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The
**COMMONWEALTH
FUND**

CASE STUDY
**GERICARE@NORTH: INTRODUCING TELEMEDICINE TO SKILLED-NURSING
FACILITIES IN SINGAPORE**

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Abstract: GeriCare@North is a telemedicine initiative in Singapore designed to improve access to specialist elderly care physicians for residents of skilled-nursing facilities. The global population of elderly requiring long-term care is increasing rapidly, heightening the need to make quality health care more accessible and more affordable to this vulnerable group. The GeriCare@North initiative has delivered system cost savings by preventing unnecessary acute hospital admissions and reducing the need for specialist outpatient consultations. The program has enhanced long-term care standards by delivering the national advanced care plan initiative, providing targeted nurse training, and improving clinical governance practices. Improvements to productivity and scaling, as well as capitalizing on opportunities to deliver other services, could generate further system cost savings. Through technology, GeriCare@North is helping to build better working relationships between hospitals and skilled-nursing facilities, resulting in better care for elderly patients and reduction in overall system costs.

BACKGROUND

By 2050, the global number of people over age 60 is expected to double, to nearly 2 billion.ⁱ Over this period, the number of older people requiring long-term care because of limited mobility, general frailty, and other physical or mental health problems is set to quadruple.ⁱⁱ In Singapore, the problem is particularly acute: as many as one of five people is expected to be over age 65 by 2030.ⁱⁱⁱ The Singapore Ministry of Health is taking steps to ensure that Singapore's elderly are more active and care is more affordable, as well as to enhance the quality of care provided. By harnessing technology to improve clinician productivity, decrease the number of patient transfers to hospitals, and deliver targeted training courses to improve quality of care, GeriCare@North's telemedicine initiative is helping to achieve these goals.

WHAT IS GERICARE@NORTH AND HOW DOES IT WORK?

GeriCare@North aims to improve access for residents of skilled-nursing facilities to specialist elderly care physicians at Khoo Teck Puat Hospital (KTPH). Managed by Alexandra Health, KTPH is the newest public hospital in Yishun, built to serve the health care needs of the more than 700,000 people who live and work in the north of Singapore. For its "Healthcare 2020" campaign, Singapore's Ministry of Health identified six key strategic priorities to make quality health care more accessible and more affordable for all citizens (Exhibit 1).

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Exhibit 1. The Six Priorities of the Singapore Health System

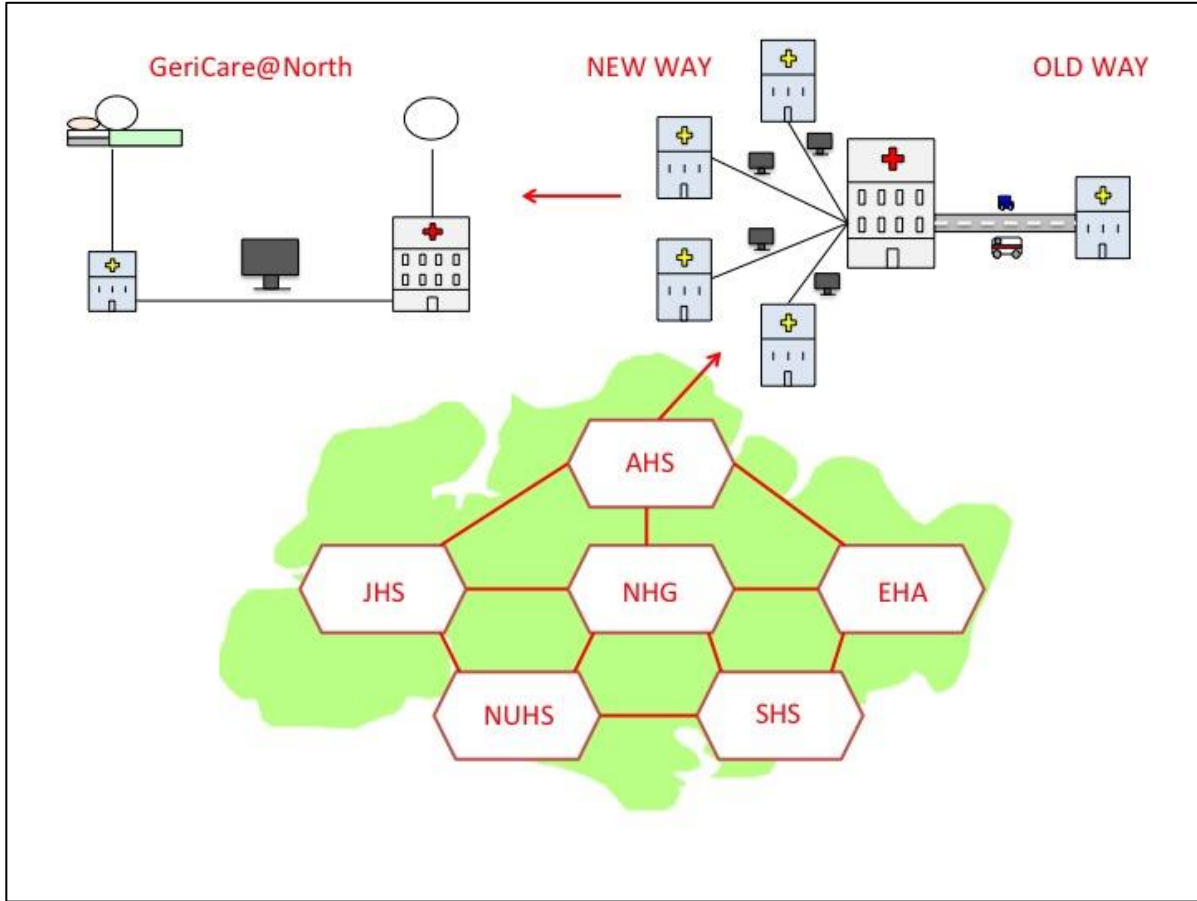
1	Manage frequent flyers
2	Timely discharge from acute hospital
3	Timely discharge from specialist outpatient clinic
4	Deliver person-centric, seamless care
5	Health promotion and education to keep population out of hospital
6	Build capabilities of primary and community care partners in regional health systems

The GeriCare@North initiative focuses on priority 6—building capabilities of primary and community care partners in regional health systems—by developing partnerships between the regional hospital and skilled-nursing facilities to enhance care. It achieves this in three ways: telemedicine, training and equipping facilities, and end-of-life care and advance care planning.

So far, four skilled-nursing facilities have been equipped with mobile audiovisual (AV) units connected via a secure dedicated line to KTPH (Exhibit 2). Four more facilities will be equipped later this year, at which time GeriCare@North will be providing services to six of nine skilled-nursing facilities in the region and two from neighboring health care clusters.

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Exhibit 2. Schematic of GeriCare@North



The dedicated telecommunications infrastructure can be easily harnessed by other telemedicine projects, and the standardized information and communication technology protocols make nationwide dissemination much easier.

The AV unit can be wheeled to the patient's bedside to conduct scheduled or emergency consultations with doctors at KTPH or elsewhere. Specially trained telemedicine nurses identify patients in need of geriatric input and present cases at scheduled times. The nurses become the remote hands, eyes, and ears of the doctors. The doctors can provide advice and make medication changes remotely. This reduces unnecessary hospital admissions, which lowers patient distress and avoids transfer costs.

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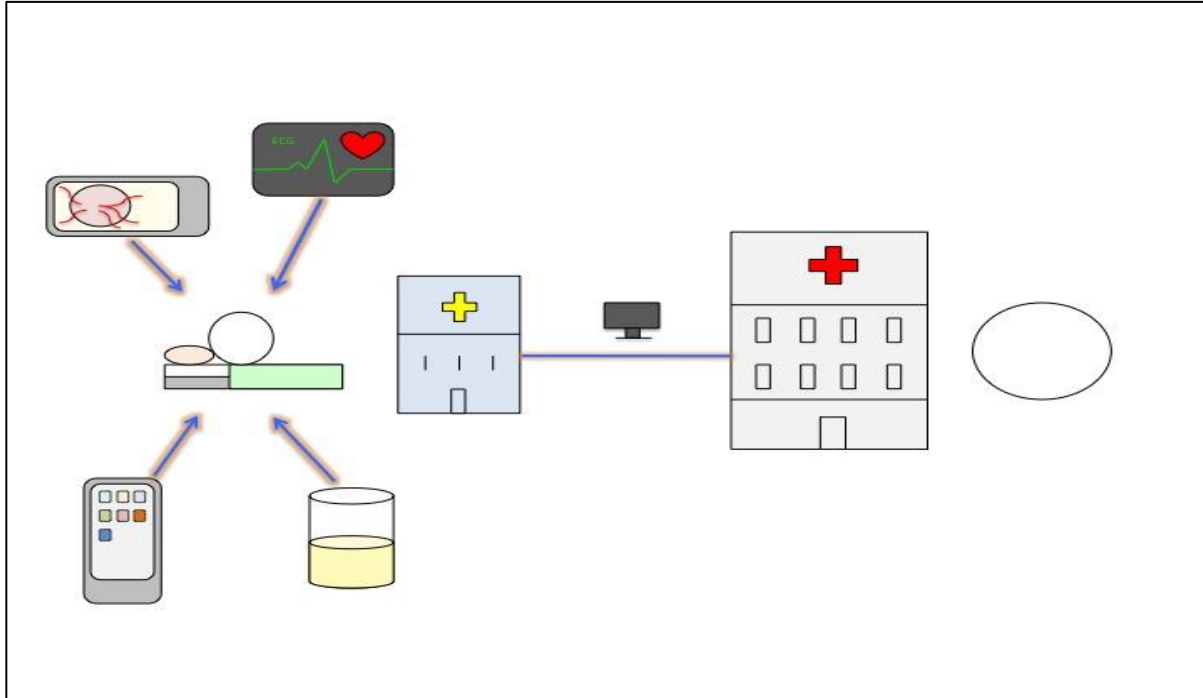


A telemedicine consultation takes place between telemedicine nurses at a skilled-nursing facility and the consulting geriatrician at KTPH.

All registered nurses working at nursing homes under the GeriCare@North program are encouraged to undergo telegeriatric training provided by a dedicated clinical educator. The two-month basic course develops communication, case presentation, and clinical examination skills. An advanced course builds on these skills and introduces nurse assessment and intervention. In both courses, certification requires successful completion of written and practical examinations. Continuing professional development is provided by remote case presentations and lectures, which include delivery of training in enhanced end-of-life care and advanced care planning. Nurses also may learn to use additional equipment, such as bladder scanners, which provides a potential opportunity for the adoption of other point-of-care diagnostic technologies (Exhibit 3).

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Exhibit 3. Potential of Telemedicine to Harness Point-of-Care Diagnostic Innovations to Further Decrease Care Delivery Costs



GeriCare@North is actively expanding its scope of services. It recently began the telegeriatric on-call service, and, by the end of 2015, it will double the number of enrolled skilled-nursing facilities. The initiative's success is attributed in part to establishing good working partnerships with the skilled-nursing facilities. The senior nurse from each enrolled facility becomes part of the training steering committee, which sets the training direction. This currently focuses on achieving the Ministry of Health's enhanced nursing home standards, required by 2016, and includes the establishment of a palliative care training course to help deliver the advance care planning agenda. The GeriCare@North management team is discussing formal recognition of its telemedicine course with the Singapore nursing board. It also has contributed significantly to Singapore's National Telemedicine Guidelines.

IMPLEMENTATION AND SCALE

In 2009, Dr. James Low, senior geriatric medicine consultant at KTPH, project director, and principal innovation champion, obtained nearly USD1.5 million from the Singapore Agency for Integrated Care (AIC) to develop a telegeriatric service. Following a successful pilot, the project received further funding totaling USD5.84 million. The project has seen two phases: developing an appropriate technological solution and developing an appropriate training program.

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Phase 1: Technological Solution

The telegeriatric team worked with the Integrated Health Information Systems (IHIS) team. IHIS is a private provider owned by the Singapore government that delivers information technology (IT) resources for Singapore's six regional health care clusters. That allows it to focus on nationwide interoperability and IT integration. The development team followed an iterative, user-centered design approach to establish the program requirements. Proof of concept was achieved using the telecommunication software Skype on a laptop computer. Due to poor network performance and problems with AV quality, the team decided to use a formal "AV stack" connected to KTPH by a dedicated line. The GeriCare@North team found that patients and nursing staff liked the physical presence of the AV stack at the bedside. The on-screen consultant is required to wear a white coat and stethoscope to further establish the presence of the doctor. After encountering considerable problems at the outset, telegeriatric nurses and doctors today report very few technological issues and find the AV stack user-friendly and reliable.

Phase 2: Training Program

After creating the technological solution, the team discovered that the skilled-nursing facility staff did not have the knowledge, physical examination skills, or communication skills required to liaise remotely with the KTPH medical team. A dedicated training program was developed to bridge this gap. The program began in December 2011 and engaged stakeholders through creation of a joint training steering committee. Through the committee, members contribute to the overall direction, vision, and strategy of GeriCare@North and feel increased ownership of the program. Today, a wide range of educational content is delivered via teleconferencing, including the current nationwide enhanced nursing standards program and training in end-of-life care.

The Future

GeriCare@North is starting to scale up. This year, the number of enrolled facilities will double. Facilities in several other regional health care clusters have expressed interest, and two of the currently enrolled facilities are from other systems. Significantly, because of the IHIS's position at the center of health care IT delivery in Singapore, program expansion can be achieved easily by replicating the existing technological solution for all skilled-nursing facilities in the country. Furthermore, the lessons learned during the pilot phase are transferable to any telemedicine program. Mental health services have shown considerable interest.

EVIDENCE OF IMPACT

The GeriCare@North program collects data monthly. Evaluations monitor adoption and impact against key performance metrics established by the AIC.

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Pilot Program Results

A pilot program undertaken between December 2010 and March 2014 demonstrated a statistically significant 29 percent decrease in hospitalizations after the introduction of the GeriCare@North initiative.^{iv} It involved 379 telegeriatric consultations (average length of 22 minutes) with 198 unique patients (average age of 75) from two skilled nursing facilities. Nearly all patients (95%) were classified as category 3 or 4 using a risk assessment framework (1 = least dependent; 4 = fully dependent), and 90 percent had multiple comorbidities, 35 percent used multiple prescription drugs, and 34 percent had been admitted to the hospital within the last six months. Behavioral problems related to dementia, medication review, and skin rashes or lesions were the most common topic of consultation.

User Satisfaction

Researcher explored the perspectives of 24 users from across the enrolled skilled-nursing facilities and the regional acute hospital, KTPH. In analysing results from seven focus groups and two semistructured interviews, they found a consensus opinion that GeriCare@North increased patient access to specialist care, reduced the need for hospitalisation, improved the quality of care, and enhanced nursing skills and knowledge.^v

Cost per Consultation

The Institute of Global of Health Innovation constructed an economic model, following an activity-based costing methodology^{vi} and using data provided by the GeriCare@North team for the financial year 2014–15. For a standard face-to-face consultation, assuming a geriatrician travelling to the skilled-nursing facility, data indicated a median cost per consultation of \$52USD. A comparison model for a telegeriatric consultation indicated a median cost per consultation of \$53USD. The additional set-up costs required for upgrading infrastructure and providing hardware to deliver a telemedicine consultation equates to \$5,810USD per facility, annuitized over five years. However, the ability to provide remote consultation offers the potential to avert acute hospital admissions and reduce specialist outpatient consultations. Current data demonstrate savings of \$9,101USD per facility per year; this represents a 43 percent return on investment. This suggests that greater project expansion offers the potential to enable significant systemwide cost savings.

Enhancing Nurse Standards in Long-Term Care Facilities

GeriCare@North has become a key vehicle for delivery of Singapore's nationwide program to enhance nurse standards in long-term care facilities. In the 14 months leading up to May 2015, 36 percent of teleconsultations were quality improvement activities facilitated by the regional hospital. These include:

1. Introduction of regular mortality and morbidity meetings;
2. Nurse education and training;

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- a. Delivery of specific telemedicine training (basic and advanced courses);
 - b. Delivery of other relevant geriatric care training; and
3. Advanced care planning (ACP).
- a. In the 14 months prior to May 2015, data indicate that 19 percent of patients had been introduced to ACP.

The current costing model demonstrates the huge potential of the GeriCare@North initiative. However, it is perhaps too early to fully evaluate cost-effectiveness and efficiency gains enabled by the program. Further impact could be achieved by:

1. Improved productivity of the GeriCare@North service;
2. Delivery of diversified services via the current platform in fields such as mental health, ophthalmology, and dermatology (mobile technologies exist to support these activities);
3. Wider adoption of GeriCare@North within skilled-nursing facilities in the other five Singapore health care clusters (there are 66 skilled-nursing facilities nationwide); and
4. Cross-subsidization via commercializing of program delivery know-how and educational resources for use by other health care clusters and throughout southeast Asia.

HOW CAN THE INNOVATION BE ADOPTED TO WORK IN THE UNITED STATES?

The Affordable Care Act (ACA) has set a precedent for delivering care within the community as a means of reducing care costs and improving the quality of chronic disease management.^{vii} The aims of the ACA are analogous to the objectives of the Singapore Ministry of Health.

Telemedicine is not new to the United States, but, as the focus of health provision shifts to affordability, the emerging evidence for telemedicine as a conduit to improve cost-effectiveness, maintain quality, and improve access to care reinforces its relevance.^{viii}

The vision and leadership displayed by Singapore's Ministry of Health, the information and communication technology capabilities of IHiS, and the dedicated resources available to support innovation provided by the AIC have been core enablers of the GeriCare@North program. Its unique strategic positions give it the ability to rapidly diffuse innovation throughout Singapore. The program has benefited greatly from the foresight and resilience of Dr. Low, however, it has also astutely built inclusive relationships with key nurses, who then champion GeriCare@North. A great deal of work went into adapting the telemedicine concept to the needs of caring for skilled-nursing facility residents, but, perhaps more important, was the development of the telemedicine training program. It proved vital to addressing the concerns of clinicians and providing the necessary time and space for nursing home staff to learn new ways of working.

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In the United States, many companies could provide the technical capabilities for telemedicine. There are well-established delivery guidelines, standards of practice, and privacy and security protocols, which will ensure appropriate clinical governance.^{ix} U.S. health care organizations interested in implementing telemedicine systems would benefit from considering the “soft” success factors identified in the GeriCare@North program: specifically, adapting the innovation to the context, providing resources and space for change, and addressing the concerns of health care professionals.

The ability to manage patients remotely via telemedicine will be most valuable to health care organizations where the primary objective is decreasing overall system expenditure, such as in accountable care organizations. Limited reimbursement continues to be the major barrier to telemedicine expansion, but payment policies are evolving.^x A recent study demonstrated that when reimbursement for telemedicine is given parity with a face-to-face consultation, the likelihood of adoption increases.^{xi} With respect to a GeriCare@North equivalent program, a restructuring of Medicare payments to organizations could provide an appropriate motivation to encourage increased use of telemedicine.^{xii,xiii} In the longer term, if health care systems want to focus on decreasing overall costs, they must address the incentives that reward hospitals for being full, thus promoting volume of care over value of care.

Telemedicine offers the potential to decrease the system costs of health care. In addition there is an opportunity for health care organizations to further enhance a standard telemedicine program by harnessing the potential of multiple new point-of-care diagnostic devices to magnify the system cost reductions of care delivery.

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Hannah Patel is a policy fellow based at the Centre for Health Policy within the Institute of Global Health Innovation, Imperial College London. She is a graduate of the University of Oxford. Her work focuses on the diffusion of innovation within global health systems, and she is the current forum delivery manager for the World Innovation Summit for Health.

Alex Carter is a health economist based at the Centre for Health Policy within the Institute of Global Health Innovation, Imperial College London. He is graduate of King's College London and the London School of Economics. His research focuses on the economic impact of quality improvement programs in the National Health Service.

Greg Parston, Ph.D., is executive advisor to professor the Lord Ara Darzi. He is responsible for leading global research on diffusion of health care innovation, use of behavioral simulations in policymaking and citizen engagement in public policy debates. In 1989, he cofounded the Office for Public Management, an organizational development company that he led as chief executive. He later established Accenture's global Institute for Health & Public Service Value. Earlier in his career, Dr. Parston was deputy director of the King's Fund College and vice president of SUNY Downstate Medical Center in New York City.

Professor the Lord Ara Darzi of Denham holds the Paul Hamlyn Chair of Surgery at Imperial College London, the Royal Marsden Hospital, and the Institute of Cancer Research. He is director of the Institute of Global Health Innovation at Imperial College London and an honorary consultant surgeon at Imperial College Hospital NHS Trust. Research led by Professor Darzi is directed toward achieving best surgical practice through innovation in surgery and enhancing patient safety and the quality of health care through global health policy. His contributions within these research fields have been outstanding, publishing over 950 peer-reviewed research papers to date. In recognition of his achievements in the research and development of surgical technology and health care innovation, Professor Darzi has been elected as an Honorary Fellow of the Royal Academy of Engineering, a Fellow of the Academy of Medical Sciences and a Fellow of the Royal Society. In 2013 he was elected a foreign associate of the Institute of Medicine.

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