challenges might impact PLM’s goal of supporting the NDoH in reaching target patient enrollments and expanding the number of private pick-up-points.

Participants described some initial hesitations regarding private-sector collaborations in general and PLM in particular. The skepticism appears to be declining as the PLM team has become more actively involved in CCMDD; nevertheless, some skepticism persists regarding the private pharmacy delivery partners. Also, due to
the limited scope of PLM’s initial phase of work, not all stakeholders have had the opportunity to engage with the PLM team fully. As a result, some participants reported that they had insufficient experience with PLM to understand their activities or comment on the extent of PLM’s impact, as exemplified by the following account:

What’s still missing is I don’t think there’s ... enough awareness being created around the value that they [PLM] bring to the table. I have had discussions with them to start showcasing what are they doing, what are the differences that they are making in terms of the approach, and bring that to a higher level where your other struggling provinces or participants can see the true value of them being a part of this process. Now, I’m not sure what the reason is behind them only focusing on specific districts. If it was up to me, I would have let them work with five or six different districts at the same time because the value of what they are bringing to the table is so critical, and [PLM] has a massive impact in how quickly we grow the numbers. (Government Official)

Although the PLM team adapted a significant role in facilitating inter-sectoral communication, participants described a number of ongoing communication challenges. Specifically, participants noted that silos continue to exist among departments at the NDoH and with other stakeholders. Furthermore, the appropriate lines of communication are sometimes unclear, hindering the progress and momentum of PLM and CCMDD. Because the PLM team is only working in select districts during the design phase of work, areas without a PLM presence still face communication and coordination challenges, limiting full CCMDD implementation, as stated in the following account:

... The big challenge remains that ... information and data is just so difficult to come by at times. As a result ... [there is] just a bit of silo and structure within the Department of Health between key departments that are all impacted or affected by CCMDD model, not necessarily carrying an aligned view on even what the target should be. It’s been both the biggest challenge, but also one of the greatest values ... We’ve been able to bring ... aligning across departments, getting people to talk to each other that typically don’t talk to each other. Not because there’s any personal issues or anything, it’s just ... the organizational culture just hasn’t promoted it in the past. (PLM Project Management Team Member)

Some participants stated concerns that the human and financial resources allocated to CCMDD were inadequate. First, they perceived a shortage of pharmacy assistants to help both at the facility-based pick-up points (PuPs) and the external PuPs. Without pharmacy assistants, the CCMDD program could quickly become a time-intensive burden for the staff in clinics, reducing the incentive for staff to encourage patients to enroll. Second, participants described inadequate support for districts to identify and establish external PuPs. The current NDoH processes of identifying PuPs—from the mapping and data collection stage to the vetting and registration stage—is lengthy and complicated. In districts where PLM is not currently active, the process to vet and to register PuPs was described as being a significant barrier to expanding the CCMDD program:

The pharmacist feels that CCMDD is “just generally a lot of work”, noting that human error causes a lot of headaches, and that she needs more help. She asked if we wanted to help hand out parcels and joked that she would put us to work. The pharmacist mentioned that she generally has an assistant to deal specifically with CCMDD work, but that the assistant was not there today. She also stated that the process is slowly getting better, but that there are still lots of challenges. (Observation from pick-up point in a private pharmacy)

Several respondents described ongoing challenges with the clinician and patient buy-in to CCMDD. Participants stated that clinical staff members (nurses as well as public and private pharmacists) are hesitant to participate or send their patients to take part in CCMDD. Nurses are concerned that patients will not receive adequate medication counseling at the PuPs. Nurses and facility pharmacists are also concerned about some of the communication problems, and misconceptions that patients enrolled in the program have experienced. Patients are notified by text message when their prescriptions are ready to be picked up, but due to limited cell phone access and low literacy, patients do not always receive or understand the text messages. Interview respondents also described patient confusion over the CCMDD enrollment process, resulting in un-enrolled patients going to a PuP and being turned away. Some clinical staff report that communication challenges make CCMDD burdensome and have not consistently encouraged their patients to enroll. The communication challenges also appear to discourage patients from enrolling in the program:

The district representative feels that branding efforts need to be done very carefully and expressed concern that the promotion of external pick-up points has created patient confusion about the enrollment component of CCMDD. They explained that patients sometimes take their file and go to a pick-up point without first enrolling in the program. Specifically, clinics have received calls from a private pick-up point that was receiving unenrolled patients. They believe these patients don’t enroll because they hear about CCMDD through word of mouth and never learn about formal enrollment before
collecting their medications ... They feel that the private service provider was overly aggressive in marketing and overly focused on achieving target numbers early on, which further contributed to patient misunderstanding of the program and enrollment. The district representative also feels that this overly aggressive marketing prevented clinic staff from taking full ownership and feeling fully invested in CCMDD. In their words, the CCMDD became “a [private pharmacy provider] program and not a clinic program.” (Observations from Urban Public Clinic)

In addition, the initial design and implementation of CCMDD created barriers to patient buy-in. CCMDD began by dispensing antiretroviral medication to HIV patients and was then scaled up for patients with other chronic conditions. However, the initial perception of CCMDD as a program for HIV patients, combined with separate lines for CCMDD patients at PuPs, led many to fear that enrolling in CCMDD would result in disclosure of their HIV-positive status by the visibility of the PuPs and medications. One NDoH official described visiting a PuP and seeing medication packaging littering the road outside the facility, as participants collected their prescriptions and immediately discarded the packaging in which it came to avoid being identified as HIV positive. The stigma associated with HIV in South Africa might continue to prevent patients from enrolling, although the program has been expanded to include other chronic conditions:

... Initially, the funding was just for ARVs [antiretroviral medicines] ... Then we said, "Listen, the patient cannot exist without comorbidities. We cannot separate the patients.” [One partner organization] said, “Okay, we’re gonna do comorbidities as well.” With the comorbidities, and then we included the others, so some patients are not positive, but they have other NCDs [non-communicable diseases]. Once we did that and put a lot of the other NCDs onto the program, patients really started uptake of this. Whereas the ARVs, and we didn’t have the external pickup points, it meant that you went and collected in a fast lane, and if people saw you going in the fast lane collecting this sort of packaging, this created this perception that you are positive ... That’s where the stigma is, and that’s when patients do not want to come. (Government Official)

Implications of Mixed Methods in Large Scale Evaluation

In this article, we describe the rationale for and use of a mixed methods approach to the evaluation of PLM, followed by the application of this approach to implementation in South Africa, where PLM has partnered with the National Department of Health (NDoH) to provide catalytic support to their Central Chronic Medicines Dispensing and Distribution (CCMDD) initiative. The development and application of a mixed methods approach to PLM evaluation has allowed us to systematically identify the unique value of PLM contributions and measure associated changes in CCMDD performance, findings that are of direct relevance to continued PLM program development and would not have been possible through traditional approaches to monitoring and evaluation. Specifically, the mixed methods approach allowed us to link descriptions of PLM’s work to the observed accelerated growth in national-level program metrics. Although this acceleration cannot be related statistically to PLM activities, the qualitative data elucidate in detail the PLM team’s key convening role and infusion of private-sector strategies that facilitated this increased momentum. The mixed methods approach also generated in-depth insight into the range of the PLM team’s private-sector strategies that stakeholders viewed as unique and valuable, including the strategic use of data and business insight.

Although a mixed methods approach was optimal for achieving our study objectives, several challenges emerged in the implementation, including the following (a) obtaining support for a mixed methods approach, given the lack of familiarity with the methods and the resource-intensive nature of mixed methods studies; (b) ensuring sufficiently uniform quantitative metrics to allow for cross-country aggregation and interpretation while also examining country-specific variation and context with qualitative data; and (c) aligning data collection with project implementation. Obtaining the buy-in of stakeholders for a mixed methods approach has required careful attention. Each of the PLM partners came to the partnership with a well-developed monitoring and evaluation framework that they use to measure the impact of most of their investments, which often emphasize quantitative metrics. Mixed methods, particularly qualitative approaches, are less commonly applied in program evaluation in the private sector and, hence, might be perceived as ‘soft data.’ Also, the qualitative component of the study design requires substantial investments regarding time, finances, and human resources. Ensuring robust data collection involves close collaboration with each project’s delivery team to identify a representative sampling frame among diverse project stakeholders and coordinate on-the-ground data collection with key informants who are often in dispersed locations. Our team has worked with project partners to understand their priorities for monitoring and evaluation efforts, conveying both the rationale for using mixed methods as well as the rigor and value of qualitative research and incorporated partner feedback into the ongoing refinement of study design.
The second set of challenges, although anticipated given the tailored nature of the intervention and the varied capacities of countries in maintaining comprehensive data, involves balancing the need for select uniform quantitative metrics with country-specific measures and requirements. Because PLM projects address a wide range of potential health system challenges, including supply chain route optimization, cold chain maintenance, centralized medicine distribution, and health services demand generation, it is critical to identify relevant key performance indicators for each country in addition to tracking high-level measures of health system performance. The need for a study design that accommodates country-level variation is compounded by the vastly different types and quality of routine performance data available in each country setting.

Finally, alignment of project implementation and data collection timelines, including both quantitative and qualitative data, has presented a particular set of challenges. Because PLM is a multi-country intervention that is implemented in discrete phases within each country, data collection efforts must be flexible to account for delays or gaps between phases of implementation, as well as project periods and durations that differ across country settings. It is critical to remain regularly engaged with delivery leads in the field to identify key project inflection points that might prompt renewed action, such as further data collection or the identification of new stakeholders to include in future interviews.

Conclusion

We have described here the strengths and challenges of applying a mixed methods approach to evaluating complex health systems strengthening intervention aiming to transfer private sector knowledge to public health ministries. Our findings and reflections might be useful to global health researchers seeking to evaluate complex multi-country partnerships for health systems strengthening, as well as for practitioners seeking novel approaches to persistent supply chain challenges in resource-limited settings.

Acknowledgements

The study was funded by the US Agency for International Development (USAID) through a grant to the Global Education and Technology Fund (GETF). The content is solely the responsibility of the authors and does not necessarily represent the official views of the funding agency or other project partners.

References


Appendix A: Project Last Mile Evaluation Conceptual Framework and Study Design

Project Last Mile Conceptual Framework

The Project Last Mile monitoring and evaluation framework follows a standard impact evaluation logic model that links financial investment and in-kind contributions (inputs) to project deliverables (outputs), intermediate outcomes, and long-term impact. This framework is designed to align with evaluation frameworks utilized by PLM partner organizations, including The Coca-Cola Africa Foundation, the Bill and Melinda Gates Foundation, the Global Fund, and USAID. The framework includes a set of uniform “global” indicators that are defined for use across all PLM interventions, and tailored “country-specific” indicators that are developed or modified for each specific PLM intervention in partnership with the local delivery teams.

![Project Last Mile Evaluation Conceptual Framework](image)

**Figure 1. Project Last Mile Evaluation Conceptual Framework.**

Inputs refer to financial investments, project management effort associated with the Engage and Align phases, and in-kind contributions from PLM partners. Outputs refer to the major contractual deliverables of each country’s delivery team. Outcomes refer to changes in management systems, processes, and skills in host organizations as well as incremental results of pilot projects. Impact refers to changes in overall business culture within the public sector partner organization, and national-level improvements in medical supply chain performance.
Study Design

The PLM evaluation is a longitudinal intervention design, which tracks measures repeatedly over time to demonstrate change. Monitoring and evaluation activities are conducted at defined, pre-determined points for each country program. Specific project implementation timelines vary by country, typically ranging from six months to two years. In the pre-implementation stages, we track investment in project development and work with project partners to shape the country-specific monitoring and evaluation framework (metrics and timelines). During project implementation, we track project activities, measure changes in performance metrics, and conduct key informant interviews to understand the process of change.

The PLM monitoring and evaluation approach is based on principles of participatory evaluation and, therefore, is integrated into program implementation rather than conducted as an independent research endeavor (Milstein et al., 1999; USAID Center for Development Information & Evaluation, 1996). This approach allows for a flexible evaluation plan that emphasizes collaboration with intervention partners to develop evaluation metrics and focuses on sharing results in real time for program improvement as well as measuring program results. We work closely with project management and local delivery teams to identify appropriate metrics, gain access to quantitative data, develop reports, and disseminate information. Engaging implementation partners in the evaluation process helps ensure that data collection is feasible, accurate, relevant, and cost-effective.