**Supplement**

***Summary of International Case Studies***

During the presentations, each panelist provided a case study that highlighted the opportunities, challenges, considerations for, and current context of, aging-related HTA in their country. While some countries presented an updated version of their original case in 2017, others discussed an additional case study, separate from their 2016 example. Each of the panelists began their case by discussing the importance of focusing on aging-related issues in HTA to manage the health and health care of the aging population.

Global population aging has captured the attention of government agencies and health care organizations across the world, resulting in an increasing focus on the development of innovative policy and public services to support aging and older adults [12]. In Canada, older adults comprise the fastest-growing age group [13], and those over the age of 65 consume approximately 44% of Canadian health care resources [14]. Korea’s population is projected to age faster than any other OECD nation, and this growth corresponds with a sharp increase in health care spending [15]. The European population over the age of 65 is projected to increase by nearly 30% with those over the age of 80 increasing by nearly 60% by the year 2080 [16]. China is experiencing rapid population aging, with older adults comprising 10% of the population [17]. Japan already has the oldest population in the world [18], even before 2025 when the baby boomer generation will reach 75 years of age [19]. This demographic transition has resulted in concern about the capacity of health care systems to provide quality services in the upcoming years [20; 12]. The increasing demand for health care products and services will demand a response from public authorities, policy makers, health care providers, and payers globally [21; 12].

*Canada*

An example of HTA and aging in Canada is the case undertaken in the Canadian province of Alberta: the creation of a Palliative and End Of Life Care (PEOLC) framework. It has been estimated that over 70% of Canadians who require PEOLC do not have access to it [22]. In Alberta, 85% of adults die in hospitals, despite over 80% reporting that they would prefer to die at home or in the community [23]. Currently in Alberta, PEOLC is provided in many different settings through a variety of programs and services under an array of standards and legislation. This has resulted in variable, un-coordinated, and inequitable access to high quality PEOLC across the province [23].

The Alberta Health Services (AHS) PEOLC Provincial Framework was collaboratively developed by AHS and Alberta Health (AH) in 2014, with the aim of improving PEOLC for all Albertans [23]. Issues related to an appropriate model for PEOLC were explored by the Health Technology Assessment Unit at the University of Calgary; these issues included: safety and effectiveness; cost-effectiveness; budget impact; geographical variation; provincial, national and international context; relevant social, ethical, and legal considerations; impact to patients and health system; affordability and sustainability; and implementation feasibility.

Within the pan-Canadian AGE-WELL research network, the Policy and Regulatory Issues in Enabling Technological Innovation (PRI-TECH) project is focused on examining the current policy and regulatory frameworks and developments relevant to the licensing, approval, regulation, reimbursement and evaluation of new health technologies and innovations [8]. The project has examined the complex HTA processes for innovative health technologies related to aging in the Canadian context. Through semi-structured interviews with innovators, researchers, industry, and government representatives this project has identified that low-risk health technologies which may shift care from hospital to home settings face numerous barriers to adoption, including a lack of resources and the tendency for decision-makers to focus on acute care needs [24]. Working to overcome some of these barriers, AGE-WELL’s Developing Regional Health InnoVation Ecosystems (DRiVE) project is developing partnership models known as Regional Health Innovation Ecosystems (RHIEs) that facilitate collaborations between researchers, policy makers, practitioner, and industry [8]. This project has identified the importance of including older adults and relevant end-users in RHIEs, and established seven themes that are important to consider in engaging older adults in RHIEs, including advocacy and knowledge translation engagement, co-production and partnerships, developing cultural capacity, and linkage and exchange [25]. An additional project within AGE-WELL, called Data-Driven Decision-making in Healthcare (3DHC), aims to utilize ‘big data’ collected through standardized assessments (interRAI assessments) and wearable devices to inform health decision making [8].

*Korea*

In Korea, HTA is important in controlling sharply increasing health spending.More and more non-covered services are being provided to generate revenue [26; 15]. To address this issue, the Korean National Evidence-based healthcare Collaboration Agency (NECA) and new Health Technology Assessment (nHTA) committee act as gate keepers by assessing the effectiveness and safety of all new procedures and diagnostics, unless the service will be provided free of charge.

There is no separate HTA category for assessing aging-related technologies despite several reviewed technologies corresponding to aging-related conditions. One specific aging-related example is the government telehealth project, designed to increase access to health care for rural and remote older adults. HTA was used to evaluate the efficacy and safety of the telehealth intervention. The HTA committee, lacking specific criteria for assessment of aging-related technologies, used effectiveness and safety as the main criteria for assessing the intervention, as these factors have been found to be most influential in health care decision making in Korea [27]. NECA and nHTA will be keeping a watchful eye on developments surrounding the opportunity for technological innovation to address aging-related issues.

*Italy*

The increase in population life span has resulted in a greater proportion of the population living with chronic disease and frailty [28]. The mismatch between acute health system delivery and population needs has been thought to significantly increase health care costs [29; 30]. As such, the early identification of frailty risk, along with the development of a multi-modal community based intervention, is necessary to provide citizens with the opportunity to be cared for in their community and contain health care costs.

The Innovative Medicines Initiative Sarcopenia and Physical Frailty in Older People: Multi-component Treatment Strategies (IMI SPRINTT) Project is a five-year study involving 16 research institutions in the geriatric field across Europe. It is a public-private partnership aimed at enhancing frailty research in Europe to address key societal challenges and increase innovation and efficiency in drug research and development processes in Europe. The IMI SPRINTT Project plans to: 1) develop an operational definition of at-risk populations with unmet therapeutic need; 2) validate and implement practical clinical methodologies for screening and prevention of physical frailty and sarcopenia; and 3) develop a health economic model of physical frailty and sarcopenia in real life settings. One component of the health economic model project involves a comprehensive HTA evaluation, reporting on the cost effectiveness and cost utility, economic relevance, and efficiency of the developed frailty-related interventions. Early results of the project suggest that a public partnership in addressing frailty-related issues may be a promising approach.

*China*

China has embraced HTA as an approach to help address the promise and diffusion of health care technologies. The increasing prevalence of diabetes in China, especially among the older population, has led to the development of mobile applications for diabetes management [31]. These applications, or apps, for diabetes management provide an interesting case study for HTA and aging. Several challenges exist for apps designed for diabetes management in China, including issues of user friendliness and assessments of ease of use and readability. Due to these challenges, uptake of these apps among the older population has been limited. In addition to issues with usability, the apps neglect the importance of interaction between people with diabetes, their family, peers, or providers within the apps. Despite their challenges, these applications may provide a compelling solution for enhancing diabetes self-management in the older population. However, in order to increase use of these applications among older adults, the apps’ impact on user experiences, behaviour, medication adherence, and behaviour improvement should be further investigated. Currently, there is limited evaluation of the impact of these apps on health outcomes, as well as questions about how these apps would work for people with cognitive impairment.

The gaps in understanding the impact of diabetes management apps, especially among the older population, suggest that completing an HTA may be warranted. However, challenges exist for HTA in determining patient perspectives and ease of use of the apps [32]. As such, HTA for diabetes management apps should incorporate more process and user experience evaluation, rather than outcome evaluation. Additionally, real world evaluation, compliance, co-morbidity and multi-treatment evaluations should be conducted to understand the full impact of these applications. Currently, HTA in China focuses on ‘big-ticket’ technology [33]. These challenges suggest that traditional HTA methodology may not be sufficient for understanding non-invasive mobile technologies, like diabetes management applications, within older populations. The opportunities for exploring the development of new methods to address these issues is ripe.

*Japan*

The Ministry of Health in Japan promotes regional inclusive care plans where medical and health care services are integrated in an attempt to reduce hospitalizations and shift the place of care to the home [19]. Japanese national medical care and health care insurance is facing budget constraints, with national medical expenses accounting for $370 billion, or about 40%, of the total national budget in 2015 [34]. These restraints exacerbate the current challenges in caring for the growing population of older adults at home. One such challenge involves the lack of patient information available to homecare providers. Health technology has the potential to support homecare provider information needs but technologies in this realm are limited.

To drive the system towards an integrated approach, Japan is developing and adopting a nationwide electronic health record (EHR) called “Sen-nen Karte”. To date, thirty hospitals have implemented the Sen-nen Karte system, with plans for the EHR to be fully functional in all Japanese hospitals in the next four years. This EHR will integrate health information and provide it to patients through mobile phone applications. Patients will then be able to access their test results and consult with general practitioners through the application.

The acceptability and usefulness of this application has been questioned, especially for older adults. Those in the age range of 60-64 are high users of the application, however for those over the age of 65 application use decreases despite an increase in hospital usage. Additionally, the application relies solely on information collected in hospital, and is therefore not capable of evaluating elderly health outcomes post discharge. This lack of information after discharge impacts homecare providers, who already struggle with limited access to patient data. In order to improve homecare in Japan, especially through the use of technology, more patient data are required. A framework and approach for performing HTA on aging-specific technology should inform the type of data that the EHR and similar technologies must collect. Japan is committed to finding ways to link the use of real world data of their population health needs to technological interventions.