Electronic Medical Record System for Key Population Programmes in Kenya

Introduction

Driven by the UNAIDS 90-90-90 fast track target and the promise of "leaving no one behind", the rapid scale-up of HIV prevention and treatment is transforming the lives of key populations in Kenya. The quality of life of Individuals living positively has been greatly improved by ensuring access and availability of antiretroviral drugs while offering prevention tools to negative persons to avert new HIV infections. To sustain this momentum, the need for a coordinated, multi-sectoral approach guided by timely and accurate data cannot be underscored. It is in this back-drop that a national electronic medical record system (EMR) was borne.

Prior to commissioning of the development phase, Palladium group (the national system development partner) presented the EMR concept to the key populations technical working group who ratified the proposal and paved way for the formation of an M&E sub-committee to guide the process. An agile iterative approach was deemed fit for this activity, which involved; stakeholder user requirements gathering, presentation of mock-screens, refinement of system requirements, system piloting (this was done between October 2019 to February 2020) and an overall system review from the pilot sites which took place on 2nd March 2020 at Palladium offices in Nairobi. Special appreciations go to the sites where the system was piloted, which includes; MAAYGO DICE in Kisumu, MPEG in Kiambu, HAPA Kenya in Mombasa, CHS sites (Machakos DICE, Mlolongo DICE, Mwingi DICE and Murang'a DICE), Hope worldwide (Mwea DICE), University of Maryland (Gucha sub-county hospital), EGPAF sites (Makongeni health Centre, Kendu sub-county hospital and Ndhiwa sub-county hospital), IRDO sites (Tuungane and Siaya DICE). Feedback from these sites went a long way in strengthening the system.

Why an EMR

An electronic medical record (EMR) is a digital equivalent of paper records for respective individuals captured at a specific DICE / facility. Some of the advantages of an EMR includes:

- Improved Quality of Care: Computerized notes are often easier to read than a service providers handwriting. This reduces the risk of errors and misinterpretations that can negatively impact the quality of patient care.

- Convenience and Efficiency: Service providers can access electronic health records quickly and efficiently with just a few strokes on a keyboard. Convenience of data availability also improves data use for programming
- The automated system reminders improve follow up of individuals based on the type of triggers
- Reporting: Customized and in-built queries shorten the time spent in generating reports for use by programme team within the implementer and for upward submission
- Standard data collection system for the KP program facilitating easy data abstraction at different levels
- The data can help individualized monitoring of clients. As a Unique Identification Code analysis can be done with anonymity of the client identity

Integration with Kenya EMR

The KP EMR system combines both prevention and treatment components facilitated by controlled access depending on the rights of the service provider. For instance, outreach workers can only access peer calendars, outreach worker's summary and contact forms while locked out from the other clinical forms. Implementing partners who already have the Kenya EMR installed, will not need to install a new server, Palladium will install the KP module as an add-on to the existing system. With this addition, a KP client can be tracked across prevention and care continuum using one EMR system.

EMR Implementation model

The implementation model for the EMR System is a facility/ DICE based model. Data captured into the system will be mainly at the DICE level. The providers will see clients at their respective service delivery points and that data is saved in one centralized database hosted in the DICE server. In situations where the partner has more than one DICE within an implementation zone, two options presents on the design model: 1) setting up LANs within each DICE and interconnecting them via a virtual private network 2) stand-alone local area network (LAN) for each of the DICE. The latter is what is proposed in this document considering financial cost. If the IP has resources, they can also go for the first option.

Once the data has been captured, its hosted at the server within the DICE and is accessible for generation of reports. Periodically, this data can then be pushed to DHIS II platform in aggregate form. This is shown on the figure 1.1 below:

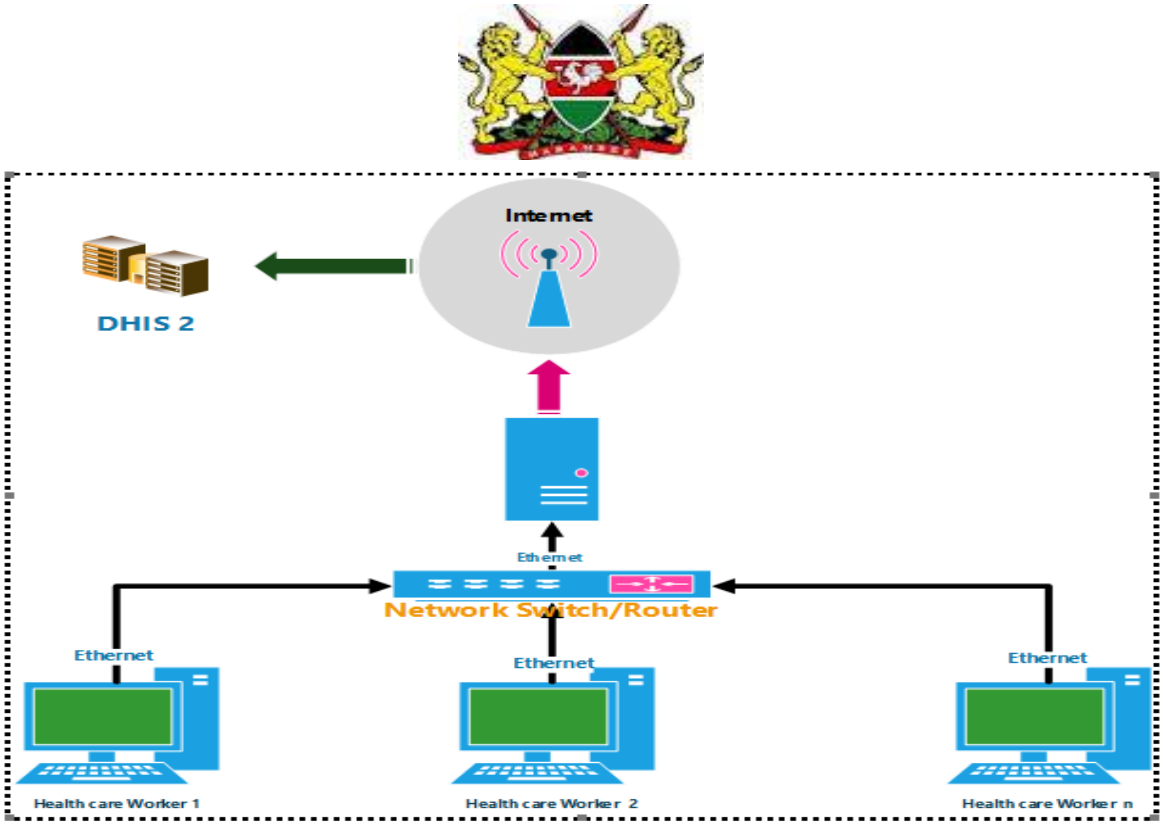

Figure 1.1 KP EMR implementation model

Architecture model

There are two modes of implementation that can be adopted depending on the facility/DICE setting. For any successful implementation, there needs to be supporting infrastructure. These are the supporting equipment and the physical structure which are in the facility/ DICE where the system will be used. It is advisable that the DICE has the following security features at a minimum. These are:

i. Lockable cabinets

ii. Burglar proofing for windows and doors

iii. Security guard

Model 1

This model consists of stand-alone desktops at each service delivery point connected via Local Area Network to one server hosted at the DICE. Each provider enters data, and this is saved in the server. The server must be on, for the client machines to access the software, see figure 1.2.

This implementation requires that the DICE has adequate security for the equipment to be locked in. The required infrastructure is:

i. Local Area network

ii. Network switch- (8 port, 16 port or 24 port)

iii. High end server- (hard disk 500gb, RAM 8gb, Core i5)

iv. Desktop computers- (Core i3, 4gb RAM)

v. Power backup- UPS (6kva or higher)

vi. Modem/ Wireless internet/ monthly data bundles- (provider will vary with the location)

vii. Operating system- Ubuntu 16

viii. External hard disk- for a backup (500gb)

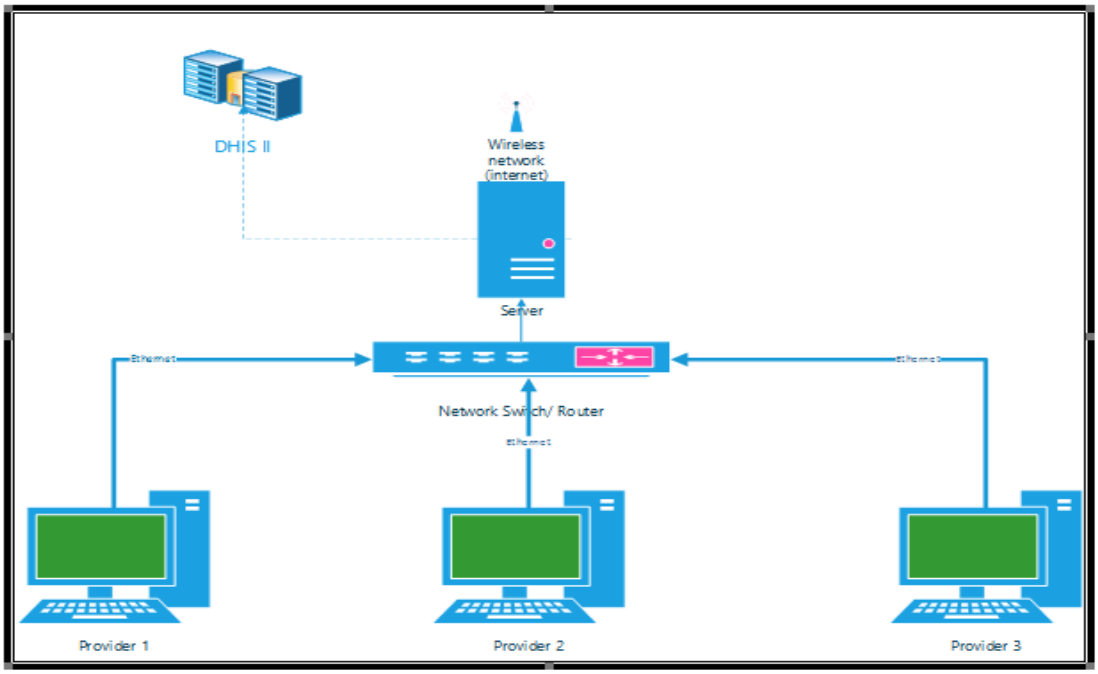

Figure 1.2: Architecture design for model 1

Model 2

This model consists of laptop(s) at each service delivery point connected via wireless connection using a router(s) set up in the facility to one server hosted at the facility. Each provider enters data, and this is saved in the server. This implementation requires that the DICE has adequate security for the equipment to be locked in. The laptops however can be carried to an external place other than the DICE. The server must be on, for the client machines to access the software, see figure 1.3. The required infrastructure is:

i. Local Area network
ii. Network switch- (8 port, 16 port or 24 port)
iii. Wireless router
iv. High end server- (hard disk 8gb, RAM 16gb, Core i5)
v. Laptops- (Core i3, 4gb RAM)
vi. Power backup- UPS (6kva or higher)
vii. Modem/ Wireless internet- (provider will vary with the location)
viii. Operating system: Ubuntu 16
ix. External Hard disk- for a backup (500gb or above)

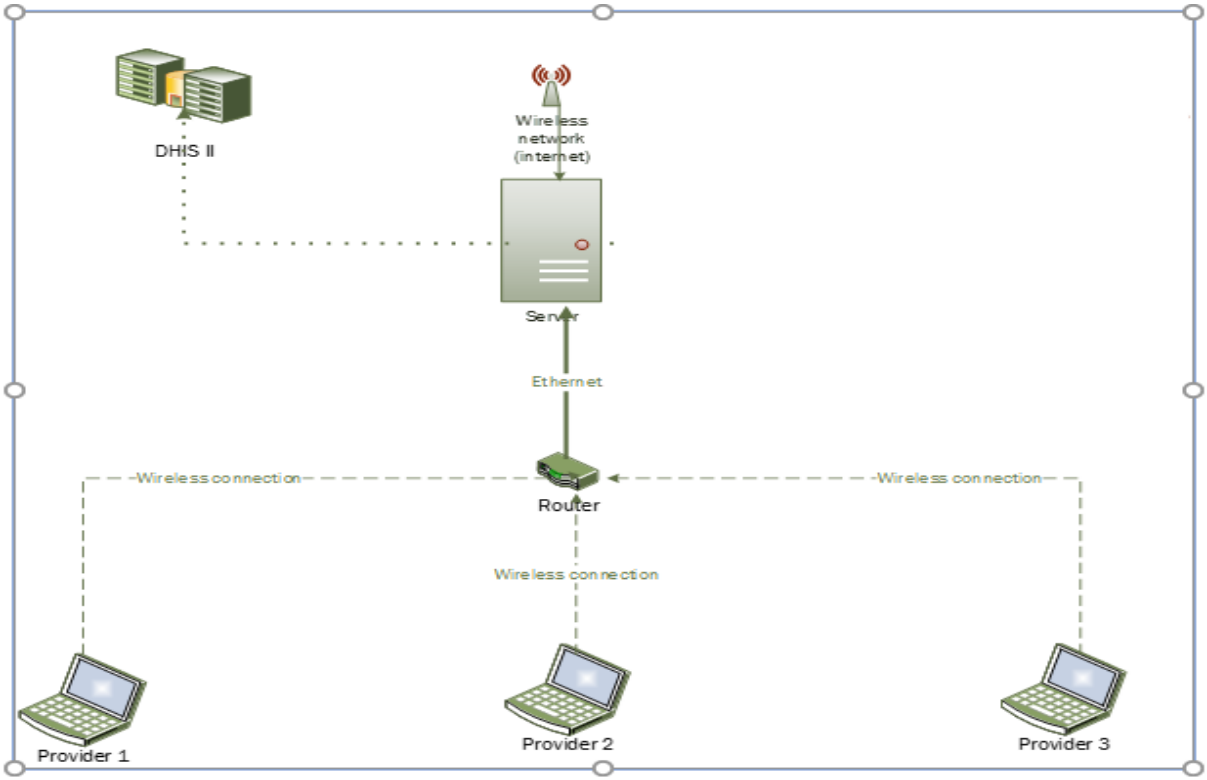

Figure 1.3: Architecture design for model 2

Cost estimate – for model 1

#	Item Description		Unit Cost (KSH)	Remarks	Scenario 1 (Assuming all Desktops are available meeting the minimum specs +UPS)-Exclusive of cost for installation	Scenario 2 (Assuming all Desktops are available but not meeting minimum specs +UPS)-Exclusive of cost for installation
1	Local Area Network Setup	Router: Bridge Hub/Standalone router E1200 ; 5 Fast Ethernet ports	7,000		7,000	7,000
		Cat 6 cable (One Roll/Box has 300M)	7,500	Overall metres required dependent on how far apart the desktops will be	7,500	7,500
		Cable trunking (2*1 trunking)	5,000		5,000	5,000
		RJ45 Clips (Pack of 100 units)	1,300		1,300	1,300
		8 Port network switch : IEEE 802.3X Flow control switch	3500	Number is dependent on how far apart the service provision points are located	10,500 (3 Switches)	10,500 (3 Switches)
2	Service Points	Desktop Computer	40,000	At least 1 for clinician, 1 for HTS, 1 for receptionist, 3 for outreach team. RAM should be atleast 4GB, 500HDD and Corei3	X	X
		Desktop RAM *4GB	5000	To be used in upgrading desktop RAM assuming	X	30,000 (Six 4GB RAM chips)

		DDR4 PC4-19200		the already installed chips are not 4GB		
		Laptop	60,000	Number of laptops same as desktops if using model 2	X	X
3	Server Setup	Server (upgraded workstation) / HP EliteDesk 800 G2-Core i5 - 8GB RAM, 1000GB HDD - 3.2GHz - Desktop CPU	80,000	A workstation with 500HDD, 8GB RAM and Core i5 can still be used.	X	10,000 (Two 4GB RAM chips to upgrade the desktop to server spec)
		Uninterruptible Power Supply Unit	10,000	The number of UPS equals to the number of desktops and servers	X	X
		External Storage Hard Disk (1 TB)	15,000		15,000	15,000
		Modem	3,000		3,000	3,000
		Monthly Bundles (GB)	4,000		4,000	4,000
		Total			**53,300**	**93,300**

Note: Its recommended that the implementing partner conducts a site assessment with the help of a local IT firm to refine the estimate as well as get a quote on the labor cost.