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Strategic Implementation Plan:
Medical Record Keeping and IT Infrastructure
Nord Department of Haiti

Commissioned by: **Pinnacle Healthcare Consortium**

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1.0 Introduction

Following the earthquake in January 2010, a desire was felt by the Haitian people and the international community that this was an opportunity to not just reconstruct Haiti, but to 'Build Back Better'. Haitians have shown a tremendous resilience and capacity to absorb new technology which enhances the quality of life. Despite its relative poverty, there is a higher percentage of ownership of mobile phone than many other areas in developed countries. A significant percentage of Haiti's GDP is derived from financial remittances by expatriate Haitians. Many of these expats have unexpressed reservations that the money that they do send does not end up benefiting the recipient in the way they had intended.

The current resource allocation to medical record keeping is very patchy. This has actively prevented initiatives to improve the quality of care delivered. The current system is an extremely inefficient and potentially hazardous way for clinicians to manage their patients. In any healthcare system, ensuring that the medical record is available to the clinician, whether in primary or secondary care is always a logistical challenge. Even in the most deprived of countries, the patient held records are significantly more likely to arrive with the patient compared to when the hospital is responsible for the management of the medical records. This is true in developed countries as well.

1.1 Gateway to Health System (GTHS)

The GTHS recognizes the challenging circumstances of providing high quality medical records to the health professional at the time of treatment to the patient. The GTHS is modelled after the system used in Belgium serving over 10 million people and will be adapted to accommodate the social, economic, governmental, and technological situation in Haiti. The end product is a credit-card sized personal electronic record which holds the entire patient's health information. The system has the ability to receive overseas financial remittances and if desired, restrict the spending of these remittances for use only on medical care and pharmaceutical products for the individual recipient. The implementation and use of this system will also result in a dramatic improvement in the efficiency of the local health economy. Using our network of IT consultants with strong track records of implementing similar systems in the developed and developing world environments, this plan will achieve:

1.2 Overarching Objectives

- Constructing a system that is economically viable and sustainable in the Haitian setting
- Improve the efficiency of the health economy by ensuring that the health record follows the patient journey
- Standardize the recording of clinical information
- Inspire confidence in Haitian expatriates to increase overseas remittances to contribute to individualized patient care
- Create an open source platform which will encourage international healthcare data management corporations to invest in the system
- Education and capacity building opportunities for local Haitians to ultimately manage the system

1.3 Tactical Objectives

- Simple stepwise implementation plan which recognizes the current resources allocated to clinical record keeping
- Distributed initially through health center referral network in Cap Haitien
- Portable health record which stays with the patient
- Scalable to the entire population
- National government to provide assurance that the capital sent is protected. The interest accrued from the funds can be allocated to the national health budget

Gateway to Health System Schematic Overview
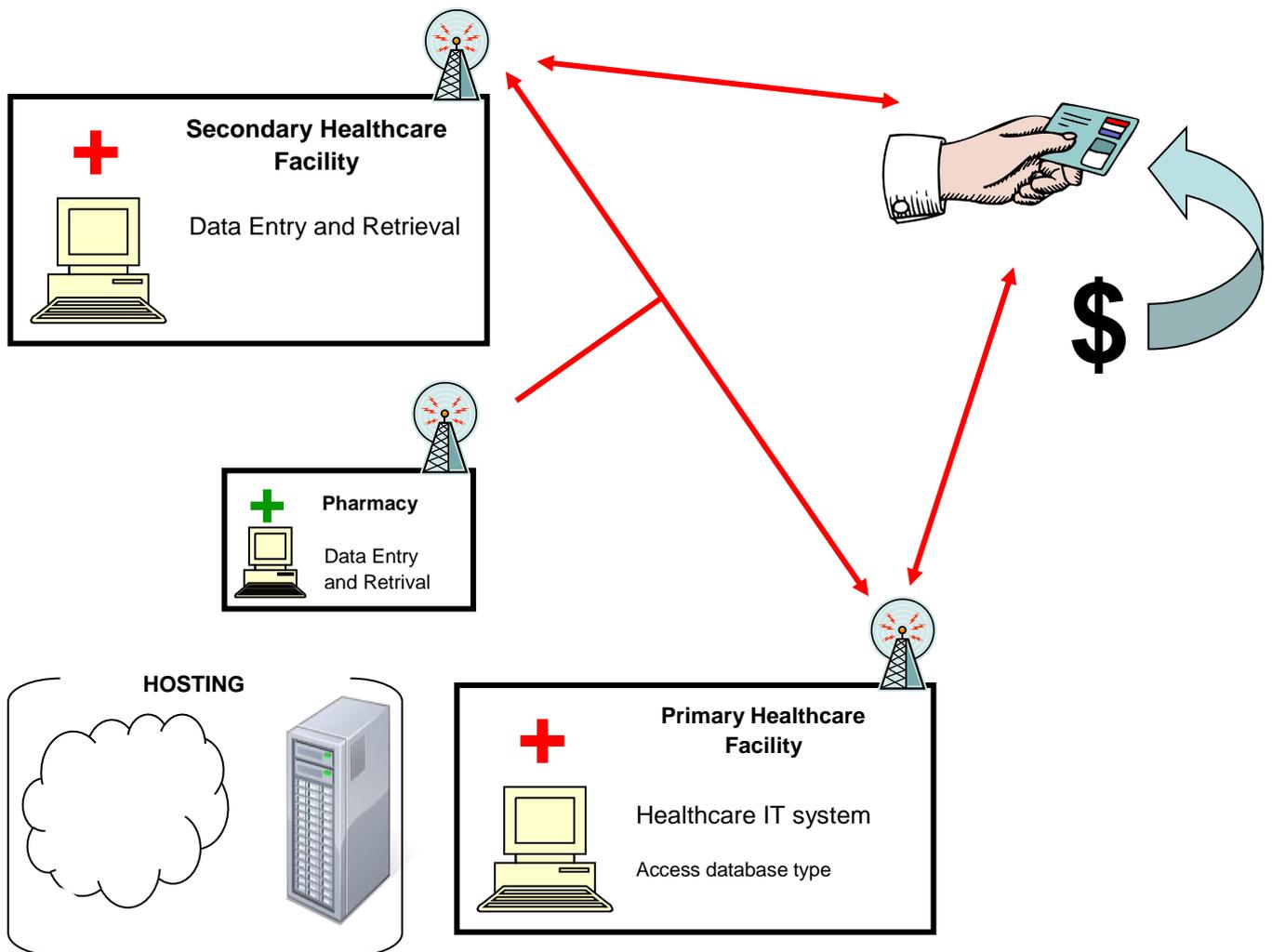
Pinnacle Healthcare Consortium (PHC) is familiar with the challenges faced in providing infrastructure improvement programs in developing countries. Our first step will be to construct a *Stakeholder Consultation Statement* in order to seek the appropriate balance of ownership between the government, private, and public stakeholders for this IT infrastructure initiative.

2.0 Patient Records Management

GTHS will be developed as an online Patient Records Management system in Haiti. We have previous experience of developing and implementing this kind of system for a number of clients and we are confident that we will be able to meet the country's requirements in full. We propose to use Microsoft development technologies to develop the solution. The technologies would be Microsoft SQL 2008 and ASP.NET utilising the C# programming language and the Microsoft .NET Framework.

2.1 Operational Objectives of GTHS are:

1. Be a secure, browser based system that will allow patient information to be captured in a structured way from any of the designated Health Centres or other facilities.
2. Be robust, easy to use and highly scalable to support significant further growth in terms of patient numbers, staff numbers and centre locations.
3. Facilitate access to up-to-date patient information across all centres provided they have the correct username and password.
4. Allow users to gain valuable insight and identify trends from the data.
5. Have a secure permissions system that would mean that each user could have a different access level giving you overall control on determining what each user can see.
6. Include a version control function to track when changes are made within the system, and keep a record of all changes with a date and time stamp.
7. Include a document management function so that all paper documents can be scanned and all electronic documents can be attached to each patient record (if required). This would ensure that all patient documents are kept in one place and can be accessed from anywhere.
8. Include a powerful reporting capability to mine the data in the system and pull off reports that can be analysed online or offline.

Throughout the project, PHC will provide an on-going, dedicated support and maintenance service to keep all users moving forward.

3.0 Security

Security and protection of patient data is of paramount importance to PHC and our network of IT consultants. All system access will be logged and tracked for auditing purposes.

3.1 Datacentre

Rackspace is the preferred secure hosting provider. The GTHS will be hosted at one of their highly specified data centres, all of which are built to exacting, rigorous standards and deliver unparalleled security, power, connectivity and environmental control. Each facility is built to at least an N+1 standard; thereby guaranteeing 100% availability.

3.2 Data Protection

Rackspace is also audited annually for SAS70 and the facilities are also SAS70 Type II certified demonstrating that it has adequate controls and safeguards when it hosts and processes data belonging to its customers.

3.3 Roles and Access

The system will have role-based access that can be determined by a central administration to maintain confidentially, privacy and control for security and segregation of duty reasons. Users will be assigned on a group basis. Any number of groups can be created. Groups can represent roles, regions, internal and external. Each user can belong to one or more groups. Each user will have a unique, personalised view, dependent on their group membership(s).

4.0 Disaster Recovery plan

4.1 Data Backup

We have a proven, best practice process that covers backup recording, verification and prompt backup recovery. A full data backup is taken weekly and an incremental backup is taken each night. Backup tapes are collected by designated specialists and stored at a secure location.

4.2 Server Hardware Failure and Recovery

The data centre has been proven and tested within a limited range of server hardware. Only server hardware that has been fully tested is hosted in the data centre. There is a pool of new hardware on site in the data centre of matching specification to that used to host the system. If the server hardware physically fails we will put in place replacement hardware to an identical specification, where possible. We will then attempt to restore the System and data from the hard drive of the failed hardware to the new hardware. If this fails, data will be restored from backups as outlined above. Hardware replacement will happen within 2 hours of failure.

4.3 Infrastructure Failure and Recovery

The data centre in which the System is hosted is leading edge in its use of technology to provide a high degree of redundancy in all aspects of its operations. This covers Internet connectivity, data centre computer network, power, temperature control, fire, physical security, software security. In the event of failure of any of these infrastructure elements the data centre has automatic fail over in place to ensure no interruption to service. If a critical infrastructure break down occurs we will invoke the data centre loss plan, detailed below.

4.4 Data Centre loss

In the unlikely event of entire data centre loss, Enable has the ability to restore the System and the data to an alternative physical location. Enable operates a local staging environment which will always have the latest version of the System. If a recent backup can be retrieved from the fire proof container at the data centre this will be retrieved and restored. If it cannot be retrieved the most recent offsite backup will be retrieved from the offsite backup provider, and this will be restored.

In the event of total data centre loss it will would take 12 hours to re-point domain names and set-up the system at the alternative physical location. The backup restore process would then commence as normal.

Conclusion

This strategic implementation plan will deliver a final system that is efficient, economical, simple, and operationally sustainable. All our IT infrastructure development activity will be horizontally integrated with the healthcare referral network designed by the Pinnacle Healthcare Consortium in Cap Haitien. Further work needs to be undertaken as part of a Feasibility Study to determine the extent of each of the above operations coming on-line. As part of this work collection of data, investigation and assessment is required and will be provided by our technical experts.

These infrastructure changing programs will usher improved health outcomes, local employment opportunities and build a solid framework for income generation by creating an open source platform for international healthcare IT data management firms to invest into the network. Opportunities for the private sector will continue through commitment from operators (such as Microsoft, Google, Ingenix as well as EU based companies), technology, and industrial IT providers.