

Office of the CIO

# Knowledge & Information Strategy

Delivering the Benefits of  
eHealth in Ireland



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# Foreword

## Foreword from Richard Corbridge, HSE CIO

Accumulation and enhancement of clinical knowledge and timely access to the right information are critical to delivering better patient care. Technology enablement plays a fundamental role in facilitating both. However, unlocking the knowledge and information within a health system takes more than simply having a technology strategy, more than a definition of a digital health system and more than a technology operating model.

In your hands is the key to deliver a truly digitally connected health experience, made real over the next five years, for the whole country.

The Health Service Executive (HSE) is taking the opportunity to reform the way in which healthcare is provided to the whole country. At the centre of this reform is the absolute need to increase the capability and capacity to build knowledge and provide access to information that supports the provision of health care for public, patients and clinicians alike.

The creation of this knowledge and information strategy is grounded in clinical engagement, and places the tenets of knowledge and information before technology itself. Technology provides the foundation and delivery vehicle for the delivery of knowledge and information to support patient care. Technology supports the development of our capability and our capacity to deliver it.

Across the public sector of Ireland, delivery of innovation through access to technology is coming together under the auspices of the Office of the Government Chief Information Officer (OoGCIO). Principles such as a public sector connected network, standards based definitions and government wide procurement will bring efficiencies at scale that the delivery of healthcare can benefit from.

For us to achieve our objective of delivering high quality knowledge and information to support the delivery of patient care we need components of information and technology to work in harmony. The concept of 'organum' is an idea that has existed for centuries. The original idea refers to the multiple harmonies that create a new sound. The term was originally applied to Gregorian chants in the ninth and tenth century when a polyphonic sound was created. The same idea applies to barbershop singing in which four voices can work together to create a fifth voice. What if this strategy, this key, became the 'organum' for the delivery of healthcare in Ireland, where the capability of a digital health system is unlocked by technologists,



clinicians, project managers, analysts, designers, patients, nurses and the public of Ireland all coming together to create a new voice for healthcare?

What will that new voice sound like? Harmonious and clear - ready to deliver a healthcare system that is integrated, outcome based and transparent. A harmonious voice that is truly able to disrupt the way in which the delivery of care is traditionally considered. The healthcare system will enable a patient not only to be referred to electronically but to also be able to see the content of that referral from their own home. The healthcare professional will be able to safely identify patients regardless of where they receive care and, with a legitimate reason, access that information, reducing the burden on patients and making the system more efficient.

The delivery of eHealth to Ireland means digital transformation. It means the agile transition to an underlying healthcare model that exploits digital infrastructure that is making Ireland the digital hub for Europe. This evolution will enable commonly shared capabilities and access to information throughout health and removes silos of information that exist today. It will ensure that excellence is shared - not piloted in obscurity, but enabled and encouraged to realise benefits to patients.

eHealth is an important enabler to the sharing and protecting of information. Where sharing is critical to the delivery of patient safety it should be acted upon as standard, however sharing should be controlled by the patient and the healthcare professional that has a legitimate relationship with the patient.

We are focused on delivering technology to support healthcare, grounded in the outcomes it delivers and not deploying technology for its own sake.

The strategy in your hand describes how the HSE will deliver the outcomes and benefits of eHealth Ireland. It will no longer be acceptable for technology professionals to simply support the business; the delivery of digital health will be the business of the HSE.

Technology delivery is part of improving healthcare in Ireland and providing tools to enable the people of Ireland to access usable information to keep them fit and healthy.

The team that delivers eHealth Ireland will be proud of their involvement. Dramatically improving the healthcare system through the use of technology will be a core value of the team as a whole. Key to success will be a new level of focus on professionalising each role within the entire team, with the objective of providing interesting and challenging careers in delivering healthcare technology and change, and continuing to develop our people and their skills.

Through the delivery of this strategy, Ireland will have a healthcare system that drives forward the health and indeed the wealth of the nation. Ireland will become a country that has succeeded where others have initially struggled. Ireland will have a digitally connected healthcare system, delivered in harmony, for one and all.

Thanks and kindest regards,



Richard Corbridge, CIO HSE



# Executive Summary

*“In order to deliver truly patient centred, safe and excellent integrated care, we need integrated information management and technology. Technology allows better access to accurate information, quick and efficient sharing of patient information which releases more time to treat patients. It allows access to potentially life-saving patient information and faster access to relevant information. Perhaps more importantly, it allows individuals to better manage their own health and become active participants in planning for their own needs. In short, connected health is better health.”*

*Dr. Áine Carroll, National Director Clinical Strategy and Programmes*

## Introduction

The Knowledge & Information strategy builds upon the eHealth Vision for Ireland, and outlines how integrated information and enabling technology will support the delivery of innovative, safe and high quality patient care to meet the needs of our population across all patient pathways and care settings. This strategy also outlines how we transform our organisation, from a knowledge and information perspective, to meet the delivery challenge ahead and to support the vision and values outlined in the HSE Corporate Plan. Integrated Healthcare Capabilities

Future health service capability requirements, identified in consultation with the HSE National Directors and clinicians, set a compelling vision for how healthcare will be delivered in the future. These capabilities have been distilled into five

focus areas which are key to facilitating the seamless delivery of healthcare across integrated care pathways and all stages of care, as illustrated in Figure A. The detailed capability requirements captured from each National Director are included in the appendix to this document.

- **Care Delivery Enablement** - Provides a series of clinical and care delivery capabilities which digitally enable processes allowing data to be captured as a by-product of clinical activity, sharing of patient information, better quality of care, more clinician time spent with patients and greater ability for patients to participate in their own care.
- **Electronic Health Records** - Creates and enriches the patients' electronic health records at each patient contact and across settings, stores the detailed care

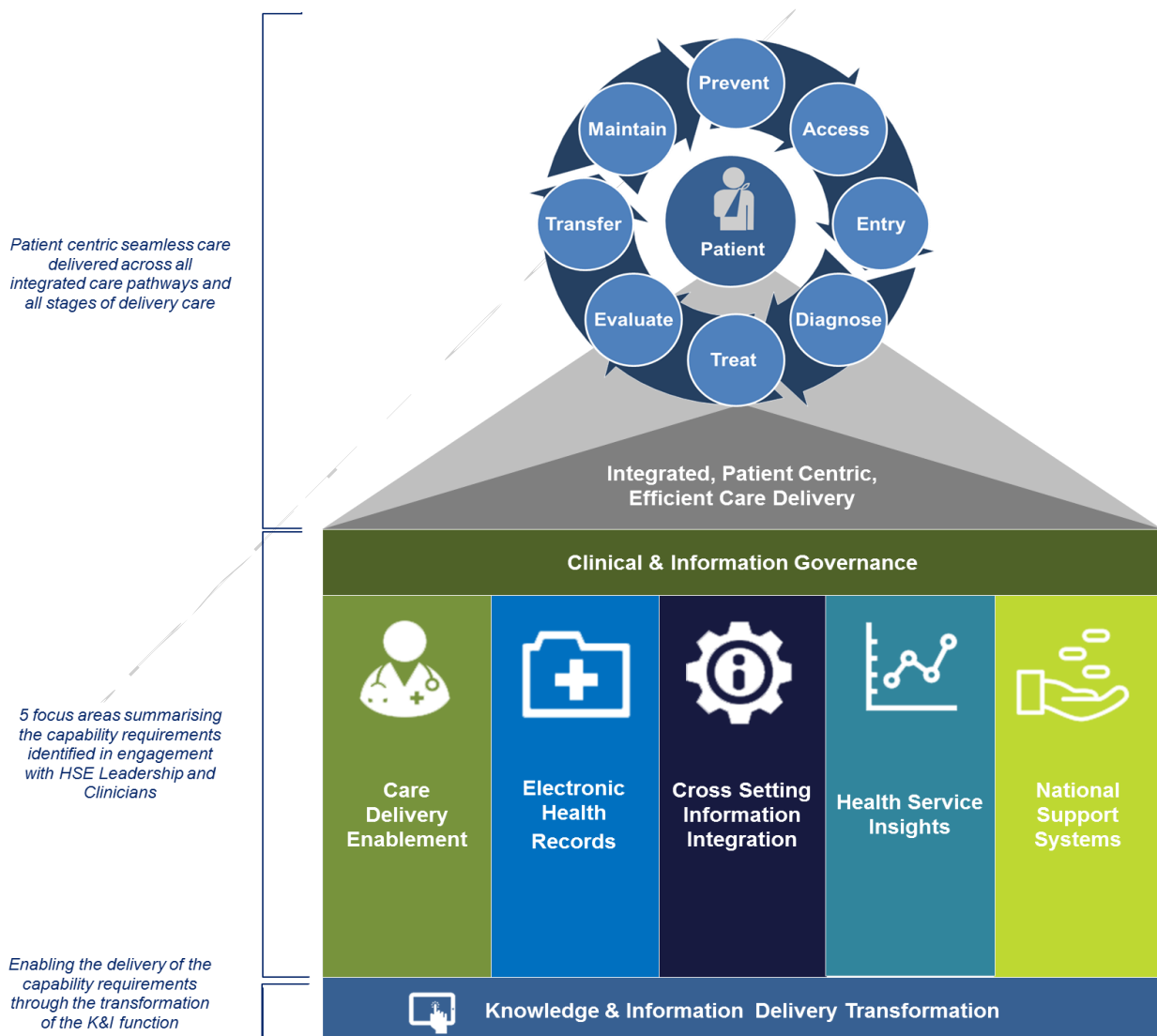


Figure A



information at activity level, and feeds the summary care record to enable patient care along the pathway

- **Cross Setting Information Integration** - Delivers the required integration across the patient pathway including information flows and process standardisation across care settings, enabling the summary care record at a patient level, and seamless patient transition between settings.
- **Health Service Insight** - Delivers the information management, reporting and analysis solutions and processes which provide timely, reliable information and decision support for patients, clinicians, and management from the micro level (e.g. individual patients or treatments) up to the macro view (e.g. system wide performance scorecards, population health trends).
- **National Support Systems** - Provides the national backbone for the core support service – finance, procurement, and HR – and is crucial for integrated, efficient management of the health system, and enabling the shift of more care community settings.

Implementation of these new capabilities will support the delivery of healthcare benefits to the population of Ireland, and the Irish society and economy. They will also have a profound impact on how different stakeholders experience the health service – from patients to general practitioners to hospital clinicians and community healthcare providers, and the managers of the health system. The new capabilities are described in more detail in Section 3 of this document.

The delivery of the target capabilities represents a transformation of scale and ambition unprecedented in the Irish health system to date.

Successful delivery will require significant investment, leadership commitment, extensive clinician involvement, and programmatic approach with dedicated resourcing, effective governance and strong benefits realisation practices. Indicatively, the programme is expected to span 5+ years – however, a business case and a more detailed programme plan needs to be developed as a next step.

### Future IT architecture vision

The healthcare capabilities will be enabled through a future IT architecture vision. The architecture vision describes the technology capabilities required in the future to enable the new ways of delivering healthcare. The vision is guided by seven design principles (Figure B).

At the heart of the future architecture, there is a set of core services which enable the functional connections between applications, and consistent views of information across the system and care settings. Another key part of the future architecture is the integration tier. Integration provides a single logical gateway into core HSE systems, and facilitates standards based data integration between the HSE and other systems.

### Target IT Operating Model

Target operating model describes how we will work differently in the future. Transformation of the Knowledge & Information delivery function is a critical enabling step in the implementation of the target capabilities, building knowledge and integrating information. The target operating model outlines future organisation structures, processes and governance for the function. The model is aligned to five guiding principles, set out



Figure B



Figure C

in Figure C. These build upon the broader organisational values that have been defined in the HSE Corporate Plan.

The target operating model is based on a matrix structure, where the vertical dimension facilitates focus on quality, consistency and standardisation of methods and practices, and realisation of cross-organisational synergies. The horizontal dimension creates focus on alignment with, and delivery to health service requirements, and providing end-to-end delivery accountability with patient care and outcomes at the heart of everything we do.

At the core of the target model will be industry standard practices in programme delivery and service management, and an enterprise architecture capability to ensure alignment with target vision. Another key tenet of the new model is the creation of a new level of professionalism for each role, emphasising the organisational value of learning by providing an opportunity to develop new and deeper skills and knowledge within a

structured career framework. The target operating model is described in section 6 of this document.

The new operating model relies on the implementation of a clear governance structure which ensures that the decisions are made at the right level, with agreed authority, in a transparent way and without creating unnecessary

bureaucracy. Built into the governance structure will also be the integral involvement of clinicians and leadership, so that proposed solutions are defined with the practitioners and alignment with integrated care pathways is assured.

A strong role for clinical and operational leadership helps to ensure that the priorities remain focused on the core mission of providing knowledge and information that underpins ongoing service priorities and that we continue to build the trust and confidence of our service users.

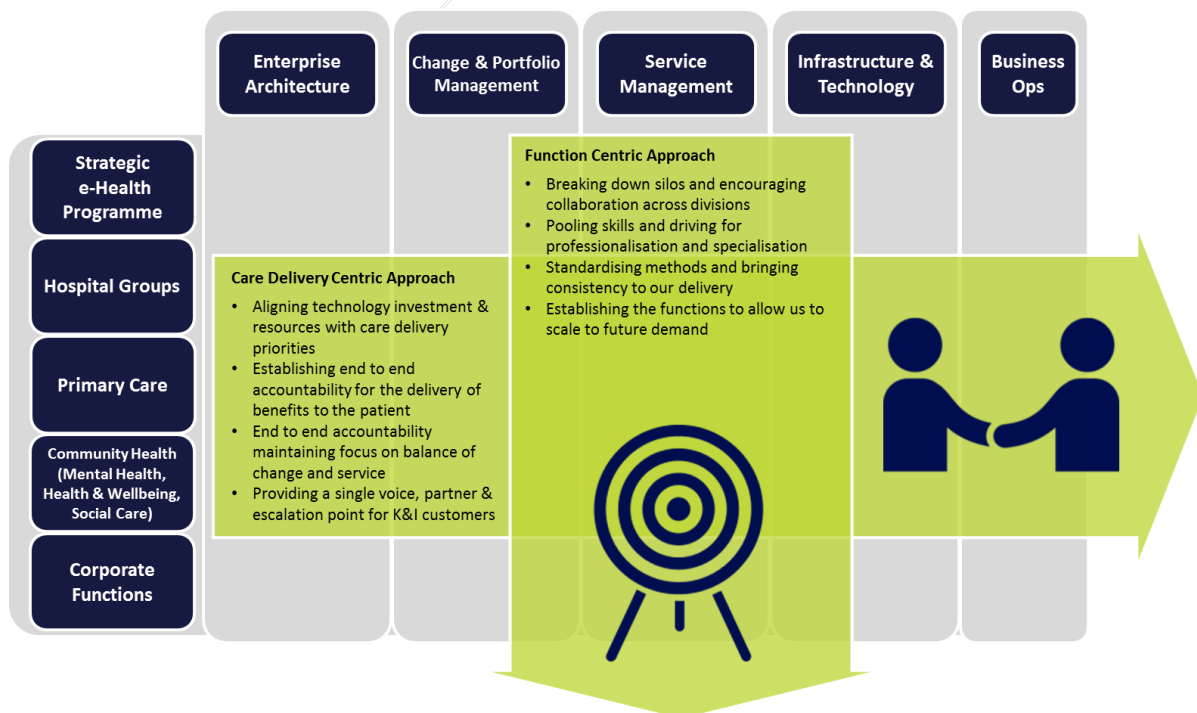


Figure D



# Context

*“Ireland is poised to take a massive leap towards healthcare transformation. eHealth can facilitate service transformation and process redesign within our hospitals, GP practices, community health centres and beyond, connecting our care teams and their patients across the continuum of care.”*

*Managing Director, Current HSE Supplier*

The Knowledge & Information strategy outlines how the Office of the CIO will deliver the enabling technology to support the release of the benefits of eHealth into Ireland – the delivery of this enabling technology will enable safe, high quality patient care that meets the needs of our population.

## Setting the Scene

The Irish healthcare system is at a key juncture.

On one hand, Ireland has in the past years experienced many of the same challenges as other developed countries:

- Growing population
- Increase in chronic disease
- Multiple co-morbidities
- Increased cost of healthcare provision
- Historical lack of technology investment

However, on the other hand, significant positive momentum is building up to start transforming the entire healthcare model for Ireland, in line with global best practice in healthcare delivery and innovation.

- Life expectancy in Ireland has increased and is above the EU average. We are living longer through advances in medicine, technology and improved models of care
- Mortality rates from circulatory system diseases fell by 30% between 2004 and 2013 and cancer death rates decreased by 10%

- Transport accident mortality rates have fallen by 55% in the past decade, infant mortality by 29%, and suicide rates by 13%
- The average length of stay for the remaining inpatients has shown a gradual decline to 5.4 days in 2013 which represents a reduction of 13.5% since 2004
- Development and publishing of the Ireland eHealth Strategy in 2013 and the HSE Corporate Plan for 2015-2017
- Planning and mobilisation of the Health Reform programme, and as part of this, the definition of Integrated Care Programmes, and establishment of new Hospital Groups and Community Health Organisations.

At the same time, significant steps have been made in the wider government context. A major milestone was the publication of the National Digital Strategy for Ireland in 2013 which focuses on “doing more with digital” and sets out a vision and steps to do more online. Also, more recently, the OGCIO Public Service ICT Strategy was published which sets out to deliver better outcomes and efficiency through innovation and excellence in



ICT and for ICT to enable better sharing and integration across all of Government.

There are also compelling examples of success in the health system from deploying new technology to benefit the patient, the clinician and the system – such as the health information exchange (for example, HealthLink), successful pilot on eReferrals, national implementation of PACS solution known as NIMIS, and out-of hours General Practitioner support through the use of integrated systems. More broadly, too, there are strong positives: the Irish economy is growing again, the nation's population is still relatively young compared with our European peers, and proliferation of and familiarity with consumer and digital technology in all age and demographic groups is overwhelming, creating a fruitful ground for greater use of technology enablement in delivering healthcare services.

Against this context, there is an opportunity now to accelerate the implementation of the overall Reform Programme with eHealth enabled capabilities, and create a more integrated, more efficient and truly patient centric healthcare service. To support this effectively, our ambition is to re-position technology delivery capability within the health service as a value-add, integral part of the healthcare provision, not 'ICT' outside the 'businesses'. This is reflected in the title of this document, Knowledge & Information Strategy.

Furthermore, to mark the start of this journey, the new name of the technology delivery function within the HSE will be Knowledge & Information (K&I). This name appropriately reflects the new positioning of the role that technology delivery capability within the HSE plays in enabling integrated care delivery. This function is responsible for the delivery of this strategy as well as providing the ongoing support and development of existing information technology services. The function is led by the HSE CIO, supported by the Office of the CIO and the Knowledge & Information Senior Management Team.

This strategy does not solely impact the Knowledge & Information function. eHealth priorities and benefits realisation must be driven by Clinical and Operational leadership. The Knowledge &

Information strategy outlines how Clinical leadership for the programme will be instituted with a number of senior clinicians and operational leaders having been consulted in its formation. This engagement process is described in the Appendix.

## This Document

This document sets out how we will build the new capabilities required to deliver on this mandate, and how we will organise ourselves to achieve this effectively.

This strategy sets out:

- Key health service capability requirements, captured in initial engagement with the National Directors of the HSE, clinicians within the HSE, and local ICT management in major hospitals
- Operational and clinical priorities from across the service that we must deliver
- Based on these priorities, an indicative high level roadmap and milestones for the delivery of the target capabilities
- The high level technology architecture vision that will underpin the new capabilities – describing the principles, architecture and applications necessary to support the information flows and healthcare functionality
- The Knowledge & Information function operating model – setting how the Knowledge & Information functions needs to build on current strengths and evolve in order to be positioned to successfully deliver the technology enablement.

The implementation of this strategy will require substantial investment, building on investments already made. The estimate for this investment will be developed as the next phase of work.

A glossary of key terms is provided in the final section of this document.



# New Health Service Capabilities

*“Improving access to real time data will enhance our assessment and decision making capabilities”*

*Pat Healy, National Director Social Care*

The required capabilities, identified through clinical and operational leadership engagement have been distilled into five priority focus areas. Across all of these areas, effective clinical and information governance is required to ensure and maintain alignment with the reform objectives. In addition, the delivery capabilities of the K&I function must also be established and matured to enable the successful implementation of unprecedented level of change.

## Introduction

The vision for the HSE is to move dramatically from the current way of delivering care to integrated care pathways underpinned by an information enabled model. Some key characteristics of the future vision - "the direction of travel" - are highlighted below in Figure 1.

Key to establishing the HSE Knowledge & Information Strategy was the identification of required target capabilities, aligned with the needs of delivering high quality integrated patient care. This means providing a seamless and information-rich experience to patients, care providers and the system as a whole through all stages of care:

- Prevention of illness
- Access and entry to care

- Diagnosis, treatment and evaluation of treatment effectiveness
- Timely transfer to most appropriate setting, and maintenance of care plans and persons' health

## Key Capability Areas

The capability requirements to deliver this experience were identified through engagement with the HSE National Directors, and distilled into five focus areas, which support the delivery of the overall reform agenda. The five focus areas are highlighted in Figure 2 below, supported by the critical enablers for a successful delivery – effective clinical and information governance, and the transformation of the Knowledge & Information function itself.



Figure 1: The Direction of Travel

While other valuable initiatives will be identified, assessed and delivered over time in parallel to the implementation of this strategy, we are setting our focus now on capabilities which are expected to have the greatest impact across the service.

This distilled view is underpinned by a more detailed map of capability requirements, shown on the next page in Figure 3. The detailed capability requirements captured from each National Director are included in the appendix to this document. The five focus areas outlined here will also be

referenced throughout this strategy, creating an explicit lineage between the capability requirements, their expected outcomes and benefits, and the delivery approach to realise these. The overlaps and mutual dependencies between these capabilities and their impacts are also recognised – international experience shows that a holistic, connected approach is at the heart of successful eHealth transformations.

The focus areas identified in Figure 2 are described in more detail below.

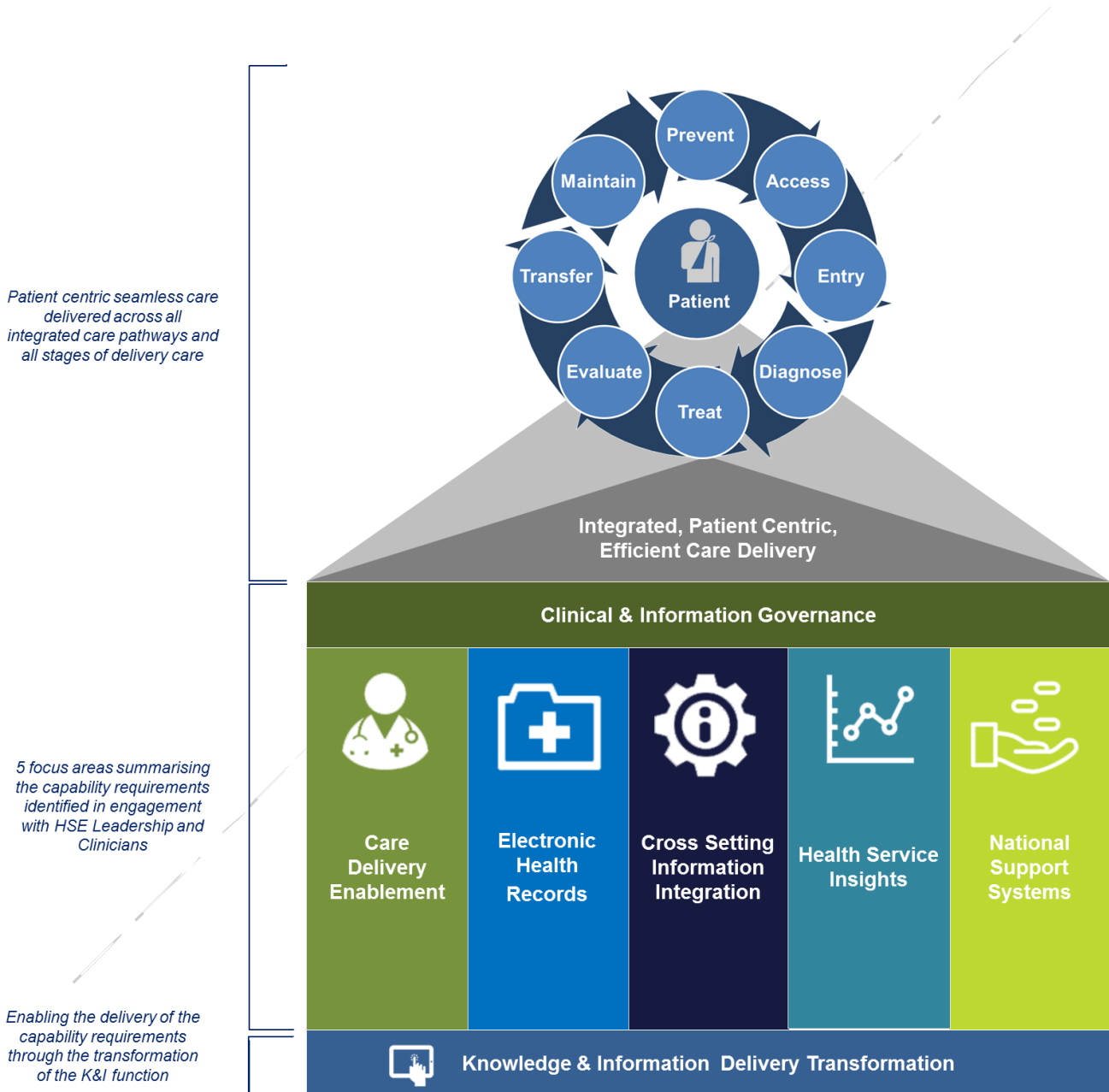


Figure 2: Key Focus Areas



### **Cross Setting Information Integration**

This capability delivers the required integration, information flows and process standardisation across care settings that reflect the patient care pathway, enabling the summary care record at a patient level, seamless transition between settings supported by secure handovers of patient information.

- Patients will have an Individual Health Identifier (IHI), unique to them throughout their lifetime and across all healthcare settings
- Care providers and care facilities will also have a similar unique identifier, enabling their mapping back to the patient throughout integrated care pathways
- Standardised business processes and rules for data integration so that interoperability and data sharing are enabled across all care settings
- Security & access processes and controls to support this increased level of data access and sharing

### **Electronic Health Records**

This capability creates and enriches the patients' electronic health records at each setting, stores the detailed care information at activity level, and feeds the summary care record to enable cross setting integration.

- Electronic record of all patient interactions with care services – capability covering hospitals, community care, social care, health & wellbeing and mental health
- Specific activities captured include ePrescribing, test ordering, care plans and transition management
- Reduced dependence on paper records on forms through introduction of clinical documentation and workflow functionality
- Decision support capabilities to provide contextual information to assist clinicians to make decisions
- Patient facing capabilities (e.g. a patient portal) to enable health information exchange, helping patients to manage their care supported by clinicians sharing knowledge and information.

### **Care Delivery Enablement**

This capability delivers a series of clinical and care delivery capabilities which digitise areas/processes thereby allowing electronic data capture, better quality of care, more clinician time spent with

patients and greater ability for patients to participate in their own care.

- Technology enabled function specific capabilities that support care delivery – a series of national programmes across the health service
- Examples include Lab Systems, Radiology tooling, ePrescribing for primary care, Appointment management and eReferral systems (all of which have care and efficiency benefits)
- Information and functionality can also be made available directly to patients through a patient portal to allow the patient to manage their own care and interact with clinicians
- Can be implemented in parallel to and later integrated with EHR

### **National Support Systems**

This capability provides the national backbone for the core support service – finance, procurement, and HR – it is crucial for integrated, efficient management of the health system as a whole.

- Consolidated national finance solution including accounting, reporting, budgeting and forecasting, billing, and procurement
- Enablement for activity based funding (patient level costing of healthcare delivery)
- Human resource management, payroll & pensions, and learning management

### **Health Service Insight**

This capability delivers the information management, reporting and analysis solutions and processes which provide timely, reliable information and decision support for patients, clinicians, and management from the micro level (e.g. individual patients or treatments) up to the macro view (e.g. system wide performance, population health trends).

- A comprehensive data repository allowing consolidation and flexible manipulation of data from disparate data sources – a 'single source of truth'
- Business intelligence tooling allowing rapid and flexible production of backward and forward looking management information and analytics
- Tactical BI enhancements to provide short to medium term management information to support operational management.

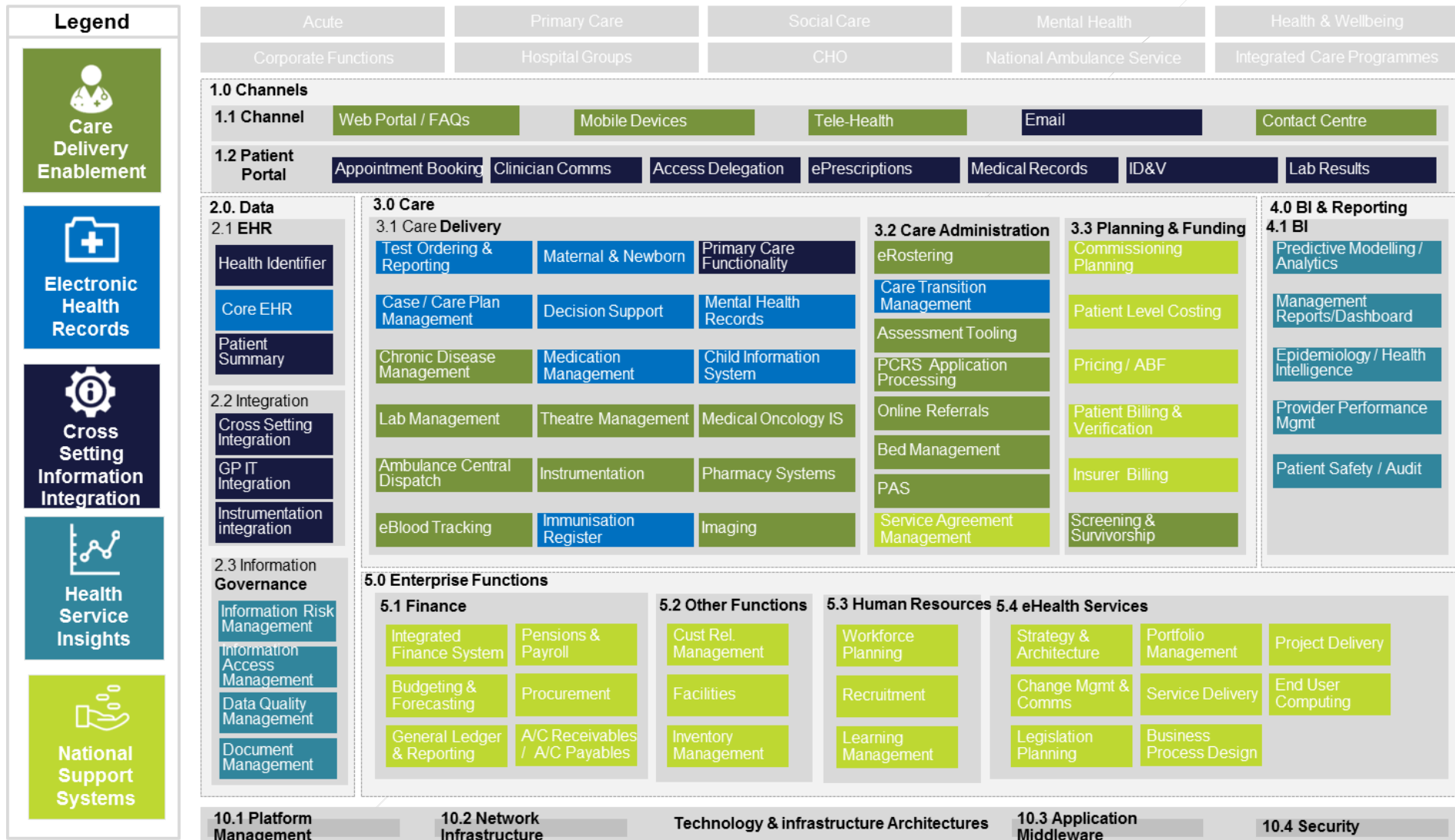
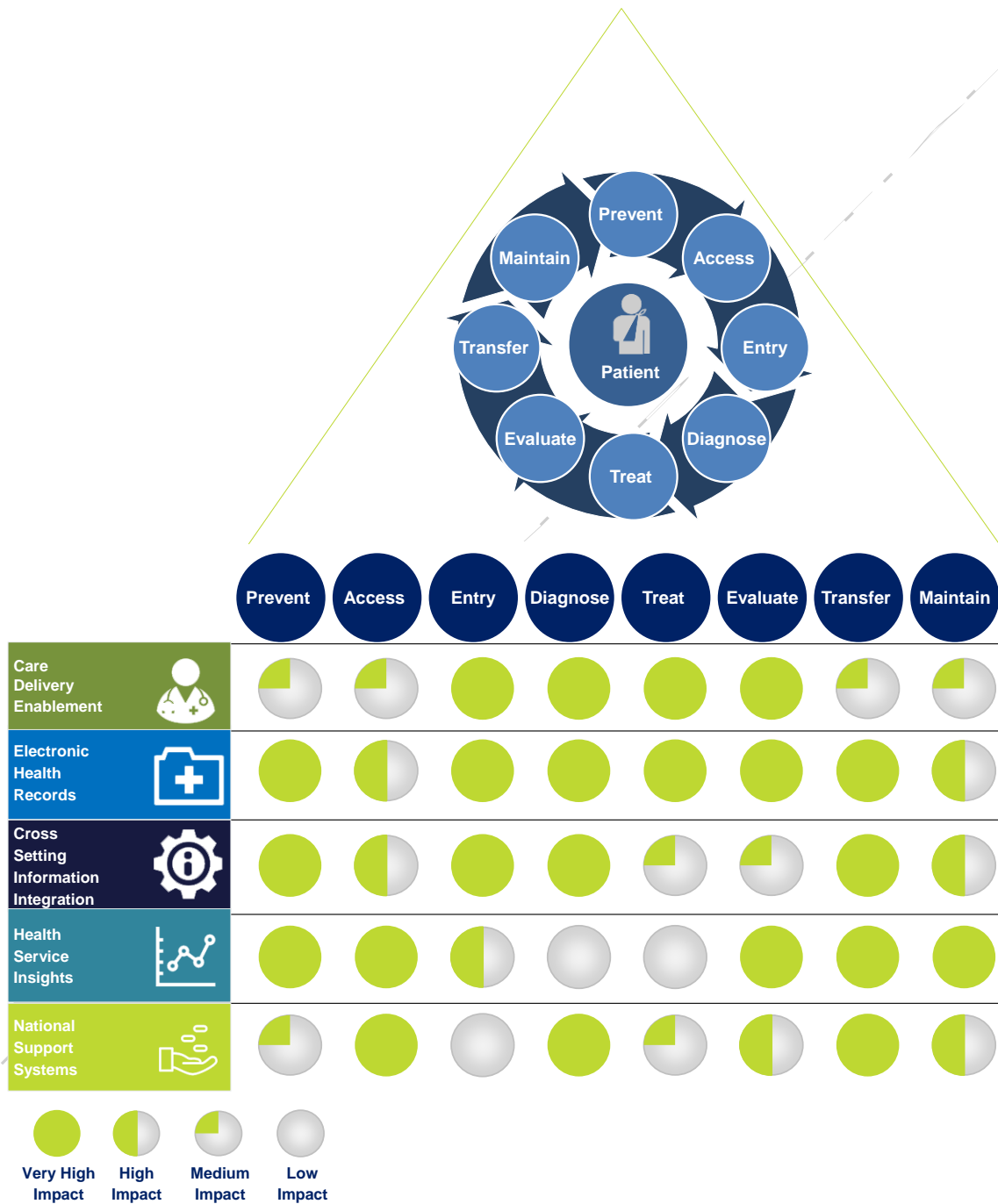


Figure 3: Future State Capability Requirements


**Capability Contribution towards Integrated Care**


Delivery of each of the core capabilities outlined above makes a significant contribution towards realising the eHealth vision. Figure 4 below illustrates the relative magnitude of impact of each capability on the different stages of integrated care delivery.





**Figure 4: Impact of Priority Capabilities**


These capabilities will unlock wide-ranging benefits across all stakeholders of the healthcare system. A non-exhaustive selection of the outcomes is highlighted below, from key stakeholder perspective where the term patient encompasses any person who uses any healthcare service, care providers covers the delivery of healthcare across all care settings and the health system entails the overall national structures and management of healthcare in Ireland.

Capability	Patient	Care Providers	Health System
 <p>Care Delivery Enablement</p>	<p><b>Better quality of care and a seamless patient experience</b></p> <ul style="list-style-type: none"> <li>Greater coverage of electronically supported care delivery (instead of paper based) – allowing the information generated in specific care delivery situations to be used in the future (underpins the electronic health record and patient-centric view of care history)</li> <li>Better diagnosis capability with decision support</li> <li>Improved specific care outcomes through use of enhanced capabilities</li> <li>Less risk of errors</li> </ul> <p><b>More flexible care experience and ability to self service</b></p> <ul style="list-style-type: none"> <li>Ability to schedule appointments based on patient choice over provider services</li> <li>More transparency over own care</li> </ul>	<p><b>Greater clinical efficiency and quality</b></p> <ul style="list-style-type: none"> <li>Increased use of information, decision support &amp; automation (e.g. radiology and laboratory alerts based on abnormal results)</li> <li>Improved consistency of care within the hospital as systems are integrated</li> </ul> <p><b>More efficient management of clinical and other resources</b></p> <ul style="list-style-type: none"> <li>Facilitates an automated flow from appointment booking through to rostering across the entire patient journey</li> <li>Helps balancing patient demand with capacity across facilities (e.g. across a hospital group)</li> </ul> <p><b>More flexible and timely integrated care delivery</b></p> <ul style="list-style-type: none"> <li>Electronic referrals can shorten waiting lists by giving the referring clinician visibility of waiting times</li> <li>Allows mobile staff to more effectively schedule and manage home/community appointments</li> </ul> <p><b>Reduced risk</b></p> <ul style="list-style-type: none"> <li>Prescription errors are significantly reduced through ePrescribing</li> <li>Electronic ordering of blood tests improving reliability</li> </ul>	<p><b>More clinical and administrative data, to allow better planning and management</b></p> <ul style="list-style-type: none"> <li>Improves quality and quantity of data captured electronically</li> <li>Patient safety and outcomes improved through stronger clinical capabilities</li> </ul> <p><b>Enabling system-level efficiencies</b></p> <ul style="list-style-type: none"> <li>Efficiency gains through automation at all stages of care delivery and greater levels of patient self service</li> </ul>

Capability	Patient	Care Providers	Health System
 <p><b>Electronic Health Record</b></p>	<p><b>Better quality patient care and patient experience across all stages of care</b></p> <ul style="list-style-type: none"> <li>• Patients provide information once that is reused across departments, tests and procedures – the health record is the prime source of information instead of the patient</li> <li>• More rapid diagnosis through electronic ordering and provision of tests and results</li> <li>• Better quality diagnosis through decision support systems that provide contextual information and advice to the clinician – such as decision trees</li> <li>• More effective, joined-up care plans across settings</li> </ul> <p><b>Increased ability for self-care</b></p> <ul style="list-style-type: none"> <li>• Reduced unnecessary visits to healthcare facilities as patients can self-serve for basic requests (e.g. medication repeat prescriptions)</li> <li>• Patients can help maintain their own data and contribute to care plans to demonstrate adherence to post discharge plans</li> </ul>	<p><b>Better clinical outcomes</b></p> <ul style="list-style-type: none"> <li>• Supports care providers delivering better care outcomes through richer information including longitudinal data, decision support, and reduction in errors</li> </ul> <p><b>More efficient care delivery</b></p> <ul style="list-style-type: none"> <li>• Implementation of standard clinical pathways will support clinical best practice to reduce average length of stay for patients</li> <li>• Full electronic capture of clinical events - clinicians can send and receive appropriate order requests &amp; prescriptions electronically</li> <li>• Electronic ordering and result provision of tests to hospitals, reducing administrative time and paper based processes</li> </ul> <p><b>More effective risk management</b></p> <ul style="list-style-type: none"> <li>• Clinical decisions are supported by information and rules based warnings (e.g. drug interactions)</li> <li>• Electronically captured (as opposed to paper based) information of prescriptions mitigates risk of error</li> </ul> <p><b>Greater degree of care delivered in the community</b></p> <ul style="list-style-type: none"> <li>• Sharing of care plans and notes between hospitals and other settings, enables as much of the patients care as possible to take place outside of the acute hospital setting and improving the quality and consistency of care</li> </ul>	<p><b>Better quality of care</b></p> <ul style="list-style-type: none"> <li>• Rich data can be analysed to identify areas for review of clinical care protocols or outcomes</li> <li>• Improved data quality as patients act as the guardians of their own records</li> <li>• Health system develops best practice over time due to access to date especially in cases of rare/specialist illnesses/cases</li> </ul> <p><b>Better management of healthcare resources:</b></p> <ul style="list-style-type: none"> <li>• Underpins activity based costing and funding</li> <li>• Greater efficiency through reduced paperwork, use of workflow etc.</li> </ul>

Capability	Patient	Care Providers	Health System
 <p><b>Cross Setting Information Integration</b></p>	<p><b>More patient involvement in own care planning and delivery</b></p> <ul style="list-style-type: none"> <li>• Access and ability contribute to own health care information and history</li> </ul> <p><b>Easier access to care</b></p> <ul style="list-style-type: none"> <li>• Self service capabilities (e.g. scheduling most suitable appointments)</li> <li>• More transparent availability of services across providers</li> </ul> <p><b>Better patient care experience</b></p> <ul style="list-style-type: none"> <li>• Seamless transition between care providers supported by the integrated patient health information – e.g.: between GPs and hospitals; or between different specialists within a hospital</li> <li>• Reduced repeat procedures and information requests</li> </ul> <p><b>Improved patient safety &amp; security</b></p> <ul style="list-style-type: none"> <li>• Ensuring all information can be linked to an individual e.g. allergy information being available to new care givers</li> <li>• Clear rules and protection over who can access personal data</li> </ul> <p><b>More timely transition to convenient &amp; appropriate care setting</b></p> <ul style="list-style-type: none"> <li>• Enabling more community care and telehealth</li> </ul>	<p><b>Improved patient safety and quality of care</b></p> <ul style="list-style-type: none"> <li>• Sharing of critical information in a timely manner (e.g. sharing of previous historical information like x-rays or lab tests to quickly understand a patient's history when these events may have taken place in different hospitals)</li> <li>• Reduced errors due to more accurate patient identification and access to records</li> </ul> <p><b>More efficient management of scarce resources</b></p> <ul style="list-style-type: none"> <li>• Reduced delayed discharges, enabled by faster patient flow</li> <li>• Reduction in repeat tests, procedures and administrative time through more complete information</li> <li>• Overall reduced demand for acute hospital care</li> </ul> <p><b>Enabling and transferring care from acute hospitals to community care settings</b></p> <ul style="list-style-type: none"> <li>• Better collaboration and information sharing by GPs, clinicians and other allied health professionals to deliver health in a community setting</li> <li>• Enabling more effective patient pathway management including appropriate intervention prior to acute re-admission based on access to latest medical information and cross setting care planning</li> </ul>	<p><b>Improved population health</b></p> <ul style="list-style-type: none"> <li>• Better patient outcomes overall</li> <li>• Ability more rapidly and effectively identify and address macro level trends in population health</li> </ul> <p><b>Greater focus on prevention</b></p> <ul style="list-style-type: none"> <li>• Foundation to carry out detailed cross health setting clinical research and identify preventable trends</li> <li>• Reduced cost of healthcare</li> </ul> <p><b>More effective and efficient overall care delivery and planning</b></p> <ul style="list-style-type: none"> <li>• Enable end to end evaluation of care delivery effectiveness</li> <li>• Faster flow of patients between settings</li> <li>• Combining data sets across care settings allows for a more holistic view of the usage profile of patients</li> <li>• Enabling health economics of Ireland to be linked to the patient rather than the process</li> </ul>

Capability	Patient	Care Providers	Health System
 <p>Health Service Insights</p>	<p><b>Better quality of care</b></p> <ul style="list-style-type: none"> <li>Better management information to drive continuous improvement in care quality</li> <li>More rigorous performance management across healthcare delivery to improve patient outcomes</li> <li>Richer data to support more accurate diagnosis and treatments, and evaluation of care effectiveness</li> </ul> <p><b>Greater access to care</b></p> <ul style="list-style-type: none"> <li>More proactive, forward looking intelligence about care delivery needs to allow timely adjustments in capacity, speciality skills etc. – improving the level of patient access to care and waiting times</li> </ul>	<p><b>More holistic view of care delivery and impacts, driving better patient care</b></p> <ul style="list-style-type: none"> <li>Timely and accurate care delivery performance reporting within hospitals, Hospital Groups and Community Health Organisations and analysis of, and reaction to, variances</li> <li>Operational reporting of care metrics (e.g. incident reporting, attendance rates etc.) that may trigger specific care interventions such as understanding patient’s use of multiple services (e.g. instances of mental health patients attending at Emergency Department)</li> </ul> <p><b>More effective and predictive resource management, leading to greater access to care</b></p> <ul style="list-style-type: none"> <li>For example, bed management, allocation of staff, medical device utilisation etc.</li> </ul> <p><b>More advanced clinical research and analysis</b></p> <ul style="list-style-type: none"> <li>BI capabilities be used to support medical research activities</li> </ul>	<p><b>More comprehensive and accurate planning of national trends and service requirements</b></p> <ul style="list-style-type: none"> <li>Supports health care planning for all time horizons</li> <li>Enables population health and disease surveillance and control, and initiation of interventions (e.g. national programmes) to address undesirable trends and effects</li> </ul> <p><b>More effective care delivery</b></p> <ul style="list-style-type: none"> <li>Comparative reporting across providers allows for effective provider management, continuous improvement and allocation of financial resources</li> <li>Stronger operational management across the entire healthcare system through the efficient collation of local service data into macro level balanced scorecards outlined in the HSE Accountability Framework.</li> </ul>

Capability	Patient	Care Providers	Health System
 <p>National Support Systems</p>	<p><b>Greater access to care</b></p> <ul style="list-style-type: none"> <li>Enhanced resource planning enables greater access to care</li> <li>More granular management and planning of scarce resource will help address care delivery bottlenecks and support reduction in waiting times</li> <li>More care provided closer to the patient in the community settings</li> </ul>	<p><b>More proactive and effective resource planning and allocation, leading to greater access to care</b></p> <ul style="list-style-type: none"> <li>Ability to project resourcing needs and more effectively allocate resources across temporary peaks and troughs (e.g. within a Hospital Group or Community Health Organisation)</li> </ul> <p><b>More care delivered through the community</b></p> <ul style="list-style-type: none"> <li>Provides the basis for funding mechanisms to allow more care to be delivered within the community setting (instead of acute hospitals)</li> </ul> <p><b>More accurate, granular financial management and planning</b></p> <ul style="list-style-type: none"> <li>Underpins transition to activity based funding that will align funding with the care provided</li> <li>More effective billing of private medical insurers</li> <li>Supports financial management of hospital groups</li> </ul>	<p><b>More efficient short and long term resource planning &amp; management</b></p> <ul style="list-style-type: none"> <li>Ensuring that capacity gaps are identified early and structural programmes are put in place to address these</li> <li>Providing data to underpin the balanced scorecard approach outlined in the HSE Accountability Framework</li> </ul> <p><b>Healthcare funding model aligned to strategy</b></p> <ul style="list-style-type: none"> <li>Activity based funding to align funding with care delivery</li> </ul> <p><b>More proactive financial management of the health system</b></p> <ul style="list-style-type: none"> <li>More rapid and efficient reporting to allow timely corrective action if required, and more granular information allowing detailed analysis and focus on variances</li> <li>More proactive forecasting capabilities</li> </ul>



The capabilities described above will result in a fundamentally more ‘user friendly’ experience for all stakeholders of the health service. A selection of future experiences are highlighted below in Figure 5, to illustrate the ‘look and feel’ of the eHealth enabled care delivery system.



Figure 5: Sample User Experiences

# Roadmap for Delivering the New Capabilities

*“Safe, high quality cancer care is based on commercially available technology, including clinical information systems, providing controlled access to data for care providers, management and funding agencies. The National Cancer Control Programme relies on activity and key performance indicator data from the designated cancer centres to monitor and develop cancer services. Therefore, in the transition to a data-driven and knowledge-based culture, we are strongly committed to the goals of the Knowledge and Information Strategy.”*

*Dr. Jerome Coffey, Director, National Cancer Control Programme*

The delivery of the target capabilities represents an unprecedented scale of transformation for the Irish health system. Successful delivery will require programmatic approach, dedicated resourcing, and commitment to funding. The benefits are dramatic and far reaching – to patients, the health system, and the Irish population and economy at large.

The delivery of the target capabilities represents a transformation of scale and ambition unprecedented in the Irish health system to date. Experience from other countries that have embarked on similarly comprehensive reform programmes, such as Canada, Norway, Singapore and Spain have been researched and embedded into the roadmap as well as operating model and architecture principles, highlights some key success factors:

- The reform must be managed as a programme, with clear vision and dedicated leadership from Knowledge & Information, HSE Leadership and Clinicians. Additionally resourcing, funding, strong change management, clear targets and governance must be in place to enable predictable, effective delivery
- Robust information and technology architecture is critical, with particular focus on standards-based interoperability, coherent design and strong governance
- Extensive staff and subject matter expert involvement is the proven way to ensure delivery of designs that are pragmatic, allow and facilitate local flexibility and innovation, and have the buy-in of practitioners across both front line care delivery staff as well as management and administration

The high level roadmap is anchored in the five priority focus areas outlined earlier. The current view of the high level roadmap represents an indicative, pragmatic but aggressive delivery vision, and will be refined in line with the evolving overall health reform programme and its timelines and priorities. The execution of the plan is in parts dependent on new legislation being passed. It is also subject to the appropriate funding to be made available in a structured and informed manner. A more detailed Business Case & Planning Phase is therefore required as a first priority, with close involvement from key stakeholders in the HSE, Department of Health and other critical parties to ensure creation of, and joint agreement on, a feasible, appropriately balanced, outcome-focused delivery programme.

The highlights of the current view of the roadmap include:

- The core of the programme will be delivered over the next five years, with the

national rollout activities for electronic medical record and some of the clinical programmes expected to stretch beyond this

- There are some key enabling capabilities, particularly related to information integration, which are critical to support the benefits realisation from other areas
- While new strategic capabilities are being built over a period of time, an ongoing stream of more tactical enhancements is required to address the shorter term priorities within care delivery
- Transformation of the Knowledge & Information function itself is crucial to enabling the delivery of this programme. A significant capability and capacity uplift is necessary to create the 'delivery engine' that will power the programme in an effective, controlled and predictable manner, and support these new business capabilities efficiently in a live service environment once they have been deployed. This uplift can be achieved through a combination of additional internal resourcing, appropriate increased external sourcing, resource backfilling for short periods (especially clinical expertise) and cooperation across the system between implementation teams. A phased approach that first focuses on making the transition to new structures and then defining and executing against transformation plans for each function.

The creation of business cases and detailed planning will deliver a refined, more detailed view of the roadmap and the associated investment case for the overall programme. Based on international experience, it is expected that the total investment required for this programme will be significant, measured in hundreds of millions of euro. The magnitude of the required investment in Ireland is compounded by the chronic underinvestment during past years, illustrated by technology ICT spend as a portion of the total healthcare spend (approx. 0.85% in Ireland compared to EU norm of 2-3%, per annum<sup>1</sup>).

## eHealth Benefit Areas

The return on this investment comprises direct benefits to the patient, the healthcare delivery system and the tax payer, as well as broader positive ripple effects into the health ecosystem, SME businesses, etc. Some highlighted benefit areas include:

### Health Service Delivery

- **eHealth improves quality and safety of care.** The six key drivers for quality improvement as outlined in the HSEs Strategic Approach to Improving Quality of Care are at the heart of the person centric approach in this strategy. The eHealth capabilities will make a meaningful contribution to improving healthcare outcomes through information based workflows and automated processes. This will increase our ability to track and measure improvements as well as providing the ability to monitor adherence to best practices thereby ensuring the provision of safe quality services and the best experience of care for all those who use our healthcare services
- **eHealth brings increased clinician face time.** By freeing up resources on typical administrative roles which allows clinicians to optimise individual care plans
- **eHealth brings efficiency.** Both to legacy healthcare systems through lower operational costs, and to new healthcare investments within existing systems.
- **eHealth brings increased transparency of service outcomes.** Patient safety, quality and service efficiency can be understood in a more timely manner by mining health record information
- **eHealth enhances information.** Providing for increased level of information flow, transparency, customisation, patient choice and responsibility-taking, as well as quantitative, predictive and preventive aspects
- **eHealth puts a great focus on community care.** Allows remote monitoring and management of patients from settings such as the home, reduction in travel times for patients and improvement in general convenience for both patients and care providers

### Population

- **eHealth enables increased population wellbeing.** Extending the active life of an

average employee in Ireland by 1 year can lead to a 1.5% rise in GDP<sup>ii</sup> and deliver savings resulting from reduced demands for healthcare during that period of time

- **eHealth empowers patients.** By allowing consumers to proactively manage their own health, and improving participation in self-monitoring and chronic disease management
- **eHealth enables transparency for the patient.** Where they can see their own medical records, lab results and other information they have a clearer understanding of the care they are receiving
- **eHealth allows better access to services.** Delivering health services to remote communities and allowing online access to healthcare systems including scheduling, prescription ordering, referrals and telehealth monitoring
- **eHealth improves epidemiology.** Improving the ability to support management of public health interventions and the availability of high quality data sets which can be readily mined through valuable longitudinal studies to inform national policy.

### Irish Economy

- **eHealth makes health delivery cheaper.** eHealth enables transition of care from relatively more expensive acute hospital setting to community based care and self-care – reducing the overall cost to the system. More efficient, automated processing also makes each visit cheaper.
- **eHealth opens up new markets.** The size of the internal eHealth-related market in Ireland is forecasted to be €42-€88 million by 2025 while the estimated size of the market potential for direct eHealth exports from Ireland are expected in the region of €559-€573 million per annum through 2020<sup>iii</sup>
- **eHealth creates jobs.** Once developed, eHealth services are imminently exportable with potentially 2,360 new full-time jobs and an exchequer impact of approximately €135 million<sup>iv</sup>
- **eHealth fuels entrepreneurships and start-ups.** Ireland is well positioned to capitalise on the growth potential within the eHealth sector with advocated incentive schemes and the presence of agencies such as the Digital Hub Development Agency and the National Digital Research Centre

- **eHealth increases Foreign Direct Investment (FDI).** The industry cuts across many industry sectors including Technology, medical devices, pharma/bio and financial services who all invest heavily in eHealth.

### **Benefits Realisation**

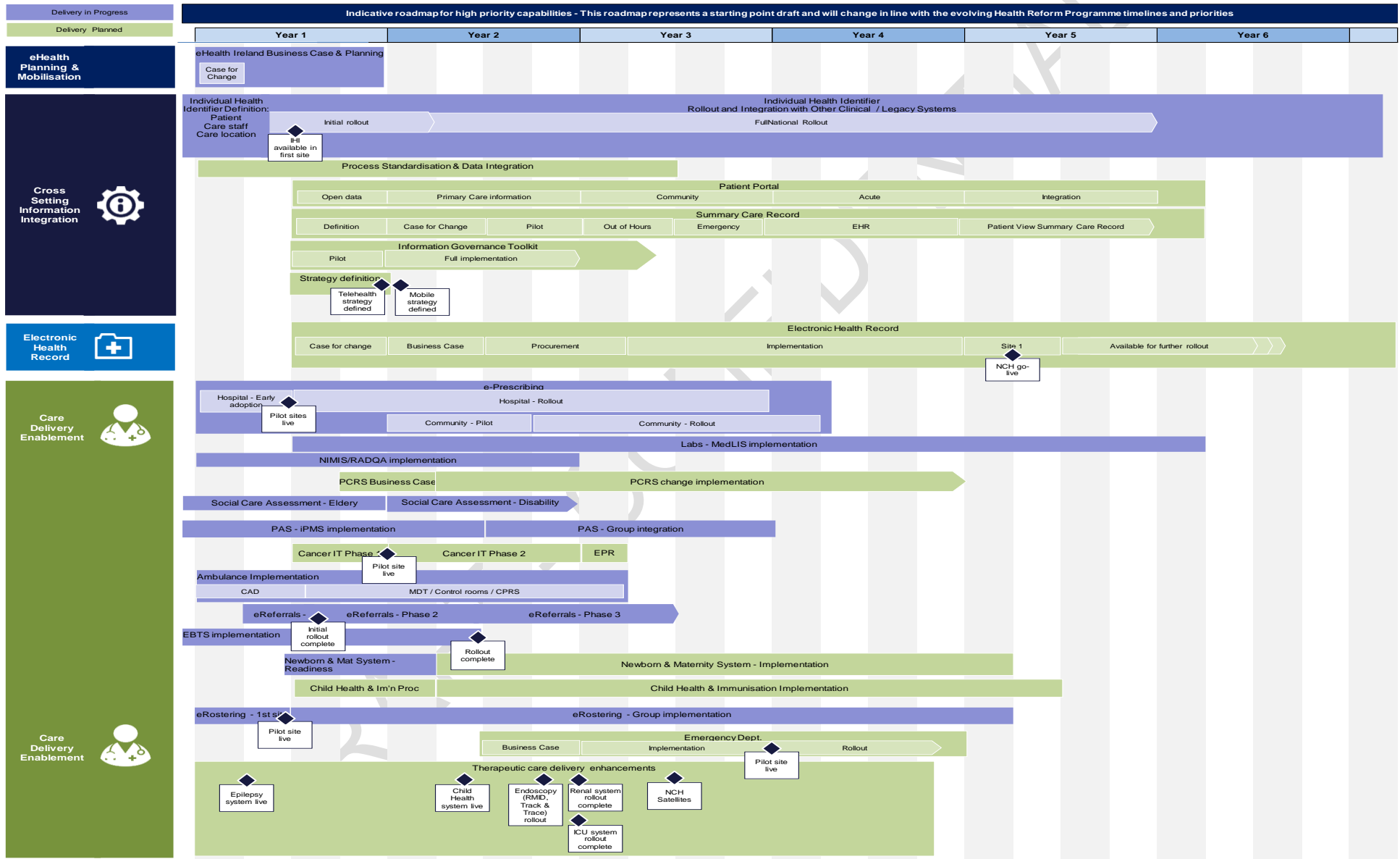
With a substantial investment at stake, and such a vast ranging benefits potential to be realised, it is important that the programme business case is underpinned by a strong benefits realisation framework and practices. Core tenets of this include:

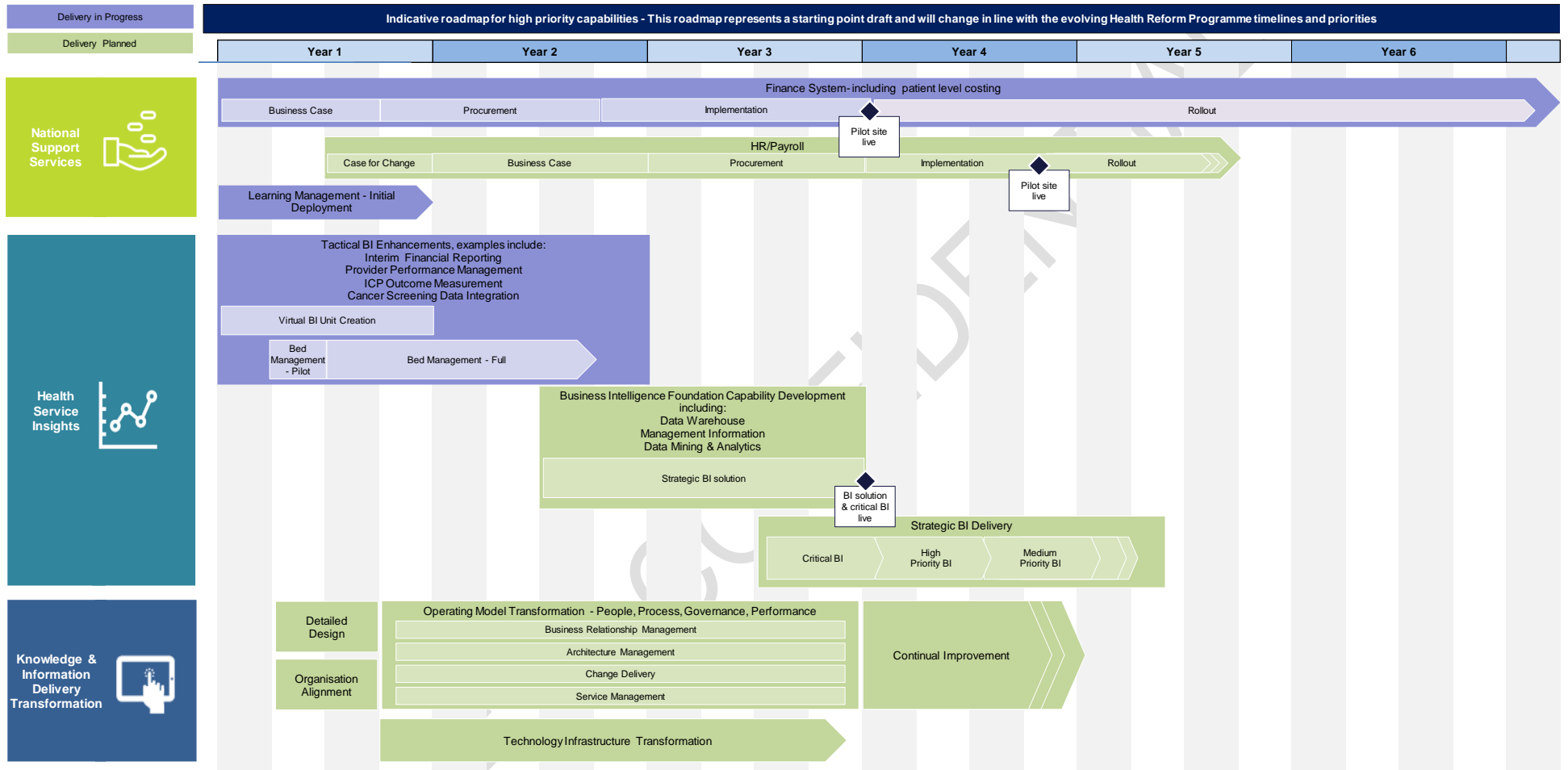
- Business case rigour for each programme to justify investment
- Robust quality assurance of the cost side of the business case – estimates, risks etc

- Clear ownership of benefits definition and realisation by Clinical and Operational leadership within the healthcare delivery system
- Tangible and measurable plan to realise benefits
- Roles of different stakeholder groups in assuring that benefits are actually realised – including:
  - Health service management and clinicians as business case sponsors
  - Knowledge & Information function as the delivery engine
  - Local Knowledge & Information management and resources in hospitals and other care settings as the 'benefits realisation officers', ensuring successful business adoption and implementation



The indicative delivery roadmap is set out below, and will be refined in light of evolving overall reform programme plans.





DRAFT

# Future IT Architecture to Enable the New Capabilities

*“Healthcare transformation, underpinned by technology, will better equip our healthcare service providers to:*

*Know their patients: providing access to data when and where it’s needed most, to identify what is happening and predict what will happen next.*

*Engage our citizens: connecting patients to their care teams to better manage care delivery and engage people individually in their health and wellbeing.*

*Manage services: putting data into action to improve outcomes, manage demand and optimise service delivery to maximize value and better serve our population.”*

*Director, Current HSE Supplier*



The delivery of the health service capabilities is underpinned by the delivery of the future IT architecture vision. This vision is aligned with the HSE objectives, eHealth Strategy and business capability requirements, and enables integration and provision of information in a timely, reliable way.

This more technical section sets out the architectural vision describing the future technology architecture for eHealth in Ireland. The architecture covers all care settings, and all systems, at a high level. The architecture supports the eHealth Strategy and Integrated Care Programmes through standards, common identifiers, common services and where practical and cost effective, central core applications. The vision will be delivered under clinical and operational leadership, by the health service with K&I function and its partners. The realisation of the benefits that the vision brings is ultimately an operational responsibility and lies with the front line service and the health service management.

## Architectural Design Principles

The key principles of the future architecture direction consider the technology trends in health and are based on international best practice and experience in the health sector. As a key theme underpinning these principles is the sharing of information, alignment with legislation and engagement with the Irish Data Protection Commissioner will play a critical part to ensure successful implementation. The principles are set out below.



Figure 6: Architecture Design Principles

### The IT Architecture Vision

The high level future IT architecture vision is illustrated in Figure 7 below, and each of the

include security, messaging, and auditing. In practice, the integration tier is likely to be implemented through a number of specialised systems. It will initially include the integration functionality in PCRS and HealthLink. Over time,

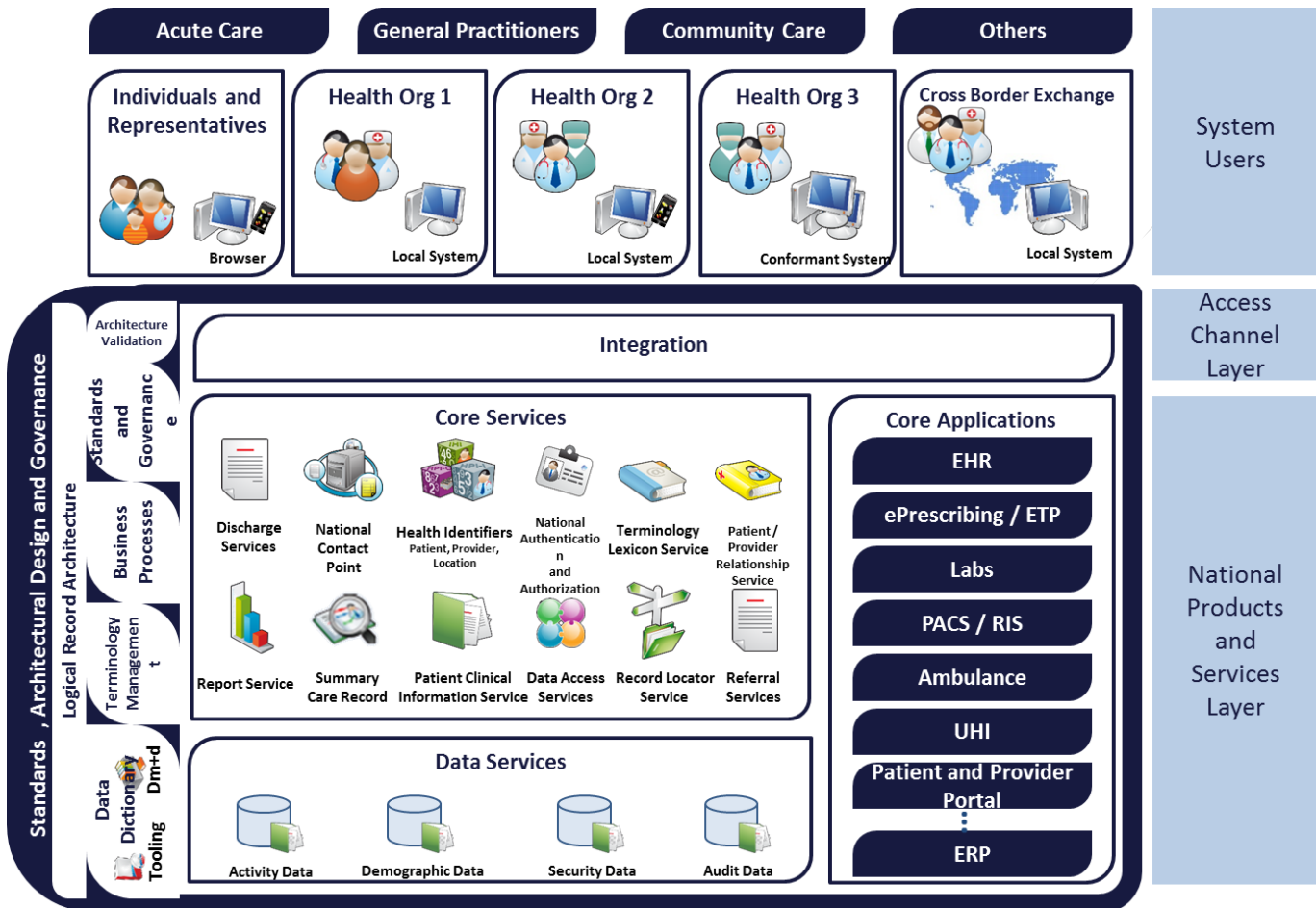


Figure 7: Future IT Architecture Vision

elements described briefly below.

#### Care Settings and System Users

Different healthcare organisations are depicted under the care settings of Acute Care, General Practitioners, Community and Others. Organisations will include users such as patients, clinicians, social, mental health and community workers. Organisations will have local technology systems, which can be integrated with the HSE core systems. To facilitate this, the architecture will define, certify and enforce standards for integration, requiring that systems are conformant with the standards before integration can proceed.

The integration tier provides a single logical gateway into core HSE systems, and standards based channels for synchronous and asynchronous messaging between local users, local systems and the HSE core. Key functions will

this will be evolved based on integration and security requirements. Future components may comprise commercial off the shelf products (COTS) or Open Source technologies. In either case, a cost assessment must verify and include the cost of support requirements in the decision making and business case.

On a phased basis, integration with core systems (e.g. use of the IHI) will become mandatory. The approach by which individual organisations implement this integration will be determined by them, in conjunction with a design authority. The role of the design authority will be to provide overall governance to ensure coherent design that shares appropriate data at each stage of the patient pathway.

## Core Services

Core Services comprises key national HSE systems that are used by other systems and applications, such as IHI, or Referral Services. These are the kernel of the architecture and enable the functional connections between applications. The core services shown in the HSE future architecture have been identified based on the requirements for integration, and consistent views and behaviour across systems and care settings. For example, the requirement for clinicians to have a synopsis of a patient's history is met by the Summary Care Record core service and necessary integration with this. The services that are defined are logical services. Services perform functions within an overall Service Oriented Architecture (SOA). Services may be physically implemented using existing systems or through new systems, either COTS or Open Source. Services, and the HSE SOA, will be governed by the HSE Design Authority.

## Data Services

A number of logical data services are depicted. The architecture states that defined HSE datasets should be normalised, integrated and held centrally where necessary to support business capabilities. The detailed contents of these will be driven by the information architecture and the detailed design of core applications and core services, the definition of which will continue to evolve and mature as the new Knowledge & Information capabilities are implemented. Clinical experts will be the lead stakeholder for the content of datasets, with the Design Authority supporting the technology and process. These data services underpin the

availability of management information throughout core applications. **Core Applications**

As noted above in "Care Settings and System Users", applications may be central or local. Applications include clinical and administrative applications for all care settings. Regardless of whether applications are central or local, they will integrate using the same standards with the Core Services.

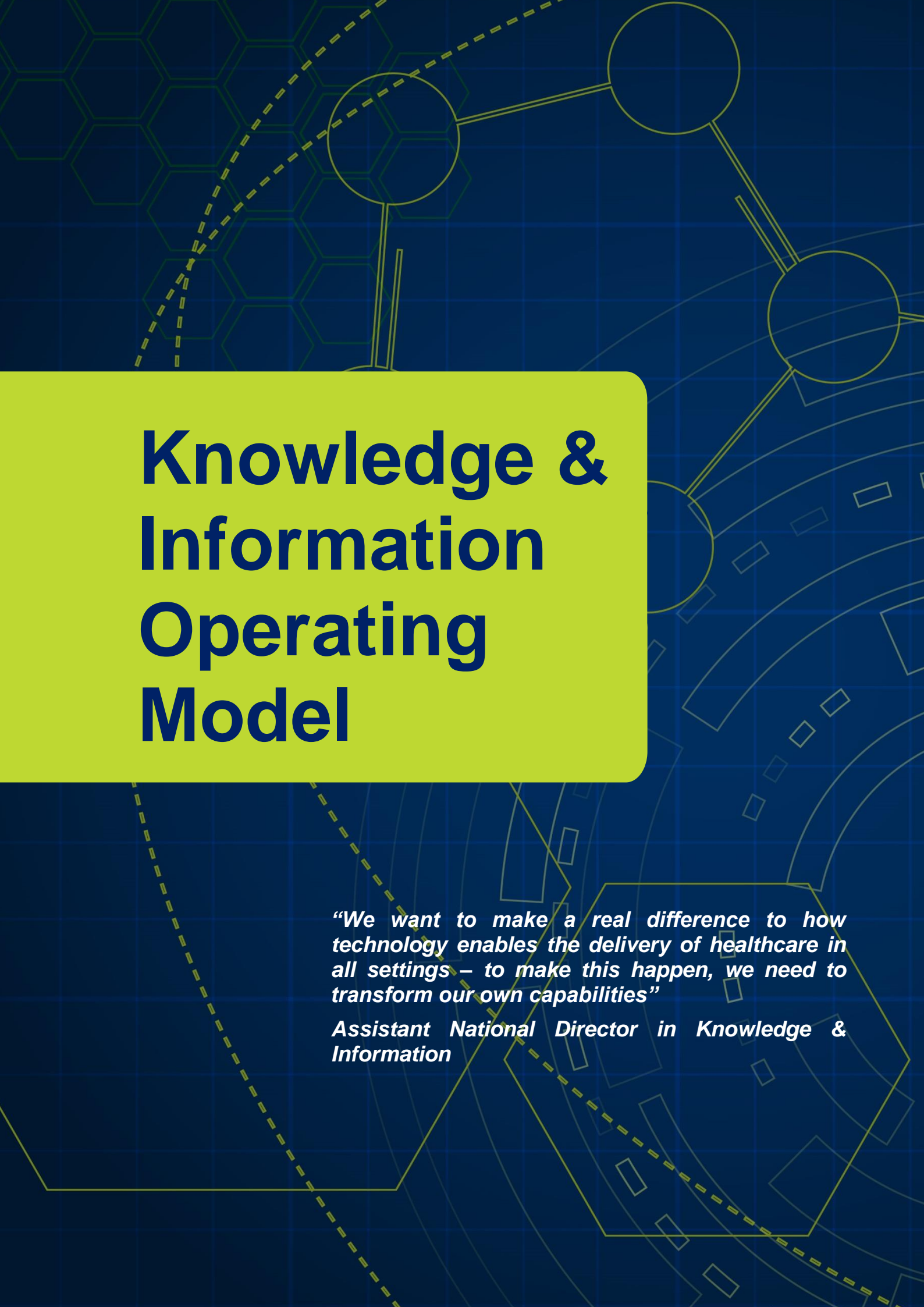
A Core Application is a central national application, typically deployed as a single instance. As local applications require replacement or major upgrades, consideration will be given to migrating instead to a national core application, where available. Use of national core applications should improve the level of integration while reducing the cost of integration.

## Standards and Architectural Design and Governance (Design Authority)

Effective communication requires that information issuers and recipients share a common "reference framework" that allows for interaction. Standards provide this common framework, promoting uniformity in the definition and identification of health system components, whether they are objects, diagnosis, people, or interventions.

The Enterprise Architecture function, leading the Design Authority, will be responsible for the definition of these standards and the design of technology to meet business capability and process requirements. The function will work closely with the health service and clinicians in particular to shape the design of functions and capabilities, and govern and enforce the standards.





# Knowledge & Information Operating Model

*“We want to make a real difference to how technology enables the delivery of healthcare in all settings – to make this happen, we need to transform our own capabilities”*

*Assistant National Director in Knowledge & Information*

Transformation of the Knowledge & Information delivery capabilities is a critical step in enabling the overall reform. Knowledge & Information will be integrally part of the business of delivering healthcare, and operate in a joined-up, collaborative and transparent way. Five key principles guide how we operate with our stakeholders, and organise ourselves to drive value and innovation to the healthcare system, enable efficient, integrated and secure flow of information and provide a great place to work for our staff.

## Vision for Knowledge & Information

This strategy reflects the need to move away from treating technology as something separate from the “business” of delivering healthcare and position technology as an enabler for the delivery of high quality patient information. This repositioning of technology based enablement is critical to the cultural change we wish to affect within the HSE.

This change in perspective places emphasis on Knowledge and Information – the key outputs of technology rather than the building blocks themselves. Enabling every clinician and service manager with timely and useful information are critical to transforming Ireland’s health service into a 21<sup>st</sup> Century leader.

## Operating Model Guiding Principles



Figure 8: Operating Model Principles

Delivering on this vision requires a refocused operating model consisting of refreshed organisation structures, processes and governance. We have defined a set of target principles to underpin the design for the target operating model. These target operating principles describe the way Knowledge & Information delivery in the future will be conducted. They are intended to set the tone for why we need to embark on a transformation programme within the function itself and how it operates with other healthcare stakeholder groups. More specific, measurable targets for the programme implementation will be defined as part of the detailed planning for the implementation. The Knowledge & Information guiding principles are:

- **We will work as one effective organisation:** To deliver mutual outcomes and benefits by aligning the objectives of the Knowledge & Information function with

those of care delivery to deliver integrated healthcare to patients, but also by eradicating existing silos to operate as one coherent team of technology professionals. The operating model outlines how we will collaborate with the rest of the Health Service so that service needs are clearly understood and responded to by Knowledge & Information. The service itself must be facilitated to articulate these needs and take responsibility for realising the benefit

- **We deliver to our commitments:** We will have access to resources and skills to satisfy the demand for technology enablement, with predictable delivery, clear commitments and strong governance
- **We provide innovation & value:** We will proactively seek to harness the technology

innovation in Ireland and beyond to create new healthcare services and realise patient benefits, and support more efficient delivery of existing services. The HSE has a unique opportunity to learn from international, national and local experience and the leading practices extolled by the extensive local ecosystem of leading digital companies. In addition, we as a function will demonstrate value for money to our internal stakeholders by providing a responsive, agile, cost efficient delivery of capabilities, supported by transparent measurement of performance. A focus on fostering innovative solutions from small teams can rapidly demonstrate the value that can be delivered from eHealth

- **We support effective risk and security management:** We will provide a flexible working environment underpinned by integrated information, taking advantage of

mobile technologies. We will focus on effective risk and information security management to do this in a safe and secure manner

- **We foster a great place to work:** We will provide a clear shared vision and strong leadership culture to help restore Knowledge & Information professionals with pride in their work. We will equip the workforce with relevant skills and provide meaningful and interesting career development opportunities with healthcare technology.

### Knowledge & Information Operating Model

This vision for the target operating model was created based on an assessment of current capabilities, an understanding of care delivery priorities to be implemented and a view of leading practice adopted by similarly sized organisations.

The operating model is based on a matrix structure, the rationale of which can be explained in two dimensions:

1. The vertical, 'function-specific' dimension (highlighted in Figure 9): focused on quality, consistency and standardisation of methods and practices, and realising cross-organisational synergies
2. The horizontal 'care delivery aligned' dimension (highlighted in Figure 10): focused

on alignment with, and delivery to health service requirements, and providing end-to-end delivery accountability

These dimensions are further elaborated as part of the description below.

Significant investment will be required to eradicate existing silos and transform technology delivery into an agile, digitally focused Knowledge & Information function that can drive both structured delivery while continuing to preserve the strong culture of local innovation that exists within the HSE.

This strategy represents a renewed vision for technology enabled healthcare and the operating model is a renewed approach to deliver upon that vision.

### People

Delivery of our goals will depend on enabling our people to contribute as effectively as possible. The model strikes a balance between organising to reflect the structures of our customers, while also organising to maximise the flexibility of the organisation. This objective is advanced by organising most of our people into function specific pools of shared skills where centres of excellence can be developed.

In addition to formal structures a priority is fostering a culture which our people are proud of and

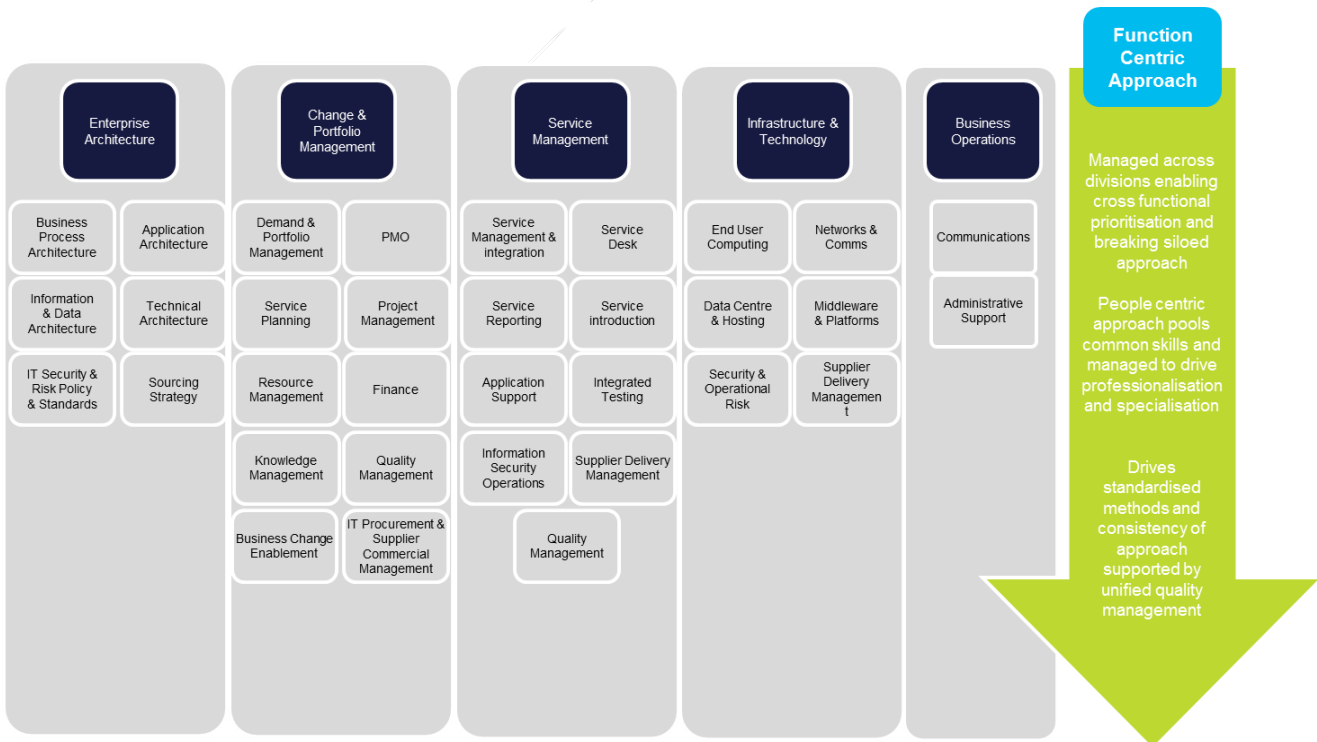


Figure 9: Function Centric Operating Model View

committed to their work, where everybody has an opportunity to contribute, learn, and advance on merit. This ambition will be made real through the definition of clear career framework, and by professionalising roles in Knowledge & Information. This will encompass appropriately defined career paths and structure for Knowledge & Information staff to effectively develop skills in their roles. Certification in areas such as service management, project management and various technical skills will also be a part how we professionalise ourselves.

### Partners

The extensive scaling of technology demand will create a greater need for effective input from our partners and vendors and stronger capabilities within the HSE to ensure both change programmes and ongoing service delivery are effectively managed. Embedding a strong culture of service management supported by processes and governance aligned with leading industry practices and frameworks (e.g. the use of ITIL - a set of

global practices for IT service management) are critical.

### Interactions with Knowledge & Information

Ensuring that our customers have timely access to the appropriate contacts within Knowledge & Information is a key objective. The service desk provides a single point of contact to users with transactional needs (e.g. incidents, requests etc.), while senior management in the Business Delivery functions provide a single point of contact for HSE divisional leadership for overall service planning and performance management.

### Functions within Knowledge & Information

Knowledge & Information will comprise five core functions, around which the services, responsibilities, people and external relationships will be organised. These are:

- Business Delivery
- Enterprise Architecture

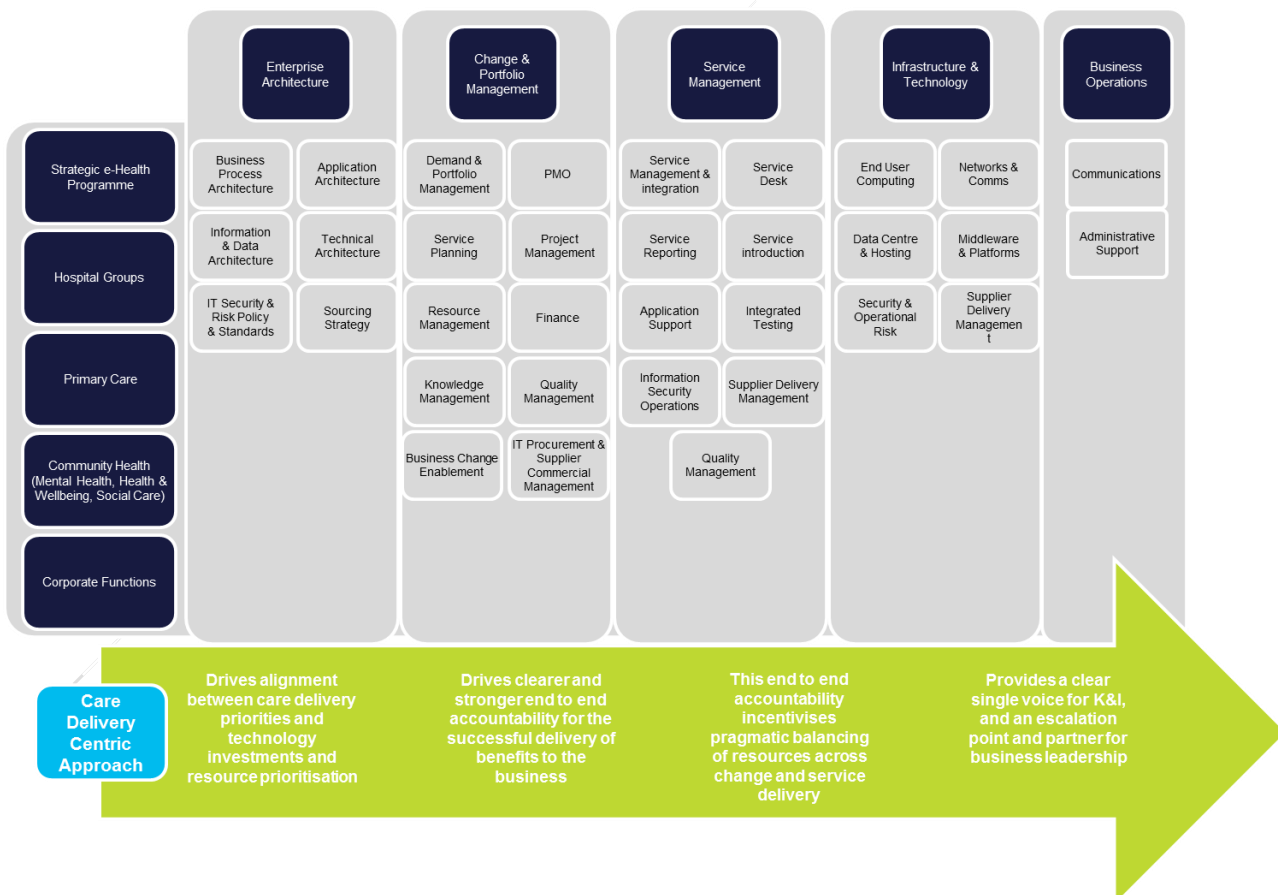


Figure 10: Care Delivery Centric Operating Model View

- Change & Portfolio Management
- Service Management
- Infrastructure & Technology

The purpose and core responsibilities of these functions are described at a high level below.

### **Business Delivery**

The primary objective for the Business Delivery function is to create a single point of accountability representing Knowledge & Information and technology service delivery - both change projects and business-as-usual run services - in the health service, and to drive technology enablement, adoption and innovation to achieve better patient outcomes. To achieve this effectively, Assistant National Directors will be assigned to specific areas of the health service, who then work with clinicians to shape, plan and deliver the end-to-end portfolio of Knowledge & Information services to that area.

### **Enterprise Architecture**

The purpose of this function is to underpin the work of the Technical Design Authority and to ensure the continued alignment of the technology architecture and capabilities across the whole service and across all settings with the strategic direction. This function will work to promote cross-capability integration, re-usability, and standardisation and work closely with the Business Delivery to ensure that new demand is always considered in the broader context. Responsibilities for the function include defining robust and clear standards and policies for technology implementation and service delivery; owning the design of all architectural layers including business process, information, application and technical; defining and quality assuring compliance with policies relating to information security and risk; and owning the overall sourcing strategy.

### **Change & Portfolio Management**

This function will comprise three main components – Portfolio Planning & Management, Programme Management Office and Business Change Enablement. The purpose of the function is to continually balance the future delivery needs with the available human and financial resources; oversee the successful delivery of the whole change portfolio and provide project management expertise, tracking and monitoring and quality assurance to enable this; and develop and deploy business change capabilities to support successful embedding of change including identifying and planning any business process impacts and any required communications and training.

### **Service Management**

Service Management is responsible for the delivery of all operational services in line with ITIL service management principles. This means managing service delivery in a business focused, standardised, consistent way, which allows effective planning and management of current and future capacity, service availability, IT security and service continuity across all components of the service (people, process and technology). Service Management will be characterised by:

- Alignment to recognised health service functions
- Clear accountabilities for service levels, underpinned by strong service integration
- Customer service focus, with a single point of contact for service consumers
- Standardised processes and continuous improvement
- Effective use of 3rd party suppliers as an extension of the in-house Knowledge & Information capability
- Controlled transition of changes and new developments into operational service

### **Infrastructure & Technology**

This function is responsible for the provisioning and management of all enabling infrastructure for users and services:

- Networks & Telecoms that provide voice and data connectivity across the HSE's extensive footprint
- Servers and Storage (including leveraging cloud technologies as appropriate)
- End user computing (including desktops, laptops, mobile devices, printing & productivity software)

A national data centre has been created from which a growing infrastructure base is being delivered. Key ongoing priorities for the infrastructure function include:

- Delivering high availability infrastructure that reflects the criticality of the clinical applications it underpins
- Managing technical security to mitigate any risks to service or information security
- Utilising, monitoring and automating technologies to deliver high levels of service
- Delivering service in line with HSE service integration approach and ITIL service management principles
- Supporting the successful delivery of change projects



**Knowledge & Information Managers throughout the HSE**

In addition to the functions described in the operating model, the management of technology for healthcare is in place through the HSE in many different ways. Some hospitals employ resources directly to support solutions deployed while other hospitals are reliant on HSE resources to operationally deliver systems and/or to strategically manage them. The new operating model will allow the levels of support and access to expertise to be addressed.

The first action will be to put in place a resource at the hospital group level that will manage hospital group level strategy, deploying localised versions of the national strategy into the groups and facilitating agile adoption of solutions and where appropriate manage the implementation of nationally standardised solution sets.

Additionally the newly formed service management function will ensure that the levels of support across the healthcare system are balanced and appropriate to each organisation that requires support.



# Governance and Clinical Engagement

*"This Strategy outlines a clear and ambitious direction for Knowledge and Information as a re-energised, value-adding, integral function of the HSE with the potential to transform Ireland's health service into the modern, safe and efficient service we can, and must, aspire to."*

*Country Manager, Current HSE Supplier*

Clinical leadership is critical success factor to any major healthcare change programme, its impact amplified in this case by the transformative nature of the reform. The programme structures and governance ensure that this is built into all steps of the Knowledge & Information strategy implementation. Overall governance design for Knowledge & Information facilitates coherent and effective decision making at all levels and across both change delivery and service delivery.

## Governance

### Governance Model

Implementing a clear governance structure for Knowledge & Information is a key component of the new operating model, to ensure:

- Effective and coordinated flow of decision making at all levels, in line with accountabilities and decision authorities, and across functional areas
- Ongoing alignment with strategic priorities and reform programme objectives, to release new capabilities

The governance model, illustrated in Figure 11, operates at three levels – strategic, tactical and

operational – and across both change delivery and ongoing service delivery.

- Operational governance is closely tied with the operational processes and day-to-day / weekly activities, and focused on monitoring & reviewing execution, and the need to escalate exceptions.
- Tactical level typically operates with monthly frequency, with the objective of consolidating a holistic view of performance to enable decision making and course corrections in the short term.
- The objective of the strategic level is to ensure that alignment with overall objectives is maintained – including strategic direction and plans, investment

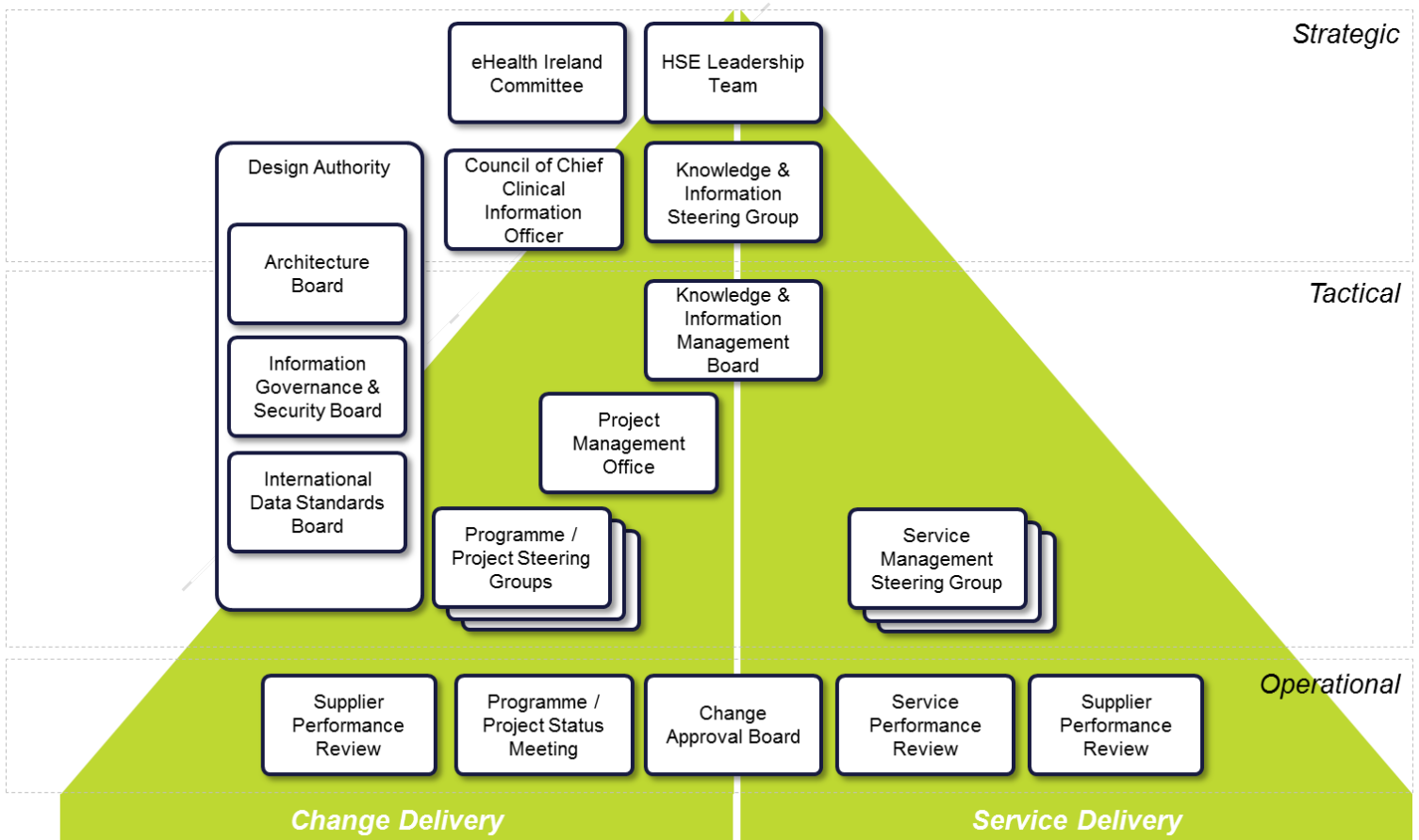


Figure 11: Governance Structure

prioritisation, and delivery progress and quality.

In addition, a small number of collaboration fora is envisaged to complement this governance structure. One of these is the eHealth Ireland Committee. This committee is formed as an outcome of the publication of the eHealth Ireland strategy. The purpose of the eHealth Ireland Committee will be to support and guide implementation of the eHealth Strategy and to provide assurance of clinical engagement.

The eHealth Ireland Committee will comprise individuals with relevant competencies to support the CIO in the implementation of the strategy. It will review and recommend implementation strategies to the CIO, and advise the office on investment decisions, clinical engagement and health reform needs.

Another key aspect of governance in the context of the entire reform programme is the level of clinician involvement in setting direction and decision making. A number of steps are being taken to ensure that strong clinical support is built-in to the way the programme is managed. These are described in more detail below.

### **Clinical Engagement & Leadership**

A key principle we will enshrine in our programmes is that all will be guided by clinical leadership. While technology is an enabler of clinical development, international experience clearly underlines the importance of clinical leadership as a necessary pre-condition for successful programmes. The pressures experienced at the clinical front line create a particular impetus for strong involvement throughout the project lifecycle from conception, through to design and adoption. A clinical role to lead on Informatics will be filled within each programme. The role of Chief Medical Information Officer of the HSE will be developed to support this overall leadership and to support the delivery of integrated care. This approach aligns with international best practice, e.g. the appointment of a Chief Clinical Information Officer in the UK and leading roles for Chief Medical Information Officers in the United States.

#### ***Council of Clinical Information Officers***

There is a need to ensure that the clinical engagement achieved in getting the Knowledge & Information strategy to this stage is continued and strengthened. A Council of Clinical Information Officers will be formed that will provide oversight to the portfolio of clinical information systems proposed. This group would be provided through an investment of time from clinicians throughout the Irish healthcare system and is considered to be essential in the assurance that the delivery

programmes are based in the clinical need and reality of what can be delivered into care settings in the Irish healthcare systems.

This council will provide support, and in many of the delivery cases, governance for the delivery of solutions defined as part of eHealth Ireland. An example is how we will embed clinical leadership into the Electronic Health Record Programme. This clinical leadership will have the key design authority role over each phase of the programme: from the case for change, to the specification of requirements, through to the delivery phases of the programme.

#### ***Clinically Led Engagements***

In addition to the formal governance, Knowledge & Information envisage that all major change programmes or change processes will be clinically led. When a programme or change process is clinically led it is more likely to succeed than when clinicians only engage in the programme or process but do not lead. A clinically led programme leads to higher levels of clinician early adopters and high levels of clinician buy-in overall. Some additional design principles to support strong clinical engagement are proposed below:

- Establish an open forum for clinical development with a focus on collaboration and idea exchange
- Administrators must be willing to relinquish control to clinicians where appropriate. Proving rather than saying that they are decision makers
- Balancing evidence based approaches allowing the clinician to leverage their interpretation, judgement and contextualisation
- Using data to measure outcomes and refine
- A strong alignment with the integrated care programmes and the clinically led national clinical care programmes.

#### ***Knowledge & Information Performance Management***

The formal governance structure will be underpinned by a set of key performance indicators (KPIs), which culminate in a Knowledge & Information scorecard at the top, and cascade from there down to different levels. This scorecard centric approach aligns with the broader approach to organisational performance management outlined in the HSE Accountability Framework.

This approach means that all Knowledge & Information functions are aligned with a coherent, integrated set of objectives and targets – which are meaningful and valuable to the health service as a whole - and each is clear about its contribution

towards these. Performance reporting processes in both change delivery and service delivery will support the generation, collation, quality assurance and interpretation of the KPIs and their trends, to support effective decision making within the different instances of the governance framework.

**Example Scenarios of Governance working within the Operating Model**

Governance drives quality and consistency across both processes and the experience of users and customers interacting with Knowledge &

Information. Successful governance depends on all stakeholders having a clear understanding of the structures so that governance remains accessible, easy to interact with and agile. To this aim, our model seeks to balance appropriate levels of rigour and control with these factors.

The following flows outline, at a high level, the operating model at work, showing simplified key activities undertaken in two common scenarios, along with the interactions with the appropriate governance.

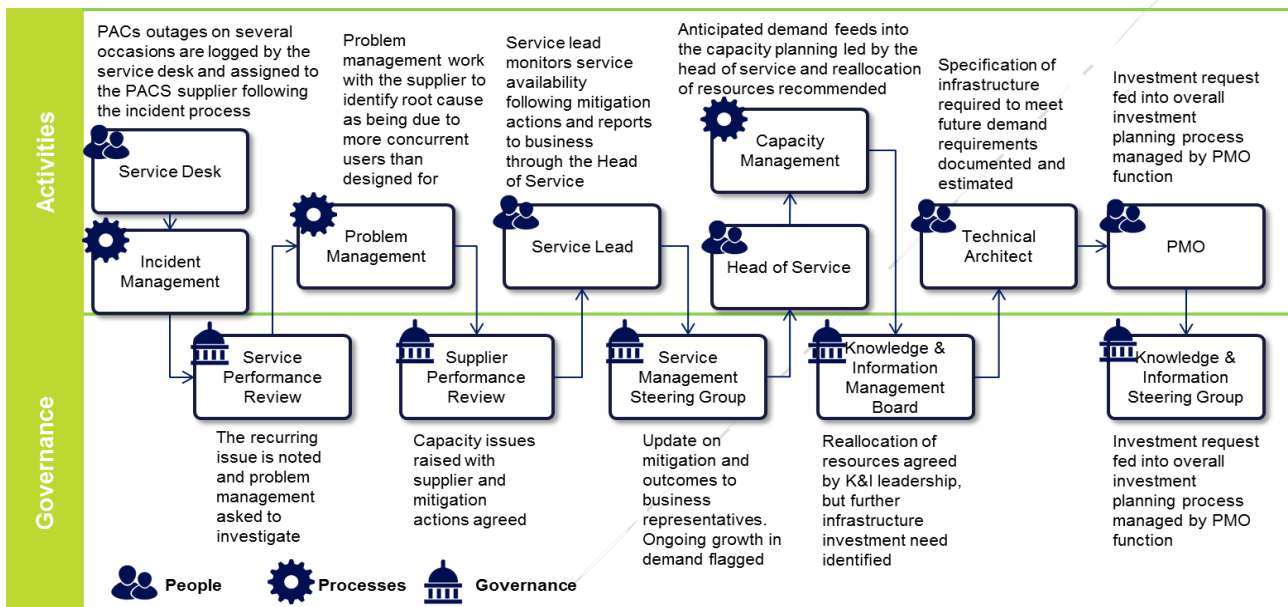


Figure 12: Scenario 1 - Service Lifecycle for Incidents and Problems

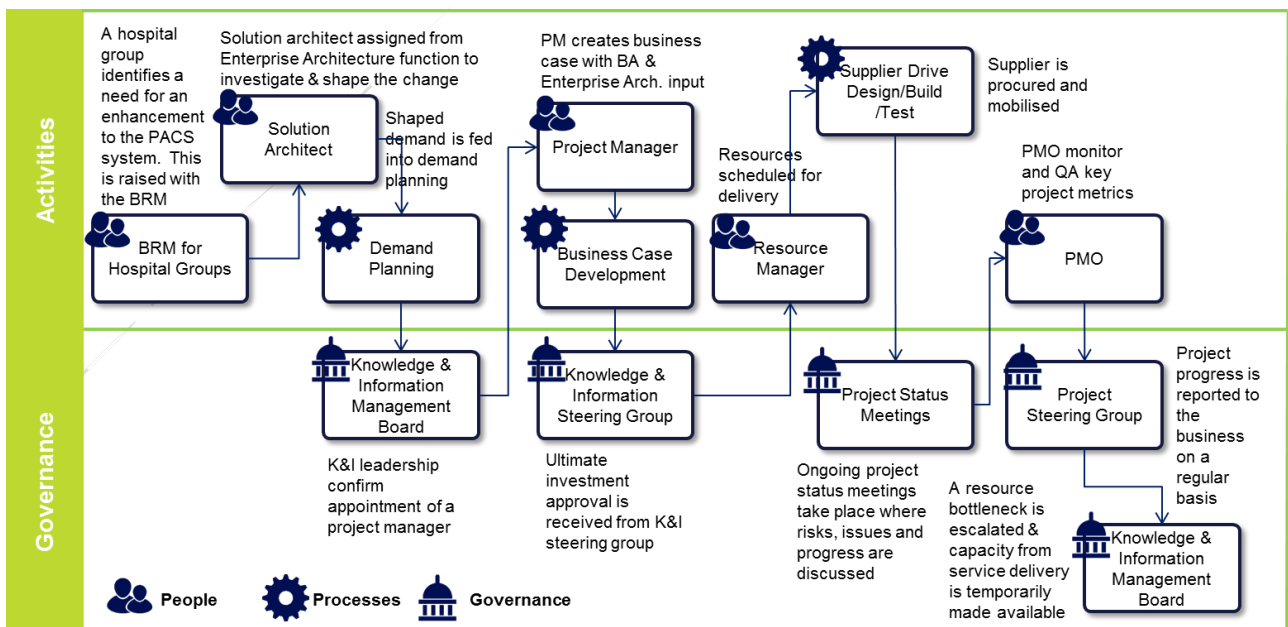


Figure 13: Scenario 2 - Mobilisation of a Medium Sized Change Project

# Looking Ahead

*“The Value for Money and Policy Review of Disability Services in Ireland, envisages the transformation of the service towards community based models focused on improving service users experience. Our ICT systems are key in linking funding to activity & outputs, cost, quality & outcomes to support implementing this change”*

*Pat Healy, National Director Social Care*

So much has been achieved in the short period of time that the concept of eHealth Ireland has existed.

Our next focus is to ensure that the momentum on driving this strategy to implementation is sustained. In the short term, this means focusing on:

- Continuing with the industry engagement process and enabling that to form the case for change for an Electronic Health Record for the whole of Ireland;
- Mobilising the business case and planning resources required to add detail to the roadmap of programmes;
- Continuing stakeholder management efforts to communicate this strategy and the broader programme;
- Progressing the detailed design of the Knowledge & Information operating model to ensure the reform supports the function thoroughly;
- Continuing to deliver on-going services and in-flight programmes including new innovations such as the Individual Health Identifier and completing implementations such as the Patient Administration System deployment.
- Continuing to stay on top of the future of the healthcare and eHealth industries, so that the latest thinking is reflected and

solutions are developed with flexibility to respond to future trends in mind

All of this is probably best described as build for the future without breaking the present on the way!

Undoubtedly, the journey ahead will be at times challenging, but imagine a world where this programme of benefits has been implemented into the delivery of health in Ireland. There will be a route to enable innovation, an eco-system that supports assurance of a return on investment and a digital solution that catches the needs and requirements of patients and clinicians alike.

Ultimately, the successful implementation of this change programme will bring about a step change in the way healthcare is experienced by patients, delivered by care professionals, and supported by the system, with ICT and information at the heart of it. The opportunity for Ireland to have a healthcare system that is supported by a digital solution to deliver healthcare in a harmonious manner is unlocked by the function, form and strategy described here.

To find out more drop an email to [questions@eHealthIreland](mailto:questions@eHealthIreland)

Follow the exploits of eHealth Ireland on twitter @eHealthIreland



# References & Glossary of Terms



## References

<sup>i</sup> <http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/ehealth/>

<sup>ii</sup> [http://cso.ie/px/pxeirestat/Database/eirestat/Institutional%20Sector%20Accounts%20Non-Financial/Institutional%20Sector%20Accounts%20Non-Financial\\_statbank.asp?SP=Institutional%20Sector%20Accounts%20Non-Financial&Planguage=0](http://cso.ie/px/pxeirestat/Database/eirestat/Institutional%20Sector%20Accounts%20Non-Financial/Institutional%20Sector%20Accounts%20Non-Financial_statbank.asp?SP=Institutional%20Sector%20Accounts%20Non-Financial&Planguage=0)

<sup>iii</sup> "Market size for remote ICT services in healthcare in Ireland", Your Country, Your Call, submission, August 2010.

<sup>iv</sup> "Market size for remote ICT services in healthcare in Ireland", Your Country, Your Call, submission, August 2010.

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## Glossary

Term	Description
<b>Business Intelligence (BI)</b>	A collection of capabilities to enable effective and efficient integration, management, manipulation and visualisation of data to derive insights for decision making - including data repositories, reporting applications and analysis tools
<b>Capability</b>	Capability is used here to describe a combination of resources (people, process and technology), directed at delivering a specific (healthcare) outcomes, and managed according to a defined operating model
<b>Centralised Solution</b>	A solution in which the major part of the systems are offered from a central and unique point
<b>Cloud Technologies</b>	Technologies that are accessed over the internet rather than personal hard drive for storing and accessing data and programmes
<b>Community Health Organisation</b>	Nine CHOs have been established for the future delivery of Community Healthcare services at a local level which will deliver the model of service envisaged in "Future Health" over time and enable and support integrated care: <ul style="list-style-type: none"> <li>• Within Community Healthcare services</li> <li>• Between the community and acute hospital services</li> <li>• With wider public service organisations (e.g. TUSLA, local authorities etc.)</li> </ul>
<b>Decision Support System</b>	Functionality to provide contextual advice, information and verification steps for clinicians when using care systems. E.g. decision trees, prompts on ePrescriptions etc.
<b>Digital capability</b>	Using web, social, mobile, analytics, and cloud based, consumer oriented technologies to enable new healthcare models or electronically enabled processes. It also implies iterative and innovation focused ways of working
<b>eHealth</b>	Enablement and integration of healthcare delivery using technology and digital capabilities – moving away from siloed and paper based operation
<b>Electronic Health Record</b>	Personal consolidated healthcare history, integrated from various source systems at a detailed level to support seamless care delivery across settings. Encompasses electronic medical record(s) from different care settings. Made available and at summary level for individual's consumption.
<b>Epidemiology</b>	Epidemiology is the study of the distribution and determinants of health-related states or events (including disease), and the application of this study to the control of diseases and other health problems
<b>Federated Solution</b>	A solution that allows interoperability and information sharing between semi-autonomous de-centrally organised lines of business, information technology systems and applications
<b>Hospital Groups</b>	Seven regional Hospital Groups have been established for the delivery of care in acute hospitals – covering statutory and voluntary hospitals. Hospital Groups will have the accountability for quality of, and access to hospital care, and people and financial performance
<b>Hybrid Solution</b>	A solution in which some key systems are offered centrally while the remaining are integrated in a federated approach
<b>Individual Health Identifier</b>	A unique lifetime identifier code for patients, care providers and care facilities so that all healthcare delivery can be linked to any and all of these from the outset and throughout and across care pathways
<b>Interoperability</b>	Interoperability is a core philosophy of the target technology architecture for the healthcare system, and means that technologies conform to a set of standards which allow data exchange and integration
<b>ITIL</b>	Information Technology Infrastructure Library is a set of practices for IT service management that focuses on aligning IT services with the needs of business
<b>Knowledge &amp; Information</b>	Knowledge & Information is the new name for information and technology delivery function within the HSE, describing the focus of its services to healthcare system in Ireland
<b>Operating model</b>	Operating model describes the (business) functions and: <ul style="list-style-type: none"> <li>• What they are responsible for</li> <li>• How they are organised</li> <li>• How they interact and operate according to processes</li> <li>• How they are resourced, governed and measured</li> <li>• How they are supported by tooling</li> </ul>
<b>PAS</b>	Computerised Patient Administration Systems (PAS) with primarily administrative functionality
<b>PCRS</b>	The Primary Care Reimbursement Service (PCRS) is part of the HSE, and is responsible for making payments to healthcare professionals for the free or reduced costs services they provide to the public
<b>Syntactic Transformation</b>	How information is packaged and communicated from one party to another and includes language, structure and data types that are required for seamless integration
<b>Technology Architecture</b>	System architecture 'layer' which defines and specifies the technology used by the application architecture layer

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Mr. Declan Lyons	Office of the CFO
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Mr. Pat Healy	National Director of Social Care
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Mr. Doug Beaton	Management Lead – Knowledge Management
Ms. Anne O'Connor	National Director of Mental Health
Dr. Tony O'Connell	National Director of Acute Hospitals
Dr. Aine Carroll	National Director, Clinical Programmes & Strategy
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Dr. Patricia Heckmann	Chief Pharmacist - National Cancer Control Programme
Mr. Patrick Cafferty	Planning & Risk Manager at National Cancer Screening Service
Mr. Liam Woods	National Director of Hospital Groups
Ms. Jane Carolan	National Director of Health Business Services
Mr. Paul McSweeney	IHI Programme Lead
Mr. Peter Connolly	National Integrated Service Framework Lead
Mr. Fran Thompson	Programme Director
Mr. Seamus Butler	Director of Information Systems - National Lead - Implementation Services
Mr. Denis Maher	Director of Information Systems – National Lead - Corporate Supports
Mr. Darach Glennon	Director of Information Systems - National Lead - Application Services
Mr. Jack Somers	Director of Information Systems - National Lead - Operations
Mr. Pat Kelly	Director of Information Systems - National Lead - ERP/Corporate Systems
Mr. Michael Redmond	Director of Information Systems - National Lead - Planning
Mr. Niall Sinnott	Director of Information Systems - National Lead - Corporate Services
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Ms. Helen McBreen	VentureLab, National Digital Research Centre (NDRC)
Mr. Joe Peppard	Director of the Information Systems Research Centre
Ms. Fiona Sanders	Director, Thorley Torrance Ltd
Mr. Henri Savisalo	IT Strategy Senior Manager, Accenture
Dr. Tony Shannon	Director, Leeds Teaching Hospitals
Ms. Ciara Walsh	IT Strategy Consultant, Accenture



# **Appendix: Detailed Capability Requirements**

## Context

Since the beginning of 2015, we have met with the HSE leadership team along with a number of other key stakeholders and programmes (e.g. NCCP). The purpose of these meetings was to understand the priority business or care capabilities that are essential to the delivering on the overall reform agenda of the HSE.

While the discussion and outputs consider priorities from a business/care capabilities perspective, the focus is on those that require technology enablement to be delivered. The outputs from this process are summarised below. These include a summary level description of key capabilities needs as well as a heat map of priorities specific to each division. This heat-map was constructed using an industry standard model for describing healthcare system capabilities.

The overall Knowledge & Information Strategy contains a consolidated view of priorities across the system. The format of this view / industry model has been adapted to be more tailored to the HSE and the purposes of the strategy. Specific changes from the input heat-maps below include:

- The view has been simplified by removing capabilities which no division regarded as a priority
- Capabilities have been reorganised into a more easily understandable structure

- Some capabilities have been decomposed, others consolidated to reflect granularity of the capability needs shared with us
- Some capabilities have been renamed to provide greater clarity and to make the priorities easily understandable to a broad audience

The ultimate purpose of this document is to provide a high level appreciation of the scale and nature of the capabilities to be developed.

### Key points of note:

- The summary descriptions provided in the main points to note are high level only. Further details of our understanding of each capability have been documented and shared with the divisional lead
- The heat map represents “to-be” desired capabilities only. It does not represent existing capabilities that have already been implemented
- The relative heat shown in the diagrams below is approximate and only intended to give a general sense of where priorities lie
- Precise prioritisation will be undertaken as part of the demand management/portfolio management processes being introduced being introduced within K&I

Capability Priorities	Main Points to Note
<b>Business Information Dashboards</b>	<ul style="list-style-type: none"> <li>• Depicting a Balanced Scorecard picture in real time and incorporating a predictive tool to aid overall hospital management, to include:                             <ul style="list-style-type: none"> <li>– Finance (e.g. monitoring agency spend)</li> <li>– HR (e.g. including European Working Time Directive monitoring)</li> <li>– Quality/Safety</li> <li>– Patient Flow</li> </ul> </li> <li>• Put in place the high level capability and then mature the underlying data</li> </ul>
<b>IHI to enable data sharing and flow</b>	<ul style="list-style-type: none"> <li>• Building block for enabling other applications and programmes</li> <li>• Not just about integrated programmes, but the substantial flow for other patient types that fall outside of these priorities</li> <li>• Identifier is required</li> </ul>
<b>Managing patient flow within Acutes</b>	<ul style="list-style-type: none"> <li>• Need to manage delayed discharges</li> <li>• Capabilities such as bed capacity predictive tooling based</li> <li>• A need for eReferrals</li> <li>• A better mechanism for the scheduling of OPD and Operating Theatres</li> </ul>
<b>Activity Based Funding</b>	<ul style="list-style-type: none"> <li>• Will require understanding of all activities relating to the treatment of that patient</li> <li>• Requires an understanding of the costs underpinning each activity.</li> </ul>
<b>Other Finance</b>	<ul style="list-style-type: none"> <li>• Insurer billing capabilities will allow the hospitals to maximise funds recouped.</li> <li>• Investing in Inventory control and management typically has a proven business case to realise benefits</li> </ul>
<b>Provider Performance Management</b>	<ul style="list-style-type: none"> <li>• Capabilities to compare providers in terms of key metrics (e.g. cost, quality, outcomes)</li> </ul>

Delivery Considerations	Main Points to Note
<b>Investment will be key</b>	<ul style="list-style-type: none"> <li>• Spending too little overall compared to other hospital systems</li> <li>• Need to ensure that there are sufficient terminals and maximise the use of mobile devices use to drive adoption</li> <li>• Need an implementation partner to assist, as there is a clear difference between implementation and installation</li> </ul>
<b>Business Involvement</b>	<ul style="list-style-type: none"> <li>• Immense interest, particularly among Gen Y clinicians, and technologies like mobile will be key to driving interest and adoption</li> <li>• Will require significant spend to backfill the number of clinicians and other staff required for projects</li> <li>• Need to identify clinical champions to drive adoption</li> </ul>
<b>Change Management Capability</b>	<ul style="list-style-type: none"> <li>• Doesn't feel there are change management skills (training, process design, communications) currently. Decision needs to be made regarding where those skills will be developed and sit</li> <li>• Don't underestimate need for culture and behaviour change due to culture of inertia</li> <li>• Needs to be proper process redesign and mapping – don't just replicate the paper</li> </ul>
<b>Public/Potential Engagement</b>	<ul style="list-style-type: none"> <li>• The value of patient portals are often overestimated in terms of care outcomes, but they do help to demonstrate enhancements to the public and increase buy-in for investment</li> <li>• Feels strongly that approach should be opt-out (typically gets 95% acceptance) rather than opt-in (typically 60-65% acceptance)</li> <li>• Prioritise pushing out through GPs first with patient capabilities when more mature</li> </ul>

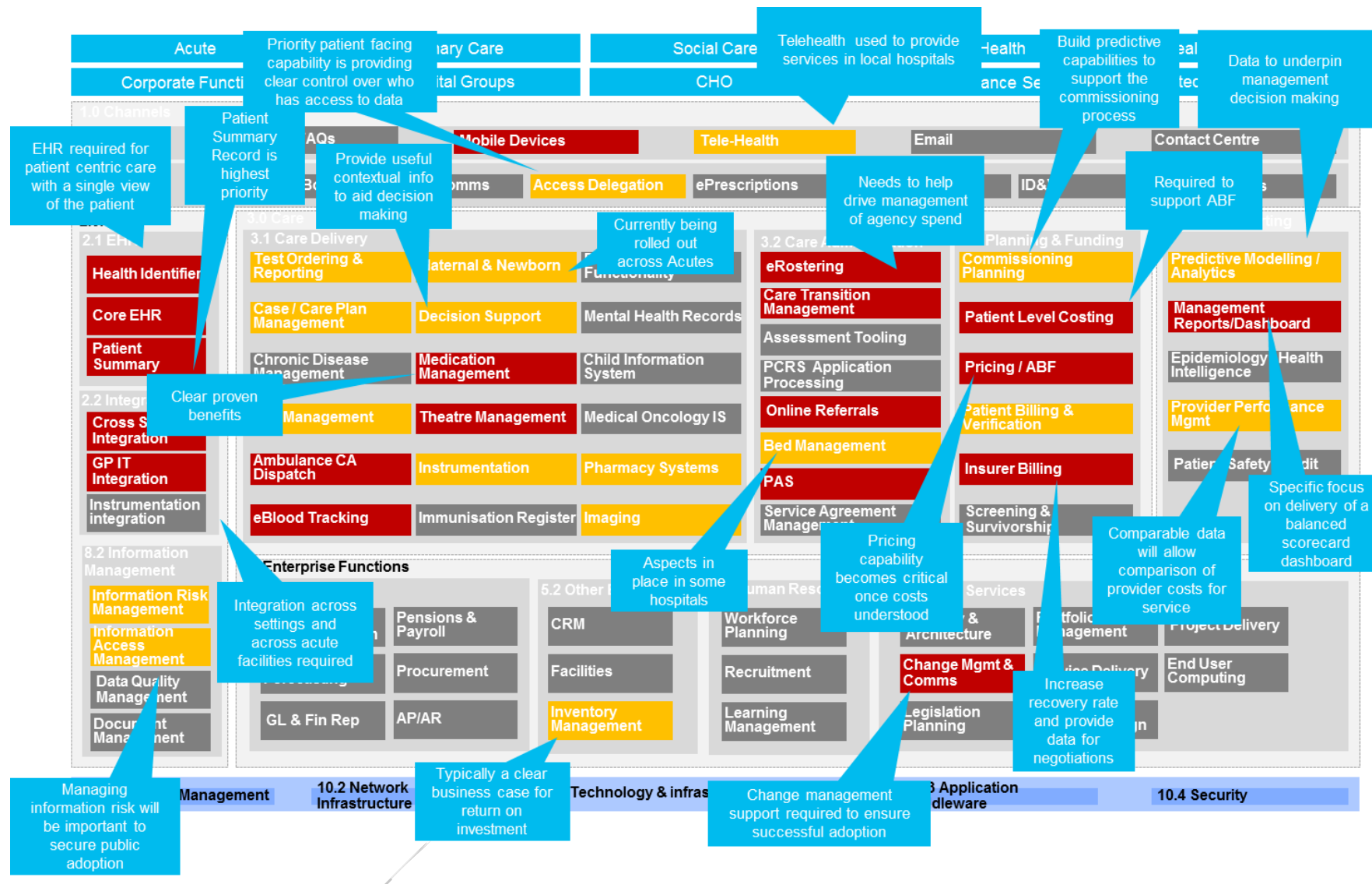


Figure A.1: Acute – New Capability/Enhancement Requirements

Capability Priorities	Main Points to Note
<b>Money Follows the Patient</b>	<ul style="list-style-type: none"> <li>• A risk to the delivery of the Integrated Clinical Care programmes is that funding and incentives are still aligned with divisional priorities rather than integrated patient centric experience</li> <li>• Until the necessary capabilities can be put in place to enable a money follows the patient model, financial incentives will not align with the to-be model of care impeding progress</li> <li>• Substantial effort is envisaged to implement this change</li> </ul>
<b>Data Analysis</b>	<ul style="list-style-type: none"> <li>• Assessing the success and refining the ICPs requires strong data and KPIs to measure impacts. Implementation of IHIs is first step in this</li> <li>• Operational units need to be accountable for data quality</li> <li>• Ongoing data collection must be systemised</li> <li>• Data collection efforts to be prioritised with a focus on measuring patient outcomes rather than feeding research data</li> </ul>
<b>Priority Clinical Programmes</b>	<ul style="list-style-type: none"> <li>• Implementation of a number of priority programmes will require technology enablement:</li> <li>• Developing a framework to establish Major Trauma Networks</li> <li>• Opportunity to develop a TARN/UKROC type programme with the National Rehabilitation Centre to measure long term outcome after serious trauma</li> <li>• Implement frail and elderly pathways</li> </ul>
<b>Chronic Disease</b>	<ul style="list-style-type: none"> <li>• Priority to expand already successful pilot programmes.</li> <li>• Systemised data is critical to scale these programmes</li> <li>• Disease registries</li> </ul>
<b>Telehealth</b>	<ul style="list-style-type: none"> <li>• Increase utilisation of Telehealth that is already in place.</li> <li>• Roll-out ECHO community-based healthcare methodologies. Telehealth can assist learning for clinicians</li> </ul>

Delivery Considerations	Main Points to Note
<b>Clinical Design Authority</b>	<ul style="list-style-type: none"> <li>• Establish a Clinical Design Authority to ensure integrated thinking in relation to clinical process design</li> <li>• Should align with business process design authority to be established for broader reform</li> </ul>
<b>Partner with Professional Bodies</b>	<ul style="list-style-type: none"> <li>• Continue to partner with professional bodies as the preferred means of engagement with clinical community</li> <li>• Utilise these to improve buy-in to reform, secure necessary expertise for design and reach clinicians outside of HSE care settings</li> </ul>
<b>KPI Driven</b>	<ul style="list-style-type: none"> <li>• Drive planning and assessment of integrated programmes through KPIs</li> <li>• Provide support to help implement collection and analysis of data as well as design of relevant KPIs that encourage appropriate behaviours</li> </ul>
<b>Authority &amp; Accountability</b>	<ul style="list-style-type: none"> <li>• Appropriate authority to be delegated to programme leads to implement change in care settings</li> <li>• Encourage long term buy-in and accountability by aligning funding models with ICP objectives and outcomes</li> </ul>



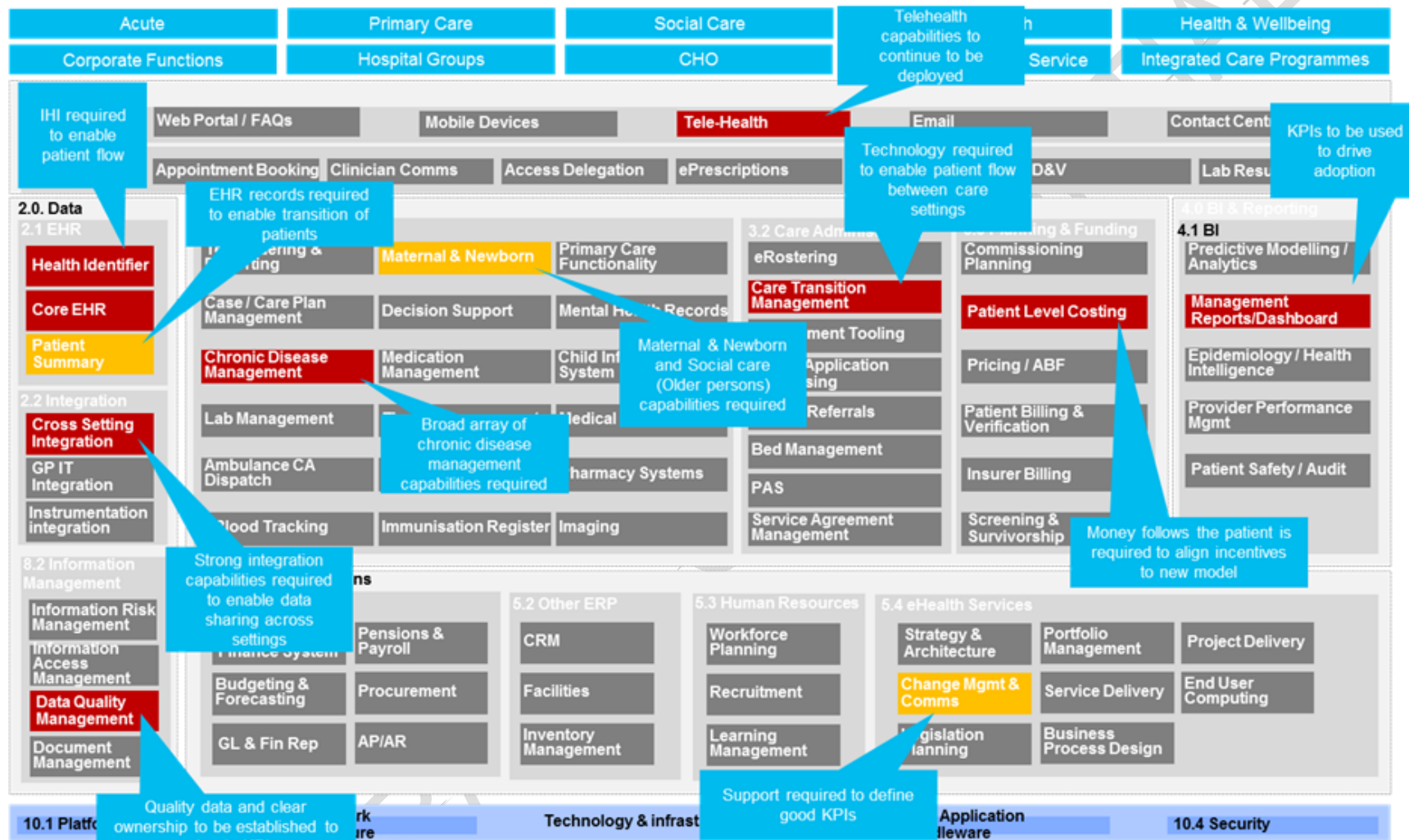


Figure A.2: Integrated Care Programmes – New Capability/Enhancement Requirements

Delivery Considerations	Main Points to Note
<b>Malleability</b>	<ul style="list-style-type: none"> <li>• Key pending decisions regarding future structures of the service present a risk with investing in new finance capabilities</li> <li>• Any future finance capabilities, including the IFS, should prioritise malleability to facilitate immediate and future changes. This malleability should minimise effort, risk and cost to change.</li> </ul>
<b>Data Governance</b>	<ul style="list-style-type: none"> <li>• Criticality of information will require robust internal data governance framework to be put in place.</li> <li>• Inconsistencies in data result in poor reporting and poor understanding of cost. This should be a key underpinning of any investment in finance systems</li> </ul>
<b>Strategic/Tactical Balance</b>	<ul style="list-style-type: none"> <li>• Resources are required to address tactical issues and immediate commitments</li> <li>• Additionally, given the ambitions of the IFS, ABF and Finance operating model a surge of project management and change capabilities is needed to implement these aspects of the reform</li> </ul>

Delivery Considerations	Main Points to Note
<b>Malleability</b>	<ul style="list-style-type: none"> <li>• Key pending decisions regarding future structures of the service present a risk with investing in new finance capabilities</li> <li>• Any future finance capabilities, including the IFS, should prioritise malleability to facilitate immediate and future changes. This malleability should minimise effort, risk and cost to change.</li> </ul>
<b>Data Governance</b>	<ul style="list-style-type: none"> <li>• Criticality of information will require robust internal data governance framework to be put in place.</li> <li>• Inconsistencies in data result in poor reporting and poor understanding of cost. This should be a key underpinning of any investment in finance systems</li> </ul>
<b>Strategic/Tactical Balance</b>	<ul style="list-style-type: none"> <li>• Resources are required to address tactical issues and immediate commitments</li> <li>• Additionally, given the ambitions of the IFS, ABF and Finance operating model a surge of project management and change capabilities is needed to implement these aspects of the reform</li> </ul>

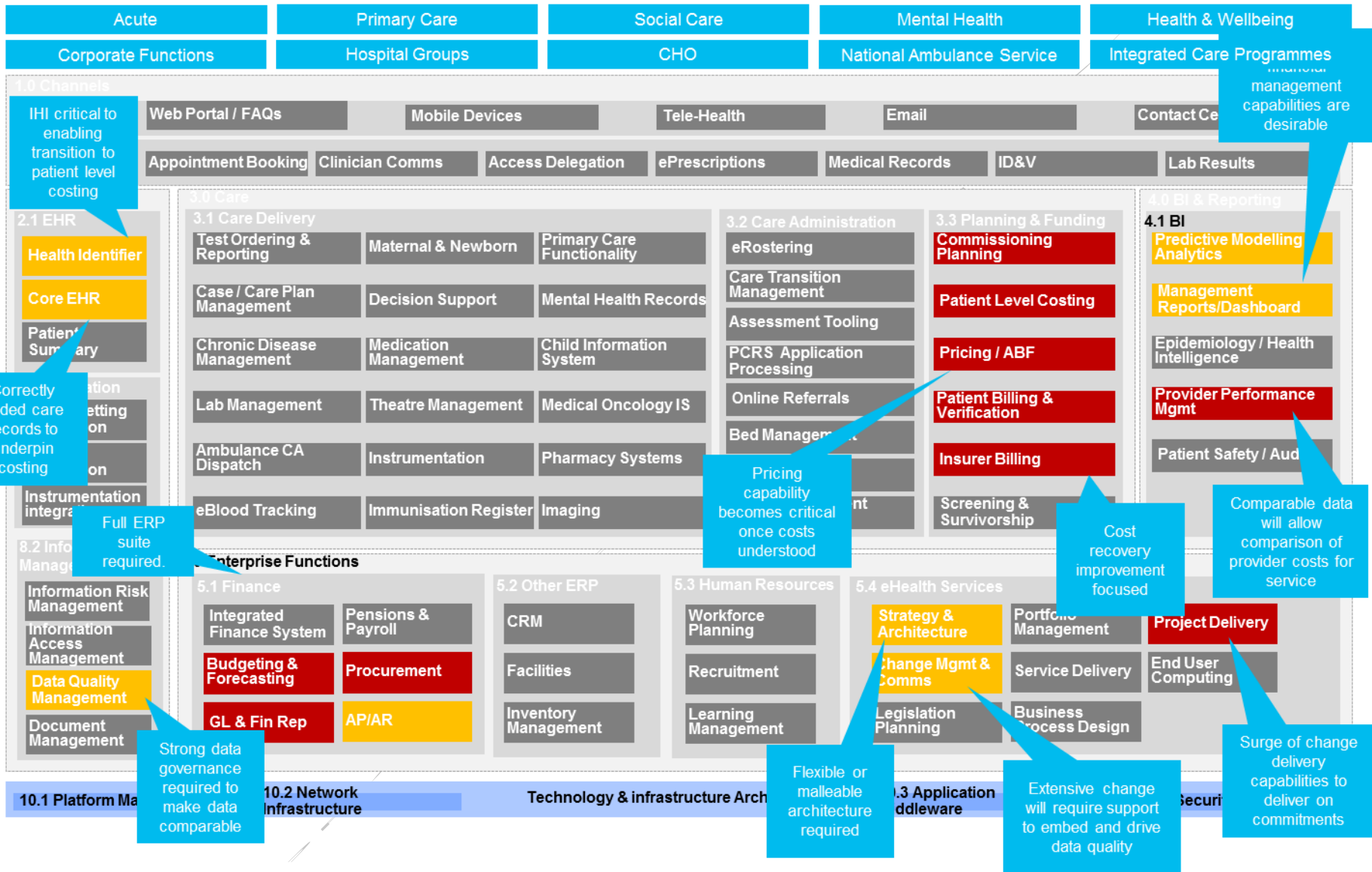


Figure A.3: Finance – New Capability/Enhancement Requirements

Capability Priorities	Main Points to Note
<b>Rapidly Deployable CRM/Workflow/Case Systems</b>	<ul style="list-style-type: none"> <li>• Rapidly deployable platform to fulfil demand for case management/workflow</li> <li>• A single platform/technology should be identified (e.g. dynamics CRM)</li> <li>• Move simple forms leverage workflow similar to procurement pilot</li> </ul>
<b>Self Service Capabilities</b>	<ul style="list-style-type: none"> <li>• Minimise manual intervention, increase service speed, maximise quality</li> <li>• Example priority areas include: Procurement, Estates, HR</li> </ul>
<b>IFS</b>	<ul style="list-style-type: none"> <li>• Implementation of a single Integrated Finance System</li> <li>• Enable cost management by allowing drill down to transactional level</li> </ul>
<b>Procurement</b>	<ul style="list-style-type: none"> <li>• Complete the roll out of PASS and PPMS</li> <li>• Tactical measures such as SAP adaptation for National Distribution Centre</li> <li>• Implement invoice capturing solution and plan electronic tendering process</li> </ul>
<b>Productivity enablement</b>	<ul style="list-style-type: none"> <li>• Complete roll-out of HR document management system</li> <li>• Implement proposed technology solution for estates (incl. Document Management)</li> <li>• Online application forms that interface with dynamics CRM recruitment</li> </ul>
<b>BI</b>	<ul style="list-style-type: none"> <li>• Tools to interrogate and analyse rich data held by HBS</li> <li>• Support workflow planning through analysis of recruitment outcomes</li> <li>• Procurement: the piloted data warehouse solution should be extended to provide visibility of spend across the service</li> </ul>
<b>Other Finance Initiatives</b>	<ul style="list-style-type: none"> <li>• Progress the business case for a consolidated payroll system in parallel to a review and transformation of current payroll processes</li> <li>• Creating single National Pension system for HSE staff and implementation of travel and subsistence management capabilities</li> <li>• Complete the roll out of Claim sure in 2015</li> </ul>

Delivery Considerations	Main Points to Note
<b>Greater Focus on Enabling Capabilities</b>	<ul style="list-style-type: none"> <li>• HBS capabilities underpin success across the rest of the organisation and require greater future focus</li> <li>• The €13b scale of the organisation requires robust supports and provides ample ground for strong business cases</li> <li>• Business cases for investment in this space can be more clearly articulated in terms of impact on care services</li> </ul>
<b>Heavily Scaled IT Capability</b>	<ul style="list-style-type: none"> <li>• There are significant resources constraints and a need for additional IT delivery resources who understand the business context</li> <li>• Resources will be required for committed projects, assisting with the form programme and ongoing BAU tasks</li> </ul>
<b>Business Transformation Capability</b>	<ul style="list-style-type: none"> <li>• Commitment required from the business to contribute resources to ensure projects are successful</li> <li>• Specifically work to ensure that the gains are delivered before the gains are shared</li> </ul>

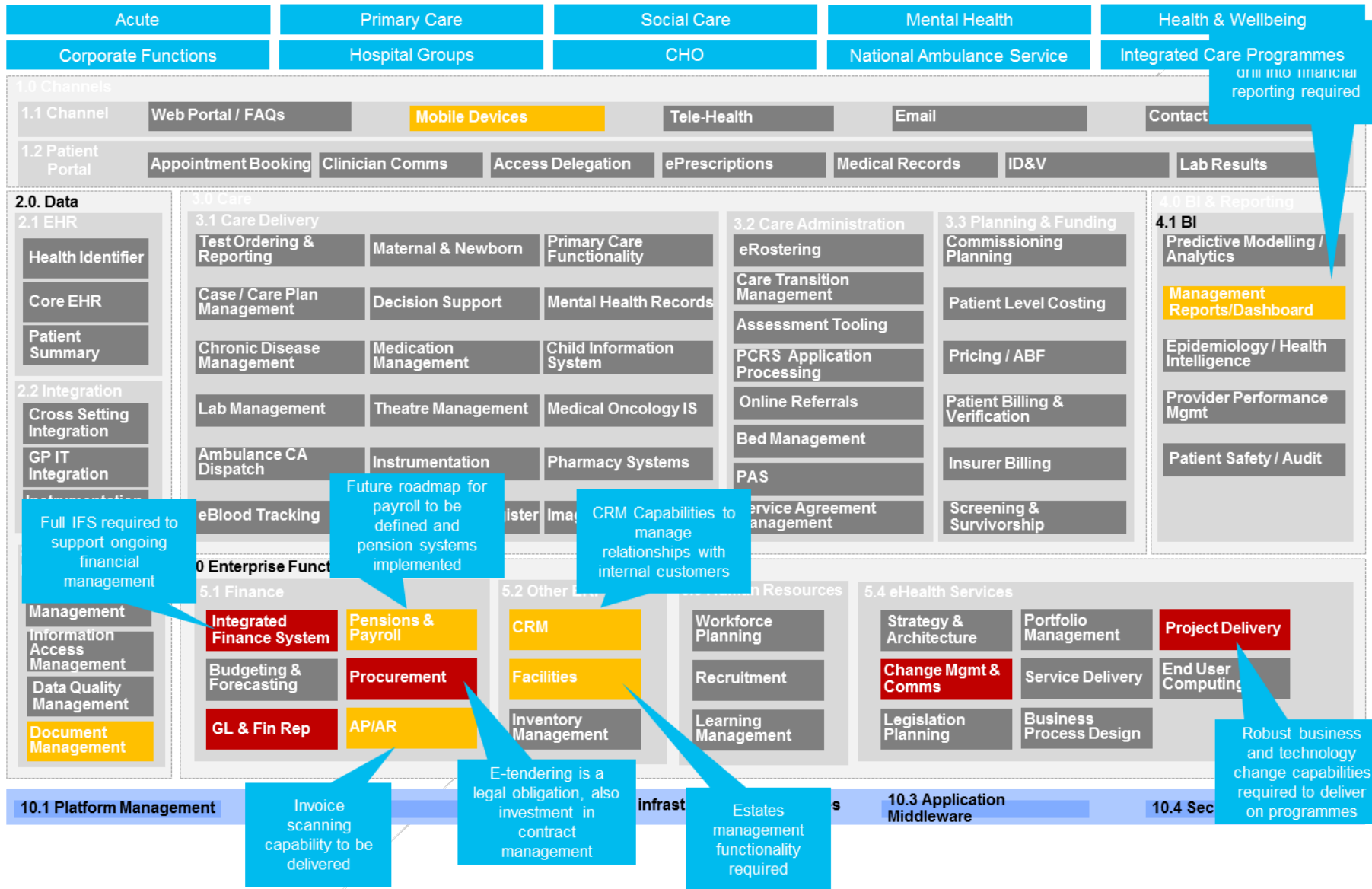


Figure A.4: Health Business Services – New Capability/Enhancement Requirements

Capability Priorities	Main Points to Note
<b>Data Capture</b>	<ul style="list-style-type: none"> <li>Implementation of EHR systems are critical to ensuring that sufficient data is captured and consistency is brought to the quality of data</li> <li>Priority EHR programme is the implementation of a National Immunisation and Childhealth Information System</li> </ul>
<b>Data Linking</b>	<ul style="list-style-type: none"> <li>The successful implementation of an IHI is critical to linking data for health intelligence purposes</li> </ul>
<b>Data Usability</b>	<ul style="list-style-type: none"> <li>Health Atlas is a key platform to enable users across the health system to use data to drive decision making. Including further data sets and making the system accessible to a greater number of users is key</li> <li>Provide the predictive capabilities to support the commissioning process</li> <li>Robust knowledge management capabilities, to more fully utilise existing data</li> </ul>
<b>Self-Care</b>	<ul style="list-style-type: none"> <li>A self-care framework is currently being developed</li> </ul>
<b>Chronic Disease Management</b>	<ul style="list-style-type: none"> <li>There is a need to be able to assess the level of chronic conditions</li> <li>There is a need to develop a standard model of care for chronic diseases</li> </ul>
<b>Case Management</b>	<ul style="list-style-type: none"> <li>A patient management system for managing smoking cessation cases is required</li> </ul>

Delivery Considerations	Main Points to Note
<b>Planning Assistance</b>	<ul style="list-style-type: none"> <li>Some projects with merit have not been initiated due to insufficient understanding of the necessary process, timelines etc. Assistance for business units by “account handlers” would be desirable.</li> <li>Project management muscle is required to facilitate the creation of business cases and drive projects</li> </ul>
<b>Information Governance</b>	<ul style="list-style-type: none"> <li>Criticality of information will require robust internal information governance to be put in place.</li> <li>Additionally there may be legislative requirements that should be planned for to enable effective use and sharing of data collected</li> </ul>
<b>User Focus</b>	<ul style="list-style-type: none"> <li>Heavy business and end user involvement in the design phase of solutions</li> <li>Adopt an iterative approach that allows solutions to evolve for greater usability</li> <li>Finally, capabilities that support looking after staff are key if the overall service and projects are to be successful</li> </ul>

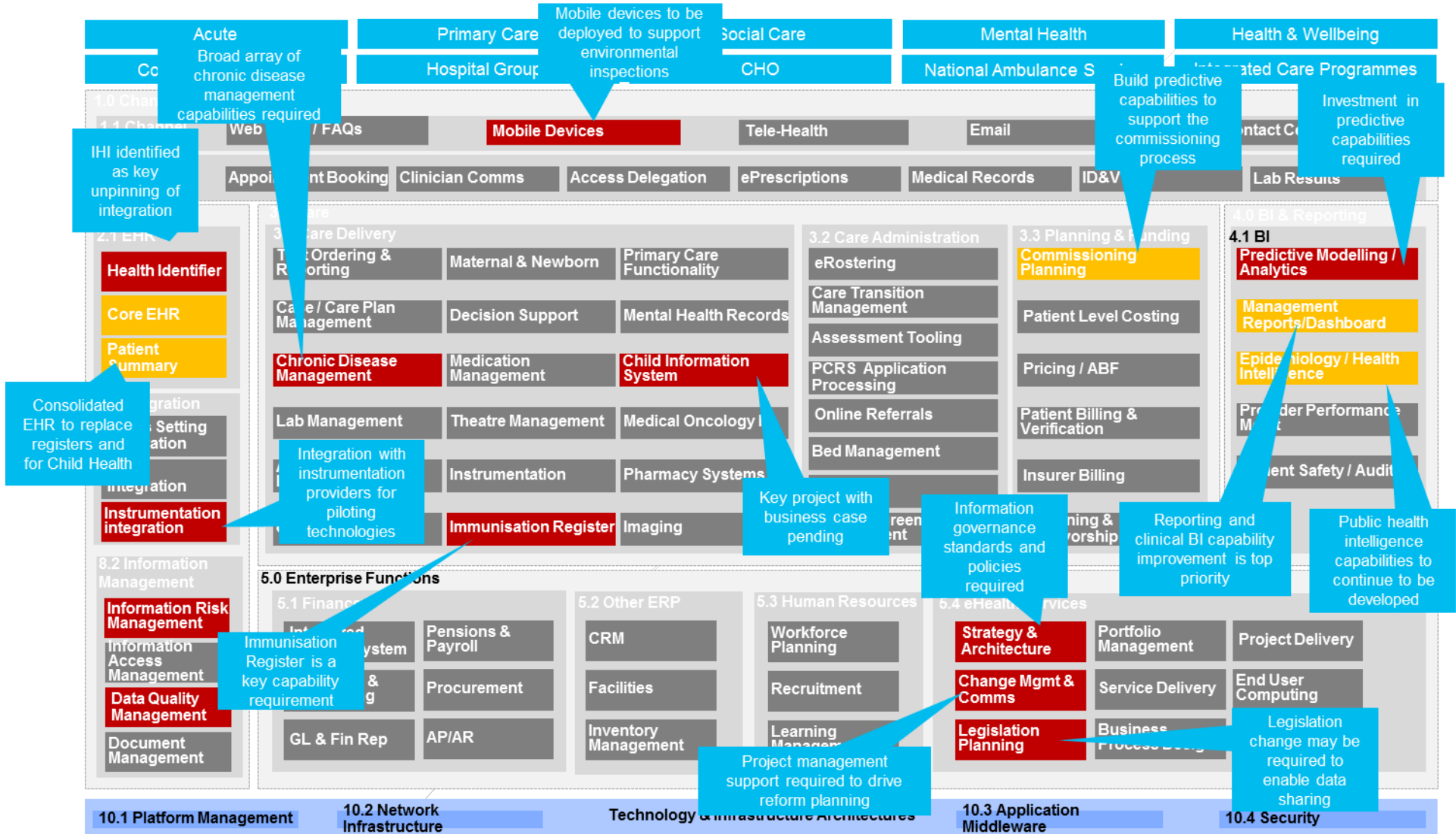


Figure A.5: Health & Wellbeing – New Capability/Enhancement Requirements

Capability Priorities	Main Points to Note
<b>Basic IT infrastructure</b>	<ul style="list-style-type: none"> <li>• Currently care deliverers have no systematic /standard IT provision (e.g. laptop) – some do have these but this is on an ad hoc basis</li> <li>• Basic enablement is required to support the adoption and use of future 'business' applications – laptops, secure access to HSE network, email</li> <li>• As a quick win there is an opportunity to consider use of 3G enabled mobile devices to support some basic / limited functionality – e.g. meeting notes</li> </ul>
<b>Information management and MI</b>	<ul style="list-style-type: none"> <li>• The creation of a common data dictionary and a minimum suite of standard operational (non-clinical) procedures. Standardised (clinical) care pathways will also support this "systemisation of information"</li> <li>• Basic systemisation of information is required for both care delivery and management purposes – e.g. to provide appointments scheduling, care notes, diagnostics, treatments, incident alerts &amp; reporting, medication, appointment attendance – e.g.:</li> <li>• Client meetings notes are recorded on paper and then transcribed into electronic format (more often than not transcription never happens in some CMHTs) – often a material time delay, which may lead to a risk of missing a crucial window for care intervention</li> <li>• No aggregated MI exists to support more centralised coherent planning of resources and the wider decision support capacity</li> </ul>
<b>Patient medical record</b>	<ul style="list-style-type: none"> <li>• Systemised capability to capture patient care delivery, history is required to allow transition of care between different people in the team and into out-of-hours care provision</li> <li>• Mental care would benefit from seeing a holistic view of all health care received by the client (e.g. attendance at an ED may indicate self-harm) but sensitivities apply in sharing mental care information with areas of care</li> <li>• Currently no centralised view of care delivery for the client is available</li> </ul>
<b>Patient portal</b>	<ul style="list-style-type: none"> <li>• To provide an information and access point for client and a potential clients for mental health services, a mental health portal is required</li> </ul>
<b>Mobile capabilities</b>	<ul style="list-style-type: none"> <li>• Due to its highly dispersed nature and lack of ICT infrastructure backbone, mental health would benefit materially from mobile applications and a mobile enabled infrastructure for service delivery in the community and to support day-to-day care management – e.g.:</li> <li>• Care notes keyed directly into an app and stored in a central database (supporting aggregated MI)</li> <li>• Mobile diary management / scheduling of appointments / referral request and acceptance / patient reminders and attendance tracking</li> <li>• Mobile incident alerts and reporting</li> <li>• Access to historical patient record</li> </ul>
<b>Tele-health capabilities</b>	<ul style="list-style-type: none"> <li>• To support the need for more 24x7 care delivery, tele-health care solutions e.g. therapy via contact centre, or a regional on-call support and monitoring, would provide a way to extend coverage</li> <li>• A pre-requisite for support beyond a passive 'help-line' type care would be the availability of a medical record, so that continuity of treatment between local and remote care is facilitated</li> </ul>



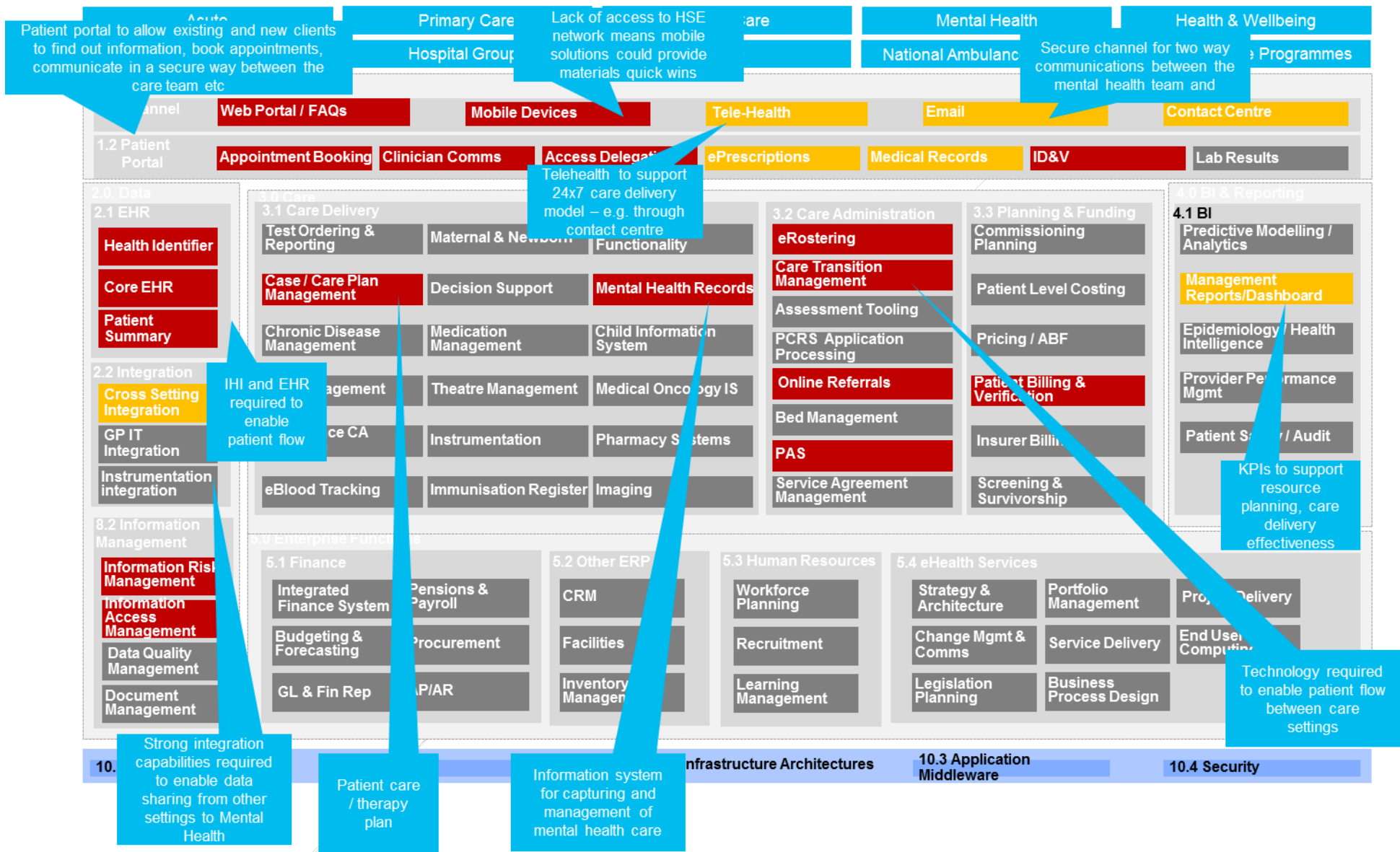


Figure A.6: Mental Health – New Capability/Enhancement Requirements

Capability Priorities	Main Points to Note
<b>Improving Data Management</b>	<ul style="list-style-type: none"> <li>The creation of a datamart to store information to enable the complete collection of data and information from disparate sources to effectively assess outcomes and plan services. Data sources include cancer screening data, cancer treatment data, HIPE and BIU data, PCRS data). (Currently in progress with Health Atlas)</li> <li>Dashboards to display the datamart information in a succinct manner for Hospitals and NCCP</li> <li>Electronic data will enable research and clinical trials</li> </ul>
<b>eHealth requirements</b>	<ul style="list-style-type: none"> <li>Each hospital to have a Medical Oncology Clinical Information System in place with interoperability to the national EPR (typical generic EHR systems don't provide the required functionality)</li> <li>Integrated patient records across multiple systems and locations eliminating paper based records</li> <li>Multi-disciplinary team meeting systems to support data collection for KPIs and implementation of best practice guidelines</li> <li>Enable better communication of patient information to GPs and pharmacies for systemic anticancer therapy</li> <li>Patient access to medical records</li> </ul>
<b>Survivorship</b>	<ul style="list-style-type: none"> <li>Patient self-management and access to complete medical history to support the discharge of cancer survivors to primary care</li> <li>Systems to enable follow up of patients following discharge as cancer survivors or to update treatment in line with emerging evidence</li> </ul>

**Note: Given the focussed nature of the NCCP – no overall heat map exists but priorities are reflected in the overall summarised system wide map included in the strategy.**

Delivery Considerations	Main Points to Note
<b>Data Collation</b>	<ul style="list-style-type: none"> <li>There is work underway to define minimum common datasets for collection to overcome the current data gaps when assessing outcomes. Discussions are ongoing by the HSE with NHS England to utilise these datasets</li> </ul>
<b>Approval Process</b>	<ul style="list-style-type: none"> <li>The DOH/HSE process for the approval of ICT projects is in a state of flux, this requires clarification (re-establish a definite timeline for the Medical Oncology project that has been put on hold)</li> </ul>
<b>Clinician Support</b>	<ul style="list-style-type: none"> <li>Maintaining the current support and buy-in from oncology clinicians by delivering on promises e.g. for a new Medical Oncology Information System</li> </ul>

Capability Priorities	Main Points to Note
<b>Patient Data Sharing</b>	<ul style="list-style-type: none"> <li>• Availability of electronic medical records underpinned by an IHI to enable continuity of care.</li> <li>• A patient portal enables patients to be custodians of their own data</li> </ul>
<b>Complementary Functionality for GP Systems</b>	<ul style="list-style-type: none"> <li>• Build on existing GP IT systems with PAS like functionality</li> <li>• Build on secure communication functionality to enable flow information between all parties</li> <li>• Additional functionality requirements to enhance integration across hospitals and diagnostic systems</li> </ul>
<b>Patient Quality &amp; Safety</b>	<ul style="list-style-type: none"> <li>• Extended use of electronic records can underpin data extracts and audit reports to demonstrate compliance and standards.</li> </ul>
<b>Electronic Case notes</b>	<ul style="list-style-type: none"> <li>• Productivity dividend to be had by moving away from paper-based case notes and time consuming duplication</li> </ul>
<b>PCRS application assessment</b>	<ul style="list-style-type: none"> <li>• Current entitlement application process is being reviewed as part of the broader reform to provide a more user friendly service</li> </ul>
<b>Patient Empowerment &amp; Self Care</b>	<ul style="list-style-type: none"> <li>• An ICT platform that enables remote monitoring and management that will support both patients and clinicians in moving chronic disease management to the Primary Care</li> </ul>

Delivery Considerations	Main Points to Note
<b>Build on what we have</b>	<ul style="list-style-type: none"> <li>• Building a platform on top of the current GP platform and integrating with the existing GP platform to increase GP buy-in</li> <li>• IT system relationship is directly between GPs and the vendor and should remain as such</li> </ul>
<b>Clinician Involvement</b>	<ul style="list-style-type: none"> <li>• The ICGP will become a more important player in the future so aim is to leverage the current good working relationship with the ICGP.</li> <li>• Their involvement will need to scale along with the pace of change</li> </ul>
<b>User Experience</b>	<ul style="list-style-type: none"> <li>• Prioritise having a sleek, user-friendly design for so that the user experience incentivises adoption</li> <li>• Involve a working group of clinicians in the design of the new GP IT system to ensure front line focussed design</li> </ul>

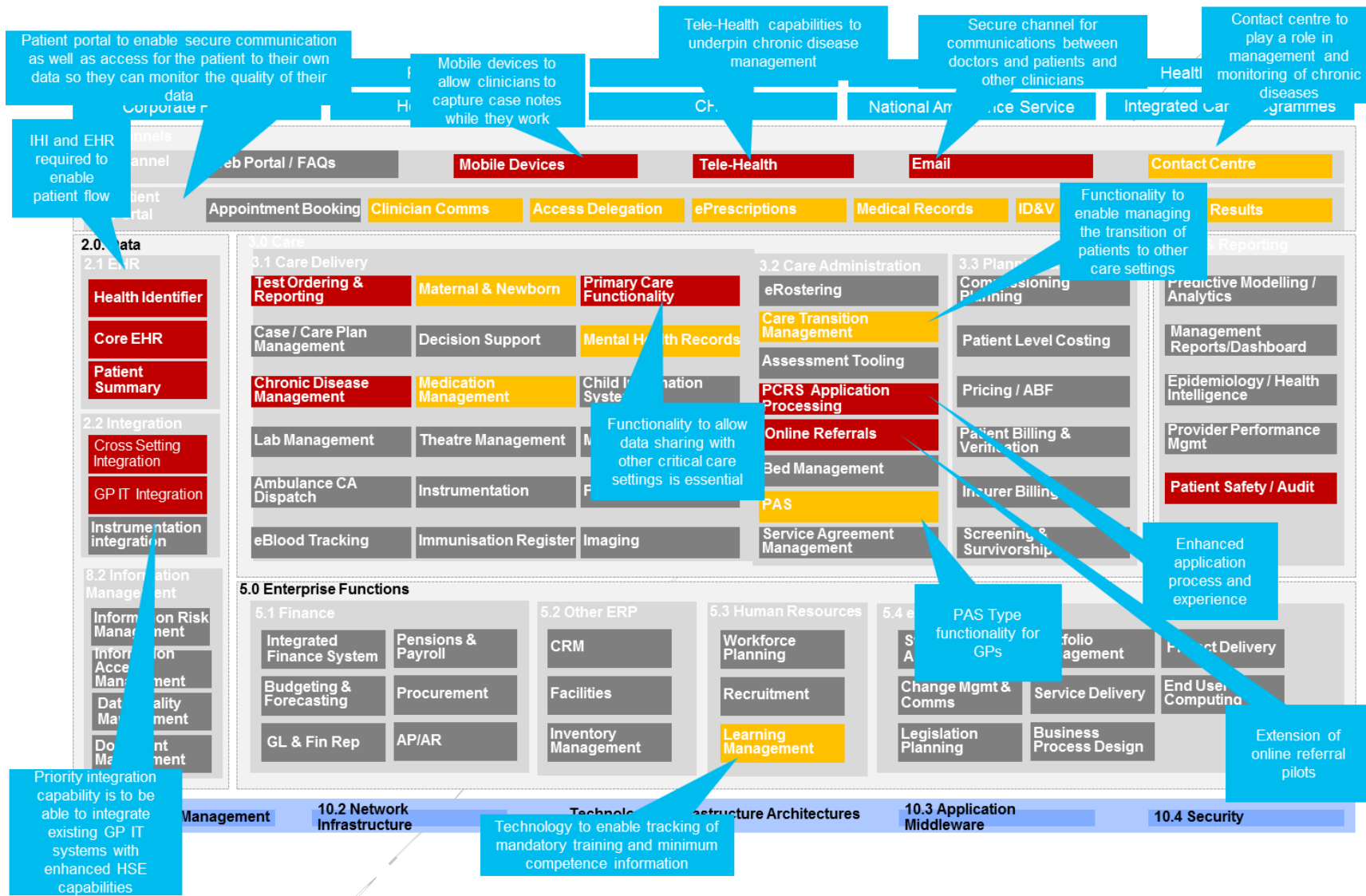


Figure A.7: Primary Care – New Capability/Enhancement Requirements

Capability Priorities	Main Points to Note
Care Provision	<ul style="list-style-type: none"> <li>Robust needs assessment tooling is the key technology capability for care provision.</li> <li>Implementation of EHR is also a priority</li> </ul>
Choice Enablement	<ul style="list-style-type: none"> <li>Implementation of EHR is also a priority</li> <li>A second key underpinning of choice is individual budgeting, which is effectively MFP in the Social Care setting.</li> </ul>
Service Planning	<ul style="list-style-type: none"> <li>Service arrangement management capability is critical due to the number of voluntary providers</li> <li>Commissioning capability is a key priority</li> </ul>
Integration	<ul style="list-style-type: none"> <li>The successful implementation of an IHI is critical to enabling integration</li> <li>Data integration between care settings is critical</li> <li>Greater integration within the care setting also remains a priority.</li> </ul>
Business Process Standardisation	<ul style="list-style-type: none"> <li>There is substantial differences in processes within social care</li> <li>Business process re-engineering capabilities are required to be able to undertake standardising these.</li> </ul>
Reporting	<ul style="list-style-type: none"> <li>Links between data is key</li> </ul>

Delivery Considerations	Main Points to Note
ICP Alignment	<ul style="list-style-type: none"> <li>Delivery of the <b>Integrated Care Programmes</b> is a major priority, in particular the Older Persons ICP in the case of community care</li> </ul>
Phasing of Delivery	<ul style="list-style-type: none"> <li>Successful projects in the past have involved a <b>rapid targeted roll-out of a pilot solution</b> in a specific locality. Using that area to build out the template processes and prove the benefits and then deploy both the processes and technology to other areas</li> <li>While a long term vision is needed, the <b>phasing</b> needs to be structured so there are clear milestones that <b>deliver “chunks” of meaningful capability</b> with measurable benefits</li> </ul>
Centralisation vs. Divisional Balance	<ul style="list-style-type: none"> <li>While there is agreement that a long term vision should be pursued, this should not be at the expense of <b>continuing to invest in tactical improvements</b> that can also make a big difference in the short term. Some of these will provide quick wins.</li> <li>A <b>clear vision and plan for the central programme</b> should be established over a long period of time so that divisions are then free to, and informed sufficiently, to make decisions regarding where to invest themselves in their own tactical solutions</li> </ul>
Delivery Challenges	<ul style="list-style-type: none"> <li><b>Limited ICT capacity</b> has constrained what the divisions can undertake. The general view is that the focus should remain on an achievable number of projects that are managed by HSE but delivery is outsourced</li> <li>Successful delivery of projects requires both <b>greater business process and project management skills</b> that can be deployed to the divisions to either assist them with their own projects or support the design and embedding of broader centrally led initiatives</li> <li>Previous projects have encountered challenges relating to issues such as data protection/legislation. Capacity and capability to deal with these issues are required.</li> </ul>

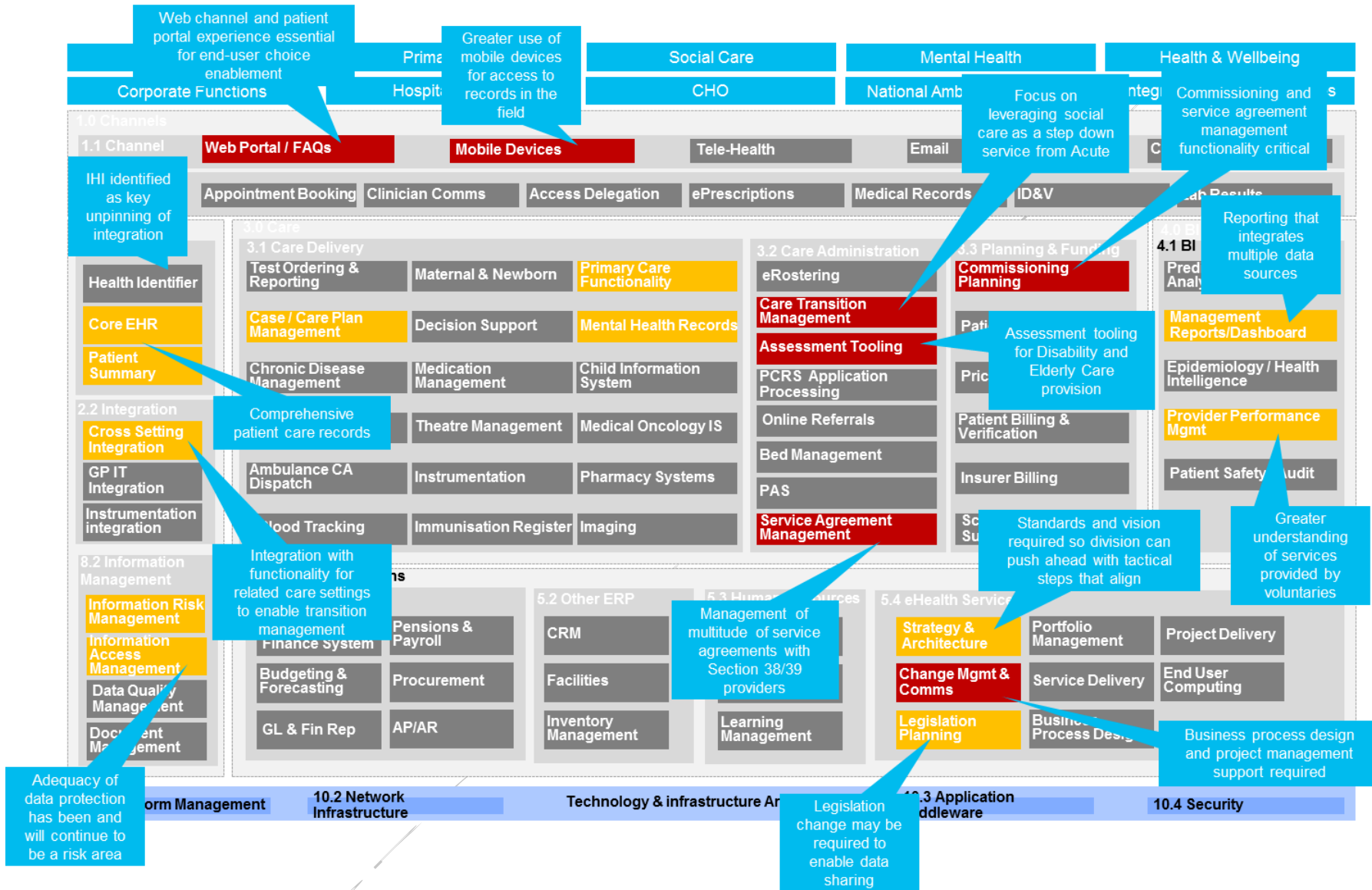
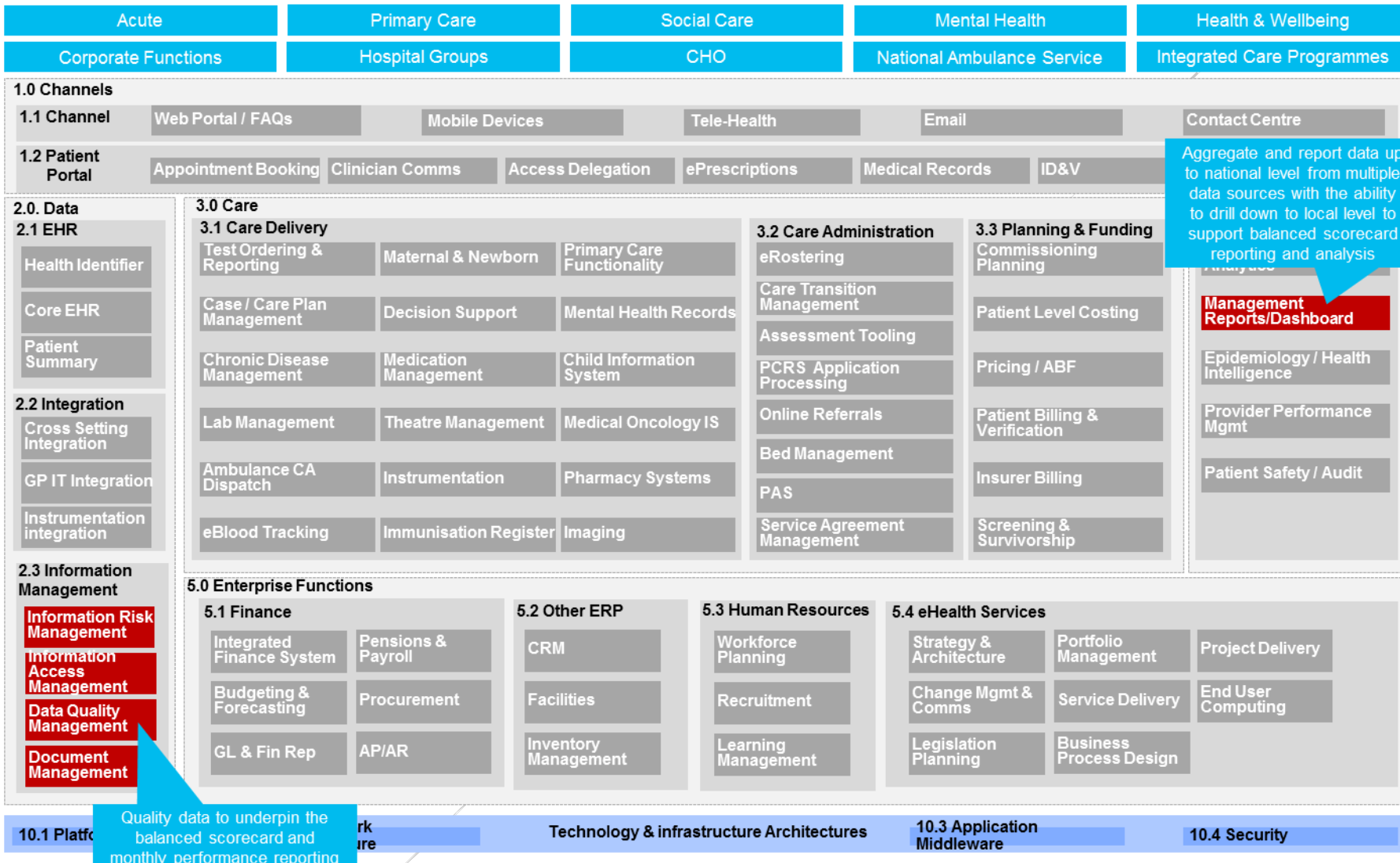


Figure A.8: Social Care – New Capability/Enhancement Requirements

Capability Priorities	Main Points to Note
<b>Reporting</b>	<ul style="list-style-type: none"> <li>Enterprise level monthly performance reporting is driven by the NSP2015 Accountability Framework and the balance scorecard and currently done manually</li> <li>Links between data and systems is key</li> <li>Accuracy of information is critical due to corporate level consequences</li> </ul>
<b>Information Management</b>	<ul style="list-style-type: none"> <li>The creation of a common data dictionary and a minimum suite of standard operational (non-clinical) procedures</li> <li>Basic systemisation of information is required for management purposes</li> <li>The creation of a common minimum organisation-wide dataset that all hospitals and CHOs must present to overcome the current data gaps when assessing outcomes</li> <li>Robust document management system</li> </ul>
<b>Information Governance</b>	<ul style="list-style-type: none"> <li>Criticality of information will require robust internal information governance to be put in place</li> <li>Additionally there may be legislative requirements that should be planned for to enable effective use and sharing of data collected</li> </ul>
<b>Data Collection and Collation</b>	<ul style="list-style-type: none"> <li>The creation of a datamarts / data warehouse to store information to enable the complete collection of data and information from disparate sources to effectively assess outcomes and plan services – potentially building on Health Atlas capability</li> <li>The ability to collate common data from a number of different sources in an efficient and effective manner</li> <li>The ability to ensure data quality through data validation and through providing support for effective data audits</li> <li>The collection of data as close to service delivery as possible</li> </ul>
<b>Data Usability</b>	<ul style="list-style-type: none"> <li>The end goal is for users to be able to self-explore data</li> <li>For data to be of a high quality and standardised in nature to ultimately enable data sharing in a reusable and open manner</li> <li>Health Atlas is a key platform to enable users across the health system to use data to drive decision making. Including further data sets and making the system accessible to a greater number of users is key</li> <li>Provide the predictive capabilities to support the commissioning process</li> <li>Robust knowledge management capabilities, to more fully utilise existing data</li> <li>Data to provide support for estimates and planning process</li> </ul>



Aggregate and report data up to national level from multiple data sources with the ability to drill down to local level to support balanced scorecard reporting and analysis

Management Reports/Dashboard

Quality data to underpin the balanced scorecard and monthly performance reporting

Figure A.9: Planning & Business Information – New Capability/Enhancement Requirements



Capability Priorities	Main Points to Note
<b>Alternative models of care</b>	<ul style="list-style-type: none"> <li>• Ability to quantify urgent/emergency care to ultimately be able to relieve emergency departments and introduce alternative models of care</li> <li>• Implementing hear &amp; treat where GP's can triage emergency/urgent care calls</li> <li>• The greater availability of patient information to determine the best model of care to adopt by the paramedic e.g. treat and discharge by the advanced paramedic, patient to be admitted to ED, primary care centre or alternative care setting</li> <li>• Strengthening communication with and visibility of community first responders nationally including a formal structure and onboarding process and the potential for mobile applications</li> </ul>
<b>Availability of patient information</b>	<ul style="list-style-type: none"> <li>• Continued rollout of the electronic patient care record for ambulance staff to enable better patient flow and allow more effective patient handover to emergency departments and other care settings</li> <li>• Introduction of a summary care record that paramedics can access remotely to determine the best treatment for a patient based on their medical history</li> <li>• The electronic patient care record will also enable the NAS to audit internally retained patient information available through web</li> </ul>
<b>Balancing responsiveness &amp; outcomes</b>	<ul style="list-style-type: none"> <li>• On-going move from response times to patient outcomes means that there is a greater need to be able to track patients through the pre hospital emergency care service and hospital to determine their outcome</li> <li>• Clinical Audit will become a far less labour intensive process through the introduction of the electronic patient care record</li> </ul>
<b>Integrated call and dispatch process</b>	<ul style="list-style-type: none"> <li>• Technical and data integration necessary to create a more holistic view of the country including ambulances, community first responders and private defibrillators (e.g. GAA club and community defibrillators)</li> <li>• Greater emphasis and importance placed on supporting and connecting technologies underpinning the move to a singular national service</li> <li>• Technical integration necessary to support the consolidation of call centres to the Tallaght national control centre and to make the possibility of a single national out-of-hours and triage service more feasible</li> </ul>
<b>Improved responsiveness and quality of care</b>	<ul style="list-style-type: none"> <li>• Ensuring that all technologies contained within the ambulances can co-exist and work both independently and interdependently most effectively</li> <li>• Emergency department real time tracking on visibility of incoming ambulances and wait times to support improved ambulance turn around</li> </ul>
<b>Integrated HR and financial information</b>	<ul style="list-style-type: none"> <li>• Accurate management information to optimise the utilisation of skilled staff and resources including vehicle placement optimisation depending on trends and times</li> <li>• Development of a Data Warehouse to support NAS Human Resource Management.</li> <li>• Implementation of an integrated HR System to support service</li> </ul>

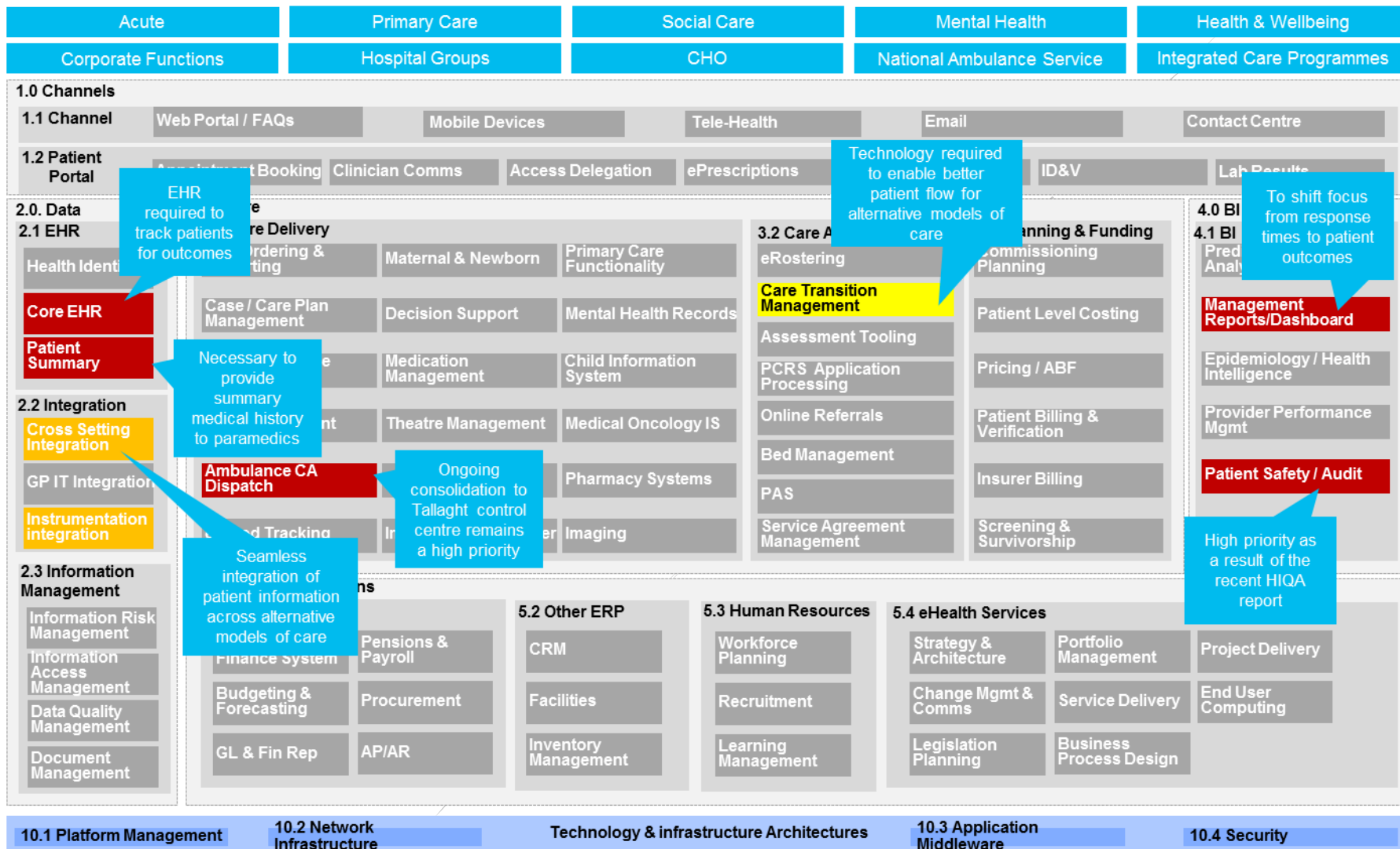


Figure A.10: National Ambulance Service – New Capability/Enhancement Requirements



While this document aims to serve as a high level guiding strategy and roadmap, it is underpinned by a rigorous process of input and review, prioritising the need to ensure that priorities are aligned with patient needs and the views of clinicians.

This strategy was formulated over a three month period commencing at the beginning of 2015. An initial draft strategy was drafted based on the ambitions set out in the 2013 eHealth strategy published by the department of health, combined with an understanding of the priorities of HSE clinical and service leadership.

This initial strategy iterated extensively based on the feedback ideas, and robust but constructive challenges received from a wide network of contributors and reviewers.

Input Type	Nature of Input
<b>Clinical Leadership</b>	<ul style="list-style-type: none"> <li>Clinical leadership was engaged at an early point to understand how technology could underpin and support broader reform objectives.</li> <li>Clinicians engaged with include HSE leaders responsible for the delivery of patient care, clinical programme leadership and key programmes such as the National Cancer Control Programme and the HSE Quality Programme</li> </ul>
<b>Health Service Leadership</b>	<ul style="list-style-type: none"> <li>The broader HSE leadership team were engaged with to understand both patient facing clinical needs as well as key support functions including finance, business services, patient administration and wellness activities</li> </ul>
<b>International Experience</b>	<ul style="list-style-type: none"> <li>The strategy also reflects the successes and lessons learned from the experience of international healthcare systems who have undertaken similar transformations</li> <li>Specific input and review was sought from a number of international clinicians, researchers and other experts on the proposed strategy</li> </ul>
<b>ICT Leadership</b>	<ul style="list-style-type: none"> <li>This strategy builds upon a complex legacy architecture and will depend on the contribution of the HSE K&amp;I team for successful implementation. The views of ICT leadership on strengths and challenges were considered along with key programme leads (e.g. Individual Health Identifier).</li> <li>Extensive valuable input was also received from both HSE ICT staff members and ICT teams in Voluntary and Statutory Hospitals.</li> </ul>
<b>eHealth EcoSystem</b>	<ul style="list-style-type: none"> <li>The views of a wide range of technology vendors and market analysts were sought to validate the direction and feasibility of the strategy. In particular, how future technology trends that are rapidly emerging might impact patient care delivery were explored. How this strategy impacts the local eHealth ecosystem was also considered during the review process</li> </ul>



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