Office of the CIO

National Electronic Health Record

Strategic Business Case Executive Summary

May 2016

Version 1.0

As Batalden and Davidoff wrote in 2007, everyone in Healthcare really has two jobs when they come to work every day: to do their work and to improve it.

An Electronic Healthcare Record (EHR) is one tool that can assist us in making it easier for Clinicians to do the right thing, by facilitating patient safety and quality improvement through the use of checklists, alerts, and predictive tools; through embedded clinical guidelines promoting standardised, evidence-based practices; through electronic prescribing and test-ordering, thus reducing errors and waste, while allowing remote access to information.

Faster, more accurate communication and streamlined processes can lead to improved patient flow across the continuum of care with less duplication of investigations, while making us more responsive to patient inquiries.

While this all sounds very compelling, we recognise the challenges encountered in other jurisdictions in successfully implementing an EHR. We acknowledge that successful implementation depends on strong leadership, full involvement of clinical staff in both design and implementation, as well as the need for staff training. We look forward to working with colleagues in the design and implementation of an EHR in Ireland and we believe that this business case is the first step in the right direction.

Dr Áine Carroll, National Director Clinical Strategy and Programmes Division, HSE

The delivery of an Electronic Health Record (EHR) for Ireland is the foundation for the reform of the health care system. The delivery of integrated care and the ability to truly place health information under the control of the patient is only possible with a digital fabric in place. Certainly, if our citizens are going to experience a truly joined up single health service then the health system will need to weave a digital fabric that supports health and wellbeing as well as integrated care.

The business case in front of you today has been created with great care and attention to how eHealth Ireland can deliver fully a core element of the digital health system. We are at a unique juncture where the Irish health system will learn lessons from many nations who have experienced EHR developments; we propose that Ireland must have an EHR that is implemented as a change project led by clinicians and Irish people, which will be facilitated by modern technology.

This business case has been created in that context and with significant clinical and patient involvement.

An EHR in Ireland can be delivered in a way that is in keeping with the current funding model of health and fully compatible with our clinical and administrative systems, whilst placing the patient at the centre of the system and enabling continuous service improvement to become the overall culture of health delivery in Ireland. Our approach is to harness the investments successfully made already and continue to build upon these. I am confident that we have set out a sound approach and programme and this business case also describes this plan.

I truly believe that Ireland, whose economy is one of the global leaders in the technology and health informatics industry, is perfectly positioned to establish a healthcare system that is digital by default. The timing of, and momentum behind the wider reform of the Health Service makes this a great time to make this investment and to be assured of the benefits to be gained.

Richard Corbridge, CIO HSE

A National Electronic Health Record is Essential to Deliver Reform

The delivery of health and social care services in Ireland is unsustainable without significant reform. There is a recognised need to do things differently and to redesign care delivery with a shift in emphasis from acute care to more care delivered in the community. This is reflected in the ambition of the current Reform Programme across the healthcare system that aims to transform clinical, structural, and financial, aspects of care delivery.

Based on international experience of the implementation and adoption of Electronic Health Records (EHR), the characteristics and challenges of the Irish health system, and the level of ambition set out in this strategic case, we believe the programme is most likely to span a 10 year period of transformation. EHR directly supports the ambition of health reform in Ireland and therefore the effectiveness and success of the EHR programme will be assured through alignment with this reform journey over the same period.

An EHR is a comprehensive solution that supports the creation and sharing of key patient information. It is a core capability required for the future delivery of healthcare. It will move us from a position where patient records and key information is locked in a paper format and within specific organisations, to an environment where digital patient records are shared securely across care settings with appropriate consent. This will result in:

- Better, safer clinical decision making,
- More informed and engaged patients and citizens,
- Integration of services across care settings,
- Increased availability of information to enable proactive management of patients and conditions,
- Improved patient outcomes.

Among a wide spectrum of healthcare technology solutions, the Electronic Health Records is foundational in terms of support for clinical environments and wider patient engagement. The National EHR is a significant investment and a long term commitment to transform health service delivery – it is not simply about adding technology to existing ways of work but incorporating digital solutions to support and enable changes and standardisation in clinical care.

As well as delivering operational benefit, a National EHR will also increase public engagement and support Health & Wellbeing objectives. It provides an essential tool for identifying cohorts of the population that are at risk and enables the development of care plans and efforts to support them. This is achieved through an integrated approach, not a set of activities tied to one particular care setting.

> It is increasingly evident that technology is a fundamental enabler in the effective and efficient delivery of health services. In effect is the 'fourth utility' without which a modern health service is not feasible.

Transformation ambitions identified by the Department of Health call for four inter-dependent pillars of reform; Health and Wellbeing, Service Reform, Structural Reform and Financial Reform. The resulting programme of work includes significant changes such as the increased focus on Health and Wellbeing, the establishment of Hospital Groups and Community Health Organisations, and moving to a different funding approach based on activity. The kind of changes envisaged cannot be achieved without the adoption of new technology. In particular, the deployment of EHR solutions across acute and community care settings (Primary Care, Mental Health, Health and Social Care Professional Services, Older

Persons Services and Disability Services), is a pre-requisite to enabling care to be delivered in a more integrated manner and allowing patients to receive a seamless service from providers.

Without a National EHR, it will not be possible to do the following:

- Deliver integrated care as care givers in different care settings will not be able to see essential information about the patient,
- Standardise care processes and pathways across the health service,
- Allow Hospital Groups to deliver care as a consolidated group where information about treatments and patients flow seamlessly across hospital boundaries,
- Enable CHOs to provide an efficient, integrated service because of the continued reliance on paper based records and administration,
- Securely maintain and manage medical records electronically as opposed to the current paper-based formats,
- Provide greater visibility of real-time views of activity and resources across the entire health system to enable greater control of costs,
- Provide the linkage between activity and cost needed for Activity Based Funding. This can only be done effectively through the introduction of the National EHR that will capture and share data relating to the episode of care.

Demand for Digital

Most sectors, for example the communications, financial, transport and retail sectors have been significantly transformed in terms of customer interactions via a digital environment. The promise of a similar transformation in health service delivery is as yet unrealised in most countries. However, some are leading the way and those in the healthcare industry that have been successful have incorporated technology adoption within wider and more comprehensive transformation efforts.

The deployment of technology in healthcare has been slower than other sectors but public demand is now becoming a key driver for change. The public increasingly demand and expect a 'digital first' experience and with 80% of the world's adult population predicted to own a smartphone by 2020 this demand will accelerate. Therefore the ability of the public to interact with health services across digital platforms will become a core requirement in service delivery.

In an Irish context there is evidence of public expectation around technology modernisation. A recent consultation with the Irish public carried out by eHealth Ireland indicated a strong view that interacting digitally with the health system would be a positive experience.
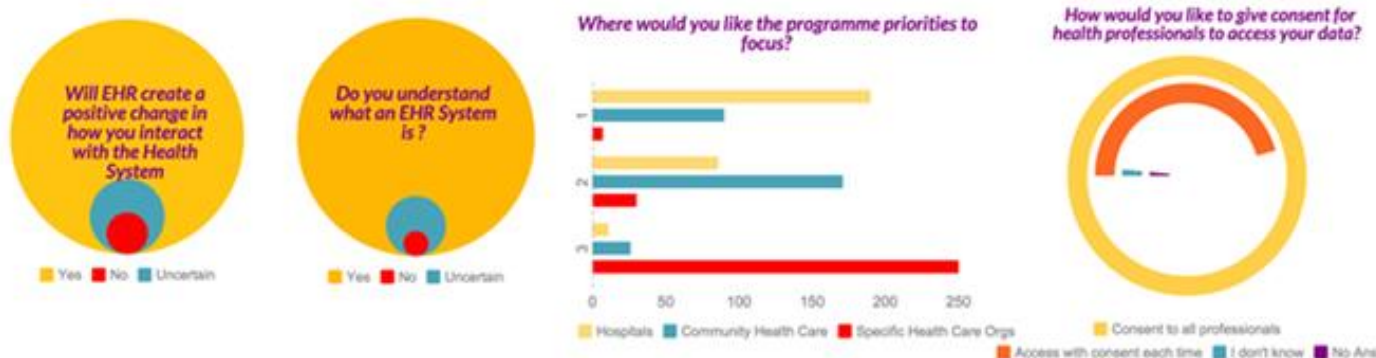
Source: Findings from eHealth Ireland EHR Public Consultation (Sample Size: 269)

International EHR Adoption and Efficacy

Deployment and adoption of EHRs continues to be commonplace in developed countries with many at very advanced stages of adoption, e.g. in the US more than 80% of providers now use an EHR[1]. While we currently lag other countries in this area, Ireland has an opportunity to make a step change and to learn from experiences elsewhere.

A selection of countries where significant programmes of work have, or are currently taking place, include:

UK – As of May 2015, over 55 million patients in England can book GP appointments, order repeat prescriptions and access summary information in their medical record online. 97% of patients in England can now take advantage of online GP services[2]. The implementation of the NHS Spine services has increased the adoption of the NHS Number as the prime patient identifier, enabling safer care by linking and tracing of a patient's records across NHS organisations. 40.2 million enquiries are made to the Personal Demographics Service (PDS) every month to confirm correct identification and contact details for patients. This has minimised misidentification of patients, assisted in linking health records, and improved data quality[3].

Northern Ireland – There has been a successful summary care record programme underway since 2011. There is now a core set of information for health service users available to clinicians including encounters, discharge letters, medications, allergies and immunisations. This has enabled integrated care pathways to be established, for example for diabetes sufferers where the care is now co-ordinated in the community and overseen by Endocrinologists.

USA – Kaiser Permanente, one of the largest not-for-profit healthcare delivery systems has 100% adoption of multifunctional EHRs. It has recently focused attention on greater patient empowerment through their investment in personal health records and connecting securely with patients. They have seen strong results such as a 57% reduction in medical errors, and a 50% reduction in hospitalisations[4].

Australia – The largest eHealth project in Australia is the Personally Connected E-Health Record accessible to patients and providers. This involved an investment of $467million (€315million) between 2010 and 2012 and a 2015 budget of $140.6 million (€95million). From an adoption perspective, it is estimated that over 60% of GPs in Australia are connected to the PCEHR. National EHR penetration in 2012 was estimated at 66% for both hospital and ambulatory settings, but 142 New South Wales hospitals (80% of the bed base) had EHR functionality[5] [6].

The Netherlands – As of January 2015 all prescriptions across the Netherlands health systems are electronic. Medication-related acute hospitalisation has reduced from 4.6% in 2005 to 3.9% in 2008[7].

Andalucia, Spain – As of 2010, there were more than 7.5 million health records and 840 primary care centres connected, covering 97% of the region's population. The outpatient clinics and emergency rooms of 26 hospital organisations and 3,500 private chemists were connected to the system. In the public health system, more than 17,000 operators use the Electronic Health Record every day[8].

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[1] Nuffield Trust (2016). Delivering the benefits of digital health care

[2] https://www.england.nhs.uk/2015/05/patient-online-55-mill/

[3] NHS Informatics (2013). Final benefits statement for programmes previously managed under the National Programme for IT

[4] Porter, M. (2014). Kaiser Permanente – Integration, Innovation and Information Systems in Health Care

[5] New South Wales Government (2013). A Blueprint for eHealth in NSW

[6] The Commonwealth Fund (2015). International Profiles of Health Care Systems

[7] Van Cauwenberge J. and Verhoyen G. (2014). E-Health in the Netherlands

[8] Junta de Andalucia (2010). Healthy Andalusia

> ⚠ EHR capability is recognised across the world as a core foundation for health IT infrastructure. It is the bedrock upon which modern, integrated and connected healthcare is delivered. As a critical enabler it allows the patient to be at the centre of care and also become involved in shaping their healthcare experience.

Developments to Date

This Strategic Business Case builds upon work and consultation completed to date as part of a structured eHealth Vendor Engagement Process, the publication of the Knowledge and Information Plan and the National Electronic Health Record Vision and Direction. The Strategic Business Case is a further step along the journey for National EHR development in Ireland.
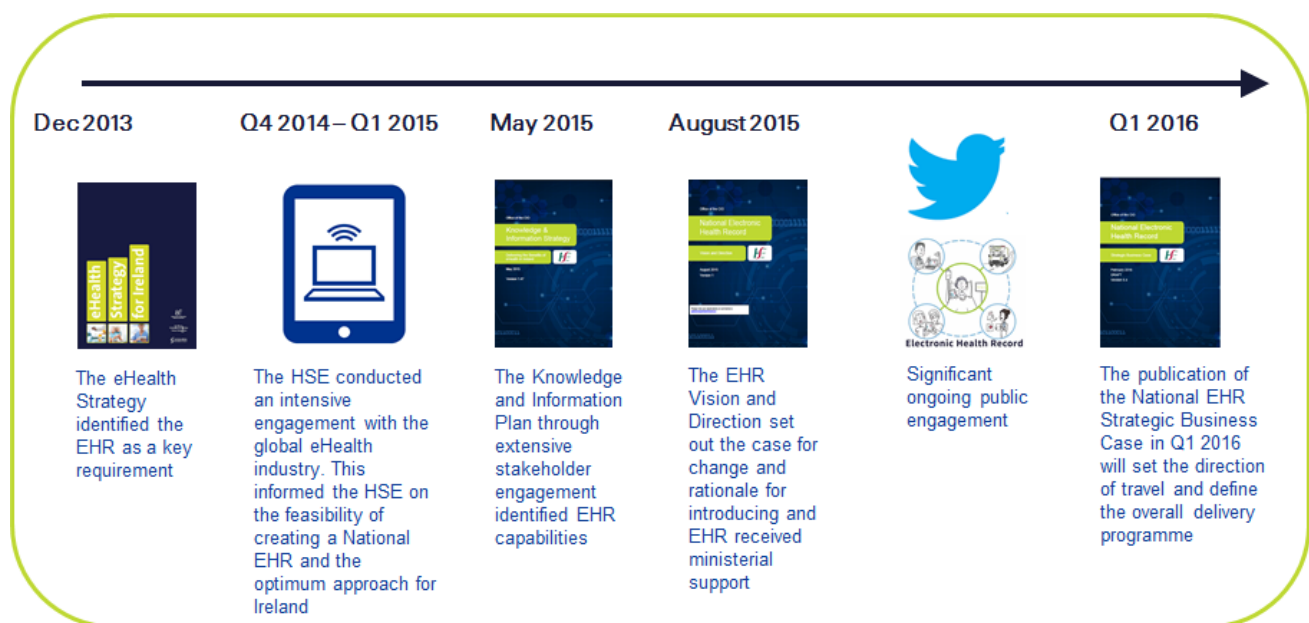

Figure 1: Developments to Date

Benefits from EHR

The benefits that can be achieved from introducing an EHR are varied and context specific. There are both quantifiable and qualitative benefits.

Quantifiable Benefits from EHR

Based on a literature review of international evidence and benefits realised in other jurisdictions, a significant range of quantifiable benefits have been identified. These benefits can often be linked to a number of different outcomes, e.g. the reduction of Length of Stay in Emergency Departments will result in an improved experience for patients but also drive down cost. In the following section benefits have been categorised across three broad outcomes:

Outcome	Description
Improved patient experience	• Better information will support more efficient and effective clinical decisions, which should result in reduced length of stay and reduced wait times for patients • Patients will become active participants in their health care journey and be better informed on their treatment options which increases their engagement and understanding of their care

Outcome	Description
Improved patient safety and care	• Improved access to integrated and shared clinical information which will support more effective clinical decision-making. This improves patient safety through benefits such as decreased instances of avoidable adverse events and hospital readmissions.
More efficient delivery of health services	• Reduced reliance on manual processes, with increased secure and robust automation of information collection, sharing and analysis to free up clinical and non-clinical resources • Greater visibility of patient flow, resource availability and other efficiency metrics across the health service allowing for more effective management of resources and overall improvements in efficiency

A selection of quantifiable benefits that can arise from introducing an EHR include the following:

Patient Experience
- ↓ **7%** reduction in inappropriate testing
- ↓ **37%** reduction in preventable hospitalisations
- ↓ **20%** reduction in LOS (Sepsis clinical pathway)

Patient Safety & Care
- ↓ **32%** reduction in Sepsis mortality (early intervention)
- ↓ **76%** reduction in errors in discharge summaries
- ↓ **68%** reduced likelihood of medication errors

More Efficient Delivery of Health Services
- ↓ **9.66%** cost per patient (advanced EHR hospitals)
- ↓ **28%** in transcription costs (Primary Care)
- ↓ **11%** reduction in drug costs

Qualitative Benefits from EHR

Qualitative benefits are understood and valued by patients, care practitioners and healthcare administrators but do not lend themselves to easy quantification. Below we outline qualitative benefits which more holistically describe the full benefits that will be possible through the availability of an EHR.

Benefit	How it is achieved
Proactive management of care	More comprehensive and integrated long-term condition management based on robust communications between professionals and complete clinical records being available. Decisions are no longer made on incomplete information and fewer patients 'falling through the cracks', leading to reduced admission rates, better outcomes, and a more satisfactory patient experience. Profiling and selection of people for care programmes enabling earlier intervention before conditions deteriorate Improved targeting of health advice to enhance health rather than treating sickness as part of Population Health management
Empowered patients who help reduce the demands on the health service	Access to information and services leads to improved patient, service user and carer participation in care. This leads to empowered patients and service users. There is potential for strong connections between healthcare professionals and patients when self-management approaches are used.

Benefit	How it is achieved
Improved Multidisciplinary Collaboration	With the longitudinal record being available electronically and standardised care pathways and decision support, the ability for care givers to collaborate is greatly increased. Care givers can view the same information in different locations and organisations to form multidisciplinary views on the treatment plans.
Improved management of the acutely ill and/or deteriorating patient	Facilitated through a complete patient record, advanced decision support and effective communication between professionals. Currently opportunities for early effective intervention are missed due to lack of available clinical data and lack of advanced decision support algorithms, leading to delays in specialist clinical involvement.
More effective and safer handover of care and more timely involvement of specialist clinical involvement	Enabled by electronic messaging of handover documentation, referrals and consultation requests, with automatic notification to recipients, who will then have the ability to access patient clinical data. Today the handover of care and requests for specialist clinical involvement are dependent either on paper documentation, often sent by post with consequent delays in receipt, or on phone conversations with consequent poor record keeping and governance.
Improved clinical decision-making and outcomes, underpinned by stronger clinical governance	Delivered through evidence based intelligent algorithms that leverage rich data to guide decisions, and track clinicians' adherence to or variance from recommended practice. A better evidence base for future decisions is also created where interventions and outcomes form a linkable base of intelligence. Currently, clinical decision-making is supported by paper or static web protocols and guidelines with no systematic capability to actively encourage or track adherence.
Improved clinical audit and quality	Clinical audit and quality improvement are supported by the availability of better quality data on adherence to clinical pathways. It allows for selecting cohorts of healthcare professionals for continuing professional development. Prioritisation dashboards and the use of alerts and notifications can prevent patients missing treatments they need. Additionally, these improvements in health services can result in benefits including: • Improved patient care through development of Evidence-Based Guidelines and Clinical Practices • Service Improvements (e.g. reducing LOS, increased throughput, increased patient satisfaction) • Improved research programs (e.g. identification of suitable patient cohorts for research
Improved health service management	Hospital and health service management are supported through monitoring of patient flow, cost of service, adherence to best practice guidelines and clinical outcomes.
More informed research into population health and clinical interventions	Data in EHR systems provide a rich source of intervention, outcomes and cost for retrospective data and trend analysis, which can identify areas where further research is required and likely cost effectiveness of treatments. EHRs readily support the identification of candidates for prospective studies and enforce the collection of data. The outcomes of research can support the development of evidence based guidelines and these can be built into EHR protocols and be implemented as best clinical practices. Additionally, the benefits of this research potential for population health includes: • Reduced burden of disease across the community • Improved cost reduction across the health system through public health programs
Enhanced clinical teaching and problem based learning	EHR records can be readily searched to find suitable case studies to support bedside or lecture based clinical teaching. Because the records contain longitudinal patient records, then they can be used to provide a problem-oriented perspective to medical education.

A National EHR for Ireland

Within an Irish context, the scope of the National EHR Programme includes both the operational systems within Community Healthcare Organisations and Hospital Groups and the solutions needed to ensure sharing of electronic patient data across care settings. The aim is to make key patient data from operational systems accessible across the entire continuum of care by relevant users, including the patient themselves. This will be enabled by the Individual Health Identifier (IHI) and could include information from all healthcare providers, including GP's, voluntary and private healthcare organisations. Critically, the National EHR will also support the broader Health and Wellbeing objectives in Ireland through the data that can be captured and analysed on a longitudinal basis and ultimately via greater patient engagement. The core information that is created and stored will provide national level data of value.

The National EHR Components

Four primary components have been identified that constitute the National EHR for Ireland. These are:

- National Shared Record,
- Community Operational Systems,
- Acute Operational Systems,
- Integration Capability.

The Individual Health Identifier, delivered under a separate programme, will also be a key enabler of the National EHR.
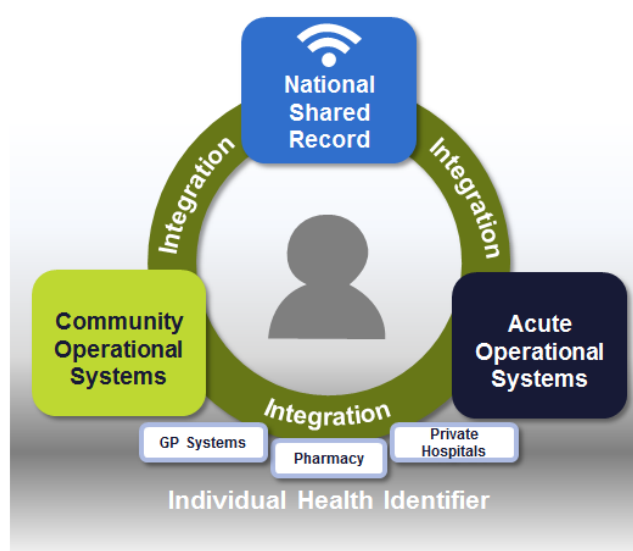

Figure 2: Scope of the National EHR Programme

This high level architecture has been derived from the initial eHealth blueprint that was shared and validated with the eHealth industry and in consultation with a wide range of stakeholders. A number of key factors were identified during this engagement that have driven the overall configuration including:

- The need to allow flexibility for different operational areas across Ireland's health system to progress in a semi-independent manner and at differing speeds,
- Facilitating a modular approach that delivers benefits within specific care settings and does so without the need to implement on a "big-bang", all or nothing, basis,
- Enabling change to take hold at local level and gradually building on that change incrementally,
- Responding to current market structure – currently, there is no mature solution available that would meet the needs and requirements of the National EHR vision which spans the entire health service.

Through the use of analytic tools, the data held in the National Electronic Health Record can aid population health planning, patient risk stratification and clinical research. Operationally, the systems will support areas such as; National Screening, Immunisation, Child Health, Sexual Health, and Health Promotion and Improvement. The rich information available will be of benefit to overall research efforts and can be aligned to the overall research approach that will emerge across the entire health service.

Other healthcare providers such as General Practitioners, Pharmacies and Private Hospitals can access and contribute to the National Shared Record. This will be achieved through the Integration Capability that will link systems and information with the portal solution for the National Shared Record.

The National EHR Strategy

There are a wide variety of approaches that can be taken regarding the deployment of a National EHR. In developing the strategy, there was a particular focus on the characteristics of the Irish healthcare environment, the current market capabilities, and the overall capability to adopt solutions as part of a transformation. This created a set of principles that set the context for the solutions strategy and guide its definition. These principles were reached by consensus at stakeholder consultation workshops:

- The current environment is not a "greenfield" one, particularly within the acute setting. In the community care setting, there are virtually no EHR capabilities currently in place. There are a large number of systems currently in use across the Acute setting that provide partial capabilities. This includes significant national systems such as NIMIS but also more specialist systems such as the Epilepsy Electronic Patient Record. The long term solution therefore will involve integrating some existing systems with others being retired as the national solution is fully implemented,
- The need to build using proven solutions for the most critical components. There is a need to minimise overall risk within the primary components of the National EHR and therefore necessary to focus on proven solutions that are mature and widely adopted,
- The overall solution space articulated within the National eHealth Blueprint is extensive and represents a large scale undertaking in terms of delivery. We must have a pragmatic approach to change so we identify and break down components of the overall solution that could be implemented on a modular basis. Allied to the current solution landscape, the approach must be to build as you go in a modular approach and reuse what you can that is fit for purpose in the future National EHR landscape,
- Innovative and emerging solutions are capable of delivering enhanced capabilities as part of the broader solution landscape. The adoption of these solutions, in a controlled manner under the right governance model (technical, clinical, information, security), will be part of the long term solution for Ireland and support emerging players in the Irish and international market.

The Solution Strategy

> The ambition in each care setting and nationally is to minimise the number of individual vendor solutions that prevail across the Irish healthcare system, minimise the integration requirement and risk, and gradually transition as close to a single solution environment as possible.

In relation to each component the solution strategy and rationale is as follows:

- **National Shared Record** – while there are critical dependencies on current projects such as the Individual Health Identifier, and integration requirements with national solutions such as NIMIS and MEDLiS, the implementation of a national shared record is largely a new and discrete initiative. The preferred solution strategy in this instance is to deploy a single solution but with a significant emphasis on standards and broader integration requirements that must be developed at a national level, to allow for local context portals where necessary,
- **Integration Capability** – in a similar way to the national shared record, an integration platform solution to support the National Electronic Health Record is a new and discrete initiative. The integration requirements will be developed in parallel with all considerations of the operational EHR solutions, and standards will be critical in ensuring that the ongoing integration tasks are feasible and cost is minimised. The solution strategy is to deploy a single solution for integration,
- **Community Care EHR Operational Systems** – the systems currently deployed in this area are limited in scope and implementation and there is therefore limited legacy to consider or build from.

Part of the overall ambition in establishing CHOs is to achieve greater consistency in operating models across the sector and this is also reflected through discussions with key stakeholders from this area of the health system. Finally, the engagement with a range of vendors suggests that there are solutions in the market that support the range of requirements suitable for initial deployment of core capabilities in the CHO areas. The preferred solution strategy is therefore to deploy a single solution for CHOs that encompasses the core needs for individual disciplines including Primary Care, Mental Health, Health and Social Care Professional Services, Older Persons Services and Disability Services,

- **Acute Care EHR Operational Systems** –Various systems of significant importance in the EHR landscape already exist in the hospitals and/or are currently being deployed. Additionally, there are ongoing requirements that may need to be addressed urgently in advance of any national EHR deployment. It is not felt that a single solution can be deployed in a "top-down" manner but that we should be to evolve towards a single solution. The realisation of a true single EHR solution within all hospitals in Ireland will take many years and over the course of this journey a multi-vendor EHR environment will exist and need to be managed. All new investments will be made in line with this solution strategy and any decision to deviate from the strategy will be taken on an exception basis.

In considering the overall National EHR journey, there are a number of specific objectives that drive the roadmap design and act as a guide to how the vision for the National EHR is achieved over time. The ambition is to provide the right information, at the right time, to the right people for the right reasons to support more effective and efficient care. The objectives that underpin the journey are:

1   *To allow the evolution of a National Shared Record* in viable stages that are increasingly information rich, i.e. it is necessary to start small and with what may be achievable over the short term in relation to the delivery of one true view of common information covering the life of the patient, and to continually improve this picture in discrete phases,

2   *To support the demands of "business as usual"* across the healthcare system while maintaining alignment with the overall vision and direction. We recognise that ongoing demands will arise for information and technology solutions to address key issues in the health system, e.g. the critical need for more effective information to support Emergency Departments. The roadmap must allow a degree of flexibility to accommodate these needs but in a controlled way that aligns with the strategic direction,

3   *To leverage and integrate existing national systems* and investments. There are national systems that currently exist or are being deployed across the ICT landscape of the Irish health system, which will be leveraged to deliver elements of the national EHR. This includes deployed systems such as The National Integrated Medical Imaging System (NIMIS) and systems being deployed such as the Maternal & Newborn Clinical Management System (MN-CMS) and the National Medical Laboratory Information System (MedLIS),

4   *To encourage and harness innovation* in the wider eHealth ecosystem in Ireland and internationally. Given the rapidly evolving landscape of emerging, innovative solutions that will enhance the National EHR landscape it is critical that the roadmap for implementation allows these solutions to be considered and, where appropriate, incorporated in the evolving model,

5   *To reliably address the existing and emerging needs of security and privacy.* It is recognised internationally that security and privacy of patient information is a critical factor in the success of EHR programmes. Confidence and trust in the EHR system and the organisation running its programme is necessary for success. The delivery roadmap must continually support these needs both in terms of the technical delivery and in the effectiveness of the communication with key stakeholders throughout the journey.

Evolving to a Single Solution

In the development of the solution strategy and subsequent implementation approach there is broad recognition that such an ambitious programme cannot be achieved in a single step and that the journey will take many years. It is also clear that there are many ongoing initiatives of varying scale that will contribute to the final vision of a single solution set in Ireland. Therefore the journey must accommodate:

- The requirement to implement *critical tactical solutions*. For example certain hospitals are in immediate and urgent need of solutions to support patient administration. These needs may need to be addressed in advance of the overall procurement and deployment of an acute EHR, through a separate solution. This would subsequently be replaced once the national solution is procured and the organisation is ready for deployment,
- The development of *innovative specialist solutions*. There are a number of highly innovative EHR Lighthouse Projects underway such as the development of the Epilepsy EPR, the bipolar solution and the Haemophilia project. While the solutions in these projects may ultimately be replaced through the National EHR programme, they can contribute significant learning to the overall national EHR implementation and will enhance the overall solution that prevails in the long term,
- *Other national solutions*. The programmes underway to implement the national solutions such as the imaging solution and the Maternal and Newborn Clinical Management System will continue and be an important part of the overall national solution landscape.

An effective Design Authority will be a key requirement within the governance structure to ensure that all decisions and investments are made in way that recognises the long term ambition and balances that with immediate needs.
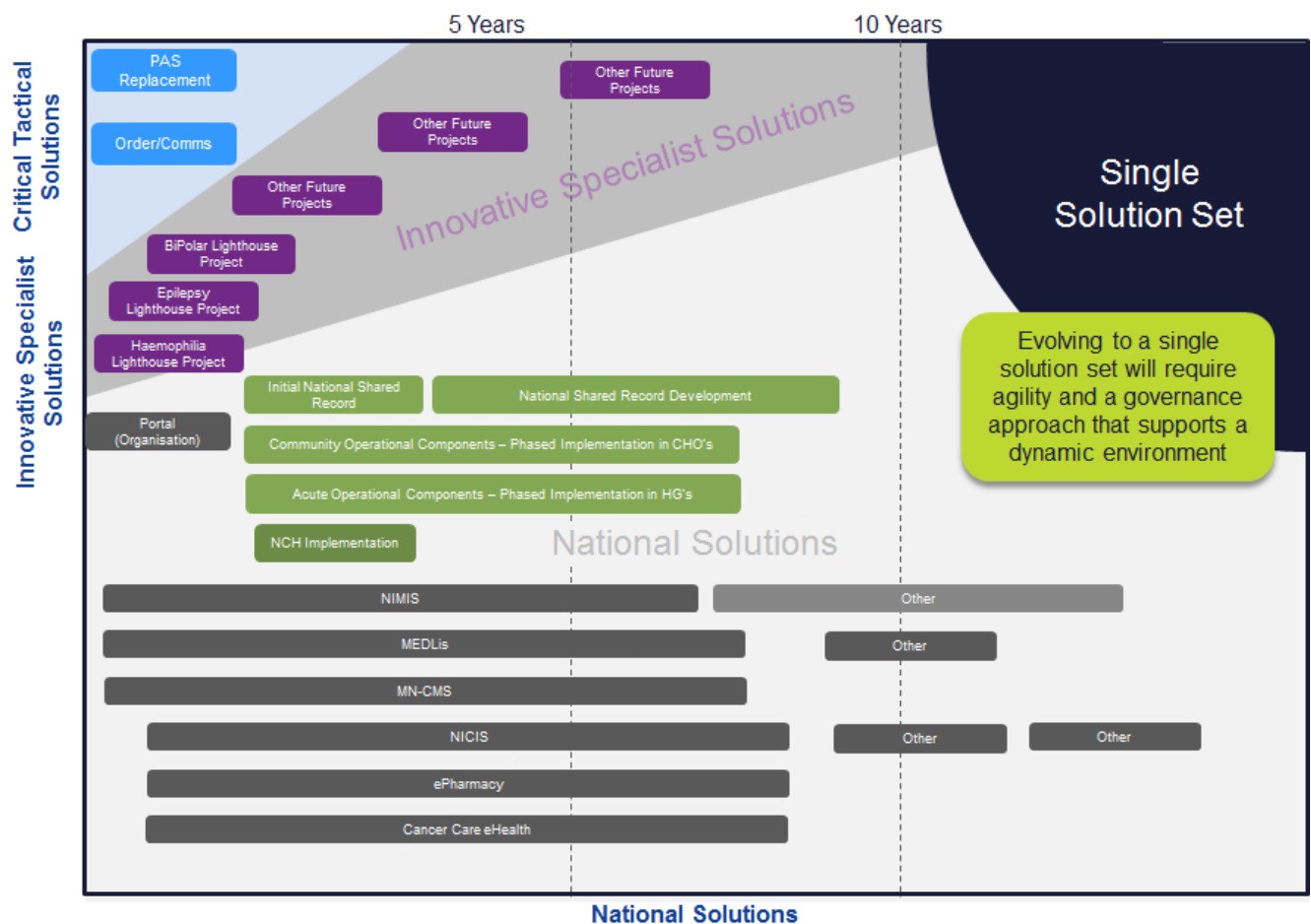
Figure 3: Evolution to a Single Solution – Example Systems and Projects

> The complexity of the solution landscape means that there will be a requirement for agility and effective governance to navigate the journey toward the overall National EHR vision.

Community and Acute Operational Systems

The National EHR Strategy involves the deployment of operational systems within the community and acute settings. The strategy makes the distinction between core components and other extended and innovative solutions.

National Core Solutions of Record: This represents a set of *core functions*, based on single vendor solution, that serve as the minimum viable functionality for each care setting. The deployment of these core functions, such as patient scheduling, would allow the health system to achieve a common capability at an operational level and underpin a national shared record of considerable value to stakeholders. The core solutions of record in the acute sector would be deployed at a Hospital Group level on a hospital by hospital basis. In the community, they would be deployed at a CHO level.
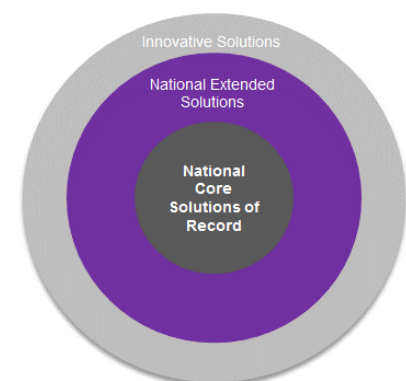

Figure 4: National EHR Suite

National Extended Solutions: These solutions deliver enhanced capability, as provided by the current national imaging solution, that may be deployed on a gradual basis and at a pace that reflects local needs and implementation capability. The default position, in line with the overall single solution strategy, would be to adopt extended solutions from the vendor providing the core solutions. However, in some exceptional circumstances a best of breed approach may be considered and adopted based on specific local criteria.

Innovative / Emerging Solutions: The market for solutions that support clinical environments is vibrant and dynamic with new solutions emerging on a continued basis that are focused on specific / niche areas, for example an app to support diabetes patients. This includes solutions from within the Irish market. The overall National EHR environment must support the adoption of these solutions as a means of extending capability across the health system.

The benefits of this overall implementation approach include:

- *Standardisation of Core Processes:* The core solutions support the critical processes within the health setting. Transitioning to a single solution for the Core helps to promote standardisation of processes and the ability for staff to work across different locations using common systems,

- *Controlled Flexibility:* Separating Extended Solutions from the capabilities in the Core provides a degree of flexibility to progress solutions in these areas to meet diverse needs over different timescales. Where the existing core solution vendor has a solution that meets the needs, that solution should be leveraged, thus reducing integration efforts. Where a new provider is introduced for an extended solution it should be considered for adoption as a national solution to limit the creation of an overly disparate IT landscape. NIMIS is an example of such an extended solution currently in use nationally,

- *Fostering Innovation:* Innovative, condition specific solutions often emerge from niche providers in a market that is dynamic and maturing. The potential for these solutions to be incorporated without impacting on the main capabilities of the overall EHR landscape is an added benefit.

Based on stakeholder consultation, the eHealth Blueprint and the capabilities identified in the Knowledge and Information Strategy, EHR Operational Systems have been identified. These are different for both community and acute, highlighting the need for different approaches to meet the core needs and broader requirements of the care settings.
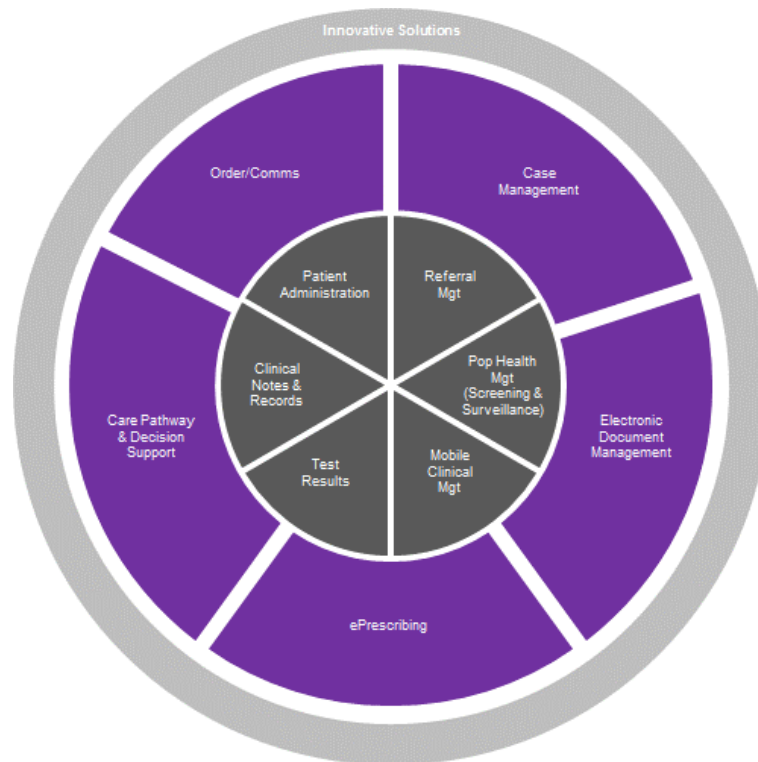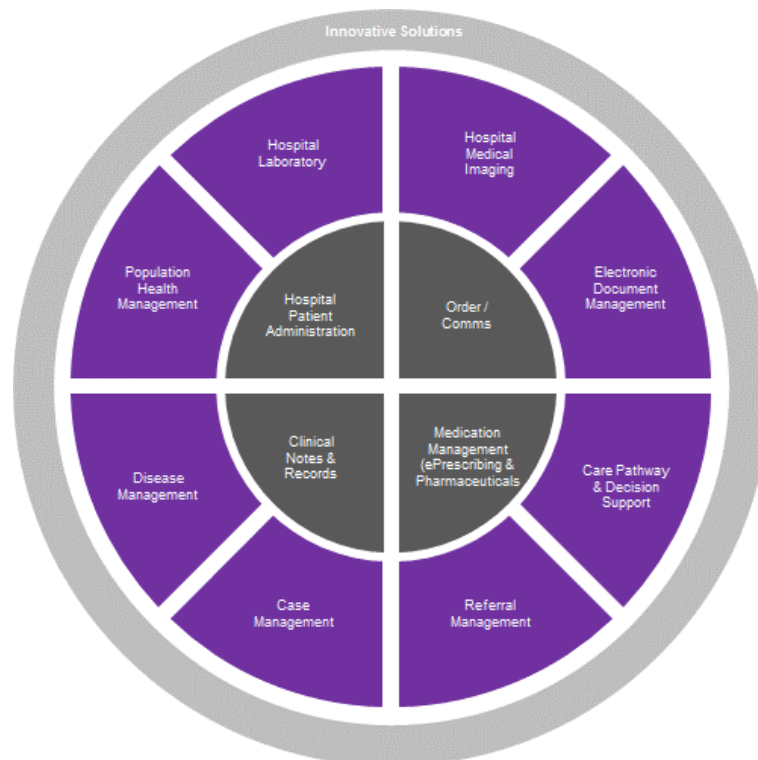
Figure 5: Community Operational Systems

Figure 6: Acute Operational Systems

EHR Challenges

The experience of other countries shows that EHR implementations of this nature are a long-term journey. The Irish journey will not be without its challenges, challenges across the spectrum of technology, change management and the evolution of care delivery.

From the experiences of other countries and taking account of the particular landscape in Ireland, the major challenges are likely to include:

- Maintaining alignment with the vision across the health service, especially given urgent and local needs that require immediate action,
- Addressing any public or care provider concerns over data privacy and the sharing of information. The Privacy Impact Assessment (PIA) for the Individual Health Identifier has provided insight that will guide the National EHR Programme and inform further PIAs. This will also involve ongoing engagement with the Data Protection Commissioner,
- Maintaining stakeholder support over such a long multiannual programme,
- Having the capacity across the health service to absorb the change, given that there will be other Reform efforts ongoing during the duration of the National EHR Programme. Detailed resource planning and profiling has been completed to help manage this challenge,
- Providing the resources necessary over the period of the programme, including clinical and management resources.

Significant steps have been taken to address potential challenges as part of the National EHR Programme. These include:

- The Council of Clinical Information Officers has been established to provide clinical governance to the delivery of eHealth solutions across the Irish Healthcare system. This group will be important to both ensure good engagement with Clinical leaders; and to use was a channel for communications with the wider community and to secure involvement in the programme,
- The eHealth Ecosystem was established by the Department of Health and the HSE to connect communities involved in eHealth in Ireland in June 2015. It is well and widely attended by healthcare providers, patient representatives and suppliers. It has had themes addressed including ePharmacy, Clinical engagement and research, Electronic Health Record programme and the EHR Lighthouse Projects. It is now established as a forum where rich communications and deep engagement regarding the EHR Programme will develop. This will address the key communications and wider stakeholder communications challenge,
- A public consultation process was conducted around a National EHR which sought opinions from members of the public on areas such as privacy, data sharing and deployment priorities,
- Wider public and healthcare provider engagement has taken place and will continue to take place as part of the Programme,
- We have engaged with our counterparts in other health systems to learn from their experiences and share our own approach. We are pleased to have developed a strong working relationship with our colleagues in Northern Ireland who are in a similar position in many ways. There is potential for an all-island approach on some of the aspects of the programme, such as the provision of clinical information through portal technology. We will continue this International best practice engagement approach for our Programme.

Programme Resource Requirements

> ⚠ The most demanding requirement for the National EHR Programme is harnessing the right people to deliver it. At its core, there will be a large team of clinical, technical, management, delivery and support staff drawn from the health system, the solution suppliers and the wider market.

This programme will need a substantial and dedicated team to deliver, operating at National, Hospital Group/CHO, and individual hospital/community site level.

The charts below summarises the overall resource requirements (excluding supplier resources) across the four National EHR components for two deployment scenarios (deploying the core acute capabilities over a 5 year period and deploying the core acute capabilities over a 9 year period). Based on international experience of a large-scale transformation of this nature, the longer term deployment option is the most likely approach.

Both scenarios involve deploying the core capabilities in the community and acute sectors as well as the National Shared Record and Integration Capability.
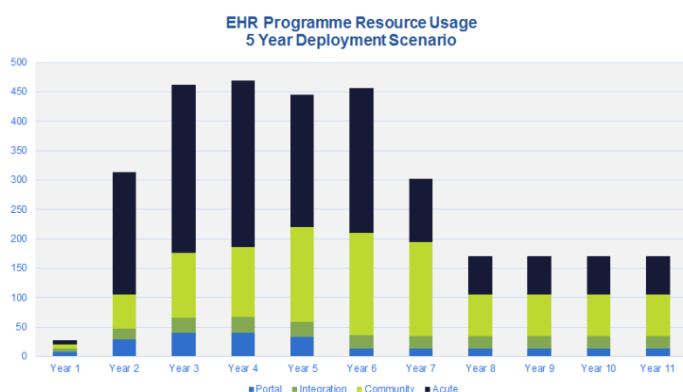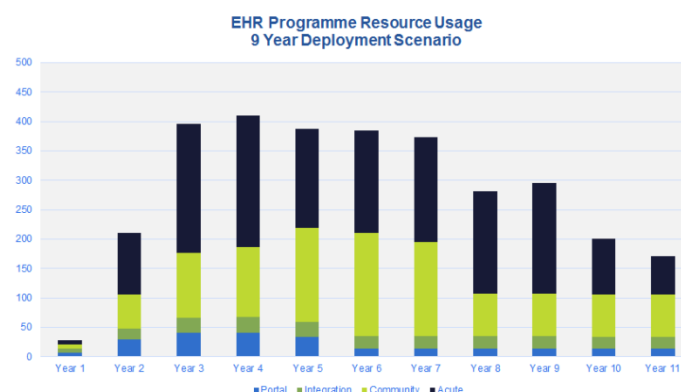

Figure 7: 5 Year Deployment Scenario

Figure 8: 9 Year Deployment Scenario

The greatest resource requirement is to support the development and deployment of the Community and Acute solutions. This is due to the fact that they span so many entities and touch so many health system staff who will need to be supported via training and change management efforts. In all areas, staff numbers have been estimated by reference to guidance provided by the supplier community, and experience from recent deployments in Ireland and beyond.

To successfully deliver this programme requires people with different types of experience and focus.

- *Clinical* – resources with a clinical background including Consultants, Senior Registrars, Nursing professionals and Health and Social Care Professionals. They will lead and guide the design and delivery of the solutions from a clinical perspective to ensure that they are clinically safe and fit for purpose,
- *Technical* – resources who provide technical leadership during the programme such as Technical and Solution Architects,
- *Configuration* – resources who work with the clinicians and the suppliers to help set-up the solutions so that they meet the requirements,
- *PMO* – resources who provide leadership, managerial and administrative support and oversight. This also includes resources who will lead the gathering of requirements, conduct readiness assessments and lead procurement activities,
- *Delivery* – resources responsible for implementing the desired solutions in the Hospital Groups and CHOs including areas such as managing the local implementations, testing, training and data migration activities.

Overall Cost Estimate

> ⊘ The National EHR Programme will require significant investment of up to €xxx over a 10 year time period (approximately x.xx% of the overall health system budget over that time period).

The overall costs of the National EHR Programme have been estimated with reference to each of the major delivery streams, reflecting both one-off programme costs and consequential impact on operational costs.

Costs have been defined as Programme Costs and Operational Costs:

Programme Costs: These are the one-off costs to deliver the solution. They include:
- establishment of the health system team and procurement to initiate the programme,
- design of the national configuration,
- technical delivery of the solution including (setting up the hosting service),
- supplier and health system costs for deployment.

Operational Costs: These are the ongoing costs to maintain and support the solutions once live. They commence during delivery and continue for the life of the solutions, and include:
- annual hosting charges,
- annual software maintenance and supplier service management (including major upgrades),
- 'back office' teams in each Hospital Group / CHO to manage user access, minor configuration changes, etc,
- national teams to maintain standard national configuration.

The cost estimates do not include the following:

- Infrastructure upgrades (network, PCs and mobile devices for e.g. Community Nurses),
- The cost of any added solutions in the extended and/or innovative solutions categories.

The diagrams below provides a high-level breakdown of the overall costs of the programme for the two deployment senarios. Both scenarios involve deploying the core capabilities in the community and acute sectors as well as the National Shared Record and Integration Capability.

Deleted Tables showing indicative costs

*VAT Inclusive

Figure 9: Indicative Cost Summaries

For short-term and specialist roles, (e.g. establishing the Programme Governance, defining requirements, and procurement) it is assumed that external expertise will be required. For enduring roles, e.g. running the Programme Office and Design Authority, costs have been estimated on the basis of some initial external support migrating over time to an all internal health system staff model. This will enable more rapid ramp-up, greater flexibility during the initiation stage, and access to resources with specific, relevant experience of similar programmes in other countries.

Where existing solutions are being replaced during the EHR journey, there may be cash savings as a result of consolidating support efforts through the solutions being deployed as part of the National

EHR Programme. The deployment schedule in CHOs and HGs would influence these cash saving opportunities.

The EHR Programme Plan

There are key activities that can be identified over the next 3 year period that are necessary in order to progress the programme. There are also a number of key decision points during that period. This includes decisions within the health system stakeholder group (such as agreeing requirements) and decisions that involve other outside agencies such as the Department of Health (DoH) and Department of Public Expenditure and Reform (DPER) securing financial commitment.

Figure 10: National EHR Programme Plan for the Next 3 Year Period

Immediate mobilisation requirements over the next 12 months

To progress the National EHR Programme, there are a number of key activities that will take place over the next 12 months at a cost of approximately €9million. These activities include:

- Mobilising the full programme governance structures,
- Defining requirements including; overall national EHR requirements and acute, community, portal and integration requirements,
- Determining the readiness to proceed in each CHO and Hospital Group and progressing any actions necessary to improve readiness and to minimise implementation risks,
- Creating and agreeing the outline and full business cases for each of the four National EHR components,
- Commencing procurement activities for the four National EHR components and any other elements necessary to deliver the National EHR, and particularly ensuring the ability to provide a solution for the New Children's Hospital within a national framework,

- Conducting any necessary Privacy Impact Assessments and resolving any outstanding data privacy challenges,
- Continuing to engage with the public and staff of the health system to generate and maintain buy-in for the overall journey.

What Agreement does this Strategic Business Case Seek?

This Strategic Business Case seeks agreement on the following:

- The overall strategy and direction as set out in the Strategic Business Case,
- To make provision for the programme costs over the time period identified with the understanding that further business cases for the National EHR components will provide increased clarity on the costs and timelines,
- To provide the resources necessary to staff the programme effectively.