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eHealth for Remote Regions: Findings from Central Asia Health Systems Strengthening Project

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Abstract. Isolated communities in remote regions of Afghanistan, Kyrgyz Republic, Pakistan and Tajikistan lack access to high-quality, low-cost health care services, forcing them to travel to distant parts of the country, bearing an unnecessary financial burden. The eHealth Programme under Central Asia Health Systems Strengthening (CAHSS) Project, a joint initiative between the Aga Khan Foundation, Canada and the Government of Canada, was initiated in 2013 with the aim to utilize Information and Communication Technologies to link health care institutions and providers with rural communities to provide comprehensive and coordinated care, helping minimize the barriers of distance and time. Under the CAHSS Project, access to low-cost, quality health care is provided through a regional hub and spoke teleconsultation network of government and non-government health facilities. In addition, capacity building initiatives are offered to health professionals. By 2017, the network is expected to connect seven Tier 1 tertiary care facilities with 14 Tier 2 secondary care facilities for teleconsultation and eLearning. From April 2013 to September 2014, 6140 teleconsultations have been provided across the project sites. Additionally, 52 new eLearning sessions have been developed and 2020 staff members have benefitted from eLearning sessions. Ethics and patient rights are respected during project implementation.

Keywords. Afghanistan; CAHSS Project; eHealth; eLearning; health care; ICT; Pakistan; Tajikistan; teleconsultations.

Introduction

The Central Asia Health Systems Strengthening (CAHSS) Project, a five-year project (2013-2017), is a joint initiative between the Aga Khan Foundation, Canada (AKF, C) and the Government of Canada, through the Department of Foreign Affairs, Trade and Development. One of the components of CAHSS, i.e. eHealth, employs Information and Communication Technologies (ICT) to improve the health status of communities in Afghanistan, Kyrgyz Republic (activities yet to commence), Pakistan and Tajikistan in South-Central Asia. In order to achieve this goal, the CAHSS eHealth Programme provides specialist health care services through a regional hub and spoke teleconsultation network of government and non-government health facilities so as to make quality health care more accessible and affordable for our target communities and conducts capacity building activities for health care professionals, enabling them to deliver quality health care services.

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1. Background and Rationale

Isolated and marginalized communities living in rural, mountainous regions of Afghanistan, Kyrgyz Republic, Pakistan and Tajikistan do not have access to health care institutions and qualified health care providers. They have to pay large sums of money for travel, food and lodging to go from remote locations, where it is not possible to obtain high quality diagnostic and treatment services, to higher level health facilities to seek specialist health services. The Aga Khan Development Network (AKDN) understands the significant role that ICT can play in linking health seekers to health care institutions and providers, and providing comprehensive and coordinated care to communities situated in remote areas. The eHealth Programme therefore aims to leverage the power of ICT to link underserved communities in South-Central Asia with health care institutions and health care providers to provide access to low-cost, equitable health services, and help minimize the barriers of distance and time.

2. Objectives

The eHealth Programme under CAHSS establishes and expands eHealth operations in the South-Central Asia region. The Programme improves access to low-cost, quality specialist health services for these communities and builds the professional capacity of health care providers. The ultimate goal of the CAHSS project is to improve the health status of men, women and children in target areas of South-Central Asia. The objectives of the eHealth Programme under the CAHSS Project are to:

- increase access to specialty health care services for target communities by providing low-cost and high-quality diagnosis and treatment services through teleconsultations, and
- build professional and educational capacity of health professionals through eLearning to deliver quality health care services.

3. Design and Target Population

Activities under the eHealth Programme are conducted through a two-tier hub and spoke model developed in a systematic, coordinated, evidence-based and cost-effective manner. Figure 1 depicts the proposed eHealth connections by 2017, in the targeted areas of the focus countries.

Tier one consists of seven health facilities in Afghanistan, Pakistan and Tajikistan. In Afghanistan, the health facilities are:

- French Medical Institute for Children (FMIC);
- Bamyan Provincial Hospital (BPH); and
- Faizabad Provincial Hospital (FPH).

In Pakistan, Tier one facilities are:

- Aga Khan University Hospital, Karachi (AKUH, K); and
- Gilgit Medical Centre (GMC).

In Tajikistan, Tier one facilities comprise of:

- National Medical Center (NMC); and
- Khorog Oblast General Hospital (KOGH).

Tier two consists of 14 district level health facilities in Afghanistan, Kyrgyz Republic, Pakistan and Tajikistan. Each of the Tier two facilities will have the space and equipment needed to connect with Tier one and other Tier two facilities and to support teleconsultation and eLearning operations. By 2017, the eHealth network is expected to connect and operationalize all these facilities in Tier one and Tier two for teleconsultation and eLearning activities.

The AKDN eHealth System in South-Central Asia currently supports the operations of health care facilities that are owned by the Aga Khan Health Services (AKHS), and health care facilities that result from public-private partnerships (PPP) including those owned by the government but managed by AKHS, or owned and managed by the government. Government-owned and managed facilities are selected for inclusion in the AKDN eHealth system based on a set of quality criteria and standards of operation.

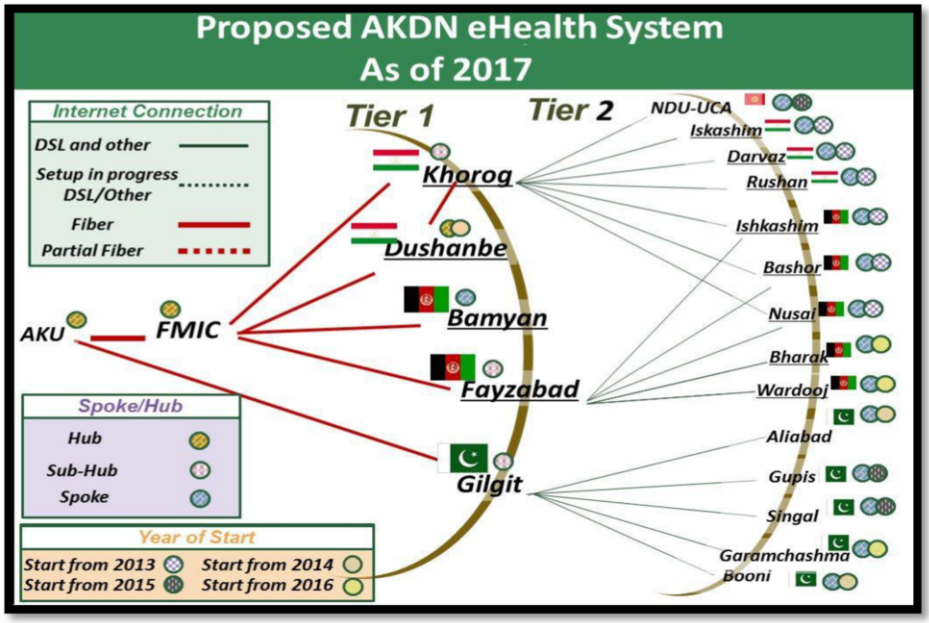

Figure 1. Proposed eHealth Connections by 2017

4. Interventions

The health facilities supported under the eHealth Programme will be connected over a period of five years, from 2013 to 2017. The eHealth system 1) utilizes teleconsultations to provide specialist health services to communities within defined catchment areas; 2) provides eLearning services to enhance professional, clinical and managerial capacities of health care providers working within AKHS owned and managed facilities or in government facilities in the South-Central Asia region. These services are provided in the following way:

1. **Teleconsultation Services**:
   The eHealth Programme delivers diagnostic and treatment services for various health care specialties through live and store-and-forward teleconsultations. The availability of teleconsultation services increases access to quality health care services and reduces travel, time and other costs borne by patients and their families.

2. **eLearning Services:**
   a. Continuous medical, nursing and professional education sessions are offered to doctors, nurses and allied health professionals in Afghanistan and Tajikistan though eLearning. These sessions are designed to improve knowledge and skills of health professionals and ensure continuous professional development, enabling them to effectively deliver clinical care and manage health operations. eLearning sessions offered within and from Pakistan are part of eHealth Programme's 2015 plans.
   b. eHealth certificate course is a year-long online course designed to create eHealth champions. This course will build eHealth capacities of professionals working in the health field and enable them to manage, administer and provide implementation oversight for eHealth programmes in low- and-middle income countries. The implementation of the eHealth certificate course is part of eHealth Programme's 2015 plans.

The teleconsultations and eLearning sessions utilize the hub and spoke model, as discussed earlier, whereby experts from the hub site provide consultations to patients and training sessions to health care providers at the spoke site, via ICT.

5. Data Collection

As part of the CAHSS Project, eHealth data is collected, analyzed and reported on a quarterly basis. Following are the output and outcome indicators of the eHealth Programme through which activities are monitored and performance is evaluated:

- number of eHealth connections upgraded and established in project supported health facilities;
- number of project supported health facilities offering full range (both live and store-and-forward) of eHealth services;

- number of project supported health facilities with guidelines in place to assure quality of eHealth services;
- number of M/F clients who attend project health facilities for live and store-and-forward consultations;
- number of new eLearning sessions developed; and
- number of participants in eLearning courses (M/F) by course.

eHealth coordinators at the implementation sites provide feedback on activities and day-to-day challenges to project managers on a monthly basis. These coordinators also provide data on the above mentioned project indicators on a quarterly basis. On an annual basis, the project management team visits all the implementation sites to conduct monitoring and to provide refresher training to eHealth coordinators and on-site implementers, such as doctors, nurses, community health workers, etc.

6. Results and Outcomes

As of December 2014, eleven spoke sites have been connected to four sub-hub sites, which are further connected to three hub sites, as illustrated in Table 1.

Table 1. eHealth Connections established as of December 2014

Hub Sites	Sub-Hub Sites	Spoke Sites
Pakistan		
AKUH, K	GMC	Singal Comprehensive Health Centre
		Gupis Comprehensive Health Centre
		Aliabad Comprehensive Health Centre
		Gulmit Basic Health Centre
		Soust Basic Health Centre
		Thoi Basic Health Centre
		Immit Basic Health Centre
		Booni Comprehensive Health Centre
Tajikistan		
NMC	KOGH	Darvaz District Hospotal
		Rushan District Hospotal
		Ishkashim District Hospotal
Afghanistan		
FMIC	BPH	-
	FPH	

All project supported health facilities connected so far have guidelines in place to assure quality of eHealth services. These sites provide live and/or store-and-forward teleconsultations in various fields such as cardiology, dentistry, dermatology, ear-nose-and-throat, internal medicine, neurology, obstetrics/gynecology, orthopedics, pain management, pathology, pediatrics, psychiatric, surgery, and radiology.

From April 2013 to September 2014, a total of 6140 teleconsultations have been provided across the project sites in Pakistan, Afghanistan and Tajikistan. Of these,

3592 were live teleconsultations (1786 male patients and 1806 female patients) and 2548 were store-and-forward teleconsultations (1340 male patients and 1208 female patients).

In the same time period, 52 new eLearning sessions have been developed to provide continuing education and professional development training to health care providers at project sites. From April 2013 to September 2014, various existing and new eLearning sessions were delivered from NMC and FMIC to sub-hub and spoke sites, catering to a total of 2020 beneficiaries (969 male patients and 1051 female participants).

These teleconsultation and eLearning activities have contributed towards improving the health status of our target communities by making quality health care services more accessible and affordable for them and building the professional capacity of health care providers.

7. Challenges

The eHealth Programme has faced and mitigated several challenges encountered during the implementation of eHealth activities. These challenges include:

a) **Connectivity:** There was unstable connectivity in some sites. **Solution:** Fiber optic lines were used where possible. Where there were no options, satellite (iDirect Connectivity) was used. Back-up connectivity, wired and wireless (3G, iDirect and Yahclick), was also used.

b) **Lack of skilled eHealth workers:** eHealth coordinators lacked necessary expertise required to effectively implement eHealth activities. **Solution:** Technical training was delivered periodically, building their professional development and providing them the confidence to carry out eHealth activities. Additionally, an online certificate course in eHealth is being offered to build the eHealth capacities of health care providers.

c) **Sustainability:** The need to create a sustainable financial model to continue offering eHealth services once donor funding ends. **Solution:** Agencies have started charging subsidized fees to beneficiaries (e.g., in Pakistan). In the long run, eHealth services must be rebranded as premium services instead of subsidized services.

d) **Language and gender barriers:** During consultations, patients and doctors located in different sites had trouble communicating due to differences in the native languages, and gender imbalances between trainer and trainees would lead to hesitancy in learning. **Solution:** Regional eHealth coordinators, native to the country of operation, were hired to act as a liaison and effectively coordinate and implement eHealth activities with the local population. For training, both male and female trainers were assigned to encourage active learning.

e) **Socio-political challenges:** Strife between various religious parties and political strikes halted eHealth operations. **Solution:** Extra time is included in project timelines to account for such unforeseeable circumstances. eHealth coordinators and other workers have been trained, making it possible to work with them remotely.

8. Ethics and Confidentiality

Before patients are inducted into the CAHSS Project for teleconsultation services, consent is taken from them. Through the consent, they are informed about the nature and process of the teleconsultation and they voluntarily decide whether or not to participate. They are ensured that their rights are protected and that information regarding their medical history and condition is kept confidential. Data received from the participants is kept confidential and only used for their treatment. The online case management system that is used to gather patient information is user-authenticated and password protected.

Conclusion

The eHealth Programme under the CAHSS Project contributes towards improving access to quality health services using low-cost approaches in the target countries. eHealth activities implemented through the project will ultimately contribute towards improving the health status of the target communities. Building the capacity of health care providers to deliver quality health services and charging patients a subsidized teleconsultation fees is our key approach to achieving sustainability.

The project will expand the scope of eHealth in the region and attract local and international organizations to engage and invest in similar eHealth activities to improve health outcomes. Entering into PPPs will further ensure effectiveness and sustainability of eHealth services. The eHealth Programme would expand over the years to cover an increasing number of sites in each country. Expansion would lead to changes in the existing hub-and-spoke model. Spoke sites would be converted into sub-hub sites as additional spoke sites are added to the system and connected to them. Sub-hub sites would then have a two-pronged operation model: 1) act as a spoke site and consult the main hub sites for services 2) act as a hub site and offer consultation services to the newly added spoke sites; hence the term “sub-hub.” AKDN’s eventual expansion of eHealth operations will provide greater access to quality health care within the region, creating an integrated eHealth network which will benefit communities as well as provide great learning for the region.