

School of Medicine & Health Sciences

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A Medical Mission to The Himalayas: Bhutan Cancer Registry



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BACKGROUND

The Kingdom of Bhutan is a Buddhist country in South Western Asia landlocked by the Himalayas and the plains of India. Traditional Bhutanese medicine which utilizes a wide assortment of medicinal plants, many unique to the nation's pristine mountainous terrain, had been the sole medical practice in Bhutan until Western medicine was introduced in the late 1960s by the Third King Jigme Dorji Wangchuck.

The incidence rate of gastric cancer in Bhutan is twice as high in the United States but is likely an underestimate rate because of unreported and undiagnosed cases in the villages^{1,2}. The high incidence has been linked to the exceedingly high rates of *Helicobacter pylori* infection in the Kingdom^{3,4}. The Bhutan Royal Ministry of Health has specified in its 2011 National Health Policy to establish a surveillance system for gastric carcinoma and *H. pylori* infection⁵. However, many unique challenges faced by the Bhutanese healthcare system hinder the registry's implementation such as specific software requirements unique to Bhutan's healthcare system, lack of network access in basic health units mostly located in remote villages, and significant shortage of diagnostic medical equipment, just to name a few.

PURPOSE

The purpose of this medical mission trip is to learn about the current surveillance system and to design a digital registry to aid stomach cancer surveillance in Bhutan.

METHODS

A 15 day trip was made during June of 2014 to visit the Royal Ministry of Health and the Jigme Dorji Wangchuck National Referral Hospital (JDWNRH) in Thimphu, the capital city, and basic health units (BHU) in the neighbouring rural districts Paro and Punakha. Potential users of the cancer registry including Bhutanese physicians, other medical practitioners, and public health officials were interviewed and inquired about the current surveillance system and their requirements for the digital registry. Based on the information collected, the Bhutan Cancer Registry is adapted from the open-source CanReg5 software, with custom features designed to overcome unique challenges proposed during the interviews.

RESULTS

The entire Bhutanese healthcare system is public and free of charge. Table 1 depicts the current hierarchical referral system in place for all complicated medical cases including stomach cancers in Bhutan. Most Bhutanese citizens visit their local BHUs for primary medical care. These BHUs, however, have very limited resources and will refer patients with high clinical suspicion for cancer to the district hospitals. Most cases will eventually go to JDWNRH, the only hospital in Bhutan equipped with an endoscope. Consequently, stomach cancer data is only collected at JDWNRH, through strenuous review of paper charts. The Bhutan Cancer Registry provides many advantages over the current system as illustrated in table 2.

REFERENCES

- Vilaichone, R., et al. (2013). Extremely high prevalence of *Helicobacter pylori* infection in Bhutan. *World Journal of Gastroenterology* : WJG, 19(18), 2806–2810.
- WHO South-East Asia Region: Bhutan Statistics Summary. (2002 - Present). World Health Organization. Retrieved on 3/8.2014 from <http://apps.who.int/gho/data/node.country.country-BHU>
- Dorji, D., Dendup, T., Malaty, H. M., Wangchuk, K., Yangzom, D. and Richter, J. M. (2014). Epidemiology of *Helicobacter pylori* in Bhutan: The Role of Environment and Geographic Location. *Helicobacter*, 19: 69–73. doi: 10.1111/hel.12088
- Dendup, T., Richter, J. M., Yamaoka, Y., Wangchuk, K., & Malaty, H. M. (2015). Geographical distribution of the incidence of gastric cancer in Bhutan. *World Journal of Gastroenterology* : WJG, 21(38), 10883–10889. <http://doi.org/10.3748/wjg.v21.i38.10883>
- National Health Policy, 2011 - Bhutan. (2011). Ministry of Health, Kingdom of Bhutan. Retrieved on 3/8/2014 from <http://apps.who.int/medicinedocs/documents/s19416en/s19416en.pdf>
- Beck M., Ding Y., Moore T., Park JS., (2004). Transnet Architecture and Logistical Networking for Distributed Storage. Computer Science Department. University of Tennessee.

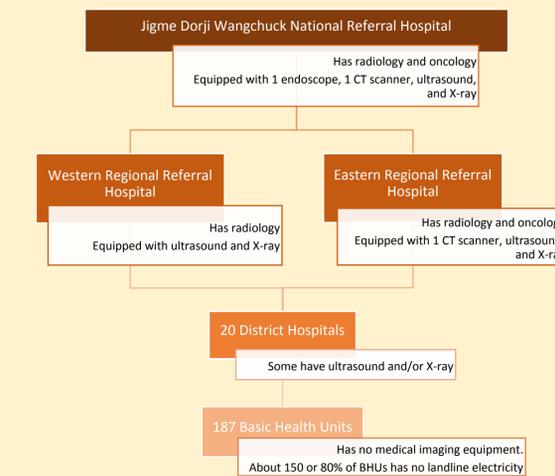


TABLE 1 Medical Referral Hierarchy in Bhutan



City of Thimphu



BHU in Punakha



With Dr. Ugen Dophu, Director General of Medical Services (middle) at the Royal Ministry of Health and Lt. Col. Dasho Kado (right)



Jigme Dorji Wangchuck National Referral Hospital (JDWNRH)

	Current System	Bhutan Cancer Registry
DATA COLLECTION	Strenuous process mainly involves paper chart review at JDWNRH.	Input digitally and can be used wherever the program is installed and connected to the central server.
DATA STORAGE	Stored on paper in the medical records office at JDWNRH.	Digitally stored at a central server and also allows secure cloud storage.
PATIENT IDENTIFICATION	Many Bhutanese share same names and do not routinely carry government issued IDs, as a result there are usually many redundant records for the same patient.	Each patient is assigned a unique identifier in the form of the combination of patient's name, date of birth, and name of the birth village.
DATA ANALYSIS	Has to be done separately.	Supports all the standard functionalities in CanReg5 including TNM staging, survival and prognostic factor analysis.

TABLE 2 Functional Comparisons between Bhutan Cancer Registry and the Current System

DISCUSSION

At the time of the mission trip, the primary target user of the Bhutan Cancer Registry is JDWNRH which remains the sole source of stomach cancer data collection in Bhutan. The software is fully ready for future expansion of the cancer surveillance program if proper diagnostic tools and network access can be established in more hospitals. To further these efforts, a Logistical Networking server is brought to the Bhutanese medical IT department on this trip to help introduce Dr. Beck's work on remote network access solutions to Bhutan⁶. Information brought back from this trip is also presented to the US Department of States and Project Hope to help the ABAH Foundation raise diagnostic medical equipment donations for Bhutan.

CONCLUSION

The Bhutan Cancer Registry software is completed 8 weeks after the mission trip and is delivered to JDWNRH. The true impact of the project on the student is far beyond the technical experience on the development of the registry itself. First-hand global health experience such as interacting with Bhutanese healthcare providers who are epitomes of compassion, altruism, and their exemplary abilities to give the best care possible on extremely limited resources have taught the student an invaluable lesson on humanity in medicine.

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