

ASSESSMENT REPORT | JUNE 2020

PEPFAR Health Care Worker Salary Support in Malawi

Impact and Lessons Learned

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ACKNOWLEDGEMENTS

This publication was produced for review by the United States Agency for International Development. It was prepared by members of the HRH2030 consortium.

June 1, 2020

Cooperative Agreement No. AID-OAA-A-15-00046

Cover photos: HRH2030 Malawi

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Abbreviations

ART	Antiretroviral Therapy
CHAM	Christian Health Association of Malawi
CMA	Community Midwifery Assistants
DATIM	Data for Accountability, Transparency, and Impact
DHMT	District Health Management Team
DMO	District Medical Officer
DNO	District Nursing Officer
DSD	Differentiated Service Delivery
EMR	Electronic Medical Records
HCW	Health Care Worker
HDA	HIV Diagnostic Assistant
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
HRH	Human Resources for Health
HRH2030	Human Resources for Health in 2030
HSA	Health Surveillance Assistants
HTC	HIV Testing and Counseling
ITSA	Interrupted Time Series Analysis
LGSC	Local Government Service Commission
MOH	Ministry of Health
NMT	Nurse Midwife Technician
OPD	Outpatient Department
PEPFAR	U.S. President's Emergency Fund for AIDS Relief
PLHIV	People Living with Human Immunodeficiency Virus
PMTCT	Prevention of Mother to Child Transmission
TB	Tuberculosis
USAID	United States Agency for International Development

Executive Summary

In 2017, the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) in Malawi received funding to recruit and deploy health care workers (HCWs) to select PEPFAR priority sites located in areas with the highest HIV/AIDS burden. The HCWs included antiretroviral therapy (ART) providers to improve ART care and treatment services; HIV/AIDS testers (lab cadres) to improve laboratory services; and pharmacy cadres to ensure proper management of medicines, including dispensing. The Human Resources for Health in 2030 (HRH2030) program managed the recruitment and deployment of the PEPFAR-supported HCWs for 63 sites in Lilongwe and Zomba districts.

As part of routine project monitoring, HRH2030 conducts an annual assessment to determine and document the impact of the PEPFAR HCW Salary Support Activity on site staffing levels and HIV/AIDS services. The purpose of the assessment is to inform PEPFAR HRH programming in Malawi and globally based on HRH2030 implementation experience. Specifically, the impact assessment aims to determine whether the deployment of the PEPFAR supported HCWs to the priority sites (1) increased the number of HCWs providing HIV/AIDS services, (2) improved availability of HIV/AIDS services and utilization of the differentiated service delivery (DSD) models, (3) improved utilization of HIV/AIDS services, and (4) enhanced the quality of HIV/AIDS services. The assessment is also used to document the key lessons learned, best practices, and key success factors of the approach used to implement the PEPFAR HCW Salary Support Activity in Malawi. The first assessment was done in FY 2018 and this report presents results of the second and final assessment.

Methodology

To respond to the objectives of the impact assessment, HRH2030 collected data from the two intervention districts of Lilongwe and Zomba where the PEPFAR supported HCWs were deployed to 63 health facilities. Using stratified random sampling, a total of 16 sites in Lilongwe and 14 sites in Zomba with representation of sites by facility ownership and type were assessed. Data was collected through structured interviews with facility or clinic in charges, PEPFAR HCWs, government HCWs, and clients from the ART clinics; in-depth interviews with district directors of health and social services, district ART coordinators, district medical officers, and district nursing officers; and from observations of service provision in the ART clinic, pharmacy, and laboratory. Analysis of secondary data was collected from the program's 61 sites (excluding 2 prison facilities) in Lilongwe and Zomba district to represent intervention districts, and 43 sites in

Ntcheu and Mulanje to represent the comparisons districts. However, due to DATIM data limitations, a planned interrupted time series analysis (ITSA) did not yield any conclusive results.

Results

The impact assessment reveals several positive and statistically significant impacts of the PEPFAR Salary Support Activity on site staffing and HIV/AIDS services. In accordance with the HRH2030 Theory of Change for PEPFAR Health Worker Salary Support, deployment of the PEPFAR-supported HCWs increased the number of HCWs providing ART services by 49 percent, boosted staff morale, and enhanced the quality of services in terms of continuity of services. See Exhibit 1 on page 2. HCW retention rate was very high in 2018/2019 at 92.3 percent compared to the 76.5 percent in 2017/2018 and the project target of 85 percent. The fact that at least 50 percent of the HCWs have already been transitioned to the government and the remaining 50 percent are on schedule for transition in July 2020, ensures the sustainability of the PEPFAR Salary Support Activity.

The PEPFAR-supported HCWs increased the number of HCWs providing ART services by 49 percent... With 50 percent of HCWs already transitioned to the government, and the remaining 50 percent to be transitioned in July 2020, the results of this initiative will be sustained.

The deployment of the PEPFAR-supported HCWs was associated at statistically significant levels with an increase in number of sites providing adult ART, prevention of mother-to-child transmission (PMTCT), and TB screening, at least five

times a week. The HCW deployment was also associated at statistically significant levels with an increase in number of sites that run ART clinics at least five times a week or more, and percent of sites using the six-month multi-month dispensing model. Except for pharmacy and laboratory cadres who are still inadequate in number, 95 percent of the facilities reported that high workload and HCW shortages are no longer barriers to service delivery. The remaining HRH gaps are beyond HCW numbers and include gaps in ART training, resources for service provision, HCW productivity issues, and limited staff establishments.

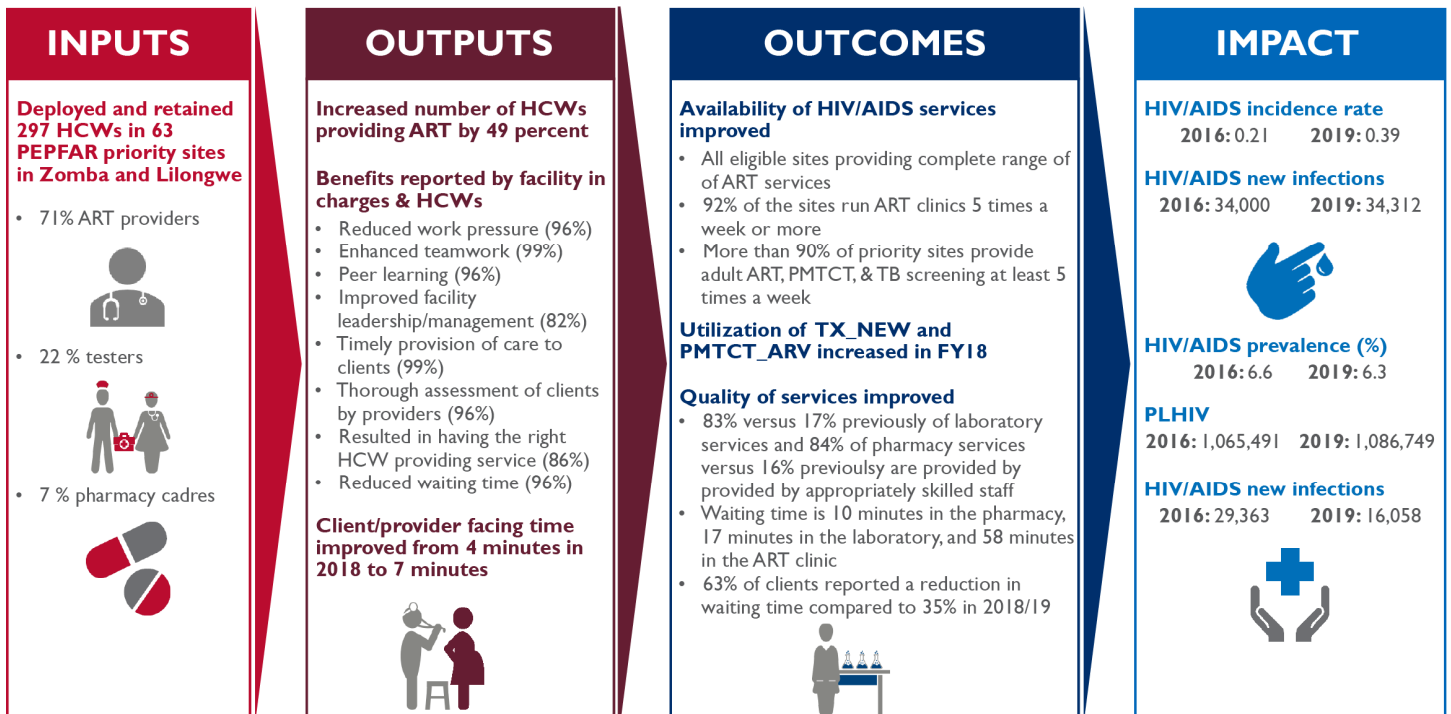
Trends in utilization of HIV/AIDS services for both intervention and comparison sites were similar and not statistically significant. Detailed ITSA tests to assess the effect of the PEPFAR HCW on utilization of services were not possible due to DATIM data limitations. However, utilization of PMTCT_ART and TX_NEW was notably high in FY 2018 and might be attributable to a multiplicity of interventions that were implemented to support same-day ART initiation including deployment of the PEPFAR supported HCWs.

Overall, perceived quality of services by all respondents was high. Ninety-six (96) percent of the clients were satisfied with the overall quality of services received, and more clients perceived that the waiting time had reduced, 63 percent versus 35 percent in 2017/2018, which is a statistically significant change. The actual waiting time was very low in the

laboratory and pharmacy, at 17 and 10 minutes respectively, while it was 58 minutes in the ART clinic. The assessment revealed several areas for efficiency gains to improve quality of services especially in terms of waiting time. Regarding adherence to standards, 91 percent of the HCWs versus 77 percent in 2017/2018 were confident that they could adhere to the treatment guidelines, mainly attributed to the ART training. However, compliance with the guidelines was sub optimal at 34 percent, a slight improvement from 12 percent in 2017/2018. Use of appropriate HCWs in provision of HIV/AIDS services improved significantly for laboratory services from 17 percent in 2017/2018 to 79 percent, and for pharmacy services from 14 percent to 42 percent.

Key lessons learned, best practices, and success factors relating to how the PEPFAR Salary Support Activity was implemented included (1) early engagement and continuous involvement of government to ensure government ownership; (2) use of government systems such as salary scales, terms and conditions of service, and governance structures to ensure sustainability and synergy; (3) use of timesheets, which was highlighted as an excellent HCW management tool that needs to be replicated and considered for adoption by government; and (4) need to modify the design of the PEPFAR Salary Support Activity to hold beneficiary districts accountable for results while giving them more freedom in allocation and use of HCWs in providing services.

Exhibit I: Results from PEPFAR Health Worker Salary Support aligned with Theory of Change



Recommendations

Several recommendations were drawn from the assessment to inform the current HCW Salary Support Activity and similar interventions in the future. Key recommendations for the current HCW Salary Support Activity were for HRH2030 to prioritize finalization of transition of the PEPFAR supported HCWs; and to continue collaborating with the supported districts to address key HCW attrition factors, so that the improved staffing levels are sustained. The other recommendation for consideration is for HRH2030 to prepare a high-level technical summary highlighting the key interventions and approaches used in implementing the PEPFAR Salary Support Activity, major achievements, lessons learned, best practices, and key challenges experienced and how they were overcome to serve as a reference in facilitating organizational learning across donors and implementing partners regarding Salary Support Interventions. Lastly, to support rigorous impact assessment using the already existing DATIM data, PEPFAR, through the service delivery partners, could consider addressing the key DATIM data quality issues at site level to ensure DATIM integrity.

Recommendations for future salary support activities were aimed to improve impact and sustainability. In this regard, donors and implementing partners should consider supporting more comprehensive HRH interventions aimed at improving staffing levels, HCW optimization/ productivity, HCW retention, and work climate improvement, coupled with interventions to improve facility optimization and to

ensure continuous quality improvement. Regarding the design of donor supported salary support activities, donors and implementing partners should consider involving key government and beneficiary groups in designing salary support interventions and using government structures to ensure efficiency in implementation as well as boost the government systems. Donors should also consider utilizing a hybrid of results-based funding where in addition to funding inputs, additional funding to governments is targeted to outputs, such as targets set for key PEPFAR indicators and the 95-95-95 targets for epidemic control. This not only strengthens government systems; it incentivizes governments to be more innovative and efficient in the way they manage and use resources in delivery of HIV/AIDS services.

Conclusion

The impact assessment provides strong, statistically significant evidence that the deployment of the PEPFAR salary-supported HCWs improved staffing levels, and consequently improved the availability and quality of HIV/AIDS services, addressing the major bottle neck to provision of HIV/AIDS services in Malawi. Moreover, the PEPFAR Salary Support Activity reveals several lessons learned and best practices for consideration in future donor supported salary support interventions. The results also highlight the need to complement interventions aimed at improving staffing levels with other HRH and wider health system strengthening interventions for enhanced and sustained positive impact of HIV/AIDS services.

I.0. Introduction

I.1. Introduction to HRH2030

Malawi is approaching epidemic control. The 2018 UNAIDS Spectrum estimates demonstrate strong progress to the globally endorsed 90-90-90 goals, currently estimated at 90-84-90. The country is a global pioneer of the 'Option B+' program and the first country to include Test and Start and the 95-95-95 objectives for epidemic control within its National Strategic Plan (Health Sector Strategic Plan II, 2017-2022). This commitment to adopt bold strategies has brought Malawi closer to reaching the 90-90-90 UNAIDS goals, and at the end of September 2018, an estimated 90% of all people living with HIV (PLHIV) knew their HIV status, 84% of PLHIV with known status were on ART, and 90% of PLHIV on ART were virally suppressed (Eaton SAE; February 2019). Despite the significant progress, some critical disparities by geography and populations persist, and require action to reach epidemic control. Health systems challenges, including human resources for health inadequacies, continue to pose a threat to successful HIV/AIDS program implementation and the achievement of epidemic control.

Since COP 16, the United States Agency for International Development (USAID) and PEPFAR have supported the deployment and salary payment for priority health care workers to ensure successful HIV/AIDS program implementation and achievement of epidemic control. The USAID-funded Human Resources for Health in 2030 (HRH2030) program managed the recruitment and deployment of PEPFAR-supported HCWs for 63 sites in Lilongwe and Zomba districts, starting in 2017. This report outlines how the impact of the PEPFAR HCW Salary Support Activity was assessed as part of the routine HRH2030 project monitoring and evaluation process.

I.2. Background to the Problem

A 2016 rapid HRH assessment of 110 PEPFAR-supported sites found that higher level cadres such as medical officers, clinical officers, and matrons were mainly based in larger facilities, with the bulk of HIV/AIDS services in smaller facilities provided by nurse midwife technicians and health surveillance assistants. The assessment also revealed that due to high workloads, 16% of the HIV/AIDS services were provided by non-clinical cadres such as ward attendants, home craft workers, tuberculosis volunteers, clinic aides, and mentor mothers, raising concerns about health care quality. Inadequate staffing was highlighted as one of the major barriers to the provision of a comprehensive range of HIV/AIDS services, while high workload was cited as one of the major causes of staff attrition (HRH2030, 2016).

Resource constraints further aggravated the health workforce situation, making the Malawian health system very fragile and in need of support to achieve Malawi's health goals, including controlling the HIV/AIDS epidemic.

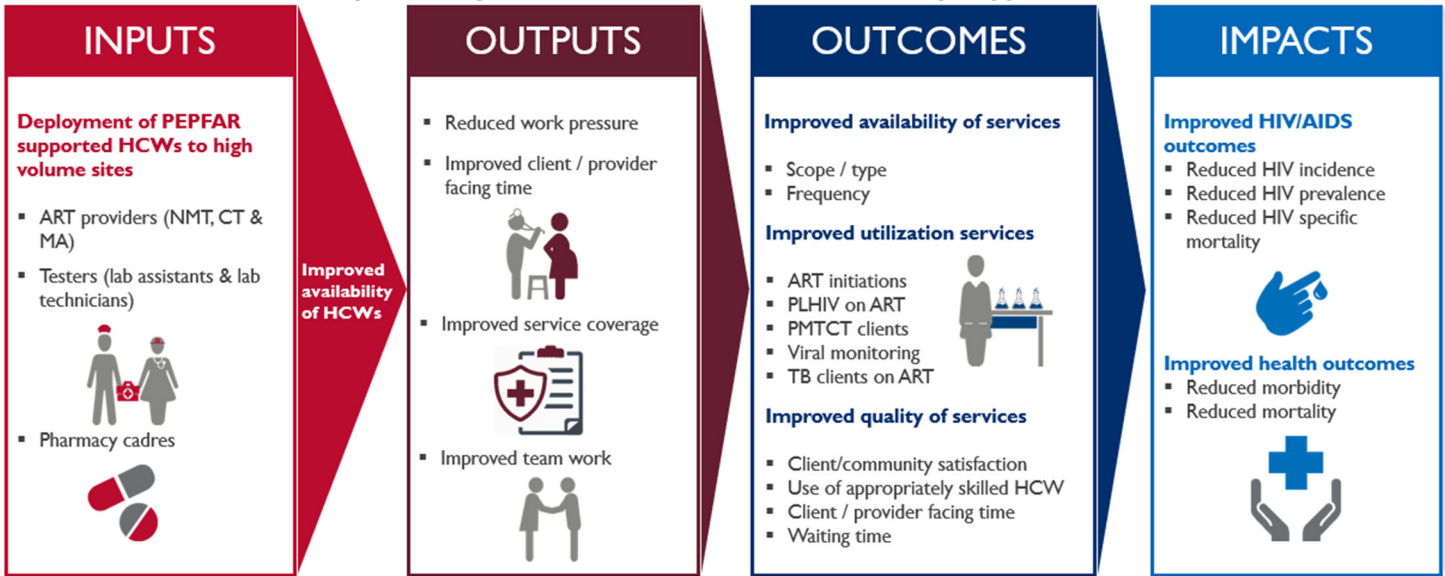
To support the MOH to scale up proven health and HIV/AIDS interventions, and to ensure continuous health care quality improvements and achievement of epidemic control, USAID and PEPFAR supported the recruitment of additional health care workers for 63 high volume/high HIV burden sites in Lilongwe and Zomba districts through the HRH2030 project in Malawi. The HCWs included nurse midwife technicians, medical assistants, laboratory assistants, clinical technicians, and pharmacy assistants. The rationale for the PEPFAR HCW Salary Support was that additional HCWs would improve availability, accessibility, and quality of HIV/AIDS and other health services at the targeted sites.

As illustrated in Exhibit 2, the HRH2030 Theory of Change for PEPFAR Health Worker Salary Support, the logic of the PEPFAR HCW Salary Support was that the deployment of the PEPFAR-supported HCWs at the sites would increase the number, or availability of HCWs providing HIV/AIDS services, particularly because the HCWs targeted for recruitment were new graduates and not existing staff. An increase in the number of HCWs providing HIV/AIDS services would in turn contribute to improved availability, utilization, and quality of HIV/AIDS services. In the long-term, this would contribute to improvements in HIV/AIDS-related indicators such as HIV incidence and prevalence, as well as overall health indicators such as morbidity and mortality.

Unlike previous approaches of PEPFAR HCW salary support, where service delivery partners hire HCWs to provide HIV/AIDS services independent of the host country hiring systems, the PEPFAR HCW Salary Support Activity in Malawi adopted a new approach. With the overall objective of ensuring host country ownership and sustainability of the PEPFAR-supported HCWs, PEPFAR-Malawi and HRH2030 worked closely with government of Malawi to plan and implement the PEPFAR HCW Salary Support Activity. PEPFAR-Malawi engaged in high level discussions with the government of Malawi to secure the government's commitment to absorb the PEPFAR-supported HCWs after two to three years of the PEPFAR HCW salary support.

The recruitment and management of the PEPFAR-supported HCWs utilized existing government systems for all steps in the process except the actual payment of salaries. Determination of the number and type of HCWs to be recruited was done jointly with MOH and the beneficiary districts based on HIV/AIDS service needs and vacancy rates. HCW interviews were conducted together with district

Exhibit 2: HRH2030 Theory of Change For PEPFAR Health Worker Salary Support



teams, the local government service commission (LGSC), and MOH. The PEPFAR-supported HCWs used the same job descriptions and salary structure as their government counterparts to ease transition. Districts spearheaded the deployment of the PEPFAR-supported HCWs based on a jointly developed deployment plan, and the PEPFAR-supported HCWs were supervised and managed on a day-to-day basis by their respective health facility or clinic in charges. Government systems were used to manage HCW discipline and performance including performance appraisal. A key assumption during implementation was that other key factors that affect HIV/AIDS service delivery such as equipment, working space, medicines and supplies, and financial resources would be available through the existing government systems. The deployment of the PEPFAR-supported HCWs started in October 2017 with the first transition to government taking place in July and August 2019.

1.3. Problem Statement

PEPFAR Malawi, through USAID, supported the recruitment and salaries of over 300 HCWs in 63 high volume/high HIV burden sites in Lilongwe and Zomba districts. With the additional HCWs, it was anticipated that staffing levels would improve and subsequently, this would improve the availability, accessibility, and quality of HIV/AIDS and other health services at the targeted sites. As part of the project's implementation cycle, HRH2030 is expected to continuously monitor and evaluate the extent to which the intentions of the PEPFAR HCW Salary Support have been achieved. The results of the assessment would not only demonstrate the project's achievements, but also provide evidence of the impacts of PEPFAR HCW Salary Support Activity on

HIV/AIDS and other health services to inform current and future HRH programming in Malawi and globally.

1.4. Justification and Purpose of the Assessment

This assessment was conducted mainly to provide regular updates to PEPFAR and the MOH on the impacts of the HCW Salary Support Activity to inform ongoing and future HRH programming in the country and globally. Most importantly, the assessment aims to demonstrate the impact of PEPFAR HRH investments in Malawi on site staffing and HIV/AIDS services, given the high-level interest of the activity, and its consideration as emerging best practice for replication. PEPFAR has used the model of additive HRH in several countries, and PEPFAR's annual report to Congress referenced the Malawi recruitment and deployment of HCWs to support the government as a best practice. Several studies have assessed impact of HRH investments in similar contexts including Malawi, but many of the studies available focused on the broad health services and not HIV/AIDS services. For example, similar assessments conducted both in Uganda and Malawi assessed impact of additional HCWs on utilization of ANC, immunization, deliveries, and outpatient department (OPD) services among others, with ART as the only HIV/AIDS service assessed in Uganda, and PMTCT in Malawi (Jaskiewicz et al, 2016; World Bank, 2017)

This assessment was therefore motivated by the scarcity of detailed data on the impact of additional HCWs on facility staffing and HIV/AIDS services. The data are critical for the MOH to advocate for additional qualified HCWs to grossly understaffed districts and health facilities. Lack of such data

could result in reduced or inadequate domestic and donor investments in HRH, which would further aggravate the already fragile HRH situation and jeopardize the availability, accessibility, and quality of HIV/AIDS and health services for the Malawian population.

I.5. Objectives of the Assessment

The overall objective of assessing the PEPFAR HCW Salary Support Activity was to determine and document the impact of the activity on staffing levels and HIV/AIDS services to inform PEPFAR and the MOH on HRH programming in Malawi and globally. The specific objectives and related questions of the assessment are presented in Exhibit 3 below.

Exhibit 3: Specific objectives and questions

Objective	Specific questions
Specifically, this assessment aimed to assess and document whether the deployment of the PEPFAR-supported HCWs to the sites:	
1. Increased the number of HCWs providing HIV/AIDS services.	<ol style="list-style-type: none"> 1. Has the addition of PEPFAR-supported staff at the site increased the number of HCWs providing ART services, or have they merely replaced existing staff? 2. To what extent have the deployed HCWs been retained at the sites and what are the key factors affecting HCW retention?
2. Improved availability of HIV/AIDS services and utilization of the DSD models.	<ol style="list-style-type: none"> 3. Has the deployment of the PEPFAR-supported HCWs increased the scope and frequency of HIV/AIDS services? 4. Has the deployment of the PEPFAR-supported HCWs at the site increased the range of differentiated service delivery models offered by the site? 5. Are there HRH “gaps” remaining at the sites that should be addressed to further improve service provision?
3. Improved utilization of HIV/AIDS services.	6. Have HIV/AIDS service outputs (TX_NEW, TX_CURR, PMTCT_ART, and TX_TB) increased since the recruitment of the additional HCWs?
4. Enhanced the quality of HIV/AIDS services.	<ol style="list-style-type: none"> 7. Has the deployment of the PEPFAR-supported HCW at the site led to improvements in the quality of services in terms of: 8. Client satisfaction with services 9. Perceived impacts of HCWs on staffing and HIV/AIDS 10. Use of appropriate HCW in providing services 11. Adherence to HIV clinical management guidelines 12. Patient waiting time 13. Client/provider facing time.
5. To document the key lessons learned and best practices in the approach used to implement the PEPFAR HCW Salary Support Activity and key success factors.	

2.0. Methodology

This section describes the methodology that was used in assessing the impacts of the PEPFAR HCW Salary Support Activity on site staffing and HIV/AIDS services, and to document the lessons learned. The HRH2030 Theory of Change for PEPFAR Health Worker Salary Support served as the theoretical framework in developing the assessment methodology. The methodology was modified based on lessons learned during the first year of data collection. Based on that experience, primary data collection through observations and interviews targeted only intervention districts to demonstrate staffing and HIV/AIDS impacts overtime due to practical difficulties of identifying true control districts. However, for comparison purposes, analysis of secondary data on HIV/AIDS service utilization obtained from the PEPFAR Data for Accountability Transparency and Impact (DATIM) included two comparison districts in addition to the two intervention districts. Data for assessing the impacts of the PEPFAR HCW Salary Support Activity was collected at different intervals including quarterly, semiannually, and annually. Each data collection activity obtained data to respond to one or more of the assessment objectives and together, the data responds to all the assessment objectives. Details of the assessment methodology are described in the sections that follow.

2.1. Assessment Design

Based on lessons learned during the 2018 data collection, this assessment used a quasi-experimental non-equivalent control group, *pretest-posttest design*, covering the period 2016 to 2020. The assessment collected primary qualitative and quantitative data from the intervention facilities using facility-based surveys, structured interviews, in-depth interviews, and observations. This primary data collection was complemented with analysis of HIV/AIDS service data (secondary data from PEPFAR DATIM) covering the two intervention districts and two comparison districts. The assessment design is detailed further in the following sections.

2.2. Targeted Sites for the Assessment

Primary data collection for the assessment was conducted only in PEPFAR-supported high volume/high HIV burden sites in Lilongwe and Zomba districts. These included both public and Christian Health Association of Malawi (CHAM) health centers and hospitals. On the other hand, secondary data collection covered all the PEPFAR supported sites in the intervention districts and two comparison districts that were matched to the intervention districts by facility type, geography, and HIV burden. The number of PEPFAR supported sites that were studied varied by data collection method as described in section 2.4.

2.3. Study Population

Respondents for this assessment included officers in charge of health facilities and HIV/AIDS clinic heads, all HCW delivering HIV services including PEPFAR- and government-supported HCWs, members of the district health management team (DHMT), and clients that received the different HIV/AIDS services in Lilongwe and Zomba districts. In analyzing the DATIM data, Lilongwe and Zomba served as intervention districts while Ntcheu and Mulanje served as comparison districts. Lilongwe district in the Central Region with a total of 142,931 PLHIV and an ART coverage of 84 percent was matched with Ntcheu district with 43,607 PLHIV and an ART coverage of 93 percent. Zomba district in the Southern Region with 74,489 PLHIV and an ART coverage of 77 percent was matched with Mulanje district with 60,473 PLHIV and an ART coverage gap of 89 percent, (PEPFAR, 2018).

2.4. Sampling Approach and Sample Size

Sample Size Determination

The sample size varied by data collection method and respondent.

Quarterly DATIM data

Sixty-one (61) of the 63 sites that received PEPFAR-supported HCWs through HRH2030 Malawi in Lilongwe and Zomba were studied through DATIM to address objective three of this assessment, that is, improved utilization of HIV/AIDS services (two prison clinics were excluded). Results from the 61 sites in the intervention group were compared to those from 43 sites from the comparison group.

Semiannual site monitoring visits

Data was collected through the semiannual site monitoring visits in response to objectives one and two in the two intervention districts. The data collection was a census covering all the 63 PEPFAR sites that received PEPFAR-supported HCWs in Lilongwe and Zomba. Officers in charge of the 63 sites and PEPFAR-supported HCWs found at the site at the time of the visit were interviewed using a structured questionnaire.

Annual observations and interviews

Annual observations and interviews were conducted to collect data to address objectives four and five of this assessment, which focus on quality of HIV/AIDS services and documentation of lessons learned respectively. Data was conducted in randomly selected sites in intervention districts. A total of 30 sites (16 in Lilongwe and 14 in Zomba) or 48% of the 63 sites were randomly selected. First stage sampling was done to select the study sites. Stratified sampling was employed to randomly select sites from six strata demarcating sites by site ownership (whether public or

CHAM) and type of site (whether clinic, health center, or hospital.) Twenty-one (21) government and nine CHAM facilities were randomly selected. A full list of the sites studied is in Appendix 1.

Second-stage sampling was (1) random sampling of clients and HCW for structured interviews; (2) random selection of service-provider and client interface sessions for observations; and (3) purposive sampling of key informants for structured and in-depth interviews. ART clients were sampled consecutively for exit interviews. Service provider and client face-to-face sessions were also consecutively sampled for observations in ART clinics, laboratories, and pharmacies. Structured interviews were conducted with 30 officers in-charge of health facilities/ART clinics; one officer-in-charge was purposively selected per site. Similarly, eight DHMT members (DHSS, DMO, DNO, ART coordinator) were purposively sampled, four in each district, for in-depth interviews. See Exhibit 3 for details.

Sample size for health care workers, clients, and observations

The following formula was used to determine the sample size for clients, observations, and health workers:

$$n = (Z_{\alpha/2} + Z_{\beta})^2 * (p_1(1-p_1) + p_2(1-p_2)) / (p_1 - p_2)^2$$

whereby

$$Z_{\alpha/2} = 1.96 \text{ for a confidence level of 95\%}$$

$$Z_{\beta} = .84 \text{ for a power of 80\%}$$

$$p_1 = .5$$

$p_2 = .4$ (to provide a more conservative estimated difference in proportions of 10%)

Using 50/40 for p_1 and p_2 the sample size is ~385, which would be necessary for each group, that is at baseline and end-line.

Exit interviews and observations

Although the sample size determined as indicated above was 385, 420 clients were interviewed after receiving services from ART clinics to cater for non-response. Similarly, a total of 420 HCW/client interface sessions were observed at ART clinic, laboratory, and pharmacy.

HCW interviews

Theoretically, the sample size for health workers was supposed to be 385. However, it was not practical to achieve this sample size given that the number of HCWs in ART clinics at the sampled sites was less than the sample size determined. According to MEASURE Evaluation (2001), at least four members of staff should be picked from each site while ensuring that all sections/units have equal chance of representation. MEASURE Evaluation recommends interviewing all health workers in small health facilities with about four to five health workers. Against this background, at least five HCWs were interviewed per site including both PEPFAR-supported HCWs and government HCWs, and one health facility or clinic in charge. The total sample size for the HCWs interviews was 150, which was adequate to detect larger changes in service availability and provision with a margin of error of +/-8%.

In-depth interviews

Eight DHMT members (DHSS, DMO, DNO, ART coordinator) were purposively sampled, four in each district, for in-depth interviews. See Exhibit 4 for details.

Exhibit 4: Sample size and respondents by data collection method

Data collection Activity	Data collection method / Respondents / data source	Number targeted per site / district	Number Targeted	Sampling
DATIM data analysis	Review of DATIM data from PEPFAR	61 sites	61 sites in intervention districts 43 sites in comparison districts	Census
Semiannual site monitoring visits	Structured interviews with PEPFAR-supported HCWs	All PEPFAR supported HCWs at site LL # 189 ZA# 104	63 sites	Census
Annual observations and interviews	Structured interviews with facility/ART clinic in charges	5 HCWs per site One in charge per site	30 in-charge	Purposeful
	Structured interviews with HCWs	2 PEPFAR supported 2 government staff	120 HCWs	Random of those on duty
	Exit interviews with ART clinic patients/clients	13 -14 per site	420	consecutive sampling
	Observation of clients at ART clinic, laboratory, pharmacy, and registration	Observations per site ART clinic: 4 Lab: 3 Pharmacy: 3 Reception/Registration	420	consecutive sampling
	In-depth interviews with DHMT members (DHSS, DMO, DNO, ART coordinator)	4 per district	8	Purposeful

2.5. Data Collection and Data Sources

Data Collection Methods

HRH2030 collected data through structured questionnaires, review of project reports and databases, guided in depth interviews, and observations.

2.6. Data quality control and assurance measures

HRH2030 put in place measures to ensure quality data, starting from the design of data collection tools to data analysis. HRH2030 hired a statistician who provided technical support in the design of the data collection tools, ensured data quality, and provided guidance in data entry and analysis. Several data quality procedures were used in the field to ensure that the data collected had minimal errors. Learning from the first data collection phase, a smaller team of data collectors was selected and trained in data collection. The data collection tools were field-tested to ensure consistency in administration and reliability. The team was divided into two teams, each with a supervisor, and each team collected data from one facility per day to ensure adequate time for data collection and validation. To minimize inter observer variability, each member of the data collection team was assigned specific data collection and entry tasks. Data was entered the same day it was collected.

Data was managed and quality assured in the field through regular supervisor checks. Supervisors checked completed questionnaires at the end of each day to promptly identify and correct any errors. In addition, the data collection team held daily debriefing meetings to share experiences; address bottlenecks; and check accuracy and completeness of questionnaires, field notes, and voice recordings while in the field. To further ensure data quality, one member of the data collection team was assigned to carry out first stage data quality checks before review by the statistician. A data entry template was designed to ensure data validation at data entry. The data entry template was programmed with automated data validations to ensure data validity. Each data collector was also responsible for entering his/her data into the data entry template to minimize errors. After data entry, the data was validated before analysis to check for duplicate records, missing data, and inconsistent values across variables.

2.7. Data Analysis

Quantitative data analysis was performed using SPSS version 20. The guiding principle for all statistical analyses was to address the evaluation questions outlined in Exhibit 2.

Descriptive Statistics

Frequencies and percentages were reported for categorical variables while appropriate measures of average and dispersion were used for numerical variables depending on distribution of the data. For normally distributed variables, and any data with large sample sizes (n above 100), means were used. Descriptive analysis was stratified by important variables. A data analysis plan was prepared to show how data would be analyzed and results presented.

Inferential Statistics

Bi-variate hypothesis testing of change from baseline to end line

For inferential statistics, Chi-squared test (or Fisher's exact test) was used to test independence of categorical variables on perceptions and client satisfaction, among others. Data for both baseline and end line interviews was used to calculate the degree of association, which was measured by a p value. As for testing of mean proportions, z test was used to determine if the two mean proportions from baseline and end line were the same or not. This helped to determine the level of impact of the program.

For all bi-variate hypothesis testing and regression analyses, a significance (alpha) level of 0.05 was used and p-values less than 0.05 were interpreted as reflecting statistically significant differences. Confidence intervals were generated for estimates of key outcomes. Confidence intervals were also generated for measures of effect in bi-variate analysis. The confidence level for all such intervals was 95%.

For DATIM data, the assessment team applied an interrupted timeseries analysis (ITSA) to test the null hypothesis that slopes for key PEPFAR indicators in intervention and comparison districts were the same post intervention. Interrupted time series analysis was done using quarterly DATIM data.

Lastly, qualitative data collected using question guides and voice recordings were transcribed and analyzed manually to obtain key themes. Qualitative information was used to triangulate findings from quantitative data.

2.8. Ethical Considerations

Drawing on lessons learned from the first data collection phase and guidance from USAID, the primary goal of assessing the PEPFAR HCW Salary Support Activity is to inform project implementation and future HRH programming in Malawi and not to generate generalizable conclusions. Specifically, the assessment results are targeted for use by HRH2030, USAID, PEPFAR, MOH, districts, and other partners with similar interventions in Malawi. Given this

refined assessment goal, no formal ethical approval was sought for the assessment. However, HRH2030 continued to collaborate with the districts and CHAM during data collection and informed consent was obtained from all respondents including DHMT members, health facility/clinic in charge, HCWs, and patients. The consent process was formally documented either by the respondent signing or thumb printing the consent form after a detailed explanation of what the study entailed, the associated risk, and the rights of the respondent. The consent form emphasized the fact that responding to the assessment questions was voluntary and included assurance to the respondents that study findings would be reported in aggregate form without attribution of data to specific respondents.

Data was collected by a team of trained HRH2030 staff. All data collected was stripped of all personal identifiers and was kept in password protected computers and hard copies in locked cabinets that were only accessible to the project team. Reporting of assessment finding is in aggregate form to minimize the risk of loss of anonymity.

2.9. Limitations

The main limitation of the assessment is that it was not possible to obtain true control districts because all districts with matching characteristics to the intervention districts receive some level of HRH support from different funding agencies. With this limitation, the study design was modified with primary data collection conducted only in intervention districts. Improvements in staffing and HIV/AIDS services is therefore be based on trend analysis in the intervention other than a comparison between intervention and control/ comparison sites. The other limitation is that there was no comprehensive baseline conducted, so different baselines were used in assessment including data from the 2016 rapid assessment and data from project monitoring reports. Despite this, some assessment results such as client waiting time and facing time remained with no comparable sources to serve as baselines and are therefore reported at one point in time. Further, although the plan was to conduct an ITSA to determine the effect of the PEPFAR supported HCWs on utilization of services, as discussed under objective 3, this was constrained by the quality of the DATIM data.

3.0. Results

Introduction

This section presents the findings of assessing the impact of the PEPFAR HCW Salary Support on site staffing levels and HIV/AIDS services. The study set out to answer seven specific research questions under five broad objectives. The

results are presented by objective after a brief section on response rate from the different data collection methods used in the assessment and respondents.

Response Rate

The study was conducted in two intervention districts (Lilongwe and Zomba) covering a total of 30 sites (16 in Lilongwe and 14 in Zomba). Data analysis using DATIM data was conducted for 61 sites in Lilongwe and Zomba which served as intervention districts, and 43 sites in Ntcheu and Mulanje which served as comparison districts. The response rate by data collection method and respondent is presented in Exhibit 5.

Exhibit 5: Response rate by data collection method and respondent

Data collection method/source of data	No. Targeted	No. Achieved	% Response rate
Observations at ART clinic	180	217	121%
Observations at laboratory	120	130	108%
Observations at pharmacy	120	134	112%
Interviews with clinic in charge	30	30	100%
Interviews with PEPFAR HCWs	60	61	102%
Interviews with Government/CHAM HCWs	60	63	105%
Client exit interviews	390	420	108%
Key Informant interviews	8	6	75%
DATIM data collection for intervention sites	63	61	97%
DATIM data collection for control sites	43	43	100%
Overall achievement	1,074	1,165	108%

The overall response rate was above 100 percent because more interviews and observations were conducted to cater for non-response. The two key informant interviews that were not done were because the targeted positions were vacant at the time of data collection. The DATIM data excluded prison health facilities hence a total of 61 out of the 63 sites targeted were assessed.

Objective 1: Number of HCWs providing HIV/AIDS services

Objective 1 of the impact assessment was to determine whether the addition of the PEPFAR-supported HCWs at the sites increased the number of HCWs providing ART services, or the HCWs merely replaced existing staff. Further, under

this objective, the assessment was intended to determine the extent to which the deployed HCWs have been retained at the sites and the key factors affecting their retention. Key results of the assessment are presented in the next sections by sub research question.

The deployment of the PEPFAR-supported HCWs increased the number of medical assistants working in ART clinics by 95 percent and nurse midwife technicians by 56 percent.

Number of PEPFAR-Supported HCWs Deployed to Targeted Sites

To improve provision of HIV/AIDS services and particularly ART services (the second 95), PEPFAR, through HRH2030, supported the recruitment and deployment of professional HCWs to 63 high HIV-burdened sites in Lilongwe and Zomba districts. In addition to the deployment, HRH2030 ensured timely payment of the HCW salaries as a motivation strategy since government HCWs rarely receive their salaries on time. HRH2030 also worked with the MOH, CHAM, and the beneficiary districts to manage the PEPFAR supported HCWs. The management of the HCWs entailed conducting quarterly/semiannual site monitoring visits to verify HCW attendance to work and to resolve key HRH challenges, conducting quarterly meetings with district health management teams to address key HCW retention factors, continuously filling vacancies that resulted from HCW attrition, managing HCW performance including HCW appraisal, and managing HCW discipline.

Exhibit 6: PEPFAR-supported HCWs deployed at priority sites in 2018/2019

Post title	No. of HCWs at site	Transitioned to government	Still on PEPFAR payroll
Clinical Technician	8	3	5
Laboratory Assistant	64	25	39
Laboratory Technician	1	1	0
Medical Assistant	65	26	39
Nurse Midwife Technician	137	90	47
Pharmacy Assistant	22	21	1
Total	297	166	131

Question 1: Has the addition of PEPFAR-supported staff at the site increased the number of HCWs providing ART services, or have they merely replaced existing staff?

Effect on the number of HCWs providing ART services.

To determine whether the deployment of the PEPFAR supported HCWs increased the number of HCWs providing HIV/AIDS services, HRH2030 compared the number of HCWs that were providing ART services in the targeted sites at baseline, in June 2016, with the number providing ART services in the ART clinics in June 2019. A total of 62 sites in Zomba and Lilongwe were included in this analysis. This excluded Kamuzu Central Hospital whose baseline data was not comparable to the June 2019 data. The HCW cadres analyzed included medical doctors, clinical officers/clinical technicians, nursing officers/registered nurses, nurse midwife technicians, medical assistants/medical technicians, and “other cadres” that included lay cadres, health surveillance assistants (HSAs), and community midwifery assistants (CMAs).

Exhibit 7: Change in HCWs providing HIV/AIDS services in art clinics

Cadre	Baseline (June 2016)	Result (June 2019)	Change in number	Percentage Change
Medical Doctors	5	6	1	20%
Clinical Officers/ Clinical Technicians	54	54	0	0%
Nursing Officers/ Registered Nurses	45	48	3	7%
Nurse Midwife Technicians	206	322	116	56%
Medical Assistants/ Medical Technicians	64	126	62	97%
Total	374	556	182	49%
Other cadres (Lay cadres, HSAs & CMAs)	36	831	795	2208%
Total w/ other cadres	410	1,387	977	238%

As illustrated in Exhibit 7, overall, there was a net increase in the number of HCWs providing HIV/AIDS services in the ART clinics. For clinical and nursing cadres, the number of

HCWs increased by 182, representing a 49 percent increase. The percentage increase was most significant for medical assistants/medical technicians at 97 percent and nurse midwife technicians at 56 percent. Of the 556 clinical and nursing HCWs in the ART clinics, 332 (60 percent) are government funded, 178 (32 percent) are PEPFAR-funded under HRH2030, while 46 (8 percent) are either PEPFAR-funded through the PEPFAR clinical partners or they are funded by other partners.

When the lay cadres, HSAs, and CMAs were included in the analysis, the overall number of HCWs providing HIV/AIDS services in ART clinics increased by 977, representing a 238 percent increase.

The quantitative results from the above analysis were triangulated with key informant interviews and the findings were similar. The major theme from the key informants regarding the impact of the PEPFAR-supported HCWs on site staffing was that not only did the PEPFAR-supported HCWs improve staffing levels, they also boosted the morale of the government HCWs who were previously overworked. The key informants also reported that they felt that the sites now have adequate HCWs, especially nurse midwife technicians (NMTs), saying, “we have adequate staff now especially the NMTs... I would say, they (PEPFAR-supported HCWs) have improved services in the facilities because they have supplemented the HCWs who were in government; we had shortage of health workers and there was high workload.”

The majority of the key informants also reported that in addition to improving staffing levels, the PEPFAR-supported HCWs enhanced the quality of services in terms of continuity of services and sustainability by reducing the need for locum payment “... we used to spend a lot on locum and relief,

because the few HCWs we had were working overtime and we had to pay for that overtime. The coming of the PEPFAR-supported HCWs has relieved us of this expenditure.” Relatedly, another key informant noted, “this [paying locum] was a problem because it was not sustainable, but it also affected the quality of care in terms of continuity of services since we would hire different HCWs each time depending on who was on leave.”

Replacement of existing staff

According to the project design, ideally the PEPFAR-supported HCWs deployed to government and CHAM health facilities were intended to be additional and not a replacement of existing staff. HRH2030 assessed whether this goal was achieved by comparing the number of government and CHAM HCWs at site at baseline in June 2016 with those in June 2019. Results of this analysis are summarized in Exhibit 7 by HCW category. Overall, government and CHAM reduced the number of HCWs working in ART clinics by 25, with the majority being clinical officer/technician and nurse midwife technicians. As explained by one district official, this was done to ensure equity across health facilities in the districts, “... it is not like we like transferring people, but we are also sorting out issues as well because we are always pressed with this thing (HCW shortage). Because for us, we look at issues of equity, is it realistic to have let us say three clinicians at Diaphwi and zero clinicians at Mtenthera?”

However, as noted, these deficits were compensated by the PEPFAR-supported HCWs under HRH2030 and other partners including PEPFAR clinical partners minimizing the impact of the transfers on service delivery.

Exhibit 8: Government/CHAM HCWs providing HIV/AIDS services in ART clinics

Cadre	Government & CHAM HCWs in ART clinics in June 2016	Government & CHAM HCWs in ART clinics in June 2019	Difference	Percentage Change
Medical Doctors	5	6	1	20%
Clinical Officer/Clinical Technician	54	34	-20	-37%
Nursing Officer/Registered Nurse	45	45	0	0%
Nurse Midwife Technician	206	187	-19	-9%
Medical Assistants/Medical technicians	64	60	-4	-6%
Other cadres (Lay cadres, HSAs & CMAs)	36	53	17	47%
Total	410	385	-25	-6%

On a positive note, government/CHAM had also deployed an additional doctor and 17 HSAs and CMAs by June 2019, when compared to June 2016. The number of government/CHAM nursing officers/registered nurses deployed in the ART clinic did not change between baseline and 2019.

Question 2: To what extent have the deployed HCWs been retained at the sites and what are the key factors affecting HCW retention?

Retention of the PEPFAR funded HCWs

The retention rate for the PEPFAR-supported HCWs was obtained by comparing the number of HCWs at post at the beginning of the year (October 2018) with those at the end of the year (September 2019). The numerator was the number of HCWs at post on 1st October 2018 that had either transitioned to government payroll or were still at site under HRH2030. The denominator was the number of HCWs at the beginning of 2018/2019 (October 2018). The retention rates obtained were compared with those of FY 2017/2018 to assess if there were any changes in retention rates following the multiple interventions HRH2030 implemented to ensure HCW retention. Results of this analysis are presented in Exhibit 8.

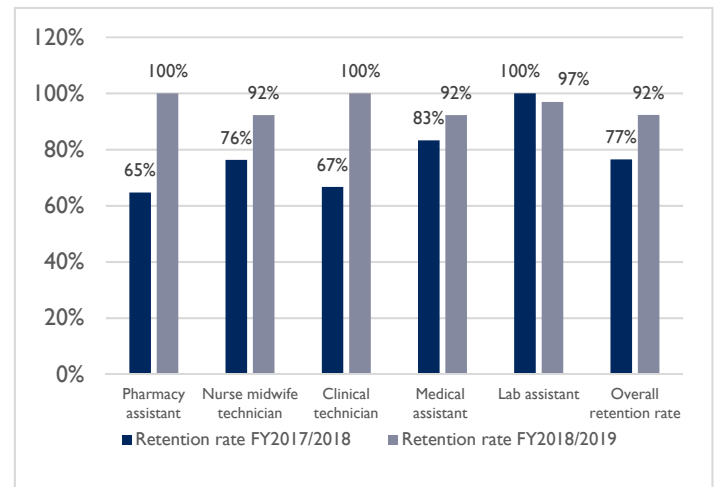
As noted in Exhibit 9, the overall HCW retention rate in 2018/2019 was very high at 92.3 percent, compared to 76.5 percent in 2017/2018, and the project target of 85 percent. Retention rate improved most significantly for pharmacy assistants, NMTs, and clinical technicians.

Key factors affecting HCW retention

During the year, only 26 HCWs left their posting for various reasons. Leaving employment to follow spouse was one of the major reasons accounting for 23 percent (6/26) of the departures. Some HCWs left employment under the PEPFAR contract to join the private sector mainly due to job security. Indiscipline accounted for 19 percent of the HCW departures and was a result of strong HCW management systems for the PEPFAR-supported HCWs. There was no difference regarding HCWs' intention to leave at baseline and in 2019.

These findings were not very different from results from interviews with key informants in Lilongwe and Zomba districts regarding HCW retention in general (including the government HCWs). When key informants were asked if HCW attrition was a challenge, consensus was that overall, attrition, including attrition of government HCWs, was low. They explained that it was very rare for HCWs to leave a government job because it is permanent, and that the PEPFAR-supported HCWs that left did so in search of a more secure job because they were not sure about the transition to government.

Exhibit 9: HCW retention rate compared by fiscal year



The factors affecting HCW retention and attrition varied by district. In Lilongwe, HCW attrition where HCWs leave for other districts was very low because many HCWs prefer to work in Lilongwe since it is a city. The main reasons HCWs left Lilongwe for other districts were to follow their spouse, and promotion in instances where the HCWs were promoted but the district did not have a vacancy. The other key factor affecting HCW retention in Lilongwe was further education "... the biggest challenge we are having now is ... most of the providers want to further their education ... we tried to say that we should have a training plan, so we can try to control this, but people still disregard that." To mitigate this, the district removes HCWs on self-initiated study from the payroll, but this is not addressing the problem adequately. In Zomba district, respondents said that HCW attrition was low and mainly attributed to following spouse, and where this was the case, the district encouraged the HCWs to find another HCW to swap with.

Objective 2: Availability of HIV/AIDS services and utilization of DSD models

One goal of deploying additional HCWs to the priority sites was to increase availability of HIV/AIDS services to support Malawi in reaching epidemic control. Therefore, under objective 2, HRH2030 assessed the availability of HIV/AIDS services as one of the anticipated outcomes of the salary support activity. Improved availability of HIV/AIDS services was assessed in terms of scope/type of HIV/AIDS services along the 90-90-90 cascade provided, and the frequency/number of times in a week that the services are provided. HRH2030 also assessed whether the deployment of the PEPFAR-supported HCWs increased the range of DSD models offered by the site as a proxy indicator of improved availability and use of HIV/AIDS services, and whether there

were any remaining HRH gaps in providing HIV/AIDS services and using the DSD models. Results of this assessment are presented in the next sections by sub research question.

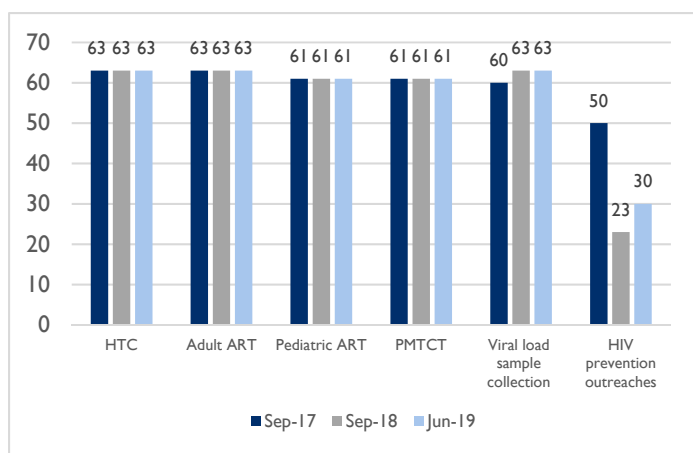
Question 3: Has the deployment of the PEPFAR-supported health workers increased the scope and frequency of HIV/AIDS services?

The number of sites running ART clinics five days or more a week increased from 19 in 2006 to 58 in 2019.

Effect on scope/type of HIV/AIDS services provided

The scope/type of HIV/AIDS services provided at the 63 priority sites was assessed at three points of project implementation through routine monitoring, in: (1) September 2017, when the first monitoring visit was conducted; (2) September 2018; and (3) June 2019. As illustrated in Exhibit 10, the deployment of PEPFAR-supported HCWs had minimal effect on the scope/type of HIV/AIDS services that the sites provide; this was not surprising given that Malawi has a mature HIV/AIDS program where most health facilities provide a whole range of HIV services. Deployment of the PEPFAR-supported HCWs was also aimed at improving the frequency and quality of the HIV/AIDS services. The effect of the deployment on frequency of services was assessed and results are presented below, while results of the effect on the quality of services are presented later in the report.

Exhibit 10: Change in number of sites providing each HIV/AIDS service



Regarding scope/type of services provided, all eligible sites were and are still providing HIV testing and counseling (HTC), adult and pediatric ART, and PMTCT services. Two sites are not providing pediatric ART and PMTCT services because they are in prisons. The number of sites collecting

viral load samples increased by three between September 2017 and September 2018. Provision of HIV prevention outreaches is sporadic because it is dependent on availability of funding to support HIV prevention outreaches, which is mainly supported by the clinical partners. Further, according to the June 2019 monitoring results, all the sites are screening clients for TB, 40 sites are providing TB testing services, and 10 sites are providing viral load testing services.

Effect on frequency of HIV/AIDS services provided

Since one of the goals of deploying the PEPFAR-supported HCWs was to improve availability of HIV/AIDS services in terms of frequency or number of days that the different HIV/AIDS services are provided, HRH2030 assessed the effect of the HCWs on frequency of services. This analysis focused on availability of the service as different from clinic days since some services could be provided even on a non-ART clinic day. The results of this assessment are presented in Exhibit 11.

There were positive and statistically significant changes in number of sites providing adult ART, PMTCT, and TB screening at least five times a week. Although not statistically significant, there were improvements in the number of sites providing pediatric ART, viral load sample collection, and HTC at least five times a week. These changes could be attributed to the additional HCWs and policy changes including the Test and Treat policy.

Exhibit 11: Change in number of sites providing HIV/AIDS services at least once a week

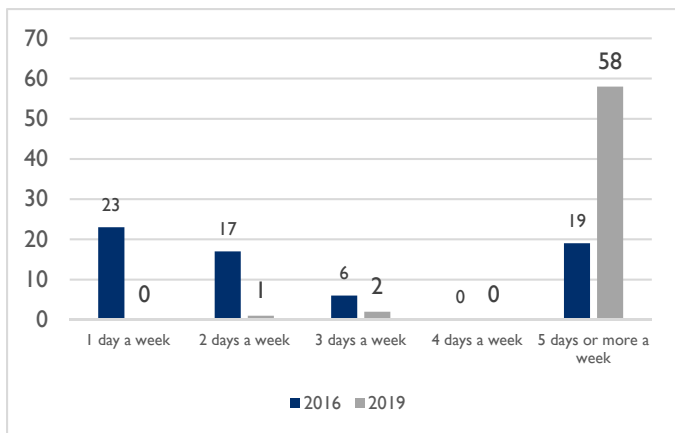
Type of service	Sept 2017	June 2019	% change	z	p-value
HIV testing and counselling	61	63	3.3%	1.43	0.154
PMTCT	52	60	15.4%	2.27	0.0233
Adult ART services	29	58	100.0%	5.59	<0.00001
Pediatric ART services	26	36	38.5%	1.78	0.0748
Tuberculosis screening	41	63	53.7%	5.16	<0.00001
TB testing	-	38			-
Viral load sample collection	28	34	21.4%	1.07	0.285

There were positive and statistically significant changes in number of sites providing adult ART, PMTCT, and TB screening at least five times a week. Although not statistically significant, there were improvements in the number of sites providing pediatric ART, viral load sample collection, and HTC at least five times a week. These changes could be attributed to the additional HCWs and policy changes including the Test and Treat policy.

Effect on number of ART clinic days

To further assess the impact of the PEPFAR-supported HCWs on frequency of services, HRH2030 assessed the impact of the HCWs on the frequency or number of times in a week that ART clinics were open in 2018/2019 compared to the baseline in June 2016. Five times a week was considered the optimal number of days that the ART clinics could open. Results of this assessment are presented in Exhibit 12.

Exhibit 12: Change in number of days that ART clinics are open



The number of priority sites with ART clinics five days or more a week drastically increased from 2016 to 2019 with 58/63 (92 percent) of the sites having ART clinics five times a week or more. The number of sites having ART clinics once a week reduced from 20 in June 2016 to zero in June 2019. This result was statistically significant, p -value <0.00001 , indicating a very strong positive link between deployment of additional PEPFAR HCWs and the number of ART clinic days per week.

When HRH2030 interviewed the key informants, the key message was that the PEPFAR-supported HCWs have significantly improved HIV/AIDS services and this is in sync with the results of the quantitative analysis. The respondents provided a wide range of examples to demonstrate the improvements including the fact that most of sites are now providing HIV services like ART clinics, ART initiation, and HIV testing on daily basis and, as a result, client volumes are increasing because clients know they will not stay long at the facility. Other examples cited included improved defaulter tracing due to reduced work pressure; better quality of care attributed to freshly trained HCWs and the increased number of HCWs providing services; timely provision of services; improved client/provider relationships; and improved linkage of PMTCT clients to ART. For the latter, one key informant noted, “In the PMTCT program, some

clients were missed because when they tested positive in antenatal, they were not followed up properly after delivery, but now, antenatal mothers who are tested positive are initiated on ART and receive the ARVs at antenatal clinic, then after delivery, their files are transferred to ART clinic where they access ARVs without any problems.”

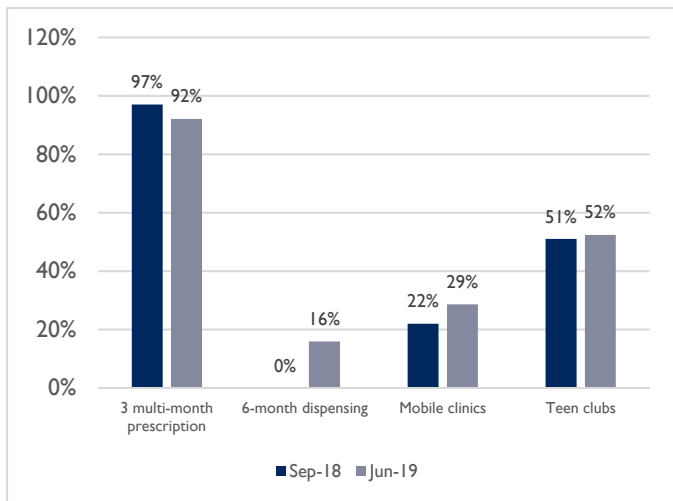
Further, as highlighted by another key informant, the most significant impact of the PEPFAR-supported HCWs has been on identification of positives: “We had many clients who did not feel like they are sick, and they therefore did not want to take almost two hours waiting for a service ... so, when we added the PEPFAR HCWs, we decreased the waiting time and those people could comfortably come and have their services.” The key informants also reported that the reduction in waiting time also attracted the very busy urban clients who previously shunned the HIV/AIDS clinics. The key informants explained how the deployment of the HCWs improved identification of positives, saying that “ ... previously due to work pressure we could sometimes misuse the health diagnostic assistants and say to them, leave those things and go and dispense medicines, but once we got the HCWs this has stopped and has given the (HIV diagnostic assistants) HDAs time to do their proper work.”

Reduction in stigma is another improvement attributed among others to the deployment of the PEPFAR-supported HCWs. As one key informant explained, “Previously, we had some facilities which, due to understaffing, would designate a day for ART services. This would bring stigma because they [the community] would know that if Jim and Jane are going to hospital today, they are going to collect HIV drugs.” Now because HIV/AIDS services are provided daily, stigma has been reduced.

Question 4: Has the deployment of the PEPFAR-supported HCWs at the site increased the range of differentiated service delivery models offered by the site?

In June 2018, Malawi approved the use of the following DSD models: three-month multi-month dispensing, pharmacy fast-track refills, teen clubs, mobile clinics, and DHO-linked drop-in centers. Later, in March 2019, the MOH discontinued the pharmacy fast-track refills and approved the use of six-month multi-month dispensing in selected sites. HRH2030 assessed the extent to which the DSD models have been scaled and are being used following the MOH approval and deployment of the PEPFAR-supported HCWs. Data was only captured for four of the five models, since the DHO-linked drop-in centers model targets specific sites. The results of this assessment are presented in Exhibit 13.

Exhibit 13: Change in utilization of DSD models from Sept 2018 to June 2019



Three-month multi-month dispensing is still the most utilized DSD model, with more than 92 percent of the sites using the model. Changes in use of the different DSD models was minimal and not statistically significant. However, by June 2019, 16 percent of the sites were using the six-month multi-month dispensing model and the increase was statistically significant (p-value 0.001).

Question 5: Are there HRH gaps remaining at the sites that should be addressed to further improve service provision?

Before deployment of the PEPFAR-supported HCWs, inadequate staffing was the most cited challenge affecting the provision of HIV/AIDS services. To determine whether this situation had changed, HRH2030 assessed if there were any remaining gaps in HRH at the supported sites. Data was obtained through structured interviews with health facility in-charges and the HCWs, and in-depth interviews with key informants at the district that included the district director of health and social services, district medical officer, district nursing officer, and district ART coordinator.

Overall, respondents acknowledged that deployment of the PEPFAR-supported HCWs improved the number of HCWs available to provide HIV/AIDS services. However, 93.3 percent of the ART clinic in charges and 74.2 percent of the PEPFAR and non-PEPFAR HCWs said there were still HRH gaps. Other than gaps among the pharmacy and laboratory cadres evidenced by the percent of services still offered by inappropriate HCWs in pharmacy (58 percent) and laboratory (21 percent), many of the remaining gaps are beyond HCW numbers. The gaps cited included the need for ART training, especially for the government HCWs; inadequate resources for the HCWs to work with; and

concerns about HCW productivity. A key informant elaborated, saying, “one of the things that is still a challenge is HCWs adhering to whatever it is that they are supposed to do ... so, it is not always that we need a physical being, but what that person is doing, the productivity of that person, that is important.” The other challenge highlighted, especially in Lilongwe district, was the issue of an inadequate staff establishment. According to one key informant, the district sees many clients and efforts to obtain additional HCWs from government has been futile, but “when we try to lobby for other HCWs, they say your establishment is full ... I think the government really needs to revise the establishment so that they come up with a clear establishment in line with our population.”

In terms of additional HCWs required, respondents highlighted the need for additional lab assistants in health centers to conduct TB tests, data clerks to manage HIV data especially in high volume sites, and pharmacy assistants to manage drug stores. In explaining the need for pharmacy assistants, respondents reported that in many sites, the drug stores are still managed by unqualified health workers and having pharmacy assistants would not only improve the quality of care, but would ensure efficient use of medicines “... we have seen tremendous improvements in those sites that are run by pharmacy assistants; they (drug stores) are better managed in terms of ordering drugs, reporting, and reduced expiry of drugs ... in that case (having PAs), we would make maximum use of this already depleted drug budget that we get. Respondents made several recommendations on how to address the HRH gaps, including conducting ART refresher trainings, mentoring HCWs in ART and use of the electronic client management system, and replacing the PEPFAR-supported HCWs that leave.

Objective 3: Utilization of HIV/AIDS services

According to the HRH2030 Theory of Change for PEPFAR Health Worker Salary Support, the deployment of the PEPFAR-supported HCWs was expected to lead to improved utilization of HIV/AIDS services, and improved performance of supported sites against PEPFAR targets. To assess whether this was achieved, HRH2030 requested USAID provide the DATIM data for the number of clients newly initiated on ART (TX_NEW), total number of clients currently on ART (TX_CURR), number of HIV-positive pregnant women who received ART to reduce the risk of mother-to-child-transmission during pregnancy (PMTCT_ART), and the total number of ART patients who were screened and are receiving TB treatment (TX_TB), covering the pre- and post-intervention period. An interrupted timeseries analysis (ITSA)

was the method of choice for assessing the effect of the PEPFAR Salary Support Activity on utilization of HIV/AIDS services. DATIM data was requested for the period of October 2016 to September 2019 for 104 sites (61 intervention and 43 comparison). However, complete DATIM data was obtained only for TX_NEW and PMTCT_ART, since TX_CURR data were only available starting October 2017 (post-intervention only) and no data were obtained for TX_TB. Given that the PEPFAR-supported HCWs were deployed in September 2017 in CHAM sites and October 2017 in government sites, FY 18 quarter 1 was considered as the start of the intervention.

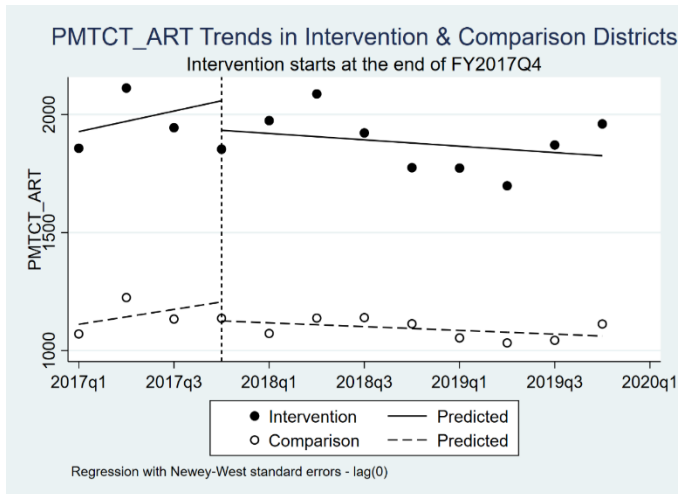
The planned ITSA was, however, constrained by the amount and quality of the DATIM data obtained. Twelve quarters of

data (four before and eight after the intervention) proved too few for a meaningful ITSA. Moreover, as discussed earlier, data were incomplete for TX_CURR and TX_TB in terms of number of sites and quarters. Exhibit 14 summarizes the level of completeness of the DATIM data received. Lastly, all indicators showed unexplained large variations between quarters (see graphs below), resulting in very large confidence intervals around the trend lines and results that are not statistically significant (see Appendix 2). Given these limitations, it was impossible to determine whether PEPFAR salary support impacts service utilization with the data available.

Exhibit 14: DATIM data completeness for selected output indicators

	No of intervention sites with complete data	No of comparison sites with complete data	Total No. of sites with complete data	Data completeness percent
PMTCT_ART	61	43	104	100%
TX_NEW	61	43	104	100%
TX_CURR	42	9	51	49%
TX_TB	0	0	0	0%

Exhibit 15: Pre- and post-intervention PMTCT_ART trends by district type



Given the level of data completeness, the planned interrupted timeseries analysis and assessment of performance against targets was only conducted for PMTCT_ART and TX_NEW, leaving out TX_CURR and TX_TB. Results obtained are presented in the sections below.

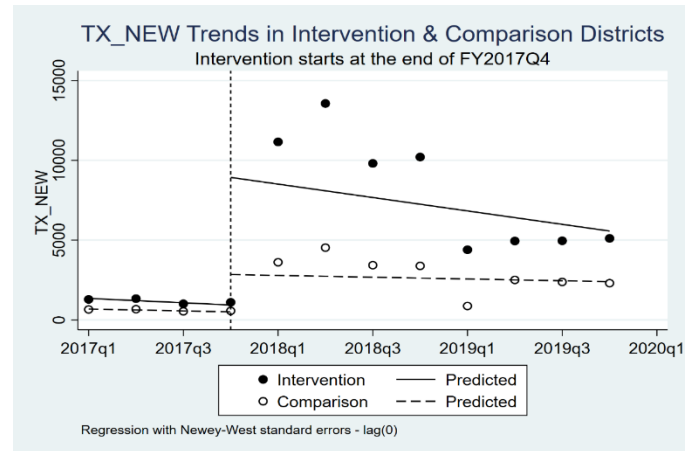
Trend in PMTCT_ART and TX_NEW

Data to assess the trend in utilization of PMTCT_ART was obtained from all 104 sites with complete data for all the 12

quarters. An interrupted time series was conducted using STATA and the results obtained are presented in Exhibit 15.

Data used for analyzing the utilization trend for TX_NEW was obtained from 46 sites in intervention districts and six comparison sites that had complete data for all the 12 quarters. Exhibit 16 shows the trend in TX_NEW for both intervention and comparison sites.

Exhibit 16: Pre- and post-intervention TX_NEW trends by district type



The focus of the analysis was the trend in utilization and not the absolute numbers, because considerably more

intervention sites than comparison sites were assessed. Results of the analysis show that the trend for both PMTCT_ART and TX_NEW in both intervention and comparison sites is similar with a considerable increase in utilization between FY 2017 quarter 4 and FY2018 quarter 4. This coincides with several interventions in HIV/AIDS treatment in Malawi, including scale-up of same-day ART, Dolutegravir-based regimens, differentiated service delivery, and viral load monitoring, and the deployment of the PEPFAR-supported HCWs in September/October 2017. However, statistical tests for the changes in levels and trends of TX_NEW and PMTCT_ART indicate that the pre- and post-intervention trends in intervention and comparison districts are not different from each other and are not statistically significant even though the changes seem substantial upon visual inspection. See Appendix 2 for ITSA results.

Conclusion: Effect on utilization of HIV/AIDS services

A meaningful ITSA to assess the effect of the PEPFAR HCW deployment support on utilization of the different HIV/AIDS services was not possible due to too few data points and unexplained large variation in the data from quarter to quarter. While utilization of PMTCT_ART and TX_NEW was notably high in FY 2018 and possibly attributable to the multiplicity of interventions that were implemented to support same-day ART initiation, these changes were not statistically significant because of data limitations.

Objective 4: Quality of HIV/AIDS services

A key intended outcome of the PEPFAR Salary Support Activity was to improve the quality of HIV/AIDS services. Quality was defined in terms of perceived quality from the client and HCWs perspective and technical quality. Technical quality was defined as compliance to standards such as appropriate use of HCW skills in providing services,

adherence to HIV clinical guidelines, client waiting time, and client/provider facing time. Data to assess the quality of services was obtained from interviews with HCWs, client exit interviews, and observation of service delivery. Results obtained from this analysis were compared with the 2016 analysis where similar data was available, or with the 2017/2018 operational research data to demonstrate change in quality. Key findings are presented in the sections that follow by quality aspect.

Question 6: Has the deployment of the PEPFAR-supported HCWs at the site led to improvements in the quality of services?

Overall, 93% of the clients were satisfied with the ART services received explaining that they were treated with respect, the HCWs took the necessary time to answer all their questions, they received adequate information about their disease, and that the clinic hours were convenient. All these factors are key in ensuring client retention in care.

Client satisfaction

During the client exit interviews, clients were asked to rate their level of satisfaction with the services received using a five-point Likert scale of very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, or very dissatisfied. The overall satisfaction was high at 93 percent and it was a slight improvement from the 87 percent obtained in 2017/2018, and this change was statistically significant (p-value 0.0067). The clients were also asked to assess their level of satisfaction with specific aspects of service provision that are proxy indicators of quality. Results of this assessment are presented in Exhibit 17.

Exhibit 17: Client satisfaction with different aspect of ART service delivery

Area assessed	Percent satisfied (2017/18)	Percent satisfied (2018/19)	% change	Z	p-value
The health workers took the time necessary to answer all my questions.	75.0%	89.0%	14.0%	5	<0.001
The clinic hours are convenient for me.	77.0%	86.0%	9.0%	3.2	0.0016
I received all the medications I needed	96.0%	99.0%	3.0%	2.7	0.0071
The information I received today about my disease and its treatment was adequate.	90.0%	93.0%	3.0%	1.5	0.1439
I was treated with respect by the health workers.	97.0%	98.6%	2.0%	1.5	0.1329
The health workers are always available when I need services at this facility.	89.0%	89.0%	0.0%	0	1
Average	86.8%	93.0%	6.0%	2.7	0.0067

Based on the assessment, the most statistically significant quality aspects that improved most were “the health workers took the time necessary to answer all my questions,” which improved from 75 percent to 89 percent, and “the clinic hours are convenient for me,” increasing from 77 percent to 86 percent; both improvements are important for greater ART adherence and retention.

Perceived impact on site staffing and HIV/AIDS services

HRH2030 assessed the perceived benefit of the PEPFAR-supported HCWs on site staffing and HIV/AIDS services through interviews with facility/clinic in charges and HCWs, including both PEPFAR and non-PEPFAR HCWs. During the interviews, the HRH2030 team ticked off every benefit that the respondents mentioned against a pre-determined list of possible benefits. Results were compared with findings from 2017/2018 to demonstrate improvements as illustrated in Exhibit 18.

Exhibit 18: Perceived impact on site staffing and HIV/AIDS services

Perceived benefit	2017/18	2018/19	% change	p-value
Reduced patient waiting time	35%	96%	174%	<0.0001
Reduced workload	51%	96%	88%	<0.0001
Improved quality of HIV/AIDS services.	71%	97%	37%	<0.0001
Having the right HCW providing services.	64%	86%	34%	<0.0001
Increased the number of HIV/AIDS patients seen	68%	81%	19%	0.0046
Increased the type of HIV/AIDS services	65%	61%	-6%	0.4522

Perceived impact of the PEPFAR-supported HCWs on site staffing and HIV/AIDS services was substantially higher and the improvement statistically significant in 2018/2019 compared to 2017/2018 for all benefits except “increased the type of HIV/AIDS services.” This finding was further supported by results from interviews with key informants who provided several examples of how the PEPFAR-supported HCWs impacted HIV/AIDS services. For example, one interviewee said, “Previously, clients were not properly assessed, sometimes clients would just get their medications without being seen holistically but now more clients are seen holistically.” Another said, “The clients say that yes, despite some challenges, the services have improved, because they

now feel at home because they have a lengthy rapport with the clinician or nurse attending to them.”

Other benefits mentioned by the HCWs and facility/clinic in charges included: timely provision of care to clients (99 percent); thorough assessment of clients by providers (96 percent); appreciation of services by the community (89 percent); enhanced teamwork (99 percent); peer learning (96 percent); and improved health facility leadership/management (82 percent). Similar observations were made by the key informants, who noted that “... there is also timely provision of services. With the PEPFAR support, the number of HCWs trained in ART has increased because most HCWs were trained ... even communities appreciate that they are assisted in good time.”

Appropriate use of HCWs

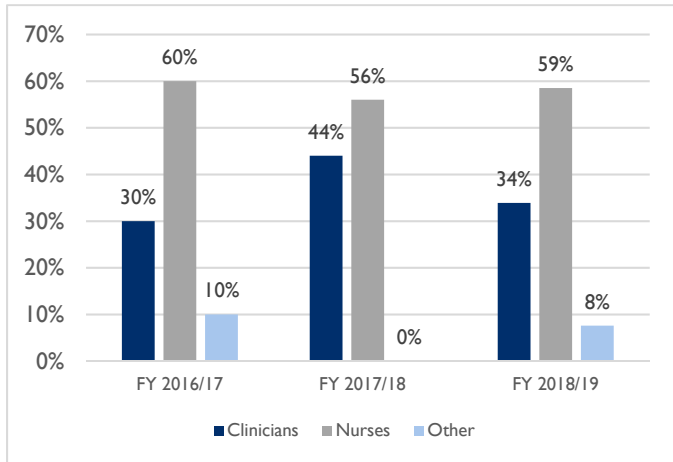
In supporting the deployment of additional trained HCWs in the facilities, PEPFAR intended to improve the quality of HIV/AIDS services by having more services provided by appropriately trained and skilled HCWs. This assessment therefore sought to find out if HIV/AIDS services, including client consultation in ART clinics, laboratory tests, and dispensing of medicines were being provided by appropriately trained and skilled health workers, and whether there have been any improvements from the 2016 baseline situation. The results of this assessment are presented in Exhibits 19, 20, and 21.

HCWs conducting client consultations

In the ART clinic, the appropriate HCWs who are expected to provide ART consultation, including ART initiation and refills, include clinicians (doctors, clinical officer/technicians, and medical assistants) and nursing staff (nursing officers, registered nurses, and nurse midwife technicians). Other cadres such as lab cadres, data clerks, HIV diagnostic assistants (HDAs), expert clients, counselors, and community midwifery assistants were considered inappropriate, for they may not have the adequate qualifications and supervision to provide optimal care according to the guidelines.

Based on the service delivery observations conducted in the ART clinics, use of appropriate HCW in the provision of ART consultations improved significantly from 2016/2017 to 2017/2018 but relapsed in 2018/2019 as shown in Exhibit 19.

Exhibit 19: Percent of HCWs conducting client consultation in art clinics

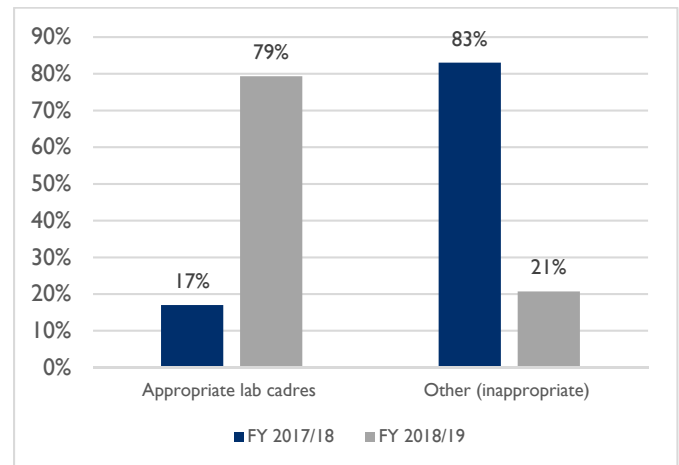


In 2018/2019, eight percent of the client consultations were being conducted by inappropriate HCWs that included laboratory assistants (2.8 percent), ART clerks (2.4 percent), and community midwifery assistants (2.4 percent). This was mainly at sites with high client workloads where, for example, an ART clerk or CMA would work usually in the same room or run the ART clinic with either a nurse or clinician. Further probing revealed that some of these inappropriate HCWs had been trained in ART; hence, they were called upon to provide surge support when the workload was high. This finding might seem contradictory to results from the in charge and HCW interviews where use of appropriate HCW improved between 2017/2018 and 2018/2019, but this is because the improvement reported by the in charges and HCWs is broader and also considers the laboratory and pharmacy services.

HCWs conducting laboratory tests

In 2016, when the baseline HRH rapid assessment was conducted, the 63 priority sites had a total of 72 lab technicians and 24 lab assistants, located mainly in hospitals and urban health centers (HRH2030, 2016). Under the PEPFAR Salary Support Activity, a total of 65 laboratory assistants were deployed to the 63 sites to support provision of HIV/AIDS services and other laboratory services. By the time of this assessment, 64 laboratory cadres were at site, providing HIV/AIDS related and other laboratory services. Observations were conducted at the general laboratory and results compared with those of 2017/2018 since similar data for 2016/2017 was not available.

Exhibit 20: Percent of HCWs providing laboratory services

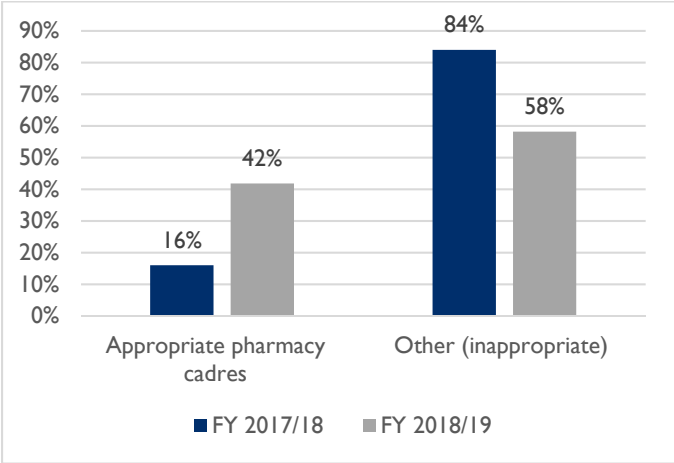


As illustrated in Exhibit 20, there was a tremendous improvement in use of appropriate HCWs in the laboratory and this was statistically significant. Use of appropriate HCWs in the laboratory improved from 17 percent in 2017/2018 to 79 percent in 2018/2019. It is worth noting that the PEPFAR supported laboratory cadres were posted after the 2017/2018 impact assessment, which partially explains why use of appropriate HCW was very low 2017/2018. The inappropriate HCWs in the laboratory were mainly patient/hospital attendants, accounting for 20.7 percent of the observations made during service delivery.

HCWs dispensing medications in the pharmacy

Before the deployment of PEPFAR-supported HCWs in 2016, the 63 supported sites had only 22 pharmacy technicians and 27 pharmacy assistants who were located mainly in hospitals and urban health centers (HRH2030, 2016). In most facilities therefore, pharmacies and dispensaries were managed by non-pharmacy cadres. Whereas PEPFAR supported the deployment of 43 pharmacy assistants, at the time of data collection, only 22 had been retained. As a result, as illustrated in Exhibit 21, the impact on ensuring an appropriately trained cadre was dispensing and managing the pharmacy was moderate, improving from 16 percent to 42 percent.

Exhibit 21: Percent of HCWs dispensing medicines at the pharmacy



52 percent of the dispensing is still carried out by inappropriate HCWs based on the HCWs’ scopes of practice. The HCWs dispensing medicines are nurses (11.2 percent) and hospital/patient attendants (47.0 percent)

Adherence to HIV clinical management guidelines

To assess the technical quality of HIV/AIDS services, HRH2030 determined the extent to which the HCWs found the guidelines easy or challenging to comply with and the key barriers affecting compliance. HRH2030 also assessed the level of compliance with the guidelines by comparing the current practice against selected standard protocols in the guideline, through observations of service provision, client exit interviews, and review of patient health passports.

Overall, based on the analysis results, the proportion of HCWs who reported that the guidelines were **not** challenging increased from 77 percent in 2017/2018 to 91 percent in 2018/2019, and this finding was statistically significant (p value 0.004). This finding was further supported by one key informant, who explained that, “Previously it (compliance with the treatment standards) was a challenge, but nowadays it is no longer a challenge because people now have started going for training ... they even sit for exams to make sure they are knowledgeable.”

Unlike the situation in 2017/2018, where respondents highlighted inadequate staffing (35 percent) and high workload (47 percent) as key barriers affecting compliance with the guidelines, less than five percent mentioned these barriers this year. This is directly due to the deployment of the PEPFAR-supported HCWs who improved staffing levels and reduced workload.

In terms of actual compliance with the guidelines, there was an overall improvement of 12 percent in terms of assessment of clients by the HCWs. Specifically, there was an improvement in the proportion of HCWs asking whether the client had cough (22 percent), night sweats (21.1 percent) and leg pain/weakness/numbness (19.1 percent). However, the overall proportion of HCWs assessing clients in compliance with the guidelines is still unacceptably low at 34 percent. Though, as highlighted by one of the key informants, some of the standard areas for assessment such as looking/examining the eyes for jaundice and weight loss can be assessed without asking the client.

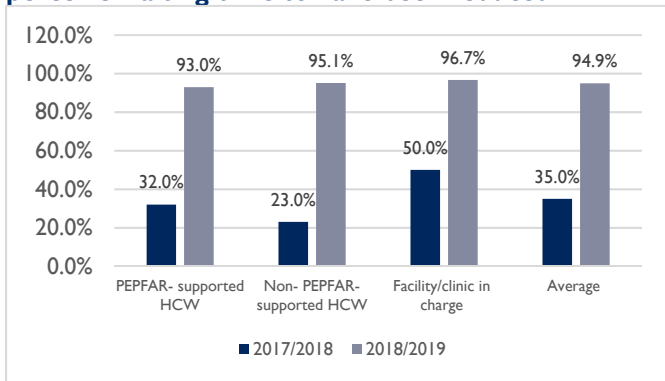
Exhibit 22: Compliance with standard areas for assessment of client at every visit

Standard area for assessment at every visit	2017/2018	2018/2019	% Change	z	p-value
	n=627	n=419			
Look or examine your eyes?	6%	12%	5.80%	3.3	0.0008
Ask you to open the mouth or ask you if you have any sores?	9%	14%	4.60%	2.3	0.019
Ask if you have cough?	41%	63%	22.00%	6.8	<0.0001
Ask if you have fever or night sweats?	28%	49%	21.10%	7	<0.0001
Ask if you have lost weight?	37%	42%	4.40%	1.4	0.1526
Ask if you are vomiting?	19%	29%	10.10%	3.8	0.0001
Ask if you have abdominal pain?	17%	30%	12.80%	4.9	<0.0001
Ask if you have diarrhea?	18%	29%	11.10%	4.2	<0.0001
Ask if you have leg pain/numbness/weakness?	19%	38%	19.10%	6.8	<0.0001
Average	21%	34%	12%		

Patient waiting time

Data to determine patient waiting time was obtained from different sources to triangulate the findings. The sources included interviews with PEPFAR and non-PEPFAR-supported HCWs, facility/clinic in charges, and the clients. As illustrated in Exhibit 23, there was a significant improvement in the proportion of HCWs and facility/clinic in charges who perceived the patient waiting time to have improved. On average, the improvement was from 35 percent in 2017/2018 to 94.9 percent in 2018/2019, and the findings were statistically significant.

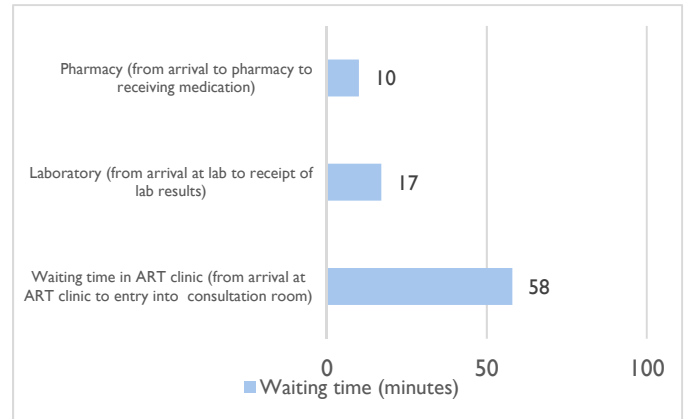
Exhibit 23: Percent of HCW and in charges who perceive waiting time to have been reduced



Similarly, the clients also indicated that overall, there was a reduction in waiting time in 2018/2019 compared to 2017/2018. The percentage of clients who reported reduction in waiting time increased from 35% in 2017/2018 to 63% in 2018/2019; this finding was statistically significant (p value <0.001). Approximately 83% of the clients reported that they noticed positive changes in the way health services were provided in 2019, compared to 47% who reported noticing positive change in the previous year; this finding was also statistically significant (p value <0.001). The two preceding findings are key because they are coming from clients themselves; this is good evidence on the impact of the PEPFAR Salary Support Activity.

The actual waiting time obtained from observations and timing of service delivery in the ART clinic, the laboratory, and pharmacy is summarized in Exhibit 24.

Exhibit 24: Mean and median waiting time in ART clinic, laboratory, and pharmacy



Generally, waiting time in laboratory and pharmacy was short due to short queues. 28.2 percent and 18.9 percent of the clients felt that they waited longest at the registration and while waiting to consult with the provider. The key factors affecting waiting time at registration and ART consultation included: late start of service provision (33 percent), disorganized clinic (17 percent), unclear queuing procedures and management of lines (14 percent), and in some sites, especially the urban sites, overcrowding of/too many clients in the ART clinic. All these can be improved with better systems for managing ART clinics and utilization of multi-month dispensing models as was noted in some clinics which had shorter waiting time.

Client/provider facing time

The client/provider facing time in the ART clinic was on average seven minutes, which is an improvement from four minutes last year. This finding is further supported by results from the key informants who reported that now providers have more time to spend with their clients resulting in better quality of care in terms of provider/client relationship and clinical assessment of the clients which key informants described as thorough.

Objective 5: Key lessons learned, best practices and key success factors

Objective 5 aimed to document the lessons learned in terms of what worked and what did not; best practices described as approaches that could be replicated in the future; and key success factors in terms of what made the PEPFAR HCW Salary Support Activity successful. Data was obtained through in-depth interviews with key informants from Lilongwe and Zomba districts, and most whom were members of the recruitment task team. Based on their involvement in the PEPFAR salary support activity, the key informants discussed their perspectives of what worked and what could be improved, best practices that can be considered for replication, and what they consider as key success factors. Results are presented by key lessons learned and recommendations in terms of what can be replicated and what needs to be improved in future programming of similar interventions.

Question 7: What are the key lessons learned, best practices, and key success factors in the approach used to implement the PEPFAR HCW Salary Support Activity?

Involvement of key stakeholders

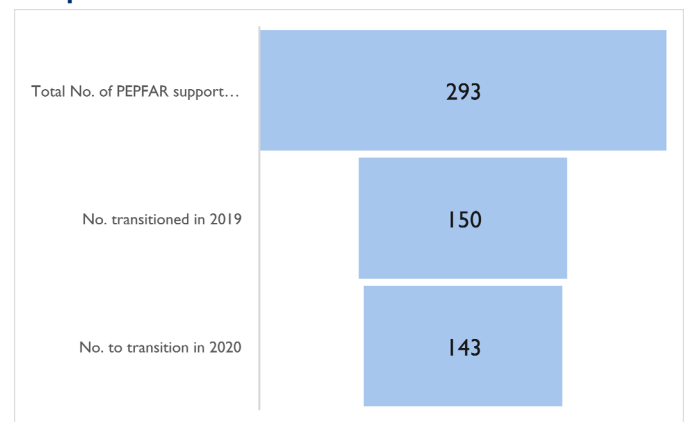
Overall, there was consensus that the approach used to implement the PEPFAR HCW Salary Support Activity was “very good” because it involved all stakeholders that included central government and the beneficiary districts. PEPFAR and HRH2030 engaged central level policy makers to agree on the terms and conditions and processes to be used in the recruitment and deployment of the HCWs. The outcome of this engagement was a letter of commitment from the government of Malawi committing to absorb the PEPFAR-supported HCWs after two to three years of PEPFAR salary support. The commitment letter also provided overall guidance on the recruitment, deployment, remuneration, and management of the PEPFAR-supported HCWs.

150/293 (51%) of the PEPFAR- supported HCWs transitioned in July/August 2019 and the remaining 143 HCWs will transition in July in 2020.

With this high-level guidance, HRH2030 established the national multi stakeholder recruitment task team as a forum for engaging key stakeholders. The team met regularly; task team members were involved in making key decisions to guide implementation and participated in recruitment, deployment, posting, supervision, discipline, and management

of the HCWs according to their organizational mandates. Key informants strongly recommended the replication of this approach in similar projects in the future. In support of this recommendation, one key informant said, “Your engagement of the government is what makes you to be really a good system because you engaged the government in everything that you did for the HCWs to be recruited ... so the government also felt that it was part and parcel of this system. That is why it was easy for them [government] to absorb those HCWs.” As a result of this continuous engagement and involvement of stakeholders, HRH2030 was able to recruit and deploy the HCWs within agreed timelines. HRH2030 also worked successfully with the government to transition the first cohort of the PEPFAR-supported HCWs in July/August 2019. As illustrated in Exhibit 25, 150/293 (51%) of the PEPFAR- supported HCWs transitioned and the remaining 143 HCWs will transition around July 2020.

Exhibit 25: Number of HCWs transitioned in 2019 and planned for 2020



In addition to ensuring government ownership of the intervention, this level of engagement with key stakeholders ensured harmonious implementation and assured long-term sustainability. As explained by one key informant, this approach to implementation was the classic strategy towards the journey to self-reliance because government stakeholders felt confident that they could manage on their own in the future: “The collaboration and working together was the key success factor ... so that way, even if you were to leave us, transition will not be that hard for us because we were involved at every stage and we understood the process.”

Joint and efficient implementation

Key informants also highlighted that another best practice was the meticulous planning and execution of the PEPFAR HCW Salary Support Activity. HRH2030 worked with the recruitment task team to develop a detailed recruitment road map with clear milestones, timelines, and roles and responsibilities. The plan was jointly monitored monthly during the first three months of implementation and key

bottlenecks jointly addressed. This not only ensured that the HCWs were recruited and deployed to the sites in the shortest time possible to support service provision, but it won HRH2030 the trust of stakeholders that the project could deliver on its promise. As explained by one key informant, “I would say organization of everything was good ... everything worked according to plan. What encouraged me most was that when the interviews were conducted like this week, within a short period, people started working ... even on salaries, HCWs were not complaining ... they receive their salary on time; with this, I can say that PEPFAR is committed.”

Use of government systems

Use of government systems was a crosscutting theme highlighted by the key informants as a best practice. As guided by the high-level agreement between PEPFAR and the government of Malawi, HRH2030 used government systems and terms and conditions of service in recruiting, deploying, and managing the PEPFAR-supported HCWs. However, payment of salaries was done using a parallel system since there was no provision in the project design for government to government funding. Key informants explained that this approach was a best practice because it promoted harmony, coordination, and teamwork between the government and PEPFAR-supported HCWs. Further, the approach was motivating to the PEPFAR-supported HCWs because it increased the sense of job security when compared to a purely project job. As one key informant said, “This approach promotes teamwork because they (government HCWs) know that everybody is on the same salary rate, everybody is being treated equally ... even for the newly employed HCWs, there is a grantee that their employment is not just going to be terminated at the end of the project, so they are motivated and give their best.” As a result, the PEPFAR-supported HCWs easily integrated into the sites and worked collaboratively with their government counterparts towards a common goal.

Key informants particularly applauded the approach where the PEPFAR-supported HCWs were supervised and disciplined by their respective government supervisors using the government system. Key informants explained that this approach made the governance structure easier, empowered HCW supervisors, and increased government ownership of the PEPFAR-supported HCWs, noting, “You have also made us own the health workers because we are their supervisors and we have a say on these HCWs and this partnership approach worked well. Even during supervision, we are also involved.” The outcome of this best practice was well described by another key informant who said, “You gave us a chance to discipline these HCWs, there was a lot of discipline

because they know our recommendation matters; it can cost someone his/her job so, there was very good discipline.”

Timesheets and contract renewals

Another significant finding was the appreciation of timesheets as a best practice by the key informants. In accordance with the USAID financial regulations, salary payment to all PEPFAR-supported HCWs was made against a timesheet validated and signed off by the HCW’s supervisor. This approach received a lot of resistance at the start of implementation, but later became the norm after the HCWs noted that they would not be paid without a timesheet. The key informants described the use of timesheets as a good HCW management tool. As one said, “. . . timesheets bring sanity and are a good way of managing HCWs. HCWs are motivated to work within their hours so that they can get their salaries. I also wish the government would use the same approach ...”

The key informants also highlighted as a best practice the quarterly verification exercises where HRH2030, jointly with members of the district management team, visit the supported sites to verify HCW attendance to work. This activity is also used to triangulate and validate the information on the HCW timesheets. As one of the key informants explained, this also provided the district management team with an opportunity to address other HCW and management issues at the sites. At the end of every year of service, PEPFAR-supported HCWs are appraised using the government system and depending on the recommendation of their supervisors, their contracts are renewed. This process was also highlighted as a best practice for replication. As one key informant said, “You also do renewal of contracts; I see that health workers are very happy when you renew their contracts and for us, we are also happy.”

Project design

The key informants had suggestions on how to further enhance the project design for maximum impact. They recommended more involvement of the beneficiaries (the districts) at the project design stage, especially in the selection of sites for HCW support. One said, “Initially, I think we should work together in coming up with those PEPFAR priority sites. We should be given a chance to express ourselves in as far as the sites that are chosen are concerned.” The key informants also recommended that in future programming, districts should be allowed more freedom to allocate PEPFAR-supported HCWs across facilities based on need. One noted, “I would have loved it if we had more freedom with the HCWs in terms of allocation.” To address this, the key informants suggested that in future, PEPFAR could consider a pilot where PEPFAR and the district would

agree on HIV/AIDS service priorities and PEPFAR allows the districts the freedom to decide on their HCW needs and allocation across facilities. In this case, the districts would be held accountable for results. This was elaborated by one key informant as, “I would really love it if maybe we could have a pilot or a memorandum of understanding with the district health office and say okay, we are giving you this (HCWs) with the hope that these things (HIV services) will improve and maybe we would review in the next six months or one year, and then see what we can achieve if we are given freedom.”

Key informants made additional recommendations in terms of modifying the project design such as using the government system to pay the PEPFAR-supported HCW salaries, such as “I would say let them get their salaries through the normal system ... so, PEPFAR should pump the money to the government.” The key informant also recommended training the PEPFAR-supported HCWs in ART as part of the induction process so that they are appropriately equipped to provide HIV/AIDS services immediately after deployment. Ensuring that PEPFAR supported HCWs are treated the same as their government counterparts in terms of materials like uniforms and training was highlighted as an area for design modification to minimize “disturbances on the ground.” Said one, “I feel if resources are available, let PEPFAR, when they are doing their trainings ... extend (participation) to other

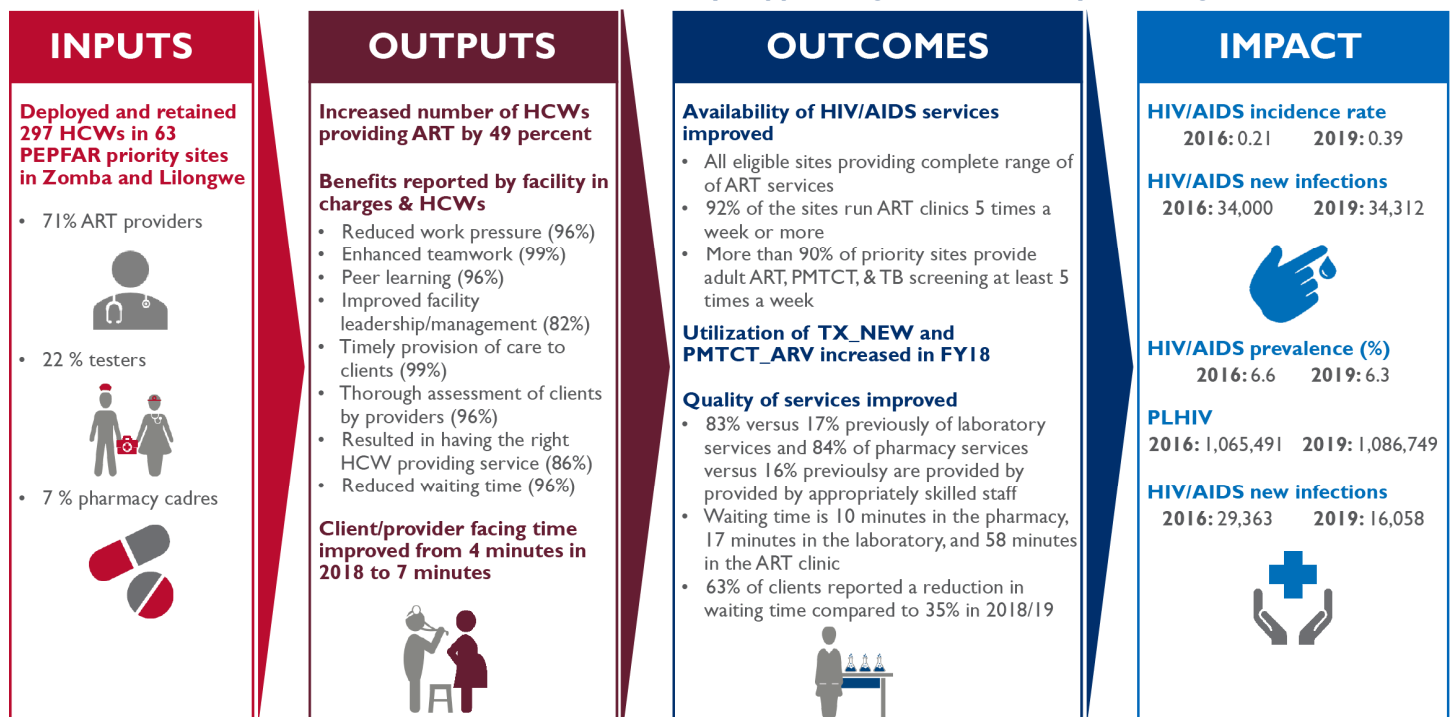
members of staff ... that can help a lot because if you want to see impact ... that cannot be contributed to by one health worker, it can be contributed to as a group.”

4.0. Discussion

Summary of the Results

The impact assessment reveals several positive impacts of the PEPFAR Salary Support Activity on site staffing and HIV/AIDS services as seen in Exhibit I. The assessment also reveals several lessons learned and best practices to inform current and future HRH programming in Malawi and beyond. The assessment results show that deployment of the PEPFAR supported HCWs improved staffing levels in ART clinics and subsequently, the deployment of the HCWs was associated with improved availability of HIV/AIDS services in terms of number of sites providing the different HIV/AIDS services at least five times a week. See Exhibit I, below. This is similar to the findings of the emergency hire in Kenya, which resulted in improved access to HIV and other services in hard-to-reach areas and high-volume facilities (Fogarty & Adano; 2009). The deployment was also associated with improved quality of HIV/AIDS services in terms of using appropriately skilled HCWs to provide the different services where inappropriate HCWs such as patient attendants that were previously providing services were replaced with qualified HCWs. In

Exhibit 26: Results from PEPFAR Health Worker Salary Support aligned with Theory of Change



addition, both clients and health providers reported that waiting time had been reduced, and the actual waiting time determined from observations was very short, at less than 20 minutes for laboratory and pharmacy services while waiting time in the ART clinic was, on average, 58 minutes. The assessment also revealed several areas for potential efficiency improvements which could be harnessed to further improve waiting time in the ART clinics.

With the deployment of the PEPFAR-supported HCWs, significantly fewer health facilities reported inadequate staffing and high workload as key barriers in provision of HIV/AIDS services. Many of the supported facilities reported that they feel that they have enough HCWs especially nursing staff to provide the different HIV/AIDS services with key barriers shifting from inadequate staffing to inadequate resources. This is a significant improvement to the situation before the PEPFAR Salary Support Activity, when provision of HIV/AIDS services was hampered by widespread staffing shortages. The impact assessment also showed significant improvements in utilization of HIV/AIDS services such as TX_NEW and PMTCT_ART in FY 18 which may be attributable to multiple interventions. An association with the deployment of HCWs could not be established in the absence of reliable DATIM data. The assessment also revealed areas that need to be addressed to complement the improved staffing levels. These include enhancing HCW performance, improving ART clinic efficiency to improve waiting time, addressing key factors affecting HCW retention, and ensuring availability of other prerequisite resources for service delivery.

Use of government systems, early engagement, and continuous involvement of government counterparts to ensure ownership of the intervention were identified as key success factors and best practices in the way the PEPFAR Salary Support Activity was implemented, resulting in seamless transition of the PEPFAR supported HCWs into the government system. Respondents also recommended use of performance-based funding mechanisms where districts are held accountable for results while affording them more autonomy in use of resources such as human resources as the most effective approach of PEPFAR support.

HRH Optimization

The assessment clearly demonstrates the link between improved staffing levels and availability of HIV/AIDS services and to some extent, the link with improved quality of services which supports the theory behind the PEPFAR HCW Support Activity. However, to sustain these benefits, especially now that the HCWs have been transitioned to the government of Malawi system, there will be a need to implement interventions that will ensure that the available HCWs are

optimally used in providing HIV/AIDS services. HCW optimization ensures maximum client outcomes with the available HCWs numbers and skills (Dubois & Singh; 2009). HCW optimization would entail ensuring that the skilled HCWs (1) are appropriately used, focusing on providing services that need their level of skills and experience while other less technically demanding tasks are carried out by other less skilled cadres, for example, lay cadres; (2) have the prerequisite skills to perform their jobs, in this case, to provide HIV/AIDS services; (3) work in a conducive work environment where they receive the resources and management support they need; and (4) are managed for performance, to ensure that intended results are achieved.

To this end, a wide range of HRH interventions would need to be implemented, including regular HRH assessments to determine staffing gaps and potential efficiencies through repurposing, task sharing, and task shifting; continued needs-based in-service training to ensure the HCWs have the knowledge and skills they need to effectively do their work; coaching and mentoring to ensure that HCWs provide services according to technical standards for enhanced technical quality; and regular supportive supervision to address key HCW concerns that might affect their motivation and performance. It would also include provision of the prerequisite tools, commodities, and resources, such as transport and associated allowances, to enable HCWs to provide HIV/AIDS services, particularly, outreach service such as HIV prevention outreaches and nurse-led community ART distribution, whose implementation is currently curtailed by inadequate facilitation.

In addition, strengthening performance management would be critical in ensuring HCW optimization because, as presented in the results section, respondents noted that improving HCW numbers alone does not improve service delivery. They specifically raised the emerging challenge of “organized absenteeism” where HCWs agree amongst themselves not to report for duty, leaving only skeleton staff on duty. These practices diminish the potential benefits of the improved staffing levels because the skeleton staff continue to be overworked, leading to poor quality of services and long client waiting times. Organized absenteeism is usually a result of poor leadership, which can be mitigated through training of facility managers and overall leadership support from district managers who could conduct impromptu site visits to verify HCW attendance and hold accountable any staff found away from duty without official leave. Districts could also explore the use of biometrics to mitigate the challenge of absenteeism in which case, biometric machines would be placed in health facility managers’ office with HCWs expected to clock in at least three to four times a day to monitor attendance to

work. To be effective, managing absenteeism needs to be accompanied with disciplinary actions for those found absent.

Enhancing efficiency of ART clinics

HRH2030 noted that even with improved staffing levels, clients' experiences at the sites in terms of waiting time and quality of services received is affected by the way the ART clinic is organized and managed. The way ART clinics were organized and managed varied across districts, implementing partners, and facility ownership. As a result, for example, client waiting time ranged from as short as five minutes in Chileka health center to nearly 2.5 hours in Area 18 and Bimbi health centers. Therefore, complementing the improved staffing levels with more efficient management of ART clinics would go a long way in improving the quality of HIV/AIDS services and waiting time.

The impact assessment revealed several best practices in the way ART clinics are managed that resulted in reduced waiting time. Some of the best practices observed in sites with short waiting time included (1) starting service provision on time (at 7:30 am) or earlier where clients are registered and organized for clinical consultation before the official clinic opening time; (2) having at least two to three ART providers assigned to the ART clinic on a clinic day to share the workload; (3) having at least two rooms for client consultation, especially where the PEPFAR prefabs are located; (4) having clear queuing procedures and ensuring that the procedures were adhered to; (5) having a good client appointment system to ensure manageable client loads on clinic days; (6) having a provision for surge support where other HCWs from other departments such as outpatient department can lend a hand to help clear the lines during client peak times; and (7) using the six-month and three-month multi-month dispensing DSD models. Wide adoption of these best practices will ensure efficient utilization of the scarce skilled HCWs and subsequently improve the quality of the HIV/AIDS services including client waiting time.

Key lessons for current and future HRH programming

The impact assessment revealed several success factors and best practices in designing and implementing PEPFAR/donor HCW salary support interventions. Early engagement of high-level government policy makers and beneficiaries was identified as a key success factor that needs to be adopted as a best practice in donor supported salary support and related intervention. This is because it ensures alignment of interventions to government and donor priorities, clarifies intended outcomes of the support, and enhances government commitment and support for the intervention which, in the

long run, ensures sustainability. Similarly, continuous involvement of government stakeholders in the implementation process or regular reporting on implementation progress and bottlenecks was highlighted as a key success factor because it enables joint planning, harmonized implementation, and joint problem solving, leading to complementarity and synergy and subsequently enhanced impact of interventions.

Use of government systems such as salary scales, terms and conditions of service, and governance structures was yet another success factor and best practice identified for sustainable impact. This is because in the process of using government systems, the capacity of government staff and systems is enhanced, which in the long run ensures sustainability. For example, using government salary structures enhances working relationships between donor-supported and government health workers and eases full integration of the donor supported HCWs into the government system. Similarly, using government governance structures such as supervisory and disciplinary systems empowers health worker supervisors to manage the donor supported HCWs, increases ownership of the HCWs by their government supervisors, eases project management, and ensures efficient use of government staff time which would otherwise be spent working with different donor systems.

One critical best practice that emerged as a recommendation for adoption for future HRH programming was regarding the mechanism used for funding donor supported HCW salaries. Respondents advised that for best health outcomes, impact, and sustainability of the support, PEPFAR and other donors could consider adopting results-based funding mechanisms for PEPFAR, for example, the results would be PEPFAR targets such as TX_NEW, retention rates, viral load suppression etc. That way, the beneficiary government entity, say the district, and the donor would agree on the expected deliverables of the support and, in exchange, the district would be given autonomy to fully manage the HCWs including determining the type and number of HCWs to recruit, and where to deploy or post the HCWs, with flexibility to move HCWs across facilities based on need. This approach is supported by literature where providers are funded based on results and have the autonomy to use some of the funding for HCW recruitment and motivation. However, in Malawi, given the acute shortage of HCWs, to be successful, the funding mechanism used would be a hybrid funding mechanism as described by de Walque, Robyn, Saidou, Sorgho, and Steenland (2017).

Sustaining Gains

The improved staffing levels and associated improvements in HIV/AIDS services need to be sustained to achieve epidemic control and ensure sustained delivery of good quality services beyond epidemic control. This would be achieved by ensuring that the PEPFAR supported HCWs are maintained in their facilities so that the number of HCWs providing ART services is maintained or increased over time with additional government supported recruitment. First and foremost, this would entail completing the HCW transition process with priority given to ensuring that the PEPFAR-supported HCWs are transitioned into the same facility where they are currently working to minimize disruption of services.

Secondly, the key factors affecting HCW attrition would need to be addressed, prioritizing strengthening the management of post basic training to minimize the number of HCWs that leave their employment to pursue further education. Other interventions would include putting in place policies that support working couples to work in the same district to minimize attrition, as HCWs leave their employment to follow spouses working in different districts, and working with DHRMD to review district staff establishments to create senior positions to enable promotion within the district thereby reduce the number of HCWs who leave as a result of promotion. Updating the staff establishment would also ensure that the approved establishment is aligned to service needs, thereby affording the districts more opportunities for HCW recruitment to minimize transfer of the already limited HCWs to other facilities, a key challenge noted during this assessment. With the opportunity of increasing recruitment, the possibility of increasing the total number of HCWs providing HIV/AIDS services would also be increased.

Additional interventions would also need to be implemented to improve HCW retention such as ensuring timely payment of HCW salaries, since as observed from this assessment, timely payment of HCW salaries was considered a motivating factor by both PEPFAR-supported and government-supported HCWs. Also, since high workload was still a challenge affecting HCW motivation and retention in a few facilities, interventions to reduce workload such as use of multi-month dispensing DSD models and regular workload assessment and subsequent HCW redeployment to match HCWs to workload would go a long way in enhancing HCW retention. As discussed previously, most important is ensuring that the HCWs are productive and used efficiently given the scarcity of skilled HCWs.

Quality of HIV/AIDS services

One of the key priorities for PEPFAR is to improve client retention with provision of quality patient-centered care as a

central strategy. Therefore, continuous quality improvement will be critical to ensure that clients are retained or returned to care. This will entail addressing issues that are currently affecting both perceived and technical quality of HIV/AIDS services, particularly ART services. Results of this assessment show that generally perceived quality and client satisfaction with ART services is high. Clients were particularly happy and reported that HCWs took the time necessary to answer all their questions, the clinic hours were convenient, and over 98 percent reported that the HCWs treated them with respect. Generally, several clients reported improved relationships and quality of interaction with their provider which is a critical aspect of quality as elaborated by Calo, Ortiz, Colon-Lopez, Krasny, and Tortolero-Luna (2014) who assert that there is a strong association between the quality of client and provider interactions and health care quality, and ultimately health outcomes. For, as explained by Ahmad (2017) and Ogden (2004), the quality of interaction with the provider is a very important factor and clients will be satisfied with services even if waiting time was long, if they feel that their needs were met and that they were listened to and understood.

However, a few cases of client dissatisfaction were also reported by implementing partners in other districts where clients reported that they were told to go home when they came to the facility late, while others reported that the providers were tough on them particularly in regard to adherence which negatively impacts client retention. So, in addition to institutionalizing exit client satisfaction surveys to monitor client satisfaction as proposed by PEPFAR, interventions to enhance HCW customer care skills need to be considered coupled with interventions to improve client waiting time as discussed in the section on “Enhancing efficiency of ART clinics.”

Although 91 percent of the HCWs reported that the HIV clinical management guidelines were not challenging to adhere to, actual adherence to the guidelines as determined by the assessment was low. Using selected indicators from the standard list of areas in which clients are supposed to be assessed at every visit, HRH2030 determined that compliance was only at 34 percent. Facilities with the electronic medical records (EMR) system were more adherent than those without the EMR because the system prompted the HCWs through the different stages of client assessment thereby improving the quality of care. Similar observations were made by the Infectious Diseases Institute in Uganda (Castelnuovo et al.; 2012) and Partners in Hope in Rwanda (Amoroso et al.; 2010), where providers reported improvement of clinical care due to automation of providers' tasks and easy access to clients' records. Therefore, to further improve the quality of

HIV/AIDS services at the sites, there is need to implement a package of quality improvement interventions that will include in-service training for HCWs in HIV/AIDS to ensure the HCWs are up to date regarding changes in treatment approaches, ongoing clinical mentoring support to enhance the HCWs skills and confidence in providing care, and performance improvement interventions aimed at improving quality of care which should be accompanied by individual or group (facility) recognition for improved quality. Ultimately, as discussed by Dasgupta and colleagues (2016), this would improve client retention in care and in this case, ultimately improve viral load suppression, contributing to overall achievement of the 95 95 95 targets.

Increase in utilization of ART services in FY 18

Unfortunately, it was not possible to determine whether PEPFAR HCW salary support increased utilization of TX_CURR, TX_NEW, or PMTCT_ART over the course of the intervention, because reliable data were lacking. While an increase in utilization observed in FY2018 is worth noting, it happened in intervention and comparison districts and declined everywhere over the intervention period. As discussed earlier, this increase in utilization could be attributed to multiple interventions, including PEPFAR HCW salary support, implemented in FY2018 and aimed at improving uptake of HIV/AIDS services, particularly ART services. These interventions included deployment of both PEPFAR supported professional and lay cadres, a range of infrastructure and equipment investments including clinics, laboratory, and pharmacy prefabs, as well as, EMRs hardware and software; clinical mentoring and training of ART providers, commodity security and supply chain; and continuous quality management including testing/labs and data quality assessments. These PEPFAR investments were complemented with several supportive policy changes including self-testing, active index testing, scale-up of same-day ART and transition to Dolutegravir-based regimens, viral load monitoring, and scale up of DSD models. The notable improvement in performance of the TX_NEW and PMTCT_ART in FY2018 is a clear testimony of the need for multiple investments beyond HCW numbers and beyond only investments in HRH to cover other health system components for improved and sustainable HIV/AIDS service delivery.

Use of DATIM data to assess impact

HRH2030 had planned to use DATIM to assess the impact of the PEPFAR supported HCWs on utilization of HIV/AIDS services by comparing utilization in intervention to that in comparison districts using the ITSA. However, the planned

ITSA was constrained by the amount and quality of the DATIM data obtained. The DATIM data was incomplete for many of the sites and indicators particularly for TX_CURR and TX_TB; inconsistent with unexplained large variations between quarters; and only available in quarters and not by month which would have been more ideal for rigorous statistical analysis. Therefore, in the future, to effectively measure the impact of PEPFAR-supported HCWs on service utilization, PEPFAR, through the service delivery partners would need to address the DATIM data quality issues at the site level through regular data quality checks so that the data entered in DATIM is clean and accurate.

5.0. Recommendations

Several recommendations can be drawn from the assessment to inform the current HCW Salary Support Activity and similar interventions in the future. These are briefly presented below for consideration.

Recommendations for Current Salary Support Activities

Given that the PEPFAR Salary Support Activity is coming to an end in July 2020, HRH2030 should prioritize finalization of the PEPFAR-supported HCWs' transition, ensuring that the HCWs are transitioned to the same facilities where they are currently working to minimize disruptions in service delivery. In addition to facilitating the transition process, HRH2030 needs to continue working closely with key stakeholders, particularly DHRMD to ensure that the functional reviews currently underway are completed to provide adequate HCW positions to enable HCW transition in the same health facility and to respond to changing HRH needs as the country moves towards epidemic control. HRH2030 also needs to continue collaborating with the supported districts to address key HCW attrition factors so that the improved staffing levels are sustained.

Based on the experience of implementing the PEPFAR Salary Support Activity and the results of this impact assessment, HRH2030 could also consider preparing a high-level technical summary highlighting the key interventions and approaches used in implementing the PEPFAR Salary Support Activity, major achievements, lessons learned, best practices, and key challenges experienced and how they were overcome to serve as a reference in facilitating organizational learning across donors and implementing partners regarding salary support interventions.

Recommendations for Future Salary Support Activities

The results of the assessment provide a clear demonstration of the benefits and limitations of improved staffing levels on HIV/AIDS services. It is clear from the assessment results that whereas improved staffing levels contribute to improved availability, utilization, and quality of HIV/AIDS services, long-lasting impacts need additional investments in HRH and the wider health system. Therefore, based on this finding, to ensure maximum and sustainable impact in future salary support interventions, donors and implementing partners should consider supporting more comprehensive HRH interventions aimed at improving staffing levels, HCW optimization and productivity, and HCW retention coupled with interventions to ensure an improved working environment where HCWs have the necessary supervisory support and resources to do their work. In addition, donors and implementing partners need to consider complementing HCW interventions with interventions to improve facility optimization; and interventions to ensure continuous quality improvement so that HCWs are provided the technical support they need through training, mentoring, quality improvement, and monitoring to institutionalize the culture of quality management. Lastly, to support rigorous impact assessment using the already existing DATIM data, PEPFAR, though the service delivery partners, could consider addressing the key DATIM data quality issues at site level to ensure DATIM integrity.

Regarding the design of donor supported salary support activities, the assessment results elaborate several key lessons

and best practices recommended for adoption in future programming of salary support interventions. Based on this, donors and implementing partners should consider involving key government and beneficiary groups in designing the salary support interventions, using government structures to ensure efficiency in implementation and to boost the government systems for long lasting impact. Donors should also consider utilizing a hybrid of results-based funding where, in addition to funding inputs, additional funding to governments is targeted to outputs. This not only strengthens government systems; it incentivizes governments to be more innovative and efficient in the way they manage and use resources in the delivery of HIV/AIDS services.

6.0. Conclusions

The impact assessment provides strong, statistically significant evidence that the deployment of the PEPFAR salary supported HCWs improved staffing levels and subsequently, the availability and quality of HIV/AIDS services, addressing the major bottle neck to provision of these services in Malawi. Moreover, the PEPFAR Salary Support Activity reveals several lessons learned and best practices for consideration in future donor supported salary support interventions. The results also highlight the need to complement interventions aimed at improving staffing levels with other HRH and wider health system strengthening interventions for enhanced and sustained positive impact of HIV/AIDS services.

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Appendix I: List of Sites Studied

#	District	Facility name	Ownership	Facility type
1	Lilongwe	Mbwatalika Health Center	CHAM	Health Center
2	Lilongwe	Mlare Hospital	CHAM	Hospital
3	Lilongwe	Dzenza Health Center	CHAM	Health Center
4	Lilongwe	Daeyang Luke Hospital	CHAM	Hospital
5	Lilongwe	Lukuni Mission Hospital	CHAM	Hospital
6	Lilongwe	Chileke Health Center	Government	Health Center
7	Lilongwe	Chadza Health center	Government	Health Center
8	Lilongwe	Area 30 Health Center	Government	Health Center
9	Lilongwe	Area 18 Health Center	Government	Health Center
10	Lilongwe	Mutundu Community Hospital	Government	Hospital
11	Lilongwe	Nthondo Health Center	Government	Health Center
12	Lilongwe	Maula Health Center	Government	Health Center
13	Lilongwe	Area 25 Health Center	Government	Health Center
14	Lilongwe	Kabudula Health Center	Government	Health Center
15	Lilongwe	Chiwamba Health Center	Government	Health Center
16	Lilongwe	Kawale Health Center	Government	Health Center
17	Zomba	Pirimiti Community Hospital	CHAM	Hospital
18	Zomba	Nkasala Health Center	CHAM	Health Center
19	Zomba	Chipini Health Center	CHAM	Health Center
20	Zomba	Chilipa Health Centre	CHAM	Health Center
21	Zomba	Ngwelero Health Center	Government	Health Center
22	Zomba	Naisi Health Center	Government	Health Center
23	Zomba	Matawale HC	Government	Health Center
24	Zomba	Nasawa Health Center	Government	Health Center
25	Zomba	Domasi Health Center	Government	Health Center
26	Zomba	Chamba Health Centre	Government	Health Center
27	Zomba	Bimbi Health Centre	Government	Health Center
28	Zomba	Likangala Health Centre	Government	Health Center
29	Zomba	Sadzi Health Centre	Government	Health Center
30	Zomba	Makwapala Health Centre	Government	Health Center

Appendix 2. STATA ITSA Output

PMTCT_ART

panel variable: dist (strongly balanced)
 time variable: datevar, 228 to 239 (FY2017q1 - FY2019q4)
 delta: 1 unit

Regression with Newey-West standard errors Number of obs = 24
 maximum lag: 0 F(7, 16) = 60.12
 Prob > F = 0.0000

```
-----+-----
      |               Newey-West
pmtct_art |      Coef. Std. Err.   t  P>|t|   [95% Conf. Interval]
-----+-----
   _t |      31.5  35.3627   0.89  0.386  -43.46558  106.4656
   _z |     815.6667 107.7767   7.57  0.000   587.1902 1044.143
   _z_t |      12  70.55642   0.17  0.867  -137.5729  161.5729
   _x_t231 |     -80.4  85.1006  -0.94  0.359  -260.8052  100.0052
   _x_t231 |    -39.48333 35.83954  -1.10  0.287  -115.4598   36.4931
   _z_x_t231 |    -44.51111 181.1412  -0.25  0.809  -428.5134  339.4912
   _z_x_t231 |    -17.48333 72.72468  -0.24  0.813  -171.6528  136.6861
   _cons |    1111.833 54.01742  20.58  0.000   997.3215 1226.345
-----+-----
```

Comparison of Linear Postintervention Trends: 231 (FY2017q4)

Treated : _b[_t] + _b[_z_t] + _b[_x_t231] + _b[_z_x_t231]
 Controls : _b[_t] + _b[_x_t231]
 Difference : _b[_z_t] + _b[_z_x_t231]

```
-----+-----
Linear Trend |      Coef  Std. Err.   t  P>|t|   [95% Conf. Interval]
-----+-----
Treated |    -13.4667 16.6349  -0.8095  0.4301  -48.7311  21.7977
Controls |     -7.9833  5.8268  -1.3701  0.1896  -20.3357  4.3690
-----+-----
Difference |    -5.4833 17.6259  -0.3111  0.7597  -42.8485  31.8818
-----+-----
```

TX_NEW

panel variable: dist (strongly balanced)
 time variable: datevar, 228 to 239 (FY2017q1 - FY2019q4)
 delta: 1 unit

Regression with Newey-West standard errors Number of obs = 24
 maximum lag: 0 F(7, 16) = 24.21
 Prob > F = 0.0000

```
-----+-----
      |               Newey-West
tx_new |      Coef. Std. Err.   t  P>|t|   [95% Conf. Interval]
-----+-----
   _t |     -59  21.93931  -2.69  0.016  -105.5093  -12.49074
   _z |     666.1667 87.98891   7.57  0.000   479.6385  852.6948
   _z_t |     -78.5  57.60226  -1.36  0.192  -200.6113  43.61134
   _x_t231 |    2340.578 1244.813   1.88  0.078  -298.3085  4979.464
   _x_t231 |     3.133333 211.0739   0.01  0.988  -444.3234  450.5901
   _z_x_t231 |    5658.067 4337.464   1.30  0.211  -3536.947 14853.08
   _z_x_t231 |    -286.0167 738.7496  -0.39  0.704  -1852.096  1280.062
-----+-----
```

 _cons | 681.3333 33.51285 20.33 0.000 610.2893 752.3774

Comparison of Linear Postintervention Trends: 231 (FY2017q4)

Treated : _b[_t] + _b[_z_t] + _b[_x_t231] + _b[_z_x_t231]
 Controls : _b[_t] + _b[_x_t231]
 Difference : _b[_z_t] + _b[_z_x_t231]

Linear Trend	Coeff	Std. Err.	t	P> t	[95% Conf. Interval]	
Treated	-420.3833	705.9476	-0.5955	0.5598	-1.92e+03	1076.1587
Controls	-55.8667	209.9306	-0.2661	0.7935	-500.8998	389.1664
Difference	-364.5167	736.5004	-0.4949	0.6274	-1.93e+03	1196.7945



Pharmacy Assistant Dreeny Tekwatekwa sorts medical supplies in Lilongwe, Malawi.

Program Partners

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- American International Health Alliance (AIHA)
- Amref Health Africa
- Open Development
- Palladium
- ThinkWell
- University Research Company (URC)

About HRH2030

HRH2030 strives to build the accessible, available, acceptable, and high-quality health workforce needed to improve health outcomes.

Global Program Objectives

1. **Improve performance and productivity of the health workforce.** Improve service delivery models, strengthen in-service training capacity and continuing professional development programs, and increase the capacity of managers to manage HRH resources more efficiently.
2. **Increase the number, skill mix, and competency of the health workforce.** Ensure that educational institutions meet students' needs and use curriculum relevant to students' future patients. This objective also addresses management capability of pre-service institutions.
3. **Strengthen HRH/HSS leadership and governance capacity.** Promote transparency in HRH decisions, strengthen the regulatory environment, improve management capacity, reduce gender disparities, and improve multi-sectoral collaboration for advancing the HRH agenda.
4. **Increase sustainability of investment in HRH.** Increase the utilization of HRH data for accurate decision-making with the aim of increasing investment in educating, training, and managing a fit-for-purpose and fit-for-practice health workforce.



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This material is made possible by the generous support of the American people through the United States Agency for International Development (USAID) under the terms of cooperative agreement no. AID-OAA-A-15-00046 (2015-2020) in partnership with The U.S. President's Emergency Plan for AIDS Relief. The contents are the responsibility of Chemonics International and do not necessarily reflect the views of USAID or the United States Government.

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