Rapidly Deployable Telemedicine/Telehealth Units

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A critical component of regional planning and management of highly infectious contagious diseases is a transfer policy focusing on limiting exposure to populations, and rapid assessment as to the nature and severity of the potential exposure. Lessons learned over the last two years by emergency care systems and public health agencies in western New York, emphasize the need for a plan that limits the exposure of highly contagious infectious diseases to populations and regional critical access healthcare facilities.

Case in point: An Army reservist had been vaccinated for smallpox and subsequently developed a reaction to the vaccine. In the course of his medical care, he went from the army base in Niagara Falls to his primary doctor in the Southtowns, then, onto the Mercy Ambulatory Care Center, and finally, to the Erie County Medical Center, all with a chief complaint to rule out the possibility of disseminated vaccinia. At ECMCC, the telemedicine system was utilized to contact Fort Dietrich, MD, and a videoconference consultation was initiated with a military infectious disease expert. All told, a significant number of people could have been put at risk of exposure in the process of getting to a place where the expertise was available. In another instance, a patient was sent from his primary doctor to a local radiology group with an order for a chest x-ray to rule out SARS. The radiology group, sensing risk to their business and patients, called ECMCC demanding that the hospital evaluate the patient for the possibility of SARS, putting the regional trauma center at risk of being shut down. The lessons learned from the experience in Toronto demonstrated the potential calamity and healthcare risks that can be introduced into a community when highly infectious disease patients move to multiple locations, and are cared for by multiple providers.

The telehealth program at the University at Buffalo and Erie County Medical Center is one of the most successful providers of emergency telemedicine services in the country, serving 51 statewide correctional facilities throughout New York State. The Emergency Department at ECMC has over 10 years of emergency telehealth practice focused on integration of the technology into an academic, tertiary care emergency department, and adapts to ongoing improvements in both telecommunications connectivity in the community, and the quality of technology solutions for visual and audio communications. This is an opportune time to develop a regional plan to manage and assess suspected highly contagious infectious disease, and focus on limiting patient movement by utilizing rapidly deployable telehealth units to those locations. In general principles, the plan involves centralization of patients with highly contagious infectious disease concerns.
followed by rapid deployment of telehealth capabilities to the location of the individual or group of possible patients.

The **Goals** of the program are conducted in the context of the regional patient management and transfer plan that emphasizes on-site assessment, directed access to expertise, appropriate utilization of quarantine and limitation of patient travel for assessment and treatment.  
- Support community monitoring for infectious disease outbreaks through concerns to the Department of Health, or syndromic surveillance of the emergency department population.  
- Centralize the consolidation of the monitoring and concerns in a 24x7 emergency medical services dispatch center for the region. Provide screening of calls to support deployment with the appropriate accuracy to be responsive to concerns vs. use in cases where telephone communications and triage would be appropriate.  
- Identify a best equipment set for the RDTU’s assessing videoconferencing capabilities, telecommunications needs, cost, extremely intuitive ease of use (EIEOU).  
- Incorporate automated and patient administered physiologic monitoring capabilities including temperature, pulse, pulse oximeter and blood pressure.  
- Identify the best packaging / kit for the unit that will provide protection while awaiting deployment and support ease of use during a deployment.  
- Develop a response plan that moves a rapidly deployable telemedicine communication device to the location of the concern utilizing regional emergency medical services (EMS) and health department dispatch center (Erie County EMS MERS), existing field units of the EMS community and various county’s Departments of Health (DOH), and the regional Specialized Medical Assessment and Response Team (SMART).  
- Develop a network operations center plan that will monitor the technical status of the deployed unit through the telecommunications network and assist in ensuring the quality of communications (24x7) if an ongoing monitoring situation exists.  
- Develop a consultation plan that will incorporate various EMS, DOH, SMART and Department of Emergency Medicine, with national experts in highly contagious or serious infectious disease agents, healthcare providers, and physicians, ensuring 24x7 availability of consultation.  
- Study the responsiveness and the effectiveness in reducing patient travel for highly contagious infectious disease assessment and management.  
- Education of the response team on the assessment and identification of highly contagious infectious disease agents.

This plan will involve **Three Levels of Capabilities** with rapidly deployable units, personal, midrange, and large-scale.  

Personal range RDTU: the system will consist of a low cost telehealth unit based on the design of existing off-the-shelf (OTS) home health models that will be able to be handed through the door to a patient with concerns and easily plugged into existing communications, and quickly dialed into the location of the EMS communications,
medical reviewer, emergency physicians, or consulting infectious disease specialists. Cost range~$400-$800.

Midrange RDTU: consists of telehealth systems, which are approximately the size of a small suitcase, which can fit into the overhead compartment of an airliner. The unit includes a more sophisticated remotely controllable, detachable camera and multiple inputs for other devices, including physiologic monitoring, video diagnostic systems (otoscopes), compact laboratory testing equipment, and peripheral PDA or laptop computer. They utilize IP broadband network connectivity or ISDN linking with wired, wireless, 3-4G cellular and satellite transmission modes. Cost range~$16,000-25,000

Large-scale RDTU: telehealth component of a system that supports a remote patient assessment center where large numbers of patients (200-15,000) can be assessed, triaged and appropriately dispositioned at a site away from the critical access hospitals in the region. A component of this system will encompass the telecommunications, network transmission to the off-site location including line-of-sight wireless transmission, 3 and 4G cellular transmission and satellite. This system will complement an existing project for wireless local area network setup in a remote site and remote diagnostic equipment capabilities called the DisasterLAN. Cost range ~ $25,000 – 50,000.

Assessment and Outcomes

Exercises and drills are an essential component of the evaluation of the readiness and effectiveness of the rapidly deployable telehealth unit system. Indicators of successful deployment include time to delivery to location, patient and staff set-up time, consistency of connectivity, and physiologic monitoring transmission status. This evaluation assumes baseline evaluation and testing by manufacturers of component products prior to deployment. Evaluations of the equipment by the patients, the support staff, and the consulting medical staff, will measure the ease of use, the effectiveness of images and physiologic monitoring toward diagnosis, and overall satisfaction with the system and its capabilities.