

## Belize health information goes digital

The tiny central American nation of Belize is digitizing its health information systems. Concerns about privacy need to be set against benefit to patients. Janelle Chanona reports.

Perched on the Caribbean coast and as ethnically and culturally diverse as it is geographically, Belize has launched a cutting-edge web-based health information system. The Belize Health Information System (BHIS), which was inaugurated on 16 September 2008, links the Ministry of Health with the country's public and private hospitals, laboratories and clinics. The system allows data to be made available to authorized users anywhere in the country almost as soon as they are entered in the system. Benefits include the use of alerts and reminders to decision-makers connected to the system, a greater ability to track and monitor infectious disease outbreaks, and country-wide support for such programmes as the prevention of mother-to-child transmission of HIV.

For Ian Smith, one of the founding developers of BHIS, the system not only improves the efficiency of the country's health system, but also encourages a more holistic approach to diagnosis and treatment: "Instead of focusing on a specific disease whenever a patient comes to them, doctors have access to their medical history, allowing them to ask the type of leading ques-

tions to provide a thorough check-up," Smith says, noting also that the system encourages participation from birth, establishing a patient ID "from cradle to grave".

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*Peter Allen*

BHIS's official roll-out was in September 2008, but the system's first modules were in fact piloted in 2005 at the Karl Heusner Memorial Hospital, the country's flagship public health institution located in the capital, Belize City. The system has faced many challenges since then, including local bandwidth limitations that obliged the founders to scale down systems designed for developed countries;

an erratic grid – electrical surges are commonplace in Belize and could damage the equipment needed to run the system; and the perennial budgetary constraints that limit many public health initiatives.

Smith is keen to stress that the system is not just a server designed to store health information. It is an adaptable system that serves many different users. "The type of information that a director [of a health centre or hospital] may need to make evidence-based decisions is different to the type of information that a maternal-child health nurse needs when they are vaccinating a child. The system is designed to meet these different requirements," he says. The director might require aggregate data for decision-making on such issues as medical supplies and human resources, while a nurse needs individual data such as patient history.

The system, which currently serves two-thirds of Belize's approximate population of 300 000, was financed initially through a loan from the Inter-American Development Bank (IADB) and the Caribbean Development Bank, with technical support received from the Pan American Health Organization (PAHO) and Accesstec of New Brunswick, Canada. In 2006, a grant was received from the Health Metrics Network, a Geneva-based partnership hosted by WHO, committed to facilitating better health information at the country, regional and global levels. That grant first brought the Belize system to Health Metrics Network's attention. The Network subsequently developed guidelines for all countries and, after studying the Belize model, found that it was in line with those recommended guidelines. In May 2008, Belize became the first country in the Americas to be granted priority technical support from Health Metrics Network and that means it will eventually receive financial resources for continued work on BHIS.

But while support has certainly come from outside, BHIS is very much a home-grown phenomenon. "Under the leadership of the Ministry of Health, Belize has pioneered an outstanding example of a national health information system," says Dr Nosa Orobaton, chief of country programmes for Health Metrics Network,



Ministry of Health, Belize

A rural health nurse providing services in the village of Bella Vista in Belize.

while Smith stresses the importance of consultation with the domestic health sector's key participants, including, notably, the director of health services, who is responsible for the delivery of services within the Ministry of Health. "Because we stayed close to the experts, we were able to understand clearly the problems and then come up with the best solutions to them," he says. Lessons learned in that process are now benefiting others facing similar challenges, notably Cambodia, Saint Lucia, South Africa and the Syrian Arab Republic, who have all come to Belize to see what has been achieved there.

But the system is not without its critics, notably those who fear that the centralization of health data may lead to abuses of privacy. According to Smith, BHIS's technology is "highly secure", including electronic audit trails that log and track every activity in the system. "We also use world class encryption technologies to transport our data, which is stored in highly secured database management systems," Smith says. For Peter Allen, chief executive officer at the Belize Ministry of Health, everything has been done to make the system secure, yet there is an inevitable trade-off between transparency and confidentiality. "Access and confidentiality are inversely proportional," Allen says. "We want care providers to have access but we want to preserve confidential data; as in all things there must be a balance."

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*Dr Fernando Cuellar*

The fact is that all the security in the world cannot prevent someone with the right access from looking at a patient's medical records and then leaking information to someone else – a problem that paper-based systems also face – or, worse, from passing on a password, giving unauthorized persons access to the system.



WHO/Janelle Chanona

Ian Smith, one of the founding developers of the web-based Belize Health Information System.

Dr Fernando Cuellar, an internal medicine and intensive care specialist working in a private hospital that doesn't use the BHIS, believes that Belize's small size creates particular problems in this regard. "I've found that people are very uncomfortable with the idea that their employer might find out that they suffer from X, Y or Z," Cuellar says. "Insurance is another issue – the possibility that information might leak to the insurance companies, which would in turn affect people's premiums."

Similar concerns are echoed by Kim Smith, a chickenpox patient, who says that while the system may be useful for treating minor ailments, in other instances it might lead to discrimination: "What if somebody is HIV positive?" she says. "Or someone is suffering from a sexually transmitted disease? I think it would be unfair to that person, because I feel that maybe people would judge them on their health status, as that could be an issue."

While concerns that confidential data could be leaked are legitimate, the benefits of the system are obvious. Dr Melissa Diaz-Musa, medical coordinator at Matron Roberts Polyclinic, says the ability to access people's medical history makes a huge difference in her work and allows her to make better diagnoses. For Diaz-Musa, one of the main obstacles to the system's further development is people's fear

of technology. She believes that as she and other medical workers become more computer-literate, the system will become more effective. The system is, in other words, a tool that must be used to be of benefit. This is a view with which Peter Allen concurs: "The measure of success is the positive outcomes for those who encounter our system," he says. "There will always be challenges since no system or tool is ever perfect – the focus must always remain on the benefits to patients and our people." ■



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Dr Melissa Diaz-Musa, medical coordinator at Matron Roberts Polyclinic.