Health Information and Quality Authority

An tÚdarás Um Fhaisnéis agus Cáilíocht Sláinte

BEST PRACTICE REVIEW

ICT Enablement of Older Persons Services

October 2021

About the Health Information and Quality Authority

The Health Information and Quality Authority (HIQA) is an independent statutory authority established to promote safety and quality in the provision of health and social care services for the benefit of the health and welfare of the public.

HIQA's mandate to date extends across a wide range of public, private and voluntary sector services. Reporting to the Minister for Health and engaging with the Minister for Children and Youth Affairs, HIQA has responsibility for the following:

- **Setting standards for health and social services —** Developing person-centred standards and guidance, based on evidence and international best practice, for health and social care services in Ireland.
- **Regulating social care services —** The Office of the Chief Inspector within HIQA is responsible for registering and inspecting residential services for older people and people with a disability, and children's special care units.
- **Regulating health services —** Regulating medical exposure to ionising radiation
- **Monitoring services —** Monitoring the safety and quality of health services and children's social services, and investigating as necessary serious concerns about the health and welfare of people who use these services.
- **Health Technology Assessment —** Evaluating the clinical and cost-effectiveness of health programmes, policies, medicines, medical equipment, diagnostic and surgical techniques, health promotion and protection activities, and providing advice to enable the best use of resources and the best outcomes for people who use our health service.
- **Health Information —** Advising on the efficient and secure collection and sharing of health information, setting standards, evaluating information resources and publishing information on the delivery and performance of Ireland's health and social care services.
- **National Care Experience Programme —** Carrying out national service-user experience surveys across a range of health services, in conjunction with the Department of Health and the HSE.

Overview of the health information function of HIQA

Healthcare is information-intensive, generating huge volumes of data every day. Health and social care workers spend a significant amount of their time handling information, collecting it, looking for it and storing it. Therefore, it is imperative that information is managed in the most effective way possible in order to ensure a high-quality, safe service.

Safe, reliable healthcare depends on access to, and the use of, information that is accurate, valid, reliable, timely, relevant, legible and complete. For example, when giving a patient a medicine, a nurse needs to be sure that they are administering the appropriate dose of the correct medicine to the right patient and that the patient is not allergic to it. Similarly, lack of up-to-date information can lead to the unnecessary duplication of tests — if critical diagnostic results are missing or overlooked, tests have to be repeated unnecessarily and, at best, appropriate treatment is delayed or at worst not given.

In addition, health information has a key role to play in healthcare planning decisions — where to locate a new service, whether or not to introduce a new national screening programme and decisions on best value for money in health and social care provision.

Under section 8(1)(j), HIQA is charged with evaluating the quality of the information available on health and social care and making recommendations in relation to improving the quality and filling in gaps where information is needed but is not currently available.

Information and communications technology (ICT) has a critical role to play in ensuring that information to drive quality and safety in health and social care settings is available when and where it is required. For example, it can generate alerts in the event that a patient is prescribed medication to which they are allergic. Further to this, it can support a much faster, more reliable and safer referral system between the patient's GP and hospitals.

Although there are a number of examples of good practice, the current ICT infrastructure in Ireland's health and social care sector is highly fragmented with major gaps and silos of information which prevents the safe, effective, transfer of information. This results in people using the service being asked to provide the same information on multiple occasions.

In Ireland, information can be lost, documentation quality varies, and there is over-reliance on memory. Equally, those responsible for planning our services experience

great difficulty in bringing together information in order to make informed decisions. Variability in practice leads to variability in outcomes and cost of care. Furthermore, we are all being encouraged to take more responsibility for our own health and wellbeing, yet it can be very difficult to find consistent, understandable and trustworthy information on which to base our decisions.

As a result of these deficiencies, there is a clear and pressing need to develop a coherent and integrated approach to health information, based on standards and international best practice. A robust health information environment will allow all stakeholders, the general public, patients and service users, health professionals and policy makers to make choices or decisions based on the best available information. This is a fundamental requirement for a high reliability healthcare system.

Through its health information function, HIQA is addressing these issues and working to ensure that high quality health and social care information is available to support the delivery, planning and monitoring of services.

An older person's patient journey typically has a high number of transitions across care settings, requiring very close coordination between the different health and social care domains. The information needed to provide care to older persons is typically held in a number of IT systems or in paper records, distributed across those settings in silos, creating challenges for those providing care. The COVID-19 pandemic intensified these challenges and led the COVID-19 Nursing Homes Expert Panel to call for the implementation of an integrated IT system for older persons (Recommendation 6.3).

The integrated IT system was intended to ensure the effective sharing of information across residential settings, home support services, and day care, and to incorporate needs assessment and care planning. It was also intended to support the management, delivery, and reporting of services, and to enable planning of alternate service provision and capacity development.

However, a large number of initiatives and projects have already been undertaken to provide ICT enablement for the delivery of older persons services, aligned to the Sláintecare vision. Given the complexity of the current situation, it was not clear that the introduction of another system would resolve these issues. Therefore, HIQA has taken a broader view and developed this set of Recommendations to the Minister for Health, which take account of both the current national situation and the future goals of the Sláintecare Implementation Plan, and which are informed by international best practice.

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Executive Summary

Introduction

Since March 2020, the COVID-19 outbreak has had an unprecedented and continuing impact on national health and social care, particularly on older persons services. Recognising the critical importance of having up-to-date information available to health and social care professionals, the specially-convened National COVID-19 Nursing Homes Expert Panel recommended the introduction of an integrated IT system for older persons services as an early priority.(1) In line with the terms of the Health Information and Quality Authority remit, the HIQA Health Information and Standards Directorate has undertaken the development of a set of Recommendations to the Minister for Health.

Currently, older persons services are delivered by health and social care professionals in many different settings, with information held in a number of IT systems or in paper records across those settings. The Sláintecare vision is that, throughout the older person's patient journey, the National Shared Record will provide a unified view of that patient's information. This will ensure that each health or social care professional has the information they need to treat the older person safely and effectively. ICT is a key enabler of integrated care services and a number of supporting initiatives have been undertaken as a result. Therefore, while the Expert Panel recommended the introduction of a single integrated IT system for older persons services, this Recommendations project will take a broader view aligned to the Sláintecare vision and taking account of these intiatives and the current national context.

The project will examine current delivery structures for older persons services across health and care settings with a view to understanding how information flows. It will also look at current levels of IT enablement and maturity in each are. Separately, the project will select comparable implementations in a number of countries, to understand ICT enablement of older persons services in those countries and to identify relevant learnings and best practices. Informed by this national and international evidence, the final Recommendations will outline ICT enablement and other measures that can improve the flow of information throughout the older person's patient journey, aligned with the broader, longer term Sláintecare vision.

This review describes the evidence from comparable implementations in eight countries, with three of those implementations described in more detail, and outlines best practices and lessons learned that may be relevant to the Irish situation.

Australia

Australia is seen as a world leader in eHealth, with the My Health Record is seen internationally as an exemplar electronic health record. However, even with this emphasis on eHealth over an extended period of time, the reports described above show that Australian aged care has not benefited significantly from these developments and that the aged care sector faces a number of challenges, such as obsolete systems, lack of interoperability across the sector including with My Health Record, multiple (and confusing) entry points, and difficulties in encouraging adoption by service providers and use by staff. The following measures were introduced to address some of these challenges:

- **Introduction of data interoperability standards:** Introduction of data interoperability standards across residential care, home care, and community care. This includes mapping the data used in systems across these settings and the definition of a standardised minimum data set conformant with the HL7 FHIR Release 4 standard, to allow integration with micro services and application programming interfaces (APIs), rather than sharing of documents. This would allow providers, vendors, Government agencies, and others to share information securely and appropriately, in realtime (or near realtime).
- **Linking to the National Shared Care Record using national health identifiers:** Creation of a roadmap for the inclusion of relevant aged care information, including the older person's care plan and services, in the National Shared Care Record using national health identifiers. This would provide a single record for every older person.
- **Incentivised adoption of cloud-based solutions:** Adoption of cloud-based solutions provides a range of benefits in the area of collaboration, scalability, business continuity, and cost effectiveness. Provision of incentives and seed funding to encourage aged care service providers to adopt cloud-based solutions and to provide appropriate training for their staff.
- **Improvement of Wi-Fi and broadband capabilities:** Establishment of broadband internet and Wi-Fi as a core service in residential care facility, to allow residents to connect with family and friends and with the community.
- **Replacement of obsolete systems with modern solutions:** Replacement of all obsolete systems with modern solutions, such as the introduction of a client record management (CRM) systems with clear master data management rules and standardised interoperability with aged care providers, health care providers, and other Australian Government agencies.
- **Improvement of the digital skills of the aged care workforce:** Provision of good quality training on use of aged care provider solutions and

any other aged care-related services, as part of their professional accreditation.

- **Establishment of a mechanism for independent oversight:** Establishment of a mechanism for the independent oversight of the measures outlined above and then transition to mandatory reporting:
  - Development and implementation of data interoperability standards
  - Development and implementation of a standardised dataset and scalable assessment instrument, based on FHIR and InterRAI
  - Incentivised adoption of cloud-based solutions
  - Support for aged care providers and vendors to change their systems to capture this data
- **Undertaking of co-design activities:** Undertaking by aged care providers, healthcare providers, research institutes and the Australian Government of partnerships and co-design activities.
- **Collaborative development of innovative solutions:** Collaboration of aged care providers, technology and software vendors, and the relevant bodies to find innovative solutions.

New Zealand

The overall national health strategy for New Zealand is similar to that adopted in Ireland, seeking to support older people to live well in their own homes and communities, and to receive the majority of their health care in the community, as far as possible.[2] eHealth and technology are also recognised as key enablers and, as in Ireland, the InterRAI has been adopted as the national standard for assessment of an older person's needs. However, the New Zealand programme is more mature and provides some interesting learning for the Irish context.

The medications management system, Medimap, which is integrated with GP and nursing home systems, provides a single record of the patient's medication that is shared between prescriber, pharmacy, and care organisation staff. However, sharing of information across healthcare settings is still a huge challenge. Different systems are used in healthcare, in residential care, and in hospitals, as well as by GPs. Primary care can access a patient's hospital record but home care cannot. Electronic discharge summaries are used though printed copies are often sent with the patient. InterRAI assessments used in home care are not shared with long term residential care. Very few GPs use the 'full richness' of the InterRAI assessment.

As the technologies used in healthcare have evolved, the national strategy has moved away from a messaging broker-based system. The vision being realised is an ecosystem of standards and APIs that enable data to flow as and when it is needed. A national health information platform is being created, with information to be held

in clinical systems and to be pulled in real-time from there. National health identifiers will be used, as will InterRAI and other generic assessments.

Additionally, InterRAI has been in use for 10 years as a national digital service in New Zealand and the detailed review of the AMS software highlights issues that had a very negative impact on the users' experience and on system performance. Navigation and data entry conventions did not match what the users expected. The design of the workflow also included a very high number of 'clicks', many of which required page reload and thereby adversely affected system performance. Issues were also noted with application stability and responsiveness, database performance, browsers, network coverage and capacity, and server capacity. Many providers operated a variety of older browsers and operating systems, which complicated hardware management. Finally, basic and generic training was delivered to a range of users, with little accommodation for self-paced or refresher training.

This demonstrates the benefits of software that is intuitive and easy to use for all user groups and that provides streamlined workflows for all the user group tasks and for patient pathways. It also shows the benefits of a hardware management strategy that provides a manageable set of browser versions and operating systems, as well as evaluation and optimisation of application stability and responsiveness, database performance, browsers, network coverage and capacity, and server capacity. Finally, the review findings show the role of effective training, tailored to the needs of the different user groups that is available in variety of formats, including self-paced learning.

Scotland

Over the last decade and longer, health policy in Scotland has placed strong emphasis on the integration of health and social care to meet the increasingly complex needs of an ageing population. eHealth policy aligns with and supports this overall objective, having committed to capture each citizen's health and social care information digitally and make that information securely available to patients and their carers as well as to staff.

Scotland has a long history of eHealth development and, as a result, many of the foundation elements of eHealth are in place. This includes national health identifiers, standardised cloud-based GP practice management systems, standardised patient administration systems, and national systems such as the PACS. However, considerable challenges remain in the area of interoperability. GP systems are not interoperable with other systems. In the community, levels of ICT enablement are typically lower, with 'pockets' of people working with paper records, sometimes out of personal preference. In fact, primary care, secondary care, and social care are

considered to be disconnected. An integrated health and social care record is therefore seen as the crucial enabler for this strategy and work has begun in this area.

During 2018 and 2019, development of a national digital platform was undertaken. A single medical record was being developed on an open platform, likely to be Azure or AWS and conformant with OpenEHR, FHIR, and SNOMED standards. cloud-based clustering of GP practices and community services is also being investigated and evaluated by the Integrated Joint Board on Health and Social Care. Other innovations are also being investigated, such as the use of community-based equipment to monitor an increase in falls or a decrease in activity and to trigger an alert to investigate this. The National Digital Service was investigating more up-to-date solution for the Key Information Summary, likely to be based on HL7 FHIR standard. Levels of ICT enablement in nursing homes also vary considerably and the 2020 Action Plan focuses on full digital enablement of care homes, including those for older persons.

Additionally, digital exclusion was highlighted as a significant challenge for older persons: adults over the age of 65 years were shown to make up the largest proportion of the adult internet non-users, and, in 2018, over half of all adult internet non-users were over the age of 75 years. Some of the principles outlined for digital enablement of care homes could also be applied to support digital inclusion of older persons:

- Digital foundations, which concerns data collection, data sharing and security, such as the provision of infrastructure and devices to support the secure digital collection and sharing of data.
- Digital services, which concerns access to digital services. Digital services should be designed collaboratively with individuals and their families and by healthcare professionals, individuals should be supported to choose and use these services. Digital services can support individuals social connections and activities and support staff wellbeing.
- Digital skills and leadership which concerns the improvement, as a high priority, of the skills and confidence of individuals and their families, and of healthcare professionals in using these services. Sector leaders should support the adoption of digital solutions and build individuals' confidence.

Other countries

This review also looked at the implementations in Canada, in Denmark, in Estonia, in Finland, and in Northern Ireland.

InterRAI Assessment have been in use in Canada since the early 2000s and the reporting systems are mature and well-regarded internationally.[3] To take advantage of the capabilities of the latest InterRAI Assessment versions, the IRRS uses the HL7 FHIR standard, which provides point-of-care, organisational, and system decisions in a near real-time reporting system. Thus, at this time, it is recommended that the HL7 FHIR standard be adopted, to take full advantage of the capabilities in InterRAI Assessments and provide high quality data. However, on its own, the availability of high quality data — as evidenced for the InterRAI Assessment for Home Care — is not enough. It has been shown that, in the home care domain in particular, organisations require the education, personnel, and support to use the resulting data to its full potential.

Internationally, the Danish healthcare system is considered an exemplar for its early adoption and widespread use of eHealth — now called Digital Health. Workflows between hospitals, GPs, and municipal health services are 'digitally supported'.[4] Key elements of this strategy were the establishment of the Danish Health Data Network, for the secure exchange of health data, and the digitisation of commonly used messages — including referrals, discharge letters, and laboratory test results.[4]

A Shared Medication Record was also introduced, showing a patient's up-to-date prescription medication overview across the health system.[4] The Danish National Health Record shows a patient's medical records from hospital admittance and can be viewed by patients and clinicians alike using the Danish eHealth Portal.[4] The current health strategy aims to make a patient's medical records from their municipality and from their GP available through the Portal, to provide a complete view of their care pathway.[4]

The Danish healthcare system faced some challenges with respect to interoperability between the IT systems used in healthcare.[4,5] An academic study outlined the strategies that Denmark adopted to address these interoperability challenges.[6] First, interoperability initiatives need to be planned and managed at regional level or by local authorities, with cross-regional communication (especially during the initial phases of planning) to set a common goal. Second, the distribution of responsibilities between the regions and the state needs to be clearly set out, with the state managing national-level initiatives and developing a framework of standards within which the regions work.

Third, countries need to investigate the actual information needs of healthcare practitioners, then identify core modules to be implemented across the regions.

Fourth, a centralised database, such as a National Health Record, is needed to centralise data from systems developed by the state and by the private sector. Public access through a national portal also increases transparency and patient engagement. Finally, consolidation of systems was found to minimise EHR fragmentation, with careful consideration needed of the opportunity cost of maintaining current systems against the advantages of new systems.

The current Danish National Health Strategy outlines an expectation that, as these systems become obsolete, they will be replaced with more complete digital solutions, more structured data and simplified workflows — and complemented by increased sharing between GPs, hospitals, and municipalities.[4] For example, a specific current challenge is that, in spite of the Common Patient Overview, the link between GPs and the social institutions was noted to be missing.[7]

It was also noted that overall, sharing information was found to be a better strategy than sending information. Initially, a suite of national standards were developed, for the sending and receiving of clinical data and information. However, with this approach, certain issues arose — for example, when a handover of information did not occur or when uncertainty arose over where the most up-to-date information was held at any given time. Thus, a strategy of information sharing, rather than information exchange, was identified as optimum.

Estonia is considered to be a world leader in eHealth, with a well-established national infrastructure and a range of government eServices. The Estonian Electronic Health Record and central repository of health data, the Estonian National Health Information Exchange, have been in operation since 2008. By law, documentation about all services provided by the EHIF must be uploaded to the Information Exchange and national health identifiers are used to uniquely identify patients and healthcare providers.

This provides a rich source of standardised clinical information and a means by which different healthcare settings can communicate — for example, with GPs accessing notes on healthcare provided to their patient in a nursing home. However, the volume of information for each patient can increase to the point of creating a burden for healthcare providers, such as a GP having to consult quite a number of documents while treating a patient.

As noted earlier, Estonian citizens also have a social care record, which uses a newer architecture. No specific systems or records have been developed for older persons. Instead, any relevant information is recorded as part of the standardised information collected for all citizens — such as the information that the GP holds for a citizen including end-of-life plans, preferences, and so on. InterRAI has been translated into Estonian but adoption rates are unclear.

In common with other countries, Estonia faces the challenge of the more complex health and social care needs of an ageing population. Technological advances notwithstanding, issues remain in the areas of interoperability and obsolescence. The lack of interoperability between the national medical record system and the national social care record system creates a significant barrier to effective sharing of information across health and social care settings, which is crucial to support care pathways for older persons.

At the time of writing, the Estonian National Health Information Exchange was 12 years old, the interval after which Estonian technology and systems must be upgraded. The upgrade is seen as an opportunity to upgrade to an event-based architecture conformant with HL7 FHIR standard, interoperable with the newer social care record system.

Every Finnish citizen has a national electronic health record and, aside from InterRAI information, no modules specifically related to older persons have been added. A national patient data repository, Kanta, stores clinical information from all Finnish healthcare providers, and patient data is retrieved using the nationa social security number. Only a small subset of data is stored as structured text, which can be re-used, with most stored free text.

Though part of social care services, nursing homes also upload information to Kanta, but other social care providers do not. Finnish citizens also have a national social care record, part of a system that is significantly newer than the national electronic health record system, which creates interoperability challenges.

More than half of Finnish nursing homes use the InterRAI assessment, and, in two years' time, the assessment will be mandatory for all municipalities that perform assessments. However, ICT enablement is also a challenge, with assessments largely recorded with pen and paper, then entered into a desktop computer at an office, before being uploaded to Kanta.

Finally, Finnish health centres (in particular, larger health centres) provide a very broad range of services and nurses often act as case managers for patients with complex needs, two characteristics of integrated care. However, integrated care is still considered to be at an early stage because few general care pathways have been defined and because of interoperability issues between health and social care systems.

In Northern Ireland, a range of systems are used for the delivery of older persons services in the context of the wider delivery of health and social care services. Additionally, the custom Northern Ireland Single Assessment Tool and a carer's assessment were developed specifically for use in olver persons services in Northern Ireland. The Key Information Summary in its current form is limited to updates by

the patient's GP. While multi-disciplinary teams have been established in primary care settings, it is not clear whether the care pathways that characterise integrated care have been developed. Thus, some silos still exist in primary care and in secondary care and the different systems in use in community care, social care, and mental health services do not share information.

However, the Encompass is expected to provide a single record designed to cover all the patient's information across health care, social care, mental health services and the Northern Ireland Electronic Care Record, as well as integrating with systems in hospices and with GP systems. It will include the Northern Ireland Single Assessment Tool and other assessments.

While this solution will solve a large number of issues, it is not without challenges. Processes differ across Trusts, making it difficult to standardize them and complicating efforts to tailor the solution to the needs of the users. Users also required encouragement to adopt and use the new solution. Agreeing best practices was found to be the most effective method of standardising process across different organisations. To encourage adoption of the new solution, training should be tailored to user needs and users should be supported until they feel comfortable using the new solution.

Conclusion

All of the countries reviewed are facing the same challenge in respect of an ageing population with increasingly complex care needs and requiring higher levels of care. All were seeking to move towards an integrated care model, based on the provision of care as close to the older person's home and community as possible. As a result, community health and social care services are called on to provide higher levels of care, of a more complex nature, including the management of higher numbers of chronic diseases. Nursing homes report having to provide far more complex care to residents, who were entering at older ages, in settings that were not designed for this purpose. And older persons tend to have higher levels of hospitalisation for longer periods. These factors lead to a far higher number of transitions of care than for other populations. Thus, the secure and effective sharing of the older person's health information during these transitions, and across health and social care settings, is becoming increasingly important.

However, every country reviewed faced some difficulties in the sharing of information across settings, regardless of the levels of ICT enablement already in place. GP practices tended to have very high levels of ICT enablement, often using one of a small number of nationally certified systems, but community settings often had lower levels of ICT enablement, (if any). Levels of ICT enablement in nursing

homes varied widely, from none to a high level (often in privately-run homes) but even those nursing homes with significant ICT enablement lacked the capability to share information with GP practices or acute hospitals. Discharge from an acute setting was regarded as one of the most important transitions. But, even with electronic discharge summaries had been implemented, paper copies were often sent with the patient.

Each country started from a slightly different place and therefore took a slightly different approach. In Australia, where the national electronic health record was already in use, a dedicated central client record was established as part of the My Aged Care programme, together with web-based portals, referral management system, and call centre. However, the national record and the My Aged Care Record were not interoperable — and neither were the systems used by other government agencies, by health professionals, by service providers, and by assessors. The problematic nature of the assumption that older persons have access to a computer and the internet, as well as literacy and proficiency in their use, was also highlighted.

An ICT architecture review characterised the Australian Aged Care system as a 'fragmented' ecosystem, owing to the legacy technologies in use, the siloed operation of the systems, and their focus on reporting requirements rather than on client needs. The review highlighted the difficulties of maintaining or making process changes to systems 'well-beyond their sell-by date'. Thus those delivering care did not have what they needed to make informed decisions, while providers often did not have the time or money to adopt new technological solutions or train staff in their use. It concluded that an overarching ICT strategy was needed to help define how the aged care providers, health care providers, IT solution providers and Australian Government work together to achieve system interoperability, data sharing agreements, standardised IT capability, and standardised workforce training.

In many countries, no dedicated record system or modules had been developed specifically for older persons. Instead, existing national eHealth services — such as electronic health records — were used. For example, in Denmark, levels of ICT enablement are high, with all GPs, nursing homes, and public health nurses using electronic record systems. Standards were defined for all commonly used clinical documents to supports the electronic exchange of these documents by hospitals, GPs and other healthcare providers using a national message broker and the national health data network. This approach supported to the digitisation of many of those workflows but had some drawbacks — such as difficulties in identifying the most up-to-date information within the system. Thus, Danish strategy had moved away from sending information using a national messaging broker — as had the New Zealand strategy, discussed later.

Sharing information was found to be more effective than sending information. Thus, Danish healthcare professionals can access a patient's prescribed medication record (Shared Medication Record) and inpatient record (Danish National Health Record). The Common Patient Overview dataset was developed for use by the health and social care professionals across the patient's care pathway. The municipalities are also working to provide access to a patient's medical records — from municipality and from GP — through the Danish Health Portal, to complete the care pathway. A number of older systems are part of this pathway.

The potentially high number of transitions across care settings in integrated care in general, and in an older person's care pathway in particular, has created challenges even in countries that have made great progress in ICT enablement. In Scotland a number of key elements are already in place: national health identifiers, standardised cloud-based GP practice management systems, standardised patient administration systems, and national systems such as the PACS. However, GP systems are not interoperable with other systems, levels of ICT enablement are lower in the community, and primary care, secondary care, and social care are considered to be disconnected. Work has begun on an integrated health and social care record and on a national digital platform. Similarly, in New Zealand, where a high degree of ICT enablement has been achieved, different systems are used in healthcare, in residential care, and in hospitals, as well as by GPs. Primary care can access a patient's hospital but home care cannot.

Interoperability between these shared records (and across the pathway) is a crucial requirement — for example, in Estonia and in Finland, the well-established national health record system is not interoperable with the much newer national social care record. In both countries, the respective national health or patient data repository is considered to be another means of communications across settings. However, the Estonian national patient data repository uses the older, document-based HL7 CDA standard, and the volume of documents held for any given patient was considered to create issues for healthcare professionals accessing them. Similarly, the Finnish national patient data repository is considered to be a means of communication between settings, but owing to the large volume of unstructured data, has limitations in practice. Both repositories are likely to be upgraded to use an event-based, rather than document-based, conformant to HL7 FHIR.

In Northern Ireland, silos exist in each of the settings that form part of an older person's potential care pathway. Nursing homes can have difficulties accessing the Northern Ireland Electronic Care Record, which is typically behind the firewall of the GP practice or acute hospital. Additionally, the current architecture of the Key Information Summary service has limitations and a more up-to-date architecture is being investigated. It is intended that the introduction of the Encompass electronic health record will resolve these issues and integrate with GP practice management

systems. The introduction of Encompass also faced certain challenges. Processes differ significantly across Trust, but agreeing best practices was found to be the most effective method of standardising process. Also, to encourage adoption, it was found that training should be tailored to user needs and that users should be supported until they feel comfortable using the new solution.

In Finland, many healthcare services previously provided in hospitals are now provided through healthcare centres, where multidisciplinary teams provide a wide range of services. Minor surgery, diagnostics, and lab testing are often available, together with inpatient departments and wards. These centres often provide social care as well as a combination of home nursing and home help services. Care plans are also developed. Thus, these healthcare centres provide the range of services that integrated care seeks to provide in the community. In spite of this, continuity of care is sometimes lacking, indicating the need for clear patient pathways.

In Finland, more than half of all nursing homes use the InterRAI Assessment and, in two years, it will be mandatory for all municipalities that perform assessments to use the InterRAI Assessment. However, InterRAI assessments are largely carried out using pen and paper, then data is entered using a computer in an office. While InterRAI data is uploaded to the Finnish National Data Repository, Kanta, an IT system that makes full use of InterRAI data is still needed, to provide decision support and to inform the development of a patient's care plan. While many countries use such a system, the Canadian Institute of Health Information (CIHI) provides perhaps the best example of how to use InterRAI data.

InterRAI Assessments have been in use in Canada for many years, during which time reporting systems have been developed and have matured. The most recently introduced system, the Integrated InterRAI Reporting System (IRRS), consolidated data from InterRAI Assessments for home care and for long-term care facilities, providing a more holistic view of an older person's patient journey. The IRRS is also the first large-scale implementation of FHIR in Canada, with the FHIR standard adopted to allow the use of the newest versions of InterRAI Assessments and supporting point-of-care, organisational, and system decisions in a near real-time reporting system. However, a 2020 study indicated that, overall, organisations often lacked the education, personnel and supports needed to use the data from InterRAI Assessments to its full potential.

In New Zealand, the InterRAI service is very well-established national digital service, implemented as the Assessment Management Service. It provides the capability to complete the InterRAI Assessments for Contact, for Long Term Care, and for Home and Community. A detailed review of AMS found that how the design and workflow of the digital service had a largely adverse impact on the successful adoption — the AMS design included out-of-date navigation and data entry conventions, which the

users were not expecting, and the workflow design necessitated numerous page reloads, which caused further delay. Issues were also found with integration of assessments, leading to the identification of the need for a new generic, standards-based assessment.

So, given these issues and limitations, what is the best approach to take, to realise the ICT enablement of older persons services in Ireland? First, the following crucial elements of service redesign must be in place, as a prerequisite for successful ICT enablement of older persons services:

- streamlined, standardised processes for planning, funding, resourcing, and enhancing these services
- well-defined pathways, based on shared care plans and care pathways, that are accessible to multi-disciplinary teams
- enhanced system capacity, in terms of community rehabilitation services, medication management, multi-disciplinary team approach, and others
- seamless care through the coordination of care and referral services.

Where these elements are in place, the measures and considerations would support the wider ICT enablement of older persons services. To optimise interoperability across health and social care, it is advisable to adopt the following strategic approach:

- Plan and manage **interoperability initiatives** at regional level or by local authorities, with cross-regional communication (especially during the initial phases of planning) to set a common goal.
- Clearly define the **distribution of responsibilities** between the regions and the state, with the state managing national-level initiatives and developing a framework of standards within which the regions work.
- Investigate the **actual information needs of healthcare practitioners**, then identify core modules to be implemented across the regions.
- Centralise data from systems developed by the state and by the private sector in a **centralised database**, such as a National Health Record. Public access through a national portal also increases transparency and patient engagement.
- **Consolidate existing systems** by carefully considering the opportunity cost of maintaining current systems against the advantages of new systems. This was found to minimise EHR fragmentation.

The following measures can help to avoid the development of a 'fragmented ecosystem' and to optimise interoperability across health and social care:

- **Introduction of data interoperability standards:** Introduction of data interoperability standards across residential care, home care, and community

care. This includes mapping the data used in systems across these settings and the definition of a standardised minimum data set conformant with the HL7 FHIR standard, to allow integration with APIs and the sharing of information, securely and appropriately, in realtime (or near realtime).

- **Incentivised adoption of cloud-based solutions:** Adoption of cloud-based solutions provides a range of benefits in the area of collaboration, scalability, business continuity, and cost effectiveness. Provide incentives and seed funding to encourage aged care service providers to adopt cloud-based solutions and to provide appropriate training for their staff.
- **Replacement of obsolete systems with modern solutions:** Replacement all obsolete systems with modern solutions, such as the introduction of a client record management (CRM) systems with clear master data management rules and standardised interoperability with health and social care providers, and other State agencies.
- **Improvement of the digital skills of the workforce:** Provision of good quality training on use of aged care provider solutions and any other aged care-related services, as part of their professional accreditation.
- **Establishment of a mechanism for independent oversight:** Establishment of a mechanism for the independent oversight of the measures outlined above and then transition to mandatory reporting:
    - Development and implementation of data interoperability standards
    - Development and implementation of a standardised dataset and scalable assessment instrument, based on FHIR and InterRAI
    - Incentivised adoption of cloud-based solutions
    - Support for health and social care providers and vendors to change their systems to capture this data
- **Undertaking of co-design activities:** Undertaking by healthcare and social providers involved in older persons services, research institutes and the State of partnerships and co-design activities. The outcome of activities should be services with designs and workflows that enhance user experience and encourage adoption.
- **Collaborative development of innovative solutions:** Collaboration of health and social care providers, technology and software vendors, and the relevant bodies to find innovative solutions.

In respect of the National Shared Care Record and other national infrastructure, the following considerations are highlighted:

- **Inclusion of health and social care information in the National Shared Care Record:** Inclusion of relevant older persons care information, including the older person's care plan and services, and other social care

information in the National Shared Care Record — building towards the provision of a single record of health and social care for every older person.

- **Linking to the National Shared Care Record using national health identifiers:** Use of national health identifiers to link an older persons care information in the National Shared Care Record.
- **Trialling of the National Shared Care Record with Older Persons as the first population:** Given the high number of potential transitions across settings, and the necessity of safe and secure data sharing, older persons should be among the first populations considered to trial a new National Shared Care Record.
- **Development of a national information health platform:** There is a need for a national health information platform, based on a distributed architecture and a suite of application programming interfaces (APIs), using HL7 FHIR standard, to share information in realtime from clinical systems where the data is held.
- **Development of a hardware management strategy:** A hardware management strategy should be developed, to ensure a manageable set of browser versions and operating systems are in use, as well as evaluation and optimisation of application stability and responsiveness, database performance, browsers, network coverage and capacity, and server capacity on infrastructure elements aging out and to create a more uniform hardware base.

Additionally, reporting metrics for InterRAI Assessments for Home Care were still evolving in Canada. Therefore, consideration could be given to potential development of such metrics and the most effective means by which healthcare professionals and others can derive value from the rich dataset that InterRAI Assessments yield.

In respect of long term residential care, the following measures should be considered:

- **Establishment of digital foundations**: This includes the provision of infrastructure and devices to support the secure digital collection and sharing of data. This includes the improvement of Wi-Fi and broadband capabilities as a core service, to allow residents to connect with family and friends and with the community.
- **Establishment of digital services**: These services should be designed collaboratively with individuals and their families and with healthcare professionals, to facilitate residents' social connections and activities, and support staff wellbeing. Individuals should be supported to choose and use these services.

- **Improvement of digital skills**: The improvement of the skills and confidence of individuals and their families, and of healthcare professionals in using these services, should be a high priority.

Additionally, this review has shown the significant benefits of software that is intuitive and easy to use for all user groups and that provides streamlined workflows for all the user group tasks and for patient pathways. It also shows the benefits of a hardware management strategy that provides a manageable set of browser versions and operating systems, as well as evaluation and optimisation of application stability and responsiveness, database performance, browsers, network coverage and capacity, and server capacity. It shows the role of effective training, tailored to the needs of the different user groups that is available in variety of formats, including self-paced learning. And finally, it shows a hugely underestimated impact on the adoption and use of digital exclusion of older persons.

As was noted in New Zealand, a clear vision of the future ideal state is also needed, showing how the different elements of the patient's pathway will share information — such as interoperability between the Home Care Management System and the Residential Management system; how the different healthcare professionals will interact with those different systems and the cumulative effect; how the patient's information is shared safely throughout the patient journey; and finally, the roadmap for development, maintenance, and future upgrades.

Chapter 1 Introduction

This document outlines the findings of a review of selected jurisdictions regarding the delivery of older persons services, as well as their ICT enablement. It is intended to inform the development of Recommendations on an Integrated IT System for Older Persons Services.

1.1 Background

Since March 2020, the COVID-19 outbreak has had an unprecedented and continuing impact on national health and social care, particularly on older persons services. Recognizing the critical importance of having up-to-date information available to health and social care professionals, the specially-convened National COVID-19 Nursing Homes Expert Panel recommended the introduction of an integrated IT system for older persons services as an early priority:

> Recommendation 6.3: Develop and introduce an integrated IT system for older persons services including residential, home support, day care, needs assessment and care planning, so as to support the provision, management, delivery and reporting of services, and especially for planning alternative service provision and planned capacity development in the event of evolving public health measures.*(1)

Therefore, the HIQA Health Information and Standards Directorate has undertaken the development of Recommendations to the Minister for Health on ICT enablement of older persons services, in line with the terms of the HIQA remit.

Under the Health Act 2007, Health Information and Quality Authority's responsibilities include providing advice and making recommendations to the Minister for Health in respect of health information:†

- Section 8(1)(i): to evaluate available information respecting the service and the health and welfare of the population
- Section 8(1)(j): to provide advice and make recommendations to the Minister for Health and the HSE about deficiencies identified by HIQA in respect of the information referred to in paragraph (i).

* COVID-19 Nursing Homes Expert Panel Examination of Measures to 2021 Report to the Minister for Health: Available from: https://www.gov.ie/en/publication/3af5a-covid-19-nursing-homes-expert-panel-final-report/

† Department of Health and Children. *Health Act 2007*. 2007. Available from: http://www.oireachtas.ie/documents/bills28/acts/2007/a2307.pdf.

Since 2012, national health strategy has focused integrated care services: that is, moving from a hospital-based model to a patient-centric, community-based model, where care is delivered at the lowest level of complexity. Integrated care services are seen as a effective way to address the increasingly complex care needs of Ireland's ageing population. Currently, older persons services are delivered by health and social care professionals in many different settings, with information held in a number of IT systems or in paper records across those settings.

The Sláintecare vision is that, throughout the older person's patient journey, the National Shared Record will provide a unified view of that patient's information. This will ensure that each health or social care professional has the information they need to treat the older person safely and effectively. ICT is a key enabler of integrated care services and a number of supporting initiatives have been undertaken as a result. Therefore, while the Expert Panel recommended the introduction of a single integrated IT system for older persons services, this Recommendation project will take a broader view aligned to the Sláintecare vision.

This Recommendations project examines current delivery structures for for older persons services across health and care settings with a view to understanding current levels of IT enablement and maturity in each. It is also looks at comparable implementations in a number of countries, identifying relevant learnings and best practices. This national and international evidence will inform the final Recommendations to support the development and introduction of the integrated IT systems for older persons. These Recommendations may also identify any national standards that need to be developed, to support the integrated IT system.

This review describes the evidence from comparable implementations in eight countries, with three of those implementations described in more detail, and outlines best practices and lessons learned that may be relevant to the Irish situation.

1.2 Methodology

HIQA's Recommendations to the Minister for Health are developed in compliance with the HIQA Quality Assurance Framework.

Project planning

Project planning documents have been drafted and were subsequently approved by the Director of Health Information and Standards. They outline the business justification, scope, and other aspects of the project.

Review of evidence

The evidence base comprises national evidence, compiled in an As Is Analysis, and international evidence, compiled in this Best Practice Review. Evidence was compiled through a systematic review of materials and research produced by authoritative organisations, video conference interviews with subject matter experts (national and international) and review of published academic articles. The As Is Analysis and the Best Practice Review (this document) are published on the HIQA website.

Convening of Advisory Group

The role of the Advisory Group participating in the development of these Recommendations is:

- to agree Terms of Reference
- to advise on the identification of key stakeholders — for example, user communities, professional bodies and domain experts who should be consulted
- to advise on the draft Recommendations for consultation and on the revised Recommendations after the public consultation, focus groups, and interviews
- to advise on any further steps, including implementation of the Recommendations.

Older Persons Services are delivered by a broad range of health and social care professionals, while their ICT enablement also encompasses ICT infrastructure and solutions for acute, community, and primary care settings. Thus, membership of the Advisory Group includes representatives of key stakeholders such as clinical experts, policy makers, and methodological experts across the very broad domain of health and social care services for older persons, as well as from ICT enablement and operations of the same. A full list of the organisations that have been invited to nominate members to the Advisory Group is documented at end of the document.

The Advisory Group is chaired by the Director of Health Information and Standards, Rachel Flynn.

Engagement in the development of Recommendations

Engagement with stakeholders is a crucial element of the development of these Recommendations. The purpose of this engagement is to obtain opinions on the key issues that the recommendations should address, gather examples of good practice and identify what is needed to support the implementation of the recommendations. The outputs from this engagement will be summarised and used to inform the development of the draft recommendations.

Public consultation and focus groups

A public consultation will be undertaken. The public consultation will be held over a minimum period of six weeks, during which time interested parties will have an opportunity to make submissions on the draft recommendations. Board members will also be asked to participate in this process.

Given the range of stakeholders, it was not possible to invite all stakeholder organisations to nominate representatives to the Advisory Group. However, a number of these organisations will be invited to nominate participants for focus groups that will be undertaken as part of the wider engagement process.

Other organisations will be invited to make submissions to the public consultation.

Submissions received during the public consultation and feedback from focus groups will be analysed, then the Draft Recommendations will be amended appropriately.

Drafting of Statement of Outcomes

An overview of feedback gathered during one-to-one stakeholder engagement and focus groups, and a summary of submissions made during the public consultation will be presented in a Statement of Outcomes report, which will be published on the HIQA website together with the final set of recommendations.

Approval of Recommendations

Following approval by the Director of Health Information and Standards, the Draft Recommendations will be presented to the HIQA Executive Management Team for approval. The Recommendations, together with a Statement of Assurance will then be submitted to the HIQA Board for approval. The Statement of Outcomes, setting out how stakeholder engagement has informed the development of the recommendations will also be submitted to the HIQA Executive Management Team

and the Board for their information. Subject to Board approval the recommendations will be submitted to the Minister for Health for approval.

Next steps

Project planning documents have been drafted and were subsequently approved by the Director of Health Information and Standards. The national evidence has been gathered and analysed in this As Is Analysis, while the international evidence is presented in this Best Practice Review. Themes have been identified. The Advisory Group has been convened and first meeting of the Advisory Group took place on 17th September 2021. The next steps are to present the Draft Recommendations to the first meeting of the Advisory Group.

Chapter 2 Australia

Government in Australia is divided into three levels – a federal government, eight state or territory governments and 560 local government councils.[8] The Department of Health plays a dominant role in policy making, while the six state governments and the two mainland territory governments are responsible for healthcare in their regions — for example, for operating public hospitals.[8] Since 1992, the Coalition of Australian Governments (COAG) manages matters that need national coordination such as healthcare.[9] The Australian Health Ministers' Advisory Council (AHMAC) advises the COAG on health services, policy and programs. In 2017, Australia's population was estimated to be over 24.6 million people.[10,11]

The Australian healthcare system provides universal access to services through the Medicare programme, which is funded largely through general taxation.[12] Medicare covers public hospitals, medical services and pharmaceuticals.[12] Private patients benefit from subsidized insurance and Medicare subsidies for medical services, according to the Medical Benefits Schedule (MBS).[12] GPs play a gate keeping role, that is, specialist treatment is covered by public health insurance only with a referral from a GP.[12] In 2017, Older Australians were estimated to account for 14% of the Australian population but for 28% of visitors to general practitioners.[13] Aged care was also considered a high priority for Primary Health Networks (PHNs) who help ensure that those receiving aged care services can access the right care in the places at the right time.[13]

2.1 Development of Aged Care (Older Persons Services)

The Aged Care Act 1997 and associated principles provide the legislative framework for home and residential care. However, consumers reported a complicated and confusing set of entry points into the age care system and multiple sources of information about ageing.[13] Between 2009 and 2011, three national reviews of the sector were undertaken.

The National Health and Hospitals Reform Commission Final Report (2009) recommended that aged care (as older persons services are designated in Australia) be consolidated under the Australian Federal Government.[13]. In 2010, the Intergenerational Report outlined the growing proportion of the Australian population aged over 65 years with a predicted increase in demand for aged care services.[13] In 2011, the Australian Productivity Commission published the Caring for Older Australians Report, which outlined the delays and discontinuity in care which older Australians experienced, and the lack of a comprehensive information portal for aged care services, among other shortcomings.[13]

As a result, the Australian Federal Government introduced the Living Longer Living Better reforms (2012), a suite of major changes to Australia's aged care system, which was implemented under the Aged Care (Living Longer Living Better) Act 2013.[14] These reforms were intended to provide better support for older people at home, better access to residential care, more support for those with dementia, and strengthening of the aged care workforce.[13]

One of the main recommendations of the Caring to Older Australians Report was the introduction of a single gateway through which older Australians could get information about and gain access to aged care services.[13] As a result, the My Aged Care system was established in 2013 initally consisting of a website, together with a contact centre that provided information only about aged care processes and services.[13]

In 2015, the service was expanded considerably as My Aged Care Stage 2, which introduced a central client record to facilitate the collection and sharing of information.[13] Web-based portals and online referral management were also provided for clients, assessors, and service providers.[13] Service providers also gained the ability to self-manage information about their services.[13]

The role of the contact centre was expanded to include registration and screening of consumers and referrals for face-to-face assessments with:

- the Regional Assessment Services (RAS) typically covering entry-level support at home
- the Aged Care Assessment Teams (ACATs) typically assessing entry to home care packages and residentical care.[13]

The contact centre, the RAS, and the ACATs also began to use the National Standardised Assessment Form (NSAF) to ensure consistency. Developed by the Australian Department of Health, the Assessment is based on existing best-practice assessment processes used in Australia, and involved significant consultation with stakeholders. The NSAF is used to perform a holistic needs assessment, with two pathways into the system.[13] Assessors also got the capability to match-and-refer eligible clients to service providers in their local area.[13]

In 2015, the ACATs received referrals from My Aged Care but undertook assessments using other legacy systems. Significant implementation and operational challenges were reported, following the transition of the assessment and referral processes to My Aged Care in 2015.[14] These are explored later. During 2016, the ACATs had transitioned to using the My Aged Care systems and the screening process used in the contact centre was streamlined, to reduce the number of incorrect referrals and completion time.[14] By the end of 2016, the My Aged Care system was managing all assessments and referrals for aged care services.[13]

Between 2017 and 2021, the Royal Commission into Aged Care Quality and Safety commissioned several further reviews on the appropriate use of technology to improve care outcomes for older Australians.[13] Three of these reviews are of particular relevance to the Irish situation:

- Legislated Review of Aged Care (2017)
- Royal Commission into Aged Care Quality and Safety - ICT Strategy and Architecture Report (2020)
- Royal Commission into Aged Care Quality and Safety - Final Report (Volume 1)

2.2 Legislated Review of Aged Care

As part of the Legislated Review of Aged Care (2017), research was conducted among consumers, carers, assessors, services providers, and health professionals.[13] While about half of consumers, GPs, assessors, and others were satisfied with accessing and using the system, satisfaction was particularly low among hospital-based professionals.[13] However, those who had accessed care through My Aged Care were more satisfied than those who had used other channels.[13]

Overall, concerns were raised that the My Aged Care website and call centre were still unknown to the broader population and, where they were known, there was a perception that it was just a website, with people not being aware of the contact centre.[13] Questions were also raised about whether the centralised intake system through the website was suitable to meet the needs of all those accessing care.[13]

Key issues were the lack of interoperability between My Aged Care and systems used by other government agencies, by health professionals, by service providers, and by assessors.[13] Resolving this issue was expected to improve the efficiency of referrals and provide a more holistic view of the client, among other benefits.[13] The referrals process was also found to need improvement, as it provided information that was 'not readily understandable' and because of the lack of visibility into the process, once the referral had been submitted by web form or by fax.[13] Additionally, referrals could not be tracked or found, or the information in them was sometimes incorrect.[13]

There was also a need to provide the ability for those with diverse needs to be represented by third parties.[13] Finally, access to the website also presumed that the older person had physical access to a computer and the internet, as well as the computer literacy and proficiency to use it, and that the content was sufficiently accessible.[13] All these issues were exacerbated for those who have specific challenges — for example, including being homeless or having vision impairment — and those in remote or rural areas.[13]

At the time of the Legislated Review, future use of ICT capabilities were already under discussion with stakeholders. The capabilities under discussion were:

- business to government capabilities
- electronic referrals for other healthcare practitioners (in addition to GPs)
- modernization of the central repository of aged care service provider organisation information
- provision of a single entry portal (with one-time authentication) to all Government portals related to aged care service delivery.

2.3 Royal Commission into Aged Care Quality and Safety - ICT Strategy and Architecture Report

The Royal Commission into Aged Care Quality and Safety also commissioned an ICT architecture review of the aged care system, which included both an assessment of the current state and the development of a vision of the target state, in collaboration broad range of stakeholders.[15] The overall aged care system was characterised as a 'fragmented ecosystem' with legacy technologies and little or no integration, giving a poor user experience.[15] The systems were found to operate in siloes and to be focused on reporting requirements, rather than taking a client-centric view.[15] Important information was not collected and other information was collected repeatedly because different systems are not integrated.[15] The review outlined opportunities grouped into three pillars: people, processes, and technology.[15]

People

The review noted that most of those delivering care were dedicated and compassionate individuals who did not have access to the systems and processes they need to make informed decions. Aged care providers often did not have the time, the money or any incentives to adopt new technology solutions (which can be expensive) or to train their staff in their use. Nor was there an overarching ICT strategy to help define how the aged care providers, health care providers, IT solution providers and Australian Government work together to achieve system interoperability, data sharing agreements, standardised IT capability, and standardised workforce training.

Recommendations included:

- improving the digital literacy and capabilities of aged care workers to use technology in their provision of care
- encouraging greater adoption of technology by service providers

- supporting co-design activities between aged care providers, health care providers and Australian Government to better design the aged care system from a data and digital context perspective
- supporting clearly defined standard practices on interoperability, training, and workforce support arrangements.

Processes

The aged care system comprised a large (and confusing) number of portals, with the client or carer visiting numerours sites and portals. Additionally, business processes are ad-hoc and disconnected because the ICT systems of Government, aged care, and service provider do not share information. As a result, changes of circumstance are not communicated between the various bodies managing care and there is no single aged care dataset.

Technology

The review stated starkly that older clients day-to-day well-being was directly dependent on ICT capability, making ICT even more important in aged care, and that multiple deficiencies had been identified and confirmed. These related to the use of obsolete technology systems, with many considered 'well beyond their 'sell-by' date', which made changes to fundamental assessment or data rules 'highly problematic' and with an increasing scarcity of qualified technicians to maintain them. Additionally, a minimum data set was required for use across the aged care sector, to ensure the provision of consistent health and aged care for older persons. The Australian national electronic health record, My Health Record, should capture this data sest but is not being used for this purpose. Finally, the obsolescence of many systems further complicates maintenance and steps towards interoperability.

As noted earlier, the lack of interoperability between aged care providers and Government systems created issues with the appropriate sharing of information, such as where information is not shared between Government agencies using My Health Record (Government to Government), where healthcare professionals and providers are unable to access care plans or other client aged care data on My Health Record (Government to Business), where hospitals and aged care providers do not share data automatically when an aged care service recipient is admitted to, or leaves, hospital (Busines to Business).

At the time of publication, the review noted the existence of seven portals for aged care, with no data sharing and repeated gathering of information, and the difficulties reported in access-ing the My Aged Care Wesite. It noted also that the systems were typically built originally for internal financial reporting

purposes, so that some important information is not collected or is inaccessible. Limited interoperability was also noted to compromise predictive analytics and trends analysis. Issues were noted around data linking, causing a lack of consistency in, and delays in receipt of, aged care data. Privacy and legal concerns existed around the collection, linking, and sharing of data across the sector. Finally, other limitations included lack of broadband and Wi-Fi in nursing homes, low adoption of assistive technology, and limited teleconferencing, among others.

Other

Other areas included:

- Designed to the users' needs – systems should be built with the client's needs as the core driver.
- Informative and accurate – data and information should be accessible, complete, accurate and up to date.
- Interconnected ecosystem – systems, process should interface, and exchange required information to enable effective service delivery in accordance with privacy, legal and data sharing acts and protocols.
- Seamless experience – the user experience should exceed or at the very least meet user expectations.
- Standardised systems and tools – the ecosystem and tools set should be consolidated and standardised where possible.
- Able to adopt existing sector solutions – the sector should look to adopt existing solutions and sector offerings to reduce complexity.
- Able to adopt assistive technologies – the sector should look to adopt assistive technologies like wearable devices, sensors, Internet of Things (IoT) to monitor the environment for safety, manage a person's health conditions, manage functional needs and support enjoyment of life.

The following capabilities were identified as necessary for a future ICT environment:

- consolidated aged care data record using My Health Record
- improved interoperability between the Australian Government, aged care providers and health care providers
- fit-for-purpose portals for older people
- adoption of tele aged care, smart homes, and sensors for residential and in-home care
- improved research and data analytics.

2.3.1 Opportunities

Following this description of the challenges faced, the Report outlined a number of opportunities available for the aged care system. As these opportunities may be directly relevant for the Irish situation, they are reproduced in full here:

Opportunity 1 – Data Interoperability Standards

Data Interoperability Standards ensure that the technology systems and software applications being used different parties — that is, providers, vendors, government agencies, and others — can exchange data and 'speak an agreed language'. Use of HL7 FHIR Release 4 would enable the use of modern platforms and integration with micro services and APIs, rather than sharing documents. The Aged Care Data Compare Project was set up to:

- to map data across the various systems currently in use in the aged sector
- to develop a standardised minimum data set, conformant with HL7 FHIR standards, and dictionary
- to evaluate a FHIR API to support data use among residential care service providers.

The resulting interoperable minimum data set HL7 FHIR Data Hub will allow for data sharing between health, aged care and Government systems.

It was noted that expanding the focus of the Aged Care Data Compare Project from residential care only, to include home care and community care applications, would enable adoption of FHIR interoperability standards across aged care.

Opportunity 2 – Using current and future data sharing frameworks

The My Health Record Act 2021 made a health provider and consumer identification system, using Health Provider Identifiers (HPIs) and Individual Health Identifiers (IHIs), available. Greater adoption of My Health Record in Aged Care and the use of IHIs to identify both aged care and health care services would improve data sharing. Linking an aged care recipient's care plan and services to the My Health Record through IHI and HPI would provide a single record for the older person.

Opportunity 3 – Using an existing standardised scalable assessment instrument

The Report noted that the Aged Data Compare Project was using the InterRAI Long Term Care Facility Assessment and that if InterRAI assessments for

home care and community care were also used, this would provide a standardised, interoperable, and scalable assessment instrument, underpinned by InterRAI and FHIR, for use across the aged care sector.

Opportunity 4 – Partnerships with relevant agencies and projects

The Report noted that Australia was scheduled to transition to a fully electronic system by 2022, but that this strategy did not include enhancement of My Health Record to handle aged care data. The Report also recommended the following steps to ensure a robust, scalable, standardised, and connected aged care system:

- Aged care providers, technology and software vendors, and the relevant bodies to work together with the to find the innovative solutions required to digitally transform the aged care sector.
- Aged care providers to provide fit-for-purpose training to their staff in respect of new business and care management applications.
- Wider partnerships or co-design activities to be undertake with aged care providers, health care providers, research institutes and Australian Government.

Opportunity 5 – Tele-aged care through smart homes and sensors

At the time the Report was published, the Smarter Safer Homes Platform had been trialled in over 150 homes in Australia, providing non-invasive sensor systems that measured and provided service needs as well as monitoring unusual activity and providing alerts. The Report noted that this type of monitoring would become increasingly important over the succeeding 10 years.

Opportunity 6 – Close the digital gap through subsidised cloud solutions

The Report noted that many aged care providers were still using manual processes for clinical and administrative processes because of barriers such as the cost of new technology or of training to develop workers' digital literacy. It recommended the provision of incentives and seed funding to encourage the digital transformation of the sector, together with the adoption of cloud based solutions. Cloud based solutions provide the ability for staff to collaborate and to use mobile devices, and reduce IT costs while providing the ability to scale up or down according to operational needs. These solutions also provide for better business continuity and give cost-effective access to the latest technologies.

Opportunity 7 – Realtime payments and reporting of services

The Report noted the approach that had been taken by the Australian National Disability Insurance Agency (NDIA), which provides services comparable to those provided by in aged care, and suggested that this approach could resolve issues of aged care providers being out of pocket for considerable amounts of time.

Opportunity 8 – Establish an Aged Care Data Authority

The Report recommended the establishment of an Aged Care Data Authority (Data Authority) to play a central role in transforming the management of data to dynamic acquisition for regulatory, policy and research purposes. The Data Authority should begin by developing and implementing aged care data standards, in consultation with all stakeholders, that provide the basis for sharing vital information at the point of care, gathering quality indicators and other reporting metrics, as well as development of a minimum aged care dataset. This capability is to be achieved through the implementation of Data Interoperability Standards (Opportunity 1), use of standardised dataset and scalable assessment instrument based on FHIR and InterRAI (Opportunity 3), and the introduction of cloud-based solutions (Opportunity 6).

Service providers and software vendors are to be supported to change their systems to capture this data, as part of the accreditation process, moving thereafter to realtime data reporting to the Authority. The aim is to make electronic submission of reporting data compulsory, after a transition period, as well as being seamless from provider systems, with a view to removing the burden of manual reporting.

The Report recommended that the Data Authority be allocated the appropriate funding to carry out these tasks:

- Adopt the interoperability and minimum data sets for aged care information as developed by the Aged Care Data Compare Project to enable real time or near real time data sharing between aged care and health care providers.
- Build out an Australian Government FHIR/API gateway and data hub to enable business to government (B2G) data sharing, in real time or near real time, between aged care providers and government bodies.
- Develop an outcomes framework for the national aged care dataset.
- Release and report data about aged care.
- Establish governance arrangements and data standards for the aged care dataset.
- Set interoperability standards for the aged care sector.

- Use the data linking capability to integrate data from aged care providers, health care providers and Australian Government to curate a national aged care data set to share and deliver analysis products to support policy appraisal, risk based regulatory monitoring and research of the aged care system; including interactions with the health system to accredited users such as government and statutory agencies and non-government entities such as universities.
- Provide a basis for publishing information and benchmarking products to support public transparency on the quality of aged care services at the service or facility level. These products should be published at least bi-annually once real time or near real time data collection capabilities are established.

Opportunity 9 – Improve Wi-Fi and broadband capabilities

The Report recommended that each residential aged care facility establish broadband internet and Wi-Fi as a core service, to allow residents to connect with family and friends and with the community.. The 2016 Australian Digital Inclusion Index identified those over 65 years of age as the most digitally excluded, owing to their level of exposure, but also capable of mastering basic communications and engagement with social media.

Opportunity 10 – Improve aged care workforce digital skills and ability

The Report recommended that the aged care workforce should undergo training, as part of accreditation with the Australian Health Practitioner Regulation Agency, that includes proficiency in the following (at minimum):

- My Health Record and other Australian Digital Health Authority services
- use of aged care provider solutions
- assistive technology, mobility, and smart homes.

Opportunity 11 – Replace obsolete systems with modern solutions

The Report recommended that all obsolete aged care systems be replaced with modern technology capability, such as the introduction of a client record management (CRM) systems with clear master data management rules and standardised interoperability with aged care providers, health care providers, and other Australian Government agencies.

2.3.2 Summary of proposed actions

The Report concluded with the following proposed actions, which may also be applicable for ICT enablement of Older Persons Services:

- establish an independent aged care data authority
- enhance the My Health Record to include relevant aged care information
- use interoperability standards for better data sharing
- enable key application changes
- improve IT infrastructure capabilities
- improve digital skillset of the aged care workforce
- residential and home care providers to provide assistive technologies as standard offerings
- to support across aged care facilities and in homes
- provide tele-aged care

2.4 Royal Commission into Aged Care Quality and Safety - Final Report

The Final Report of the Royal Commission into Aged Care Quality and Safety, Recommendation 109, outlined the need for the Australian Government should invest in technology and infrastructure that would support the new aged care system. The measures outlined include a new, service-wide client relationship management system interoperable with My Health Record for care management. Data and information should be accessible, complete, accurate, and up to date. Standardised systems and tools should also make the user experience easy and efficient.

The Final Report also recommended that information and communications systems should be interoperable, to enable the sharing of data and information between aged care providers, health care providers, and relevant government agencies in respect of older people receiving care. Ideally, this should include the development of a full set of Fast Health Care Interoperability Resources (FHIR) data standards for aged care assessment and services. The Recommendation also outlines measures for use of pre-certified assistive technologies and smart technology. And, finally, an Aged Care Information and Communications Technology Strategy should be developed, in consultation with older people and various stakeholders, to provide a roadmap for implementation of the changes.

2.5 Conclusion

Australia is seen as a world leader in eHealth, with the My Health Record is seen internationally as an exemplar electronic health record. However, even with this emphasis on eHealth over an extended period of time, the reports described above show that Australian aged care has not benefited significantly from these developments and that the aged care sector faces a number of challenges: obsolete systems, lack of interoperability across the sector including with My Health Record, multiple (and confusing) entry points, and difficulties in encouraging adoption by service providers and use by staff.

These challenges are likely to face ICT enablement of Older Persons Services in Ireland and the following measures, described earlier, may address some of these challenges:

- **Introduction of data interoperability standards:** Introduction of data interoperability standards across residential care, home care, and community care. This includes mapping the data used in systems across these settings and the definition of a standardised minimum data set conformant with the HL7 FHIR Release 4 standard, to allow integration with micro services and APIs, rather than sharing of documents. This would allow providers, vendors, Government agencies, and other to share information securely and appropriately, in realtime (or near realtime).
- **Linking to the National Shared Care Record using national health identifiers:** Creation of a roadmap for the inclusion of relevant aged care information, including the older person's care plan and services, in the National Shared Care Record using national health identifiers. This would provide a single record for every older person.
- **Incentivised adoption of cloud-based solutions:** Adoption of cloud-based solutions provides a range of benefits in the area of collaboration, scalability, business continuity, and cost effectiveness. Provide incentives and seed funding to encourage aged care service providers to adopt cloud-based solutions and to provide appropriate training for their staff.
- **Improvement of Wi-Fi and broadband capabilities:** Establishment of broadband internet and Wi-Fi as a core service in residential care facility, to allow residents to connect with family and friends and with the community.
- **Replacement of obsolete systems with modern solutions:** Replacement of all obsolete systems with modern solutions, such as the introduction of a client record management (CRM) systems with clear master data management rules and standardised interoperability with aged care providers, health care providers, and other Australian Government agencies.

- **Improvement of the digital skills of the aged care workforce:** Provision of good quality training on use of aged care provider solutions and any other aged care-related services, as part of their professional accreditation.
- **Establishment of a mechanism for independent oversight:** Establishment of a mechanism for the independent oversight of the measures outlined above and then transition to mandatory reporting:
  - Development and implementation of data interoperability standards
  - Development and implementation of a standardised dataset and scalable assessment instrument, based on FHIR and InterRAI
  - Incentivised adoption of cloud-based solutions
  - Support for aged care providers and vendors to change their systems to capture this data
- **Undertaking of co-design activities:** Undertaking by aged care providers, healthcare providers, research institutes and the Australian Government of partnerships and co-design activities.
- **Collaborative development of innovative solutions:** Collaboration of aged care providers, technology and software vendors, and the relevant bodies to find innovative solutions.

Chapter 3 New Zealand

The estimated resident population of New Zealand is 5.11 million persons.[16] Universal health coverage is provided through a mainly publicly-funded, regionally-administered delivery system that covers inpatient, outpatient, mental health, long term care, preventive, and prescription drug services in addition to others.[17] Patients must pay part of the cost of some services and products, and approximately one third of the population has private health insurance to defray these costs.[17]

The national government sets the healthcare policy agenda and determines the annual budget.[17] It also sets national requirements for the publicly funded services provided by 20 district health boards (DHBs).[17] Each DHB is responsible for planning, purchasing, and providing health services, as well as owning and running all the public hospitals in their region.[17] Public hospitals form the majority of hospitals in New Zealand and provide all emergency and intensive care, while a small number of private hospitals provide other services.[17]

GPs are the gatekeepers to specialist care and New Zealand citizens can attend any GP of their choice.[17] GPs work as independent contractors and many work in GP practices, each of which has several GPs and a number of practice nurses who play a significant role in the management of long term conditions.[17] Most GPs belong to one of approximately 30 primary health organisations (PHOs). PHOs receive additional funding for improving access, aiding health promotion, coordinating care, and providing additional services.[17] This has led to the development, in some cases, of multidisciplinary teams.[17]

DHBs provide funding for long term care and social supports, including for all homecare services for those aged over 65 years in their respective regions.[17] Of those people aged over 65 years who receive support from DHBs, approximately 33% live in long term aged care with live at home where they receive that care.[17] The DHBs also fund or contribute to other services that older persons sometimes access, such as end of life care in a range of settings, from hospitals to hospices to long term care to the individual's home.[17] Home care support services are supplied by private organisations under contract to the DHB.[18]

DHBs also assess the income of applicant's for residential care facilities and pay the difference.[18] There are approximately 650 long term residential care facilities, from

individuals owning three or four facilities to the largest organisations, which have up to 48 facilities and are quoted on the New Zealand stock exchange.[18]

Finally, a number of national organisations play a role in eHealth:

- The Technology and Digital Services business unit, which is responsible for implementing the government's Digital Health Strategy and other eHealth initiatives.[17]
- The Digital Advisory Board (DAB) provides guidance to the Ministry for Health on the potential benefits of existing, in-progress and future digital and information-related technologies and to support the development of the strategies needed for their systematic uptake.[19]
- The Health Information Standards Organisation (HISO) supports and promotes the development and adoption of fit-for-purpose health information standards for the New Zealand health system.[20]
- The Data and Digital Directorate is the Ministry of Health Directorate with responsibility for ensuring that the Ministry's data collections and digital technology support the health system to deliver better services and health outcomes. The Directorate also has oversight of current data and digital functions and of national data collections.[21]

3.1 Strategic framework

New Zealand faces the same challenges as are faced internationally by other countries with ageing populations and the role of home and community services is expected to become increasingly important.[2] As early as 2001, the New Zealand Positive Ageing Strategy outlined the goal of 'Ageing in Place', which sought to support older people to remain living in their homes and communities as long as possible.[22] The *Better, Sooner, More Convenient Health Care in the Community Strategy (2011)* national health strategy again emphasised the broader move away from a hospital-centric model of care towards a model where the majority of a person's care is delivered in the community.[23]

As a result, nine healthcare alliances were formed, each alliance being a network of primary health care providers and DHBs intended to provide services closer to home.[24] These alliances were expected to improve primary care and older persons services by supporting GPs, nurses, pharmacists and other health professionals to work more closely together on multidisciplinary teams, by providing access to specialist diagnostic testing, and by helping healthcare professionals and patients to manage chronic conditions more proactively.[24] Thirty primary health organisations (PHOs), noted earlier, were also established.[17] PHOs receive additional funding for

improving access, aiding health promotion, coordinating care, and providing additional services.[25]

The *Healthy Ageing Strategy* (2016) outlined the overarching direction and action plan for the following ten years to support the health and wellbeing of older people.[26] Key elements of the strategy include integration across health and social care sectors, to enable more efficient and innovative use of specialist roles, including of nurse practitioners, of clinical nurse specialists, and of allied health professionals such as occupational therapists and paramedics.[26] This is expected to support innovative models in home care, primary health care, and residential care in support.[26]

The Strategy also notes the richness of data in the New Zealand health system and seeks to make use of new technologies and information improvements to improve outcomes for older persons.[26] Desired outcomes include better support for older persons with high and complex needs, enabling older persons to live well with long-term conditions, and the provision of high quality acute and restorative care for effective rehabilitation, recovery, and restoration after acute events.[26]

The Ministry for Health also developed a *Digital Health Strategic Framework* (2016), to guide the use of digital technologies in support of the delivery of healthcare by means of a digital ecosystem.[27] The Strategic Framework is expected:

- to help health providers deliver better services
- to provide people with the ability to control their own health information and thereby increase their trust in it
- to improve health outcomes and equity
- to increase the performance of the public health system
- to use the insights to make information decisions in the areas of health service delivery, policy development, research and service planning, and others.[27]

Five core components of the strategy are:

- an electronic health record providing a single longitudinal view of health information accessible to consumers, carers, and decision-makers
- health and wellness dataset to support evidence-based decisions
- a preventative health IT capability to improve public health initiatives
- digital hospitals to increase capability and integration with the wider sector
- regional IT foundations to support regional access to health information, delivery of the single electronic health record, and lift digital capability within hospitals.[28]

Key enablers include (among others) interoperability, architecture and standards, and security, privacy, and trust.[27]

The *Healthy Ageing Strategy* (2016) also mandated the use of the InterRAI assessment data to improve services. An example of a key enabler, InterRAI is a set of clinical assessments that were developed and are used in more than 30 countries.[29] The following InterRAI assessments are in use in New Zealand:

Name of InterRAI Assessement	Description of use
Contact Assessment	…used for the continuing assessment of those with non-complex needs living in the community at home
Community Health Assessment	…used for everyone accessing community health services. Additional supplementary assessments look at functional mental health, deaf-blindness, and assisted living.
Home Care‡	…used to understand person's functioning and quality of life, and supports clinical decision-making around residential aged care.
Palliative Care	…used to provide a comprehensive picture of the strengths, preferences, and needs of community-based older adults for palliative care.
Long Term Care Facilities	…used to evaluate the strengths, preferences, and needs of those in aged residential care, especially around key issues regarding care planning.

InterRAI has been used by District Health Boards as a mandatory assessment for publically funded home and community support (since 2004) and for aged residential care services (since 2012).[30] For the last four years, InterRAI assessments are mandatory in residential care.[18]

The InterRAI service is a national digital service in New Zealand.[31] An InterRAI New Zealand Informatics Strategy was published in 2018, to provide direction aligned to the broader goals of the New Zealand Digital Health Strategy.[29] InterRAI service delivery aligns with the Informatics Strategy through use of:

‡ The InterRAI Home Care Assessment is a combination of the InterRAI Community Health Assessment and the supplementary functional mental health assessment.

- a standardised assessment tool, where all InterRAI tools share a common language
- a national IT platform, with all InterRAI tools operate through a single national IT platform, supporting reuse and sharing of data.[29]

In terms of the overall future direction, the national approach has moved away from use of a national messaging broker and instead towards building an ecosystem of standards and APIs that enable data to flow as and when it is needed.[31] A national health information platform is being created, which is expected to use a very distributed architecture and a suite of application programming interfaces (APIs).[31] This means that information will be held in clinical systems and will be pulled in realtime from those systems.[31] The platform is centred on identity, using the national health identifier and will encompass InterRAI and generic assessments.[31] HL7 Fast Healthcare Interoperability Resources (FHIR) standards are likely to be used.[31]

3.2 Current status

New Zealand has achieved a consistent national approach in a number of areas. As described earlier, InterRAI assessments are used consistently for home care. The Momentum software package has been contracted for use nationally in New Zealand, to deliver these assessments.[18] Additionally, the medications management system, Medimap, is integrated with GP and nursing home systems. Medimap provides a record of the patient's medication that is shared between prescriber, pharmacy, and care organisation staff.

There is also a desire to bring consistency to areas of home care where it is still required and to address some of the challenges that remain. As noted earlier, variations have been noted in how the InterRAI assessments are applied and different DHBs have different thresholds for referring to long term care.[18] Different systems are used in healthcare, in residential care, and in hospitals, as well as by GPs.[18] Hospitals send electronic discharge summaries to GPs, though a printed copy is often sent with the patient.[18] A variety of GP practice management systems are in use and nursing homes also use a number of residential management systems.[18] Primary care has access to the person's hospital record but home care cannot access the record.[18] Additionally, the InterRAI assessments used in home care are not shared with long term residential care facilities.[18] Few GPs use the full richness of information in the InterRAI home care assessment, so this information is not presented when the assessment is shared.

The Ministry for Health and Technical Advanced Services, jointly commissioned Tenzing, a management and technology consultancy, to report on the InterRAI

service. Each report provides insights and learnings that are particularly relevant for the Irish situation.

3.2.1 Review of Home and Community Support Services (2019)

In 2019, Ernst and Young (EY) consultancy was engaged to report on the Home and Community Support sector, which provides clinical and support services to over 100,000 New Zealand citizens.[2] Most of these services — including patient assessment, goal setting and plans, personal care, household management and equipment — are provided to support older people to 'age in place', in line with a national policy directive.[2]

Under the current model, home support services are initiated by the older person, the family, friends, neighbours, or a health professional.[2] A DHB-funded needs assessment and service coordination (NASC) agency then undertakes a standardised assessment of the older person based on InterRAI.[2] The NASC agency identifies what level of support is required, what services are available, and the person's eligibility, as well as aiding the person to acess the service.[2] The Report noted variations in how the NASC is applied and how often the person's needs are re-assessed.[2] Additionally, it noted home and community support services are called to address increasingly complex needs in the community, requiring a closer integration with other health and social care services.[2]

The report also noted the absence of a vision for a future, high-performing home and community support sector, as well as other limitations. The EY report outlined the need for a model where services wrap around the older person and their needs, together with a case coordinator to build and maintain a relationship with the older person.[2] The following key enablers for this situation were:

- a consistent, flexible and fit for purpose needs assessment model
- nationwide adoption of a case mix funding model that would individualise care, reduce risk, improve system effectiveness, and increase cost efficiency
- a technology enabled workforce, with access to shared electronic health records and care plans.[2]

The EY report outlines the future model of person-centred, coordinated home and community support services, which is composed of five elements:

- Service delivery: Streamlined, standardised processes for planning, funding, resourcing, and enhancing these services.
- Well-defined pathways: Well-defined pathways that are based on shared care plans and care pathways, and are accessible to multi-disciplinary teams.

- Enhanced system capacity: Enhancing the capacity of the system in terms of community rehabilitation services, medication management, multi-disciplinary team approach, and others.
- Referral services and care coordination: Provision of seamless care for older people.
- Remote contact and monitoring: Use of telehealth to support participatory health and patient activation.[2]

Coordination, pathways, and technology are three supporting factors.[2] The new model is expected to help avoid acute hospitalisations, reduce acute care related services and specialist appointments, and improve chronic disease management in the community.[2]

3.2.2 Review of InterRAI Assessment service (2019)

The InterRAI software service was launched in 2004 and, after a new procurement process, continued with a new vendor providing software services from 2011.[30] In 2018, the InterRAI Governance Board requested that a review of InterRAI services be undertaken.[30] The first stage of the (two-stage) review looked at user experience of the service, at performance against contractual obligations, and at emerging trends and capability, with a view to informing the second stage of the review.[30]

The report began by noting the key enablers identified by the Ministry for Health to deliver the principles of the Digital Health Strategy:

- Interoperability between data sources and applications across the health sector.
- Architecture and standards to which services must adhere, in line with national architecture security, privacy, and trust principles.
- Foundation services, which are non-negotiable services that are offered by the Ministry to support other enablers.
- Invesment and commercial frameworks that ensure investments are made appropriately.
- Innovation frameworks which ensure that new technologies are leveraged as they are developed.[30]

The report further noted that the Contact, Long Term Care, and Home and Community InterRAI Assessments are used by the DHBs in New Zealand, described earlier. These InterRAI Assessments are completed through the InterRAI Assessment Management System (AMS), which is also used for the production of reports. A small number of providers use additional care planning functions in the AMS. The report notes that, at the time of writing, the use of this single tool

nationally has resulted in consistent standards and processes. However, the report also noted that no InterRAI software with good interoperability was available.

On a positive note, the AMS software was recognised as focusing on clinical usefulness, collecting clinical relevant information even where it is not part of the InterRAI assessment, and providing the ability to work offline. The AMS software was considered to be highly technically accurate and to provide a high number of cross-checks. The report noted that the vendor partnered well on planned changes and that changes for other jurisdictions were included in the New Zealand service at no extra cost. The AMS was also recognised as integrating well with the New Zealand Ministry's NHI system and with Pharmac-based medication naming catalogue.

However, the report noted that the software update and upgrade process had been highlighted as lengthy. It also noted the role of user experience in ensuring that the right information is made available in the right way at the right time.[30] The design of the Assessment Management System (AMS) was considered to be out of date, not providing the navigational and data entry conventions expected.[30] A critical aspect of user experience, application performance was significantly impacted by both navigational and data entry conventions and other factors such as application stability and responsiveness, database, browser, network coverage and capacity, and server capacity.[30] AMS software was also often deployed onto a laptop and many providers operated a variety of older browsers and operating systems, which complicated hardware management.[30]

The design of the workflow within the assessment was also questioned, as it required a high number of clicks, each of which often necessitated reloading a page, thereby impacting performance.[30] The report noted integration with other health systems in order to share information appropriately was also desirable, as, at the time of writing, such information was copied and pasted from other sources such as clinical letters and diagnostic results.[30] Finally, the training available was noted to use a 'one size fits all' with little self-paced or refresher training available, which disadvantages irregular users, among others.[30]

3.2.3 Further findings

Since the inception of the InterRAI service, Momentum software was used to deliver the assessment.[31] At the time of writing, the New Zealand InterRAI service had been operated by a partner, Technical Advanced Services (TAS), for ten years.[31] TAS also runs the New Zealand national data warehouse, which is used by the Ministry for research and planning, and by academic researchers.[31]

Intially, the care planning modules in Momentum were of interest only to a few smaller providers and so was not prioritized.[31] Instead, the priority was for patients and assessors to have a good experience using Momentum.[31] Initially, two separate instances were run: one for the north island, the other for the south island.[31] This caused difficulties when a patient or older person wanted to transfer from one instance to the other.[31] These difficulties were resolved in 2020, when both instances were consolidated into a single instance run from a Microsoft Azure data centre.[31]

Some challenges still exist with the use of Momentum to deliver the InterRAI assessment. Annual licensing is expensive, costing the Ministry of Health approximately $1.2 million per annum.[31] That licence provides limited capabilities.[31] Few options are available for the integration of assessment results with Momentum because Momentum is based on the older HL7 version 2 standard and uses PDF format.[18] Another limitation is that Momentum provides the ability to copy information from the patient's most recent assessment information (if they have one), but information from any other assessments, or from any other source such as a discharge letter, must be copied and pasted or re-entered manually.[31] Larger providers have been querying how they can connect to the InterRAI service using APIs.

The New Zealand health system currently undertakes many assessments and the Ernst and Young report also found that a new generic assessment platform is required, to enable other InterRAI assessments, such as the InterRAI disability assessment, and non-InterRAI assessments.[31] The new generic assessment will be standards-based and national digital service will work with Momentum and other vendors to develop it.[31]

3.3 Conclusion

Thus, the overall national health strategy is similar to that adopted in Ireland, seeking to support older people to live well in their own homes and communities, and to receive the majority of their health care in the community, as far as possible.[2] eHealth and technology are also recognised as key enablers and, as in Ireland, the InterRAI has been adopted as the national standard for assessment of an older person's needs. However, the New Zealand programme is more mature and provides some interesting learning for the Irish context.

As noted earlier, the medications management system, Medimap, which is integrated with GP and nursing home systems, provides a single record of the patient's medication that is shared between prescriber, pharmacy, and care organisation staff. However, sharing of information across healthcare settings is still a huge challenge.

Different systems are used in healthcare, in residential care, and in hospitals, as well as by GPs. Primary care can access a patient's hospital record but home care cannot. Electronic discharge summaries are used though printed copies are often sent with the patient. InterRAI assessments used in home care are not shared with long term residential care. Very few GPs use the 'full richness' of the InterRAI assessment.

As the technologies used in healthcare have evolved, the national strategy has moved away from a messaging broker-based system. The vision being realised is an ecosystem of standards and APIs that enable data to flow as and when it is needed. A national health information platform is being created, with information to be held in clinical systems and to be pulled in real-time from there. National health identifiers will be used, as will InterRAI and other generic assessments.

Additionally, InterRAI has been in use for 10 years as a national digital service in New Zealand and the detailed review of the AMS software highlights issues that had a very negative impact on the users' experience and on system performance. Navigation and data entry conventions did not match what the users expected. The design of the workflow also included a very high number of 'clicks', many of which required page reload and thereby adversely affected system performance. Issues were also noted with application stability and responsiveness, database performance, browsers, network coverage and capacity, and server capacity. Many providers operated a variety of older browsers and operating systems, which complicated hardware management. Finally, basic and generic training was delivered to a range of users, with little accommodation for self-paced or refresher training.

This demonstrates the benefits of software that is intuitive and easy to use for all user groups and that provides streamlined workflows for all the user group tasks and for patient pathways. It also shows the benefits of a hardware management strategy that provides a manageable set of browser versions and operating systems, as well as evaluation and optimisation of application stability and responsiveness, database performance, browsers, network coverage and capacity, and server capacity. Finally, the review findings show the role of effective training, tailored to the needs of the different user groups that is available in variety of formats, including self-paced learning.

Chapter 4 Scotland

Scotland has a population of just over 5.4 million.[32] The Scottish Ministry of Health and Social Care defines overall policy and strategic direction, while NHS Scotland is charged with delivery of healthcare services, which are provided free at the point of care to the entire population.[33] NHS is comprised of 14 territorial NHS boards, seven special NHS boards, and one public health body.[33] NHS territorial boards provide healthcare services to the populations within their territories, as well as frontline healthcare services.[33] As their name suggests, specialist NHS boards provide specialist and nationalist services.[33]

The Digital Health and Care Directorate aims to ensure that health and care needs of the people of Scotland benefit fully from digital and data developments and innovation.[34] The Directore defines policy and strategic direction within the area, transforms services by implementing digital services and technology, and provides expertise on information governance, assurance, and cyber security.[34] Within the Directorate, the Technology Enabled Care (TEC) programme focuses on citizen facing digital solutions that improve outcomes for individuals in home or community settings.[35] Since its establishment in 2015, the TEC programme has systematically built the foundations, both digital and cultural, to enable Scottish citizens to benefit from digital health and care services.[35]

4.1 Strategic framework

The first Scottish electronic GP records were introduced in the 1980s and following various initiatives to introduce ICT, the first Scottish eHealth Strategy was published in 2008.[36] The second eHealth Strategy 2011-2017, published in 2010, outlined progress on a number of eHealth initiatives, including the introduction of a national health identifier, the Pictures Archiving and Communications System (PACS) to store and share X-rays and scans, and standardisation of GP practice management systems and of patient administration systems by the NHS Boards.[36] Telehealth and telecare were also emphasised.[36]

The second eHealth Strategy also emphasized the need for joint working between health and social care as essential in addressing the challenges of an ageing population and increasing numbers of people with complex long term conditions.[36] It also provided for the establishment of Integrated Joint Boards with an integrated budget for health and social care, and responsibility for the planning, resourcing, and delivery of integrated health and social care services within their remit.[37]

The most recent eHealth strategy, Scotland's Digital Health and Care Strategy 2017-2022, commits to giving each Scottish citizen access to the digital information, tools,

and services they need to maintain and improve their health and wellbeing.[38] The Strategy also ensures that the citizen's health and social care information will be captured electronically, integrated, and shared securely to assist service staff and carers that need to see it.[38] And that digital technology and data will be used appropriately and innovatively to help plan and improve health and social care services, enable research and economic development, and improve outcomes.[38]

In continuing support of the Digital Health and Care Strategy, the Technology Enabled Care Programme launched the Digital Citizen Delivery Plan 2021-2022, with the aim of enabling Scottish citizens to benefit from the range of digital public health and care services.[39] Among the Delivery Plan's four strategic priorities, Strategic Priority 1 – Addressing inequalities and promoting inclusion, seeks to address the digital exclusion of older persons.[39] This is because adults over the age of 65 years were shown to make up the largest proportion of the adult internet non-users, and, in 2018, over half of all adult internet non-users were over the age of 75 years.[40] In a survey of Scottish adults aged between 65 and 79 years, 46% had never used the internet, 18% had difficulty using a computer, and 16% cannot use a computer at all.[41]

The Delivery Plan's Strategic Priority includes the goal of the fully digitally enabled care home, including fully digitally enabled long term residential care homes for older persons.[38] The full digital enablement of care homes means that 'people living and working within Scotland's Care Homes have access to the digital support, training, equipment and tools they need to fulfil their needs'.[39] The remaining Strategic Actions focus more generally on digital enablement of health and social care initiatives, such as development of remote health pathways, use of telehealth and the role of digital mental health. Only two actions relate specifically to older persons — they include the evaluation of service options around the digitally excluded and older persons, and continuing work with Alzheimer Scotland on measures to improve outcomes for people with dementia (which typically affects a higher proportion of older persons) and their families.

Full digital enablement of care homes is described in detail in *Connecting People Connecting Services – Digital Approaches in Care Homes Action Plan (December 2020)*.[38] The Action Plan focuses on three core areas for digital enablement of care homes: Digital Foundations, Digital Services, and Digital Leadership and Skills.

- In the area of Digital Foundations, connectivity into — and within all areas of — the care home is a priority, with the recommendation that incentives be available for care homes to provide superfast broadband and that devices are available for staff and for residents to use. This is being progressed in conjunction with the Connecting Scotland initiative. The other priority is the secure digital collection and sharing of data, meaning that relevant data

about care home residents and services is collected, held and shared digitally; data and systems are secure; and reporting requirements are standardised. Suggested measures include the introduction of electronic health records and the expansion of Key Information Summary (KIS) use, as well as anticipatory care planning.

- The Action Plan recommends that a range of Digital Services to support the health, wellbeing, and independence of residents should be made available, and that residents should be supported to choose when and how to use these digital services. Examples include the Near Me application, which provides video consultations, and remote care pathways such as vital signs monitoring and other appropriate care pathways within care homes. These services should be designed collaboratively, with the residents, their families, and staff involved. They may also support residents' social connections and activities, and staff wellbeing.
- In the area of Digital Leadership and Skills, the improvement of the skills and confidence of residents, staff, and providers is a high priority. The approach used by the Connecting Scotland programme should be considered for improving the skills and confidence of residents.§ Sector leaders also need to support adoption of digital solutions and building capabilities, including ensuring that staff have the digital skills to provide the care and support that residents need.

The Feeley Report (2021) recommended the establishment of a national care service — that is, a system that is controlled nationally, that delivers locally, has the person at the centre and is cost effective.(42) The report notes that a number of improvements are being made but that too much reliance has been place on bottom-up developments. The improvements noted were:

- Reduction in use of institutional or residential care, which respects the human rights based approach that moving into a care home must always be the informed choice of the person requiring care and support.
- Making better use of adaptations and technology, where even minor adaptations have been shown to deliver significant improvements and noting the benefits of Technology Enabled Care (TEC) for older persons in their

§ The Connecting Scotland is a Scotland Government initiative, managed by the Scottish Council of Voluntary Organizations, which aims to address digital exclusion by giving people the skills and equipment to connect online at home. The Website is accessible here: https://connecting.scot/. The programme aims to support 60,000 digitally excluded households to get online by the end of 2021, including digitally excluded older persons.

homes. However, it also notes that the concomitant reduction in face to face support may increase loneliness.
- Involving people and their families more in decisions.
- Including wider community supports in care.
- Professionals working better across the traditional boundaries of health, social care support, and other services such as housing.

4.2 Delivery and Enablement of Older Persons Services

An exhaustive treatment of the delivery structure of older persons services is outside the scope of this document. Instead, several aspects are particularly relevant to the Irish context. In 2012, GPs began to include the KIS in the anticipatory care planning process.[43] Generated from the data in GP practice management systems, the KIS contains information about a person's medical diagnoses, key contacts, equipment at home, palliative care information, resuscitation status and special notes.[44] Following a conversation with the older person, a GP can add details of future care planning to the KIS.[45]

Healthcare professionals in other settings, such as in acute hospitals, could not update the information in the KIS.[43] Instead, the GP practice management system record had to be updated, which proved to be another drawback.[43] Following the 2012 directive, the KIS achieved such high rates of adoption that performance issues began to arise owing to the simple architecture.[43] Rather than overload the Key Information Summary further, a more up-to-date solution is being investigated likely conformant with the HL7 FHIR standard.

Regarding a national assessment to determine an older person's needs, no single assessment was identified. However, along with InterRAI, a number of specific assessments are in use in Scotland:

- Geriatric Frailty Assessment Tool is used in acute care
- Rockwood score is a frailty index assessment
- Electronic Frailty Index (EFI) which is an assessment developed in England for mild, moderate, or severe frailty
- Frailty Index for Elders (FIFE) Community and Wellbeing holistic assessment.

Scottish GP practices typically have high levels of ICT enablement, having moved to cloud-based practice management systems.[46] However, GP practice management systems are typically not interoperable with systems in other settings.[45] In the community, levels of ICT enablement are typically lower, with 'pockets' of people working with paper records, sometimes out of personal preference.[46] In fact, primary, secondary, and social care are considered to be disconnected.[45]

Levels of ICT enablement in nursing homes vary considerably — for example, with some nursing homes having no Wi-Fi — and levels of ICT enablement in acute settings vary across health board regions.(46) Nursing homes are assigned to a GP practice and the GP practice and nursing home are encouraged to work together, with the GP practice management system considered the source of truth.(46) Digital prescribing is now considered a high priority, as a means to provide a single medical record covering all prescribing by GPs and in acute or community settings.(46)

Three areas of ICT enablement are also being expanded:

- **eFrailty Index**: Risk assessment tools were typically focused on secondary care. The eFrailty Index is a tool that uses data from GP practice management systems to identify an older person's deterioration over time.
- **Hospital@home**: The Hospital@home programme is part of a Scottish Government plan to deliver acute care in the community, with remote monitoring and point of care testing. This was a local, rather than national, initiative that included several interested areas. It included diagnostics in the home.
- **Anticipatory Care Planning:** Anticipatory care plans are created mainly by GPs or by primary care. The GP creates and updates the KIS which is shared, view-only, with acute care. The National Digital Service is investigating a more digital solution.(45)

As noted earlier, the current focus is on the provision of digital services in care homes — such as the provision of broadband and of video consultations — and on the development of remote health pathways — such as a pilot project with chronic obstructive pulmonary disease (COPD) patients in Glasgow.(46)

At national level, work is underway to support two-way communications (asynchronous messaging) and sharing of data, such as from fitness trackers.(46) Over 2018 and 2019, work had begun on delivery of a national digital platform and Health Improvement Scotland had begun looking at the care planning process.(43) There is also a recognition that an integrated health and social care record is needed.(47) This record is intended to support the new models of care and support services that are being developed, in consultation with a broad cross-section of partners, as part of the 'reshaping' of older persons services.(47) Elements of this transformation include supporting self-management for older persons and remote health monitoring, as well as the effective use of data mined from both for service planning and research purposes, where authorised.(47) However, this work was put on hold following the outbreak of COVID-19 in 2020.

A single medical record is also being developed, using an open platform based on standards including Azur and AWS, and conformant with OpenEHR, FHIR, and

SNOMED.[46] The Integrated Joint Board on Health and Social Care has also been established to evaluate the cloud-based clustering of GP practices and community services.[46] Other innovations are also being investigated, such as the use of community-based equipment to monitor an increase in falls or a decrease in activity and to trigger an alert to investigate this. Wearable technology, remote monitoring, and proactive alarm systems in sheltered housing are also of interest. Connecting Scotland is addressing digital inequality and exclusion while umbrella representation bodies are being engaged around the provision of digital health and social care services for older persons, such as regarding skills and training.[46,47]

4.3 Conclusion

Over the last decade and longer, health policy in Scotland has placed strong emphasis on the integration of health and social care to meet the increasingly complex needs of an ageing population. eHealth policy aligns with and supports this overall objective, having committed to capture each citizen's health and social care information digitally and make that information securely available to patients and their carers as well as to staff.

Scotland has a long history of eHealth development and, as a results many of the foundation elements of eHealth are in place. This includes national health identifiers, standardised cloud-based GP practice management systems, standardised patient administration systems, and national systems such as the PACS. However, considerable challenges remain in the area of interoperability. GP systems are not interoperable with other systems. In the community, levels of ICT enablement are typically lower, with 'pockets' of people working with paper records, sometimes out of personal preference. In fact, primary care, secondary care, and social care are considered to be disconnected. An integrated health and social care record is therefore seen as the crucial enabler for this strategy and work has begun in this area.

During 2018 and 2019, development of a national digital platform was undertaken. A single medical record was being developed on an open platform, likely to be Azure or AWS and conformant with OpenEHR, FHIR, and SNOMED standards. cloud-based clustering of GP practices and community services is also being investigated and evaluated by the Integrated Joint Board on Health and Social Care. Other innovations are also being investigated, such as the use of community-based equipment to monitor an increase in falls or a decrease in activity and to trigger an alert to investigate this. The National Digital Service was investigating more up-to-date solution for the Key Information Summary, likely to be based on HL7 FHIR standard. Levels of ICT enablement in nursing homes also vary considerably and the

2020 Action Plan focuses on full digital enablement of care homes, including those for older persons.

Additionally, digital exclusion was highlighted as a significant challenge for older persons: adults over the age of 65 years were shown to make up the largest proportion of the adult internet non-users, and, in 2018, over half of all adult internet non-users were over the age of 75 years. Some of the principles outlined for digital enablement of care homes could also be applied to support digital inclusion of older persons:

- Digital foundations, which concerns data collection, data sharing and security, such as the provision of infrastructure and devices to support the secure digital collection and sharing of data.
- Digital services, which concerns access to digital services. Digital services should be designed collaboratively with individuals and their families and by healthcare professionals, individuals should be supported to choose and use these services. Digital services can support individuals social connections and activities and support staff wellbeing.
- Digital skills and leadership which concerns the improvement, as a high priority, of the skills and confidence of individuals and their families, and of healthcare professionals in using these services. Sector leaders should support the adoption of digital solutions and build individuals' confidence.

Chapter 5 Other countries

This chapter summarises information received from a number of other countries regarding best practices and lessons learned from ICT enablement of older persons services in their countries. A detailed review of each country was outside the scope of this review. Instead, each section focuses on one or two areas that are of particular relevance to the Irish context.

5.1 Canada

Canada is a constitutional monarchy, divided into 10 provinces and three territories, and administered by a federal government.[48] The population of Canada is estimated to be just over 38.3 million persons.[49] The federal government is responsible for:

- setting and administering national standards for the healthcare system, to meet the requirements of the Canada Health Act (1985)
- providing funding for provincial and territorial healthcare services
- supporting the delivery of healthcare services to specific groups
- providing other health-related functions.[50]

The provincial and territorial governments are responsible for the management, organisation, and delivery of health care services for their residents.[50] This includes all medically necessary services provided by hospitals, physicians, and dentists (when the service must be performed in a hospital).[50] They also provide a range of community mental health and addiction services.[51] The Canadian health system, Canadian Medicare, provides medically necessary hospital and physician services free at the point of care to all citizens and permanent residents.[51,52] Approximately two thirds of Canadians have private health insurance to defray costs for services that are not covered, such as vision and dental care.[52]

GPs are typically self-employed, working in private practice, and citizens can register with the GP practice of their choice.[51] GPs typically act as gatekeepers to specialist care though patients can go directly to specialists.[51] In some provinces, networks of GPs work together, sharing resources.[51] In the three northern territories (Yukon, Northwest Territories, and Nunavut), primary care is often nurse-led.[51] In 2017, the majority of regulated nurses — which includes registered nurses, nurse practitioners, and licensed practical nurses — worked in hospitals (62%) with approximately 15% working in community health settings.[51]

5.1.1 Delivery of Older Persons Services

Long term care (LTC) facilities are a mix of public and private facilities, with some private facilities operating for profit and others not-for-profit.[53,54,55] Care in LTC facilities is not part of the universally insured health insurance under the Canada Health Act.[53] Instead, each LTC facility is governed by the legislation of the respective province or territory.[53] In New Brunswick, all LTCs are privately owned, while in the Territories, all are publicly owned.[55] Health information submitted to the Canadian Institute of Health Information varies significantly — nursing homes with higher levels of IT enablement and integration provide more information.[54]

A report on the impact of COVID-19 on Canadian nursing homes highlighted issues found in nursing homes in many other countries.[53] The Canadian population is ageing, with prevalence of chronic diseases increasing.[53] Residents entering nursing homes at later ages, with much more complex needs.[53] Thus, nursing homes are required to provide much more complex care, at a time when the ratios of regulated nurses to care aides has dropped significantly and up to 90% of care is provided by unregulated aides.[53] Additionally, many nursing homes are not designed for the complex needs of today's residents.[53] The same report also noted the failure to optimise across the community, continuing care, and acute care settings, thereby ignoring the frequent and important transitions across these settings.[53]

InterRAI assessments have been used in Canada since the early 2000s to assess the needs, strengths, and preferences of vulnerable populations.[56] In 2017, the following InterRAI assessments were in use:[56]

Table 1 - InterRAI Assessments in use in Canada

InterRAI Assessment used	Resident Assessment Instrument Minimum Dataset 2.0	Resident Assessment Instrument Home Care	Home Care	Community Health Assesment
Applications				
Setting	Long-term care (LTC), Complex continuing care (CCC)	Home care (HC)	Home care (HC)	Community support services (CSS)
Jurisdiction	Mandated in 9 provinces and territories	Mandated in 8 provinces and territories	Not yet implemented in Canada	Use encouraged in Ontario, determined at organisational level
Data Repository				
Provincial	None	Ontario Association of Home and Community Care (OACCAC)	Not applicable	Integrated Assessment Record
National	Continuing Care Reporting System (CCRS)	Home Care Reporting System (HCRS)	Not applicable	None

5.1.2 ICT Enablement of Older Persons Services

The data provided through the InterRAI Assessments in home care and in the community has been shown to be of high quality and has been used in care planning, resources allocation, outcomes measures, and quality indicators.[56]

Three of CIHI's 28 reporting systems use InterRAI Assessments as the foundation for their data collection:

- **Home Care Reporting System** collected information from the Resident Assessment Instrument (RAI) – Home Care, which was used from 2006 to record demographic, clinical, functional, and resource use information for clients served by publicly funded home care programmes in Canada.[57]
- **Continuing Care Reporting System** collected information from the Resident Assessment Instrument (RAI) – Minimum Dataset 2.0, which was used to record demographic, clinical, functional, and resource use information for individuals receiving continuing care in hospitals or long-term care homes in Canada.[58]
- **Ontario Mental Health Reporting System** collected information from the Resident Assessment Instrument (RAI) – Mental Health 2.0, which is a standardised clinical instrument used to regularly assess those receiving inpatient mental health care.[59]

Each system was developed independently over a number of years, and none provided interoperability with the newer versions of the long-term care and home care assessment standards, that have been developed by the InterRAI organisation.[60] In 2019, the Canadian Institute for Health Information (CIHI) introduced the Integrated InterRAI Reporting System (IRRS), replacing all three systems.

The IRRS represents a new integrated way of producing, connecting, and reporting health information in the home care, long-term care, and child and youth mental health sectors, to improve better outcomes.[61] It supports the following InterRAI Assessments:

- InterRAI Home Care
- InterRAI Long-term Care Facilities
- InterRAI Child and Youth Mental Health – Community-based/Inpatient/Screener.[60,61]

These assessments are part of the integrated suite of InterRAI assessments, mentioned earlier, that use a common standardised language and concepts.[60]

The IRRS is considered as an early large-scale implementation of the FHIR standard in Canada.[60] HL7 FHIR supports point-of-care, organisational, and system decisions in a near real-time reporting system.[60] It is also considered to improve the sharing of health information across databases because it has evolved from existing standards, it improves implementation capabilities by adopting industry technology standards, and through its open license, it removes barriers to adoption.[60] At the time of writing, two jurisdictions in Canada – New Brunswick and Saskatchewan – were submitting near realtime data to the IRRS.[60]

The Home Care Reporting System, the Continuing Care Reporting System, and the Ontario Mental Health System will continue to be supported for five years after the introduction of the IRRS. In 2020, a review examined how providers and administrators used the data from the Home Care Reporting System, together with any opportunities to enhance this use.[3] InterRAI data was shown to guide patient safety and quality improvement initiatives and to give participants interviewed a clear picture of how their organisation was doing, when compared to others in their region.

However, significant challenges were also encountered.[3] The data from the InterRAI Assessment for home care was considered very new, and, given the complexity of the home environment, it was expected to take another five to ten years to evolve and show real value.[3] Additionally, large volumes of data were available but that the organisation did not have the resources or skills needed to interpret it and provide value. Finally, smaller organisations, or organisations in rural areas, often experienced connectivity issues, which prevented staff from completing the Assessments. Thus, overall, it was found that home care organisations needed the education, personnel, and supports needed to use the data to its full potential.

5.1.3 Conclusion

InterRAI Assessment have been in use in Canada since the early 2000s and the reporting systems are mature and well-regarded internationally.[3] To take advantage of the capabilities of the latest InterRAI Assessment versions, the IRRS uses the HL7 FHIR standard, which provides point-of-care, organisational, and system decisions in a near real-time reporting system. Thus, at this time, it is recommended that the HL7 FHIR standard be adopted, to take full advantage of the capabilities in InterRAI Assessments and provide high quality data. However, on its own, the availability of high quality data — as evidenced for the InterRAI Assessment — Home Care — is not enough. It has been shown that, in the home care domain in particular, organisations require the education, personnel, and support to use the resulting data to its full potential.

5.2 Denmark

Denmark has a population of approximately 5.6 million, with all citizens and residents entitled to free access to healthcare through the Danish healthcare system.[62] Funded largely by general taxation, the healthcare system operates on three levels:

- National level: The state sets national agenda, provides funding, and administers data for all Danish citizens.

- Regional level: The five regions administer the 54 public hospitals, manage most psychiatric services, and oversee the private practice sector.
- Local level: The 98 municipalities manage a wider range of services, including home care, nursing care, and physiotherapy, among others.[62]

The regions are responsible for providing hospital treatement to people living in their respective region and to all persons in need.[7,63] GPs operate as private contractors but are paid by the region's public insurance.[7] 99% of Danes have their own GPs.[7] The 98 municipalities manage home nurses, nursing homes (with a few privately run nursing homes), social institutions, and rehabilitation.[7] The municipalities and the GPs also cooperate in the management of chronic conditions.[7]

The Danish Ministry for Health is responsible for the development of eHealth policy and coordination of national eHealth projects, as well as for national infrastructure and for national standards, where it retains the right to stipulate use of IT.[63] The first Danish health IT strategy was published in 1996, with five more strategies published in the interim.[63]

5.2.1 Delivery Structure of Older Persons Services

In common with the healthcare systems in Ireland and in other EU countries, the Danish healthcare system faces the challenge of an ageing population.[63] The percentage of people in the Danish population aged over 75 is expected to double within the next 30 years, with corresponding increases in levels of chronic disease and in other areas such as dementia — in 2016, estimated to affect 80,000 Danes.[4,64] As a result, there is a focus on moving from a hospital-centric model of care to a model where care is delivered by GPs in the the community and many new hospitals are already being built with lower capacity in bed numbers, in the outpatients department, and in clinical capacity.[7]

Danish policy aims to promote and extend older persons living independently through prevention and reablement programmes, together with the provision of home care services and nursing facilities free of charge for all citizens in need.[63] The Social Service Act provides the framework of responsibilities, while the municipalities are responsible for providing the social services for older persons and have autonomy on the methods and service levels chosen.[63] Preventative home visits are offered to vulnerable and socially exposed people aged between 65 and 79 years of age whenever needed and yearly once the person is aged over 80 years.[63] Once a person reaches 75 years of age, the person is offered care from a municipality nurse, as a preventative measure.[7] The municipalities use the InterRAI assessment to determine the help and care that a person needs to get.[7]

5.2.2 ICT Enablement of Older Persons Services

In 1994, Medcom was established with responsibility for all electronic communication within the Danish healthcare system and has overseen the move to digitize Danish healthcare services.(63) A national messaging broker was introduced in 1997.(7) Medcom has worked to ensure that data is exchanged between the different systems, especially for those admitted to hospitals.(7) Regional eHealth organisations were established in 2010, to coordinate regional eHealth projects across the regions, while the National Board of eHealth was established in 2011 to develop the more than 400 IT standards now used for healthcare.(63)

As a result of these efforts, by 2017 all hospitals, pharmacies, laboratories, and primary care practices are now connected to Medcom's secure health data network.(63) All GPs were using electronic health records and receiving all laboratory test results from hospitals electronically.(64) All referrals to medical specialists and to psychologists were made electronically, as were 97% of referrals to hospitals.(63) Additionally, 99% of prescriptions were to sent electronically to pharmacies.(63)

In all municipalities, nursing homes and the nurses that visit patient homes typically have an electronic record system since the 1990s.(7) All public nursing homes are IT enabled and the few privately-run nursing homes are required to comply with national standards.(7)

All GPs, hospitals, and social care also have access to a Common Patient Overview, developed by the municipalities.(7) The Overview uses a specific care dataset that meets the needs of the different healthcare professionals accessing it.(7) This allows the secure and appropriate sharing of key information among the health and social care providers accessing it.(7) However, in spite of the Common Patient Overview, it was noted that the link between GPs and the social institutions is missing.(7)

The Common Patient Overview uses the HL7 Clinical Document Architecture (CDA) standard and the eXtensible Markup Language (XML) standard.(7) Medcom was also very involved in developing the first two standards based on the HL7 Fast Healthcare Interoperability Resources (FHIR) standard, to support interoperability between hospitals and social care.(7)

5.2.3 Conclusion

Internationally, the Danish healthcare system is considered an exemplar for its early adoption and widespread use of eHealth — now called Digital Health. Workflows between hospitals, GPs, and municipal health services are 'digitally supported'.(4) Key elements of this strategy were the establishment of the Danish Health Data Network,

for the secure exchange of health data, and the digitisation of commonly used messages — including referrals, discharge letters, and laboratory test results.[4]

A Shared Medication Record was also introduced, showing a patient's up-to-date prescription medication overview across the health system.[4] The Danish National Health Record shows a patient's medical records from hospital admittance and can be viewed by patients and clinicians alike using the Danish eHealth Portal.[4] The current health strategy aims to make a patient's medical records from their municipality and from their GP available through the Portal, to provide a complete view of their care pathway.[4]

The Danish healthcare system faced some challenges with respect to interoperability between the IT systems used in healthcare.[4,5] An academic study outlined the strategies that Denmark adopted to address these interoperability challenges.[6] First, interoperability initiatives need to be planned and managed at regional level or by local authorities, with cross-regional communication (especially during the initial phases of planning) to set a common goal. Second, the distribution of responsibilities between the regions and the state needs to be clearly set out, with the state managing national-level initiatives and developing a framework of standards within which the regions work.

Third, countries need to investigate the actual information needs of healthcare practitioners, then identify core modules to be implemented across the regions. Fourth, a centralised database, such as a National Health Record, is needed to centralise data from systems developed by the state and by the private sector. Public access through a national portal also increases transparency and patient engagement. Finally, consolidation of systems was found to minimise EHR fragmentation, with careful consideration needed of the opportunity cost of maintaining current systems against the advantages of new systems.

The current Danish National Health Strategy outlines an expectation that, as these systems become obsolete, they will be replaced with more complete digital solutions, more structured data and simplified workflows — and complemented by increased sharing between GPs, hospitals, and municipalities.[4] For example, a specific current challenge is that, in spite of the Common Patient Overview, the link between GPs and the social institutions was noted to be missing.[7]

It was also noted that overall, sharing information was found to be a better strategy than sending information. Initially, a suite of national standards were developed, for the sending and receiving of clinical data and information. However, with this approach, certain issues arose — for example, when a handover of information did not occur or when uncertainty arose over where the most up-to-date information

was held at any given time. Thus, a strategy of information sharing, rather than information exchange, was identified as optimum.

5.3 Estonia

The population of Estonia is estimated to be just over 1.33 million.[65] The Ministry of Social Affairs is responsible for the development of national care policies and legislation, supervision of compliance with with legal acts, and collection and analysis of data, as well as registration of healthcare professionals and licensing of facilities.[66] The Estonian Health Insurance Fund (EHIF) runs the mandatory, national insurance scheme, which covers approximately 95% of the population.[66] The EHIF acts as a single purchaser.[66]

Most hospitals are publicly owned, being either limited liability companies owned by local government or foundations established by the state, by municipalities, or by other public agencies.[66] A small number of hospitals are privately owned.[66] About 65 hospitals, both public and private, operate in Estonia, including 35 nursing and rehabilitation hospitals.[66] The majority of ambulatory specialist care is provided in hospital outpatient departments, with the remainder provided by health centres or independent specialists.[66]

All family physicians (or general practitioners, GPs) are independent and serve as gatekeepers to specialist and other care.[66] Though GPs have begun to work in group practices, approximately 70% work in solo practices.[66] GPs must maintain a registered list of between 1200 and 2000 patients.[66] In addition, GPs and nurses provide more than half of all ambulatory care visits, with the remainder delivered by ambulatory specialists.[66]

Nursing homes are typically managed by local government.[67] Nursing homes draw up a care plan for each person, in consultation with those close to the person and with local government, and this is reviewed once a year.[67] InterRAI has been discussed and translated into Estonian but it is not obligatory.[68] The level of adoption is not clear.[68] Two types of nursing homes have been established in Estonia:

- 'medical' nursing homes, have wards like local hospitals, which also give some nursing support
- 'non-medical' nursing homes, with no medical services.[68]

Admissions to these specialist wards in nursing homes usually occur following discharge form the acute sector, typically in relation to chronic diseases or injuries.[68]

5.3.1 Delivery of Older Persons Services

Following discharge from an acute setting, the patient, their relatives, and the social worker involved in the care of the older person determine where the patient should go — this may be affected by factors such as the waiting lists for nursing homes.[68] This decision is informed by the guidance of the patient's GP, who provides an opinion on the condition or problem, together with any medication needs and other medical advice.[68]

How an older person is referred to a nursing home depends on the GP(s) and the nursing home.[68] Many residents in a nursing home may retain the relationship with the GP they had prior to entering the nursing home.[68] GPs renew prescriptions for nursing homes but do not typically visit nursing homes (or patient homes) with dedicated personnel delivering medications for chronic conditions to nursing homes.[68]

EHIF finances both inpatient nursing care and home nursing, and, from 2020, in public nursing homes.[66] In 2021, EHIF provided an additional funding to increase the number of nurses working in nursing homes, with a view to increasing the quality of care and the availability of medical care, when many GPs work at a distance from the nursing home.[69] Additional funding was also provided to allow each GP or primary care practice to hire nursing staff, mental health nurses, or clinical psychologists.[69]

Home nursing is provided, following doctor referral, for those patients who do not require inpatient care but who still need professional medical care.[66] It covers those who have completed hospital treatment and need the help of a nurse, those with a disease that can be treated at home to avoid hospitalisation, and those with chronic illness and mobility restrictions.[67] Home nursing is separate to the home care services that are provided as part of social care (though there is some overlap).[66]

Social services are responsible for deciding when to bring in the GP or home support, or when to admit the patient.[68] Case managers, who are also social workers, are responsible for those who live alone and have medical needs.[68] However, integrated care services are noted to be new in Estonia, and a single pilot has been undertaken in one region.[68] The pilot involves a local hospital, a number of GPs, and social workers as well as 20 to 30 patients.[68] Underway for more than one year at the time of writing, the pilot has shown some positive results, though some bottlenecks have been encountered and some outcomes have not been determined yet.[68]

5.3.2 ICT Enablement of Older Persons Services

All healthcare providers are legally obliged to supply documents to the Estonian National Health Information System (ENHIS). This national central electronic database processes the health records of all patients receiving healthcare services from any Estonian healthcare service provider.[70] The same identifier is used for each citizen across all eGovernment Services.[70] Patients can view all of their data stored on the ENHIS on the patient platform 'My E-Health'. Other eHealth services in place include an ePrescribing service, and a GP portal.

One challenge to the integration of care services is lack of interoperability between the health system and the social care system.[68] Hospitals in each region also employ social workers, who act as case managers, advising admitted patients on social services and act as translators between the different organisations.[68]

However, these case managers are not medical professionals and so have no access to:

- the patient's medical record — access is based on having a 'caring relationship' with the patient
- the patient's social care record — access is based on being employed by the municipality, rather than being employed by the hospital.

These case workers do not visit the patients' homes but they can communicate with the social workers of the municipalities.[68]

For all services provided by the national health insurance, documentation must be uploaded to the Estonian National Health Information Exchange.[68] For example, the medical care provided in nursing homes is covered under national health insurance, hence nursing documentation related to the medical care provided in nursing homes must be uploaded to the Information Exchange, where GPs can access it.[68] Thus the Information Exchange is considered the means by which different care settings can communicate.[68]

However, owing to the volume of documents held within the Information Exchange, it was noted that a GP often had to consult several documents to retrieve clinical information required to treat a patient. In 2019, two new services were planned: the patient summary, which would source that clinical dataset from the national database and make it available to the GP in one place, and a data viewer, which would provide a longitudinal view of the data history for five years.[70]

The Information Exchange collects standardised information on all services provided and it has not been considered necessary to develop any specific functionality for older persons services.[68] Relevant information is recorded as part of the standardised information for all citizens though some of that information may be

relevant to older persons — such as the information that the GP holds for a citizen including end-of-life plans, preferences, and so on.(68)

As noted earlier, the Estonian National Health Information Exchange uses documents conformant to the HL7 CDA standard, which was considered innovative when it was introducted.(68) However, as it has reached the maximum permitted age for Estonian infrastructure components, a move to event-based approach within a service-oriented architecture is planned.(70)

5.3.3 Conclusion

Estonia is considered to be a world leader in eHealth, with a well-established national infrastructure and a range of government eServices. The Estonian Electronic Health Record and central repository of health data, the Estonian National Health Information Exchange, have been in operation since 2008. By law, documentation about all services provided by the EHIF must be uploaded to the Information Exchange and national health identifiers are used to uniquely identify patients and healthcare providers.

This provides a rich source of standardised clinical information and a means by which different healthcare settings can communicate — for example, with GPs accessing notes on healthcare provided to their patient in a nursing home. However, the volume of information for each patient can increase to the point of creating a burden for healthcare providers, such as a GP having to consult quite a number of documents while treating a patient.

As noted earlier, Estonian citizens also have a social care record, which uses a newer architecture. No specific systems or records have been developed for older persons. Instead, any relevant information is recorded as part of the standardised information collected for all citizens — such as the information that the GP holds for a citizen including end-of-life plans, preferences, and so on. InterRAI has been translated into Estonian but adoption rates are unclear.

In common with other countries, Estonia faces the challenge of the more complex health and social care needs of an ageing population. Technological advances notwithstanding, issues remain in the areas of interoperability and obsolescence. The lack of interoperability between the national medical record system and the national social care record system creates a significant barrier to effective sharing of information across health and social care settings, which is crucial to support care pathways for older persons.

At the time of writing, the Estonian National Health Information Exchange was 12 years old, the interval after which Estonian technology and systems must be

upgraded. The upgrade is seen as an opportunity to upgrade to an event-based architecture conformant with HL7 FHIR standard, interoperable with the newer social care record system.

5.4 Finland

Finland is a parliamentary democracy with a population of almost 5.4 million.(71) The Ministry of Social Affairs and Health is responsible for developing and implementing health reforms and policies, informed by a network of expert and advisory bodies.(72) The health system is highly decentralised, with 319 municipalities having the responsibility for the provision of health and social care services to their residents.**(73) Municipalities can provide these services themselves or jointly with other municipalities.(73) 20 hospital districts, which are federations of between 6 and 35 municipalities, provide public specialist and inpatient care for the respective municipality residents.(73)

Recently, health boards and social welfare and services boards, which were traditionally separate, have been merged to improve coordination.(73) In some regions, the municipalities have transformed hospital districts into joint regional health and social care authorities.(73) Most care is provided close to the patient's home with long-term and mental health care becoming more integrated with social services.(73)

5.4.1 Delivery of Older Persons Services

Long-term care changed significantly in the early 2000s, when nursing homes were largerly converted into sheltered housing, with and without assistance.(73) About half of all such housing are privately-owned, for-profit entities.(73) The type of facilities and the quality of care varied considerably across the regions, with institutional care typically required for those with dementia.(73)

Municipal primary care services are delivered through health centres, each of which is an administrative body managing care at a number of health clinics or at the patient's home.(73) These health centres are typically GP group practices that employ nurses, public health nurses, and other professionals.(73) GPs play a gatekeeping role in respect of specialist services.(73) Finnish GPs are also expected to treat patients more independently that GPs in other European countries and many services have moved from hospitals to health centres.(73)

** Health care is also provided through occupational health care services and the national health insurance system. However, municipal health care is the core health system, and therefore the focus here.

The range of services provided at each health centre is at the discretion of the municipality but usually cover ambulatory curative care, home nursing for older persons, and rehabilitative care, as well as others.[73] Physiotherapy, occupational therapy, and speech and language therapy, are also often available.[73] A team model is often adopted for patients requiring complex care, with a nurse acting as case manager.[73] Health centres offer acute emergency services during office hours, with out-of-hours care provided by hospital clinics.[73]

Larger health centres are often very well equipped and staffed. They often have a wide range of healthcare professionals, including GPs, nurses, public health nurses, midwives, social workers, dentists, physiotherapists, psychologists, nutritionists, speech and language therapists, occupational therapists and administrative personnel.[73] Diagnostic equipment, laboratory facilities for taking samples, and facilities for minor surgery are often available.[73]

Inpatient departments are a specific feature of health centres, staffed by a permanent or visiting GP or specialist in geriatrics.[73] These wards used for long-term treatment of older people with chronic diseases, with some reserved for patients with dementia.[73]

Many health centres also provide social services to their population and supply information.[73] In a move towards more integrated care, 'Home (health) care', which combines home nursing and home help services, is provided by the health centre and is GP led.[73] Patient specific care plans have been developed to integrate care and some work has been done on the development of general patient pathways across hospital districts and across primary and secondary care.[73] However, there is often a lack of continuity of care and dedicated teams of nurses now provide support to patients following their discharge from acute settings.[73]

In the South Karelia region, 'home hospital care' is provided, in nursing homes or in a patient's home, including the provision of intravenous drips and pain pumps.[74] A 'near nurse' service is where the nurse works closely with the patient — for example, providing some support in respect of medications, though not for injected medications.[74]

InterRAI was introduced as a voluntary benchmark for nursing homes in 2000 and for home care subsequently.[74] More than half of all nursing homes now use InterRAI and in two years, it will be mandatory for all municipalities that perform assessments.[74]

5.4.2 ICT Enablement of Older Persons Services

The Finish Institute for Health and Welfare manages information systems for healthcare in Finland and issues regulations and guidelines on the standardisation of information management.(75) In Finland, all healthcare providers are obliged by law to upload patient health information to the National Patient Data Repository.(76) A small subset of the data is sent to the repository as structured data, with the bulk of the data stored as free text.(76) Patient data is retrieved from the National Patient Data Repository using the single national identifier, the National Social Security Number, which is used for all purposes including health.(75)

My Kanta, the Finnish national interoperability platform and online patient portal, provides patients with a range of services including the ability to see — at organisational level — who has accessed their data in the repository.(74,75) Overall, stakeholders see the value in the repository, with approximately 95% participating in the National Patient Data Repository scheme — with exemptions for small, private providers on grounds of cost.

As in other countries, the electronic record systems for healthcare and the system for social care system have not developed in step.(74) The electronic patient records and medical records were developed in the 1980s and 1990s, but social care records developed much later.(74) Nursing homes are part of the social care systems and of the Kanta platform.(74) Most social care providers are not part of the system.(74) The initial InterRAI assessment is often completed with pen and paper when with the patient then these notes are transcribed using a desktop in the office.(74)

There is a requirement for an IT system that makes full use of InterRAI, with decision support an important element.(74) Ideally, once the patient is assessed, the measures and functional profile can inform the development of the patient's care plan, together with the informal care given.(74) InterRAI information is uploaded to the National Patient Data Repository.(74)

As noted earlier, every patient has a standard electronic health record, used in hospitals and primary care settings.(74) This record is also used to record an older person's health information, such as medications — which also require supplementary information systems.(74) Aside from the addition of InterRAI data to that record, no modules for older persons have been added.(74) The social care system is newer, with a more sophisticated system architecture that includes modules and parts specifically for older persons.(74)

5.4.3 Conclusion

Every Finnish citizen has a national electronic health record and, aside from InterRAI information, no modules specifically related to older persons have been added. A national patient data repository, Kanta, stores clinical information from all Finnish healthcare providers, and patient data is retrieved using the nationa social security number. Only a small subset of data is stored as structured text, which can be re-used, with most stored free text.

Though part of social care services, nursing homes also upload information to Kanta, but other social care providers do not. Finnish citizens also have a national social care record, part of a system that is significantly newer than the national electronic health record system, which creates interoperability challenges.

More than half of Finnish nursing homes use the InterRAI assessment, and, in two years' time, the assessment will be mandatory for all municipalities that perform assessments. However, ICT enablement is also a challenge, with assessments largely recorded with pen and paper, then entered into a desktop computer at an office, before being uploaded to Kanta.

Finally, Finnish health centres (in particular, larger health centres) provide a very broad range of services and nurses often act as case managers for patients with complex needs, two characteristics of integrated care. However, integrated care is still considered to be at an early stage because few general care pathways have been defined and because of interoperability issues between health and social care systems.

5.5 Northern Ireland

The population of Northern Ireland was estimated to be just under 1.9 million in June 2020.[77] The Northern Ireland Ministry for Health defines policy while NHS Northern Ireland is responsible for the delivery of services. Five health and social care trusts are responsible for delivering healthcare services, along with one Ambulance Trust. Health and social care is integrated, with community services include Nursing Care, Social Care, Domiciliary Care, and Mental Health Care. Numerous organisations are in the voluntary sector. There are 321 GP practices in Northern Ireland, with citizens entitled to register with their choice of GP.

The Northern Ireland model for integrated care is provided through by public and private providers. Older person's care is provided in nursing homes, in residential care homes, and in the older person's home. One initiative in this area seeks to increase the number of multi-disciplinary teams in primary care settings, where a health professional is the first contact that a patient has in a GP practice. For

example, if the patient requires physiotherapy, the practice physiotherapist can give advice, signpost, or make a more detailed referrals. Another initiative seeks to reduce 'silos' in primary and secondary care — for example, where a physiotherapist seconded to a GP practice is still rostered for work in a secondary care area. Integrated care is regulated by the Regulation and Quality Improvement Authority.

5.5.1 ICT Enablement of Older Persons Services

The Northern Ireland Electronic Care Record provides an overview of a patient's clinical information. Additionally, the Key Information Summary is often used as part of an older person's care. The KIS covers ceiling of care, do not rescusitate orders, escalation plans, contacts, and other information. The patient's GP updates the KIS, which is uploaded to the central repository. The patient's key worker can provide updates to the GP to be added to the patient's KIS. The information is static unless updated by the GP, and there are difficulties with pruning information if circumstances change. The Scottish Health Board also provides a referral management system, which GP can make referrals to acute (or other specialist) services. These referrals are added to the patient's Northern Ireland Electronic Care Record and are triaged using the patient administration system in the target service.

Some challenges remain in sharing information across primary care, secondary care, and community settings. In primary care, each GP uses an accredited GP practice management systems from one of three vendors.[††] However, GP practices and hospitals typically have firewalls, making it difficult for nursing homes to access the Northern Ireland Electronic Care Record. During the COVID-19 pandemic, private hospitals and hospices were provided with access to the ECR as an emergency, with password protection, security controls, to enable them to continue with non-COVID surgery.

A range of systems are also used for the delivery of older persons services. These systems include:

- Assessment and shared care plan for the older person.
- Northern Ireland Single Assessment Tool (NISAT) reviews a number of areas for the adult or older persons. The standard was developed from a number of sources
- Carer's assessment, which was developed around the same time as the NISAT.

[††] Accreditation of GP practice management systems is undertaken in England, then adapted for use in Northern Ireland.

- Key worker allocation‡‡, where a key worker — broadly the same as a case manager — is assigned to the older person.
- Risk stratification and virtual wards where people are grouped into patient cohorts, in terms of the services they need, in 'virutal wards'.
- Key Information Summary (KIS) is mainly used for palliative care (though it is also for multiple sclerosis, motor neurone disease, and other conditions) and is available to those who may have to intervene or treat the patient.
- Domiciliary care service brokerage is the mechanism in each Trust by which the assessment is carried out and by which services are identified and provided.

In the area of community care, social care, and mental health services, seven different systems are in use:

- Paris provides electronic patient record and case management functionality for community health, child health, mental health, and adult and children's social care. It is a very integrated health care, social care, mental health care, and the Northern Ireland Single Assessment Tool. It is used in three Trusts, with a fourth using the mental health modules only.(78)
- Social Services Client and Administration and Retrieval Environment (SOSCARE) is the main system used by social workers in Northern Irealand to record and communicate information on social care clients.
- Electronic Northern Ireland Single Assessment Tool (eNISAT) is the standalone version of this assessment, which is also provided through Paris.
- Local Community Information Development (LCID) is an administrative system used in the community.
- IMS is a full mental health system with bed management capabilities.
- Domiciliary Care Brokerage, as described earlier.

It is intended that the Encompass platform will replace all of these systems. Encompass will integrate health care, social care, mental health services, and the Northern Ireland Single Assessment Tool as well as the Northern Ireland Electronic Care Record. It will include provision for hospices and later phases will integrate with GP systems.

The enhanced domiciliary care system will have standardised processes for service brokerage and service management, monitoring, and review. The enhanced domiciliary care system will manage the brokerage of services, through a dashboard of medications, personal care, and carer management — for example, if a carer does not clock in, an alert is raised, in part to improve the safety of lone workers.

However, interoperability between Encompass and enhanced domiciliary care system is an area that requires further investigation.

The integrated solution outlined above presents several challenges. Standardizing the process and data is difficult, with ways of working differ across the Trusts, complicating efforts to tailor the solution to the needs of users. Identifying best practice was an effective way to meet this challenge. Training must also be tailored to user needs and encouraging users to adopt and feel comfortable using the new integration solution also required significant time and effort.

5.5.2 Conclusion

In Northern Ireland, a range of systems are used for the delivery of older persons services in the context of the wider delivery of health and social care services. Additionally, the custom Northern Ireland Single Assessment Tool and a carer's assessment were developed specifically for use in olver persons services in Northern Ireland. The Key Information Summary in its current form is limited to updates by the patient's GP. While multi-disciplinary teams have been established in primary care settings, it is not clear whether the care pathways that characterise integrated care have been developed. Thus, some silos still exist in primary care and in secondary care and the different systems in use in community care, social care, and mental health services do not share information.

However, Encompass is expected to provide a single record designed to cover all the patient's information across health care, social care, mental health services and the Northern Ireland Electronic Care Record, as well as integrating with systems in hospices and with GP systems. It will include the Northern Ireland Single Assessment Tool and other assessments.

While this solution will solve a large number of issues, it is not without challenges. Processes differ across trusts, making it difficult to standardise them and complicating efforts to tailor the solution to the needs of the users. Users also required encouragement to adopt and use the new solution. Agreeing best practices was found to be the most effective method of standardising process across different organisations. To encourage adoption of the new solution, training should be tailored to user needs and users should be supported until they feel comfortable using the new solution.

Chapter 6 Conclusion

All of the countries reviewed are facing the same challenge in respect of an ageing population with increasingly complex care needs and requiring higher levels of care. All were seeking to move towards an integrated care model, based on the provision of care as close to the older person's home and community as possible. As a result, community health and social care services are called on to provide higher levels of care, of a more complex nature, including the management of higher numbers of chronic diseases. Nursing homes report having to provide far more complex care to residents, who were entering at older ages, in settings that were not designed for this purpose. And older persons tend to have higher levels of hospitalisation for longer periods. These factors lead to a far higher number of transitions of care than for other populations. Thus, the secure and effective sharing of the older person's health information during these transitions, and across health and social care settings, is becoming increasingly important.

However, every country reviewed faced some difficulties in the sharing of information across settings, regardless of the levels of ICT enablement already in place. GP practices tended to have very high levels of ICT enablement, often using one of a small number of nationally certified systems, but community settings often had lower levels of ICT enablement, (if any). Levels of ICT enablement in nursing homes varied widely, from none to a high level (often in privately-run homes) but even those nursing homes with significant ICT enablement lacked the capability to share information with GP practices or acute hospitals. Discharge from an acute setting was regarded as one of the most important transitions. But, even with electronic discharge summaries had been implemented, paper copies were often sent with the patient.

Each country started from a slightly different place and therefore took a slightly different approach. In Australia, where the national electronic health record was already in use, a dedicated central client record was established as part of the My Aged Care programme, together with web-based portals, referral management system, and call centre. However, the national record and the My Aged Care Record were not interoperable — and neither were the systems used by other government agencies, by health professionals, by service providers, and by assessors. The problematic nature of the assumption that older persons have access to a computer and the internet, as well as literacy and proficiency in their use, was also highlighted.

An ICT architecture review characterised the Australian Aged Care system as a 'fragmented' ecosystem, owing to the legacy technologies in use, the siloed operation of the systems, and their focus on reporting requirements rather than on

client needs. The review highlighted the difficulties of maintaining or making process changes to systems 'well-beyond their sell-by date'. Thus those delivering care did not have what they needed to make informed decisions, while providers often did not have the time or money to adopt new technological solutions or train staff in their use. It concluded that an overarching ICT strategy was needed to help define how the aged care providers, health care providers, IT solution providers and Australian Government work together to achieve system interoperability, data sharing agreements, standardised IT capability, and standardised workforce training.

In many countries, no dedicated record system or modules had been developed specifically for older persons. Instead, existing national eHealth services — such as electronic health records — were used. For example, in Denmark, levels of ICT enablement are high, with all GPs, nursing homes, and public health nurses using electronic record systems. Standards were defined for all commonly used clinical documents to supports the electronic exchange of these documents by hospitals, GPs and other healthcare providers using a national message broker and the national health data network. This approach supported to the digitisation of many of those workflows but had some drawbacks — such as difficulties in identifying the most up-to-date information within the system. Thus, Danish strategy had moved away from sending information using a national messaging broker — as had the New Zealand strategy, discussed later.

Sharing information was found to be more effective than sending information. Thus, Danish healthcare professionals can access a patient's prescribed medication record (Shared Medication Record) and inpatient record (Danish National Health Record). The Common Patient Overview dataset was developed for use by the health and social care professionals across the patient's care pathway. The municipalities are also working to provide access to a patient's medical records — from municipality and from GP — through the Danish Health Portal, to complete the care pathway. A number of older systems are part of this pathway.

The potentially high number of transitions across care settings in integrated care in general, and in an older person's care pathway in particular, has created challenges even in countries that have made great progress in ICT enablement. In Scotland a number of key elements are already in place: national health identifiers, standardised cloud-based GP practice management systems, standardised patient administration systems, and national systems such as the PACS. However, GP systems are not interoperable with other systems, levels of ICT enablement are lower in the community, and primary care, secondary care, and social care are considered to be disconnected. Work has begun on an integrated health and social care record and on a national digital platform. Similarly, in New Zealand, where a high degree of ICT enablement has been achieved, different systems are used in

healthcare, in residential care, and in hospitals, as well as by GPs. Primary care can access a patient's hospital but home care cannot.

Interoperability between these shared records (and across the pathway) is a crucial requirement — for example, in Estonia and in Finland, the well-established national health record system is not interoperable with the much newer national social care record. In both countries, the respective national health or patient data repository is considered to be another means of communications across settings. However, the Estonian national patient data repository uses the older, document-based HL7 CDA standard, and the volume of documents held for any given patient was considered to create issues for healthcare professionals accessing them. Similarly, the Finnish national patient data repository is considered to be a means of communication between settings, but owing to the large volume of unstructured data, has limitations in practice. Both repositories are likely to be upgraded to use an event-based, rather than document-based, conformant to HL7 FHIR.

In Northern Ireland, silos exist in each of the settings that form part of an older person's potential care pathway. Nursing homes can have difficulties accessing the Northern Ireland Electronic Care Record, which is typically behind the firewall of the GP practice or acute hospital. Additionally, the current architecture of the Key Information Summary service has limitations and a more up-to-date architecture is being investigated. It is intended that the introduction of the Encompass electronic health record will resolve these issues and integrate with GP practice management systems. The introduction of Encompass also faced certain challenges. Processes differ significantly across Trust, but agreeing best practices was found to be the most effective method of standardising process. Also, to encourage adoption, it was found that training should be tailored to user needs and that users should be supported until they feel comfortable using the new solution.

In Finland, many healthcare services previously provided in hospitals are now provided through healthcare centres, where multidisciplinary teams provide a wide range of services. Minor surgery, diagnostics, and lab testing are often available, together with inpatient departments and wards. These centres often provide social care as well as a combination of home nursing and home help services. Care plans are also developed. Thus, these healthcare centres provide the range of services that integrated care seeks to provide in the community. In spite of this, continuity of care is sometimes lacking, indicating the need for clear patient pathways.

In Finland, more than half of all nursing homes use the InterRAI Assessment and, in two years, it will be mandatory for all municipalities that perform assessments to use the InterRAI Assessment. However, InterRAI assessments are largely carried out using pen and paper, then data is entered using a computer in an office. While InterRAI data is uploaded to the Finnish National Data Repository, Kanta, an IT

system that makes full use of InterRAI data is still needed, to provide decision support and to inform the development of a patient's care plan. While many countries use such a system, the Canadian Institute of Health Information (CIHI) provides perhaps the best example of how to use InterRAI data.

InterRAI Assessments have been in use in Canada for many years, during which time reporting systems have been developed and have matured. The most recently introduced system, the Integrated InterRAI Reporting System (IRRS), consolidated data from InterRAI assessments for home care and for long-term care facilities, providing a more holistic view of an older person's patient journey. The IRRS is also the first large-scale implementation of FHIR in Canada, with the FHIR standard adopted to allow the use of the newest versions of InterRAI assessments and supporting point-of-care, organisational, and system decisions in a near real-time reporting system. However, a 2020 study indicated that, overall, organisations often lacked the education, personnel and supports needed to use the data from InterRAI Assessments to its full potential.

In New Zealand, the InterRAI service is very well-established national digital service, implemented as the Assessment Management Service. It provides the capability to complete the InterRAI Assessments for Contact, for Long Term Care, and for Home and Community. A detailed review of AMS found that how the design and workflow of the digital service had a largely adverse impact on the successful adoption — the AMS design included out-of-date navigation and data entry conventions, which the users were not expecting, and the workflow design necessitated numerous page reloads, which caused further delay. Issues were also found with integration of assessments, leading to the identification of the need for a new generic, standards-based assessment.

So, given these issues and limitations, what is the best approach to take, to realise the ICT enablement of older persons services in Ireland? First, the following crucial elements of service redesign must be in place, as a prerequisite for successful ICT enablement of older persons services:

- streamlined, standardised processes for planning, funding, resourcing, and enhancing these services
- well-defined pathways, based on shared care plans and care pathways, that are accessible to multi-disciplinary teams
- enhanced system capacity, in terms of community rehabilitation services, medication management, multi-disciplinary team approach, and others
- seamless care through the coordination of care and referral services.

Where these elements are in place, the measures and considerations would support the wider ICT enablement of older persons services. To optimise interoperability

across health and social care, it is advisable to adopt the following strategic approach:

- Plan and manage interoperability initiatives at regional level or by local authorities, with cross-regional communication (especially during the initial phases of planning) to set a common goal.
- Clearly define the distribution of responsibilities between the regions and the state, with the state managing national-level initiatives and developing a framework of standards within which the regions work.
- Investigate the actual information needs of healthcare practitioners, then identify core modules to be implemented across the regions.
- Centralise data from systems developed by the state and by the private sector in a centralised database, such as a National Health Record. Public access through a national portal also increases transparency and patient engagement.
- Consolidate existing systems by carefully considering the opportunity cost of maintaining current systems against the advantages of new systems. This was found to minimise EHR fragmentation.

The following measures can help to avoid the development of a 'fragmented ecosystem' and to optimise interoperability across health and social care:

- **Introduction of data interoperability standards:** Introduction of data interoperability standards across residential care, home care, and community care. This includes mapping the data used in systems across these settings and the definition of a standardised minimum data set conformant with the HL7 FHIR standard, to allow integration with APIs and the sharing of information, securely and appropriately, in realtime (or near realtime).
- **Incentivised adoption of cloud-based solutions:** Adoption of cloud-based solutions provides a range of benefits in the area of collaboration, scalability, business continuity, and cost effectiveness. Provide incentives and seed funding to encourage aged care service providers to adopt cloud-based solutions and to provide appropriate training for their staff.
- **Replacement of obsolete systems with modern solutions:** Replacement all obsolete systems with modern solutions, such as the introduction of a client record management (CRM) systems with clear master data management rules and standardised interoperability with health and social care providers, and other State agencies.
- **Improvement of the digital skills of the workforce:** Provision of good quality training on use of aged care provider solutions and any other aged care-related services, as part of their professional accreditation.

- **Establishment of a mechanism for independent oversight:** Establishment of a mechanism for the independent oversight of the measures outlined above and then transition to mandatory reporting:
  - Development and implementation of data interoperability standards
  - Development and implementation of a standardised dataset and scalable assessment instrument, based on FHIR and InterRAI
  - Incentivised adoption of cloud-based solutions
  - Support for health and social care providers and vendors to change their systems to capture this data
- **Undertaking of co-design activities:** Undertaking by healthcare and social providers involved in older persons services, research institutes and the State of partnerships and co-design activities. The outcome of activities should be services with designs and workflows that enhance user experience and encourage adoption.
- **Collaborative development of innovative solutions:** Collaboration of health and social care providers, technology and software vendors, and the relevant bodies to find innovative solutions.

In respect of the National Shared Care Record and other national infrastructure, the following considerations are highlighted:

- **Inclusion of health and social care information in the National Shared Care Record:** Inclusion of relevant older persons care information, including the older person's care plan and services, and other social care information in the National Shared Care Record — building towards the provision of a single record of health and social care for every older person.
- **Linking to the National Shared Care Record using national health identifiers:** Use of national health identifiers to link an older persons care information in the National Shared Care Record.
- **Trialling of the National Shared Care Record with Older Persons as the first population:** given the high number of potential transitions across settings, and the necessity of safe and secure data sharing, older persons should be among the first populations considered to trial a new National Shared Care Record.
- **Development of a national information health platform:** There is a need for a national health information platform, based on a distributed architecture and a suite of application programming interfaces (APIs), using HL7 FHIR standard, to share information in realtime from clinical systems where the data is held.
- **Development of a hardware management strategy:** A hardware management strategy should be developed, to ensure a manageable set of browser versions and operating systems are in use, as well as evaluation

and optimisation of application stability and responsiveness, database performance, browsers, network coverage and capacity, and server capacity on infrastructure elements aging out and to create a more uniform hardware base.

Additionally, reporting metrics for InterRAI Assessments for Home Care were still evolving in Canada. Therefore, consideration could be given to potential development of such metrics and the most effective means by which healthcare professionals and others can derive value from the rich dataset that InterRAI Assessments yield.

In respect of long term residential care, the following measures should be considered:

- **Establishment of digital foundations**: This includes the provision of infrastructure and devices to support the secure digital collection and sharing of data. This includes the improvement of Wi-Fi and broadband capabilities as a core service, to allow residents to connect with family and friends and with the community.
- **Establishment of digital services**: These services should be designed collaboratively with individuals and their families and with healthcare professionals, to facilitate residents' social connections and activities, and support staff wellbeing. Individuals should be supported to choose and use these services.
- **Improvement of digital skills**: The improvement of the skills and confidence of individuals and their families, and of healthcare professionals in using these services, should be a high priority.

Additionally, this review has shown the significant benefits of software that is intuitive and easy to use for all user groups and that provides streamlined workflows for all the user group tasks and for patient pathways. It also shows the benefits of a hardware management strategy that provides a manageable set of browser versions and operating systems, as well as evaluation and optimisation of application stability and responsiveness, database performance, browsers, network coverage and capacity, and server capacity. It shows the role of effective training, tailored to the needs of the different user groups that is available in variety of formats, including self-paced learning. And finally, it shows a hugely underestimated impact on the adoption and use of digital exclusion of older persons.

As was noted in New Zealand, a clear vision of the future ideal state is also needed, showing how the different elements of the patient's pathway will share information — such as interoperability between the Home Care Management System and the Residential Management system; how the different healthcare professionals will interact with those different systems and the cumulative effect; how the patient's

information is shared safely throughout the patient journey; and finally, the roadmap for development, maintenance, and future upgrades.

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