

REFLECTION



The Positive Impact of Infrastructure Interventions on Public Health Services

CONTEXT

Poor infrastructure, work space constraints, inadequate water supply, equipment shortages, and health workforce capacity gaps are major barriers to the provision of services in public health facilities in Liberia. Because work spaces in most of these facilities are poorly organized and have overall space limitations, rooms are used for multiple purposes. Support services, such as diagnostics, are poor because of limited equipment maintenance and frequent reagent stockouts. Staff are not trained to maintain equipment or assess problems. This prevents them from conducting effective consultations and services and undermines the provision of safe care.

Alongside complementary health system strengthening activities, the Advancing Partners & Communities (APC) project's Ebola Transmission Prevention & Survivor Services program (ETP&SS) implemented key infrastructure improvements in facility renovations, water, and medical and laboratory equipment. The program also encouraged participation of the government at facility, county, and national levels in the infrastructure improvement process. As a result, government involvement in decision making has increased, and a broader range of health services are available at public facilities.

PLANNING PHASE

In November 2016, the ETP&SS program, funded by USAID and managed by JSI Research & Training Institute, Inc., (JSI) conducted an assessment of the overall capacity of eight health facilities in four counties: Redemption Hospital and Dupont Road Health Center (Montserrado County); Phebe Hospital (Bong County); Foya Boma, Kolahun, and Tellewoyan Hospitals (Lofa County); and C.H. Rennie Hospital and Dolo Town Health Center (Margibi County).

The assessment had two main objectives:

1. Identify the current staffing, equipment, and infrastructure capacity at each of the target health facilities.
2. Identify which facilities are best equipped to provide clinical services in relation to individual Ebola virus disease (EVD) sequelae, and in turn for JSI to further invest in their clinical capacity.

Each of these assessments involved close participation of the health facilities' leadership to ensure that inputs were tailored to meet the facilities' specific needs. A key program aim was to avoid 'orphaned' equipment, which is common across implementing partner-driven programs. APC aimed to ensure that all equipment was needed and would be both used and maintained appropriately at the selected health facilities.

Ultimately, the assessment informed development of the comprehensive facility activity plan, which captured service delivery, capacity building, and system strengthening activities. Each plan included a section on infrastructure and equipment needs for these facilities, all of which serve communities with high concentrations of Ebola survivors. The aim of the infrastructure and equipment component was to ensure that the selected facilities could offer and deliver advanced specialty and diagnostic services, and could fully integrate infection prevention and control (IPC) procedures into routine operations to reduce the risk of Ebola and other communicable disease transmission going forward.

HIGHLIGHTS

A collaborative approach with health facility leadership helped the program identify needs, avoid redundancy, and encourage active leadership at the facilities and in the MOH. Our program supported a range of infrastructure interventions, including physical renovations, water infrastructure improvements, and medical and lab equipment provision according to the needs of each surveyed hospital or health facility. Specific information follows.

RENOVATIONS

- Dolo Town Health Center: The Margibi County Health Team (CHT) advocated for a perimeter wall to improve the facility's physical security and IPC practices. The wall was built using program funds within 12 months of the health facility assessment.
- Tellewoyan Hospital: Hospital leadership and the Lofa CHT provided considerable input during the laboratory assessment and renovation processes, which resulted in improved diagnostic and referral capabilities.
- Redemption Hospital: Facility leadership and central MOH leads (health care technology management and eye unit) provided important information and guidance on the hospital's emergency triage unit and eye clinic renovations. Their guidance improved efficiency and avoided duplication, resulting in safer, more efficient emergency triaging processes and ophthalmic care.
- JFK Memorial Medical Center: Collaboration between multiple stakeholders (MOH, USAID, facility management and staff, engineers, etc.) informed the renovation of the outpatient Chest Clinic into an infectious disease clinic. This renovation has been a high priority investment in outpatient services for infectious diseases.

WATER INFRASTRUCTURE

Lofa County, a target county in which two program focus facilities are located, has a challenging geophysical environment. Many health facilities having limited water supply, and site surveys of Foya Boma and Tellewoyan Hospitals indicated the need to improve the quantity and quality of the water supply.

- Foya-Boma: Members of Foya-Boma's leadership team (i.e., logistician, hospital administrator, medical director) participated in the survey and feasibility assessment for the water supply activities and provided logistical guidance and contextual background information.
- Kolahun Hospital: Kolahun's leadership (i.e., medical director, logistics and environmental health officers) were involved in site surveying, drilling, water tower construction, and pipe connection activities.

The table on the following page demonstrates the hospitals' respective water-demand levels, pre-intervention water volumes, and post-intervention water yields at Foya-Boma and Kolahun Hospitals.

Table 1. Water Supply Need and Yield Data, Foya-Boma and Kolahun Hospitals

Facility	Water Demand per Day	Pre Intervention Water Source/Volumes	Post Intervention Water Yield
Foya-Boma	7,850 liters (2,074 gallons)	Source: Borehole Supply: Maximum 1,893 liters (500 gallons) when there was sufficient in-flow to borehole during rainy season	Expected rainwater harvesting yield: 90,000 liters (23,776 gallons) Expected hand-dug well yield: 1,200 liters (317 gallons)/hour
Kolahun	9,900 liters (2,616 gallons)	Source: Nearby stream Supply: 10,000 liters (2,642 gallons) with pumping	Expected borehole yield: 3,000 liters (793 gallons)/hour

MEDICAL AND LABORATORY EQUIPMENT

Prior to final procurement and installation of equipment, health facility staff and leadership worked closely with APC to vet equipment that could function reliably with the power supply at the various facilities. The MOH was equally involved with identifying the key equipment needs, and worked to ensure that any equipment procured by APC aligned with the national equipment standards. This approach reflects government-led decision-making with long-term sustainability in mind.

To ensure that the selected equipment is appropriately used and maintained, APC hired a diagnostics equipment representative to train health facility and CHT staff on appropriate lab equipment use and maintenance practices. Major equipment procured for hospital/health facility use include autoclave sterilizers, clinical chemistry analyzers, cataract surgical sets, infant resuscitators, multi-scan laser photocoagulators, and ophthalmoscopes.



Tellewoyan specimen collection area, pre- and post-renovation. Photos: APC



From left to right: Kolahun well development; measuring blow yield during drilling; and cast columns and ground beams for the water tower. Photos: APC

CONCLUSIONS AND LESSONS

Survivors and the general population alike benefit from this work. As a result of infrastructure interventions, health care workers have improved physical spaces, thus enhancing their capacity to practice proper infection prevention techniques, conduct diagnostic testing, and provide safe and effective care. The EVD survivor community will benefit from APC investments in provider skills and equipment for health conditions that disproportionately affect survivors, specifically eye care equipment that was procured for facilities in communities with the largest concentrations of survivors. The general population will benefit from the enhanced range of services now available at these public facilities, and especially the water supply improvements at the Kolahun and Foya-Boma Hospitals.

Another central reason for prioritizing these interventions is the value of collaborative and participatory working relationships between the MOH and implementing partners, with the joint end-goal of health system strengthening. Facility managers and providers contributed significantly throughout the assessment process. The MOH's Healthcare Technology Management Unit lead sustainable equipment procurement and guide maintenance practices.

Public health programs are unable to function without the necessary supplies (e.g., medicines, gloves, computers), and trained personnel (e.g., doctors, nurses, health workers). Just as clearly, public health facilities are unable to function without the appropriate infrastructure, equipment, and maintenance. Upgrading the physical infrastructure of health facilities and hospitals following a major health emergency such as the West African Ebola outbreak has been a key component of restoring patient trust in the health system, which, in turn, brings more patients in for care. When infrastructure interventions—physical, equipment, and water supply—are implemented in a participatory manner, government ownership of key decision-making processes is enhanced. This type of investment must be prioritized, alongside complementary system strengthening approaches, in the aftermath of future outbreaks.

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