

Calderdale and Huddersfield NHS Foundation Trust

**AN EPR (ELECTRONIC PATIENT RECORD) ENABLED
TRANSFORMATION PROGRAMME– FULL BUSINESS
CASE**

CHFT component
of a collaboration with
Bradford Teaching Hospitals NHS Foundation Trust

Draft for Discussion

DOCUMENT CONTROL

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1 EXECUTIVE SUMMARY

1.1 Introduction

This Full Business Case (FBC) seeks the Board's approval to invest in an integrated electronic patient record capability in collaboration with Bradford Teaching Hospitals NHS Foundation Trust ('BTHFT') hosted remotely by Cerner. This forms a major component of the Calderdale and Huddersfield NHS Foundation Trust's (the 'Trust') IM&T enabled Modernisation Programme.

On 18 December 2014, the Board of Directors approved the award of preferred supplier status to Cerner as part of the Trust's Electronic Patient Record (EPR) procurement. Approval of this FBC will authorise the award of contract to Cerner and the commencement of the implementation of Cerner's Millennium EPR system.

The FBC examines the options for:

- Trust only vs. collaborative implementation;
- Supplier vs. Trust hosted solution; and
- Funding and implementation arrangements.

The structure of this business case has been prepared in accordance with the HM Treasury's recommended standard, the "Five Case Model". The HM Treasury describe the business case is the important planning and management tool which enables stakeholders, customers and delivery personnel to ascertain that schemes:

- are supported by a robust case for change that provides strategic synergy – the '**strategic case**'
- optimise value for money – the '**economic case**'
- are commercially viable – the '**commercial case**'
- are financially affordable – the '**financial case**'
- are achievable – '**the management case**'

The case also sets out the metrics and expectations that will guide benefits realisation during the programme.

The document will:

- confirm the strategic context of the investment;
- make a robust case for change;
- present an options appraisal that describes the results and outcome of the EPR procurement;
- set out the commercial deal and demonstrate affordability;
- describe the management arrangements for the successful rollout of the scheme.

1.2 The Collaboration with Bradford Teaching Hospitals NHS Foundation Trust

The collaboration with BTHFT formally commenced when BTHFT was designated as an optional site within the Trust's OJEU Contract Notice for an EPR. The implications of the OJEU Contract Notice were that CHFT was the lead organisation running the procurement and that BTHFT would have the option whether it participated or not. From the perspective of day to day running of the

procurement and evaluation of supplier tenders, this was undertaken wholly by the Trust and whilst BTHFT had some involvement, BTHFT played no part in supplier evaluation and Final Tender evaluation criteria were specific to the Trust.

As the procurement progressed it became clear that the BTHFT commitment to the collaboration strengthened to the point where the final two suppliers were clear that in all likelihood a contract would be awarded that included the provision of services to both Trusts.

1.3 The Strategic Case

Advanced enterprise level information systems play a crucial role in enabling high achieving organisations, for example Salford has had an EPR for 10 years and is ranked one of the safest Trusts in the UK. Whilst this cannot be totally attributed to an EPR there significant evidence of the benefit from the deployment of electronic systems in establishing safer working practices the systems in place within the Trust have a direct impact on the level of efficiency, clinical effectiveness and quality of outcomes for our patients.

EPR systems are recognised as being significant enablers for healthcare organisations to fully establish themselves as a credible leading provider of integrated health care in the 21st Century. The national agenda demands digital record keeping in all NHS Trusts by 2018. The one to seven HiMSS rating scale for IT deployment in healthcare organisations has shown that by achieving Level 6 or 7 an organisation sees significant qualitative and quantitative benefits (See Appendix 1 HIMSS Europe EMR Adoption Model).

Over the last decade the Trust has invested in a range of 'best of breed' information systems, however this has created pockets of patient data and has not facilitated the creation of a single integrated patient record. Delivering an integrated EPR will allow the Trust to transform its clinical practice for the better and enable integration of patientcare pathways between neighboring health organisations at all levels. Our vision is to deploy a system that will take us to Level 6 at go live with the potential for Level 7 a year after. There is currently only one Level 6 hospital in the UK (using Cerner) and only 12% of US hospitals reach Level 7.

Further to the transformational vision outlined above, the EPR programme will also support the following:

- The provision of integrated health services, delivering a new model of care for the local population;
- Transforming care and improving the patient experience;
- The continuous improvement in service quality and effectiveness through innovation, productivity and promoting wellbeing;
- The ability of the Trust to move to a leaner and more efficient business;
- The Trust's vision to work with partner organisations to understand the individual needs of patients and together, deliver outstanding compassionate care which transforms the welfare of the communities we serve;
- Compliance with the target that Trusts will have fully digital record keeping by 2018 (Jeremy Hunt, 2013).

The table below illustrates how the benefits of implementing an EPR will directly support Trust four pillars of behavior.

The Four Pillars of Behaviour	Benefit
<p>We put the patient first</p> <p>We stand in the patient's shoes and design services which eliminate unproductive time for the patient.</p> <p>We 'go see'</p> <p>We test and challenge assumptions and make decisions based on real time data.</p> <p>We work together to get results</p> <p>We co create change with colleagues creating solutions which work across the full patient journey.</p> <p>We do the must do's</p> <p>We consistently comply with a few rules that allow us to thrive.</p>	<ul style="list-style-type: none"> • Improves patient convenience • Improves patient communications • Improves working practices • Improves working with other care providers • Improves working practices • Improves scheduling • Reduces waste and duplication • Improves management reporting • Improves support for patient care • Improves Patient Care and Safety

Table 1_1 Mapping of EPR Benefits to Trust Objectives

The full Strategic Case is provided within section 2.

1.4 The Economic Case

1.4.1 The Outline Business Case

The Outline Business Case (OBC) assessed a range of options for delivering the Trust's EPR vision. The OBC concluded that the most effective route was to select an option that is a 'best of suite'. Best of suite is a solution comprised of a core EPR with as much as practically possible coming from a single supplier supplemented by some 'best of breed' systems. This 'best of breed' functionality is likely to be migrated to the core EPR functions as soon as practically possible.

Based on this analysis the Trust proceeded to procurement with a set of output-based requirements to be met by a single integrated solution supplemented by 'best of breed' systems where appropriate.

1.4.2 The Procurement

The EPR system has been procured using the OJEU Competitive Dialogue procedure, which adopted the following staged approach that is outlined in this section:

- Stage One: Pre-Qualification
- Stage Two: Dialogue
- Stage Three: Contract Award

Key dates in the procurement were as follows:

- **27 March 2014** e an OJEU Contract Notice was raised for the provision of an EPR Enabled transformation programme.

- **28 April 2014** – at PQQ response deadline eight Potential Providers had submitted their responses.
- **29 May 2014** e three shortlisted Potential Providers were invited to Participate in Dialogue.
- **28 July 2014** e the Trust received two¹ responses to its EPR Invitation to Submit Initial Proposals (ISIP), which were reviewed, and clarification points raised that formed the basis of further dialogue session agendas.
- **31 October 2014** e Dialogue was closed, and two Potential Providers were Invited to Submit Final Tenders (ISFT).
- **14 November 2014** e the Trust received two Final Tenders received from Potential Providers
- **19 December 2014** e the Board of Directors approved the award of preferred bidder status to Cerner.

The results of the Final Tender evaluation are summarised below.

ISFT EVALUATION CRITERIA	MAX SCORE	Another	CERNER
RETURN ON INVESTMENT	40		37.7
TRUST FUNCTIONAL REQUIREMENTS	20		18.4
KEY CONTRACT CONTENT	22.5		15.0
DEMONSTRATIONS & REFERENCE SITES	20		16.0
TOTAL	102.5		87.1

Table 1_2 Final Tender Evaluation Results Summary

Through its Final Tender submission, demonstrations and reference site visits, Cerner demonstrated a strength of capability across the Trust's evaluation criteria.

1.4.3 Further Options Analysis

The Economic Case analyses a range of further options as follows:

1. The costs, benefits, pros and cons of a collaboration with BTHFT versus a CHFT only EPR provision;
2. The costs, benefits, pros and cons of a solution hosting and managed service provided by Cerner (RHO) versus a solution hosting and management service provided by the Trust on its own premises (CHO).

The outcome of this analysis is summarised in the table below. Please note that the analysis below excludes VAT, capital charges, depreciation and inflation.

¹ One Potential Provider withdrew from the procurement.

	OPTION 1 (Joint RHO	OPTION 2 (Joint CHO	OPTION 3 (CHFT Alone RHO	OPTION 4 (CHFT Alone CHO
Capital Costs				
Revenue Costs				
Benefits				
Risks				
COSTS & RISKS NET BENEFITS				
NET PRESENT VALUE (NPV)				

Table 1_3 Economic Options Appraisal

The key conclusions from the analysis are as follows:

- The options where the Trust collaborates with BTHFT have a significantly better NPV (in excess of £5m) than where the Trust contracts for the solution alone;
- The Remote Hosted Option (RHO), whereby Cerner hosts the solution, has a very similar NPV to the Client Hosted Option (CHO), whereby the Trust hosts the solution, in spite of the fact that Cerner is providing a much wider scope of services.

The recommendation is that the Trust should proceed a Cerner hosted solution and a collaboration with BTHFT.

The full Economic Case is provided within section 3.

1.5 The Commercial Case

1.5.1 The Scope

The key Cerner components required to build an effective EPR and the subject of this FBC are as follows:

- Patient Master Index;
- Pathway Management and Tracking;
- Outpatients;
- Community Activity and Caseload Management;
- Elective Admissions List and TCI Management;
- Admitted Patient Care and Bed Management;
- Casenote Tracking;
- Coding;
- Commissioning;
- Emergency Department;
- Order Communications;
- E-Prescribing and Medicines Management;
- Integrated Care Planning;
- The Clinical Record, Clinical Noting and Information;

- Clinical Decision Support;
- Shared Pathways and Decision Making;
- External Communications;
- Management Information.

Furthermore, Cerner will provide the following associated services in meeting its contractual obligations:

- Programme and project management of the implementation;
- Product specialists;
- Train the Trainer (TTT);
- Uploading of data from existing Trust systems being replaced into the PAS;
- Supporting the Trust's change management and benefits realisation programme;
- System documentation (training manuals, system specifications, interface specifications etc.);
- Hosting and managed services;
- Interoperability, interfacing and integration;
- Helpdesk;
- Maintenance and support.

1.5.2 The Contracts

The Trust intends to execute contracts with Cerner and BTHFT. It is essential that both these contracts protect the Trust in the event of either Cerner or BTHFT not fulfilling their specified obligations. The key aspects of those contracts are set out below.

- The Trust enters into a contract with Cerner in respect of both its own and BTHFT's requirements;
- Any specific solution configurations required by BTHFT are incorporated in the requirements set out in the Output Based Specification;
- The Trust, BTHFT and Cerner enter into a side letter confirming that Cerner will invoice BTHFT for its share of the charges (though the Trust will remain responsible to Cerner for ensuring BTHFT makes the payments);
- The Trust and BTHFT enter into a collaboration agreement setting out:
 - The terms under which BTHFT will be entitled to use the EPR solution (including service levels);
 - BTHFT's obligation to pay Cerner its share of the charges;
 - BTHFT's obligation to meet its responsibilities in relation to the implementation and use of the EPR solution (based on the relevant responsibilities set out in the supplier contract);
 - Any services provided by the Trust to BTHFT on the basis that the Trust is the signatory of the EPR Contract (e.g. contract management and administration) and any payment made by BTHFT to the Trust in respect of those services;
 - How the parties will manage the EPR Contract, anticipated to be through the use of a joint governance board, including in relation to:

- implementation of the EPR solution;
- reviewing the performance of the supplier under the supplier contract;
- considering changes to the EPR solution and services provided under the supplier contract; and
- resolving any dispute between the Trusts in relation to the EPR solution;
- the circumstances in which BTHFT would be entitled to terminate its use of the EPR solution and the financial implications of doing so (based on the terms of the Cerner contract); and
- each Trust’s commitment to the collaboration in terms of resources and effort.

The Commercial Case summarises the key risks of this approach and how they can be mitigated.

The full Commercial Case is provided within section 4.

1.6 The Financial Case

The programme requires a Trust specific contribution of £24.1m (capital and revenue, not including capital charges and depreciation). It is forecast that Trust will realise savings of £30.2m with a positive Return on Investment (ROI, costs net benefits surplus) of £4.2m.

Please note that a conservative approach to assessing the financial benefits that could be achieved from the implementation of an EPR has been undertaken. The financial benefits, which underpin this FBC, total £26.4m over 10 years, peaking at an annual figure of £3.3m per year. The financial benefits, agreed with Cerner during the procurement, totaled £35.9m over 10 years, peaking at an annual figure of £4.4m per year. This ‘stretch’ target would achieve a positive Return on Investment (costs net benefits surplus) of £13.8m.

The table below provides a summary of the financial analysis.

COST CATEGORIES/SAVINGS	TOTAL
Capital Costs	
Revenue Costs	
Capital Charges	
Savings (including conservative financial benefits)	
RETURN ON INVESTMENT (REVENUE COSTS NET BENEFITS)	
Savings (including stretch financial benefits)	
RETURN ON INVESTMENT (REVENUE COSTS NET BENEFITS)	

Table 1_4 Financial Summary

The full Financial Case is provided within section 5.

Furthermore, the following Cerner have offered two additional payment profiles that defer/spread capital payments. The impact in years 14/15 – 18/19 is summarised in the table below and the overall impact on ROI is provided.

		14/15	15/16	16/17	17/18	18/19	TOTAL
FBC POSITION	ROI						
	CASH						
4 YEAR PHASED	ROI						
	CASH						
DELAYED	ROI						
	CASH						

Table 1_5 Cerner Payment Profile Options

The '4 Year Phased' and 'Delayed' options defer/spread capital payments, but overall costs increase due to interest charges applied to the deferred charges compared to the 'FBC Position'. The Board is requested to agree the preferred Cerner payment profile.

Please note that the economic and financial analysis presented within the FBC is based on the 'FBC Position'.

1.7 The Management case

1.7.1 Key Challenges

The following five key challenges have been identified that will need to be addressed during the EPR enabled transformation programme.

1. The Management of Change
2. Executive Leadership
3. Clinical Engagement
4. Capacity & Capability
5. Training

1.7.2 Governance

This section summarises the approach to management of the programme and its associated governance structure.

1.7.3 Implementation Assumptions

The contract with the supplier will have a joint (single) implementation plan for the Trust and BTHFT. This will mean that there will be a need for a single strategy and management structure for delivering the plan. In most cases this will be delivered by a joint generic resource, however, some areas will need resources specific to each organisation.

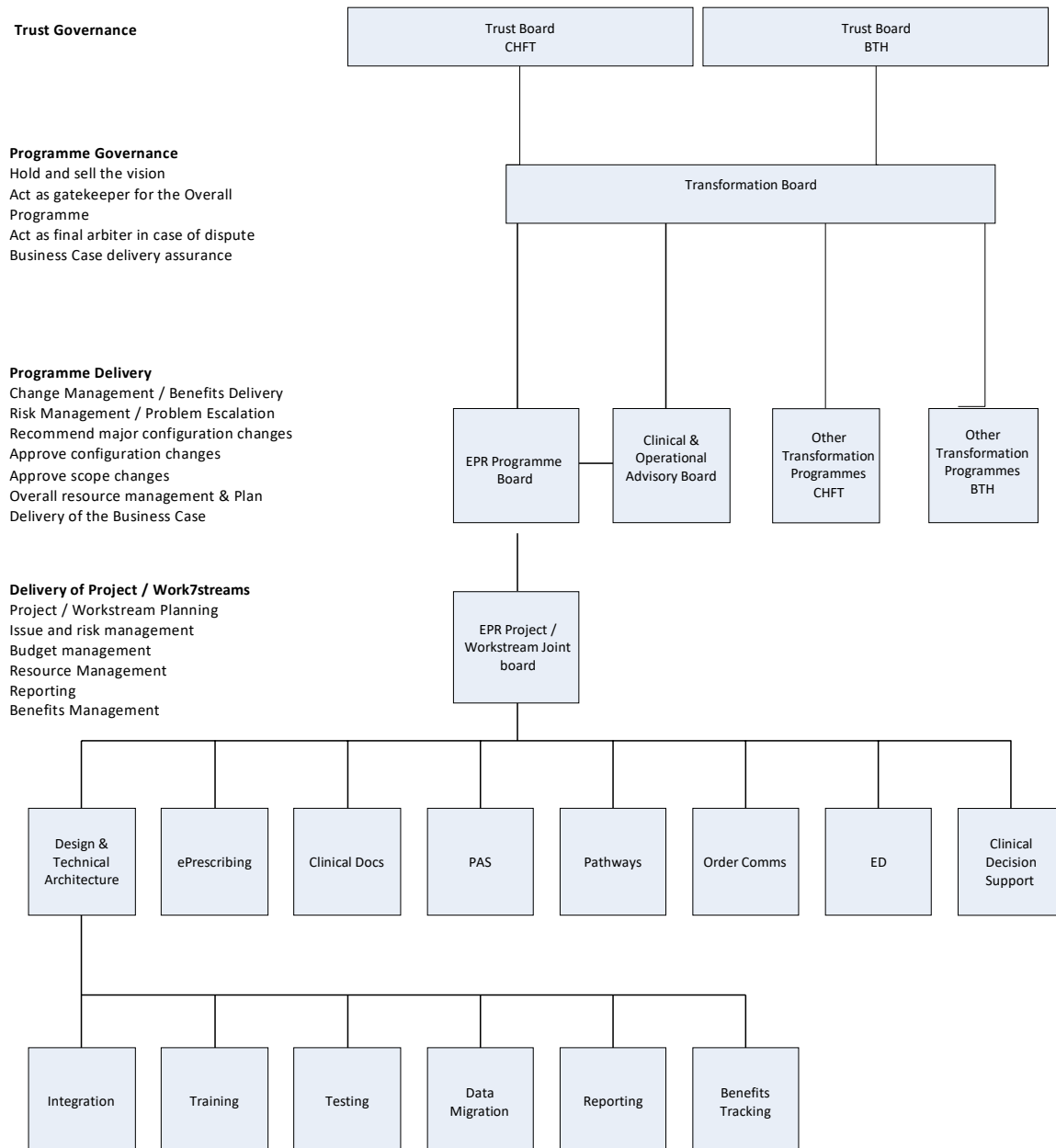
1.7.4 Governance Consequences

Both Trusts will need to take responsibility for delivering their organisation's obligations to meet milestones. However, this will deliver via a joint governance structure with each organisation clearly understanding and agreeing to its commitments.

1.7.5 Proposed Governance Structure

The proposed governance structure is detailed below.

Figure 1_1 Proposed Governance Structure



1.7.6 High Level Implementation Plan

A high-level implementation plan for the programme is shown below.

2 THE STRATEGIC CASE

This section of the business case provides an overview of the Trust and its strategic ambitions, set in a national and local context. It sets out how this proposed investment contributes to the business and demonstrates synergies with other national and local strategies.

2.1 Social & National Context

The Trust is operating in an environment of unprecedented change both politically and economically. All providers must find ways to raise the quality of care to the best international standards (responding to recommendations of Francis, Keogh and Berwick); whilst closing a potential funding gap of around £30 billion by 2020/21. This challenge is set against a backdrop of an increasing demand on services from an ageing population and greater numbers of patients with multiple long-term conditions plus those diagnosed with dementia. This section of the document outlines the key national strategies which the Trust took into consideration when producing this business case.

2.1.1 Five Year Forward View

In the past 20 years digital technology has revolutionised how major industries do business. However, healthcare is one industry which lags behind. In October 2014, NHS England produced The NHS Five Year Forward View. This paper articulates why change is needed, what change might look like and how to achieve it.

The Five Year Forward View (FYFV) states that the biggest challenges the NHS is facing are:

- Changes in patient health needs and personal preferences.
- Changes in treatments, technology and care delivery and the need to provide care that is genuinely coordinated around what people need and want.
- Changes to funding/ continued decline in funding growth.

The Five Year Forward View sets out a number of key themes that need to be addressed to overcome these challenges shown in the diagram below.

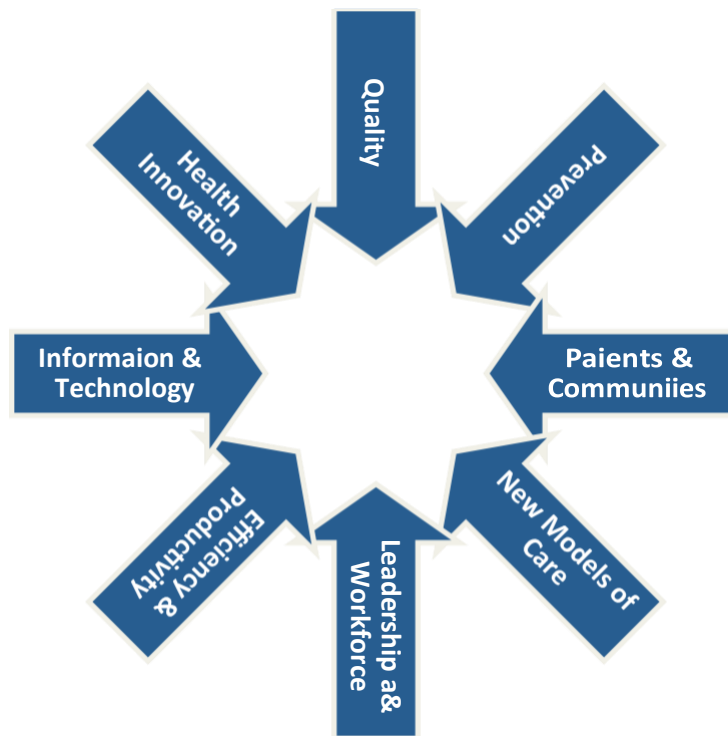


Figure 2_1 _ Five Year Forward View _ Themes

2.1.2 National Information Board (NIB) Report

In November 2014, the National Information Board issued its framework for action “Personalised Health and Care 2020: Using data and technology to transform outcomes for patients and citizens”. The document aims to provide further detail as to how data and technology will support the delivery of the Five Year Forward View.

The report reiterates the sentiment of the Five Year Forward View stating that the use of data and technology has the power to improve health, transform the quality, reducing the cost, give patients and citizens more control, empower carers, reduce administrative burden for care professionals, and support the development of new medicines and treatments.

2.1.3 Information Strategy in the NHS

“The Power of Information”, the NHS information Strategy, advocates joined up care and access to patient information for healthcare professionals, patients and carers in care settings. In January 2013, the Health Secretary, Jeremy Hunt, stated that he intends the NHS to be paperless by 2018. NHS England’s ‘Safer Hospitals, Safer Wards’ published in July 2013 sets out this vision for a fully integrated digital care record (ICDR) across all care settings by 2018:

‘An information rich care system built on innovative and integrated solutions’

“The NHS belongs to the People: Call to action” published in July 2013 further defined a vision for the delivery of integrated care centered on the patient rather than aligned to episodes of care. It proposed that £30m funding gap can be closed by applying innovation, transformation and technology to change the NHS service delivery model from acute, episodic based care to integrated care closer to home.

The £260m Safer Hospitals / Safer Wards fund was provided to support NHS England's guidance on electronic patient records to "catalyse" the adoption of IT in the NHS. The Trust made a successful bid for funds and with other NHS England technology funds has been awarded £4,500,000 to support its IM&T enabled modernisation programme.

2.1.4 Issues Arising from the National Strategic Context

This investment would aim to support these objectives by delivering digital record keeping by 2018 and through this:

- provide systems and infrastructure that directly supports the delivery of high quality care at every stage of the patient journey regardless of location;
- introduce technology to support more active health prevention and management including the use of healthcare apps;
- deliver systems which support collaboration across health partners and patients and the public;
- provide open, transparent and accessible data which can be used intelligently to become proactive not reactive and drive accurate business decisions based on integrated real time information;
- systems must enable direct access by staff, patients and public to digital records and easy bi-directional communication;
- support improved information, communication and technology to enable staff to do their jobs easily and efficiently.
- support the development of technical and informatics skills for all staff.

2.2 Local Context

This section of the document outlines the local context which the Trust took into consideration when producing this business case.

2.2.1 Transforming Health and Social Care in Calderdale and Greater Huddersfield

The 'Right Care, Right Time, Right Place' initiative within Calderdale and Greater Huddersfield has been established to define how health and social care will be provided and how it needs to be designed to meet the changing needs of people in the area and to make it fit for the future.

The background is that services are currently fragmented with duplication and inconsistency in the way they are delivered and there is a need to reduce preventable hospital admissions. Both CCGs want to commission services that will result in fewer people being admitted to hospital, which is what, through engagement, people have said they want.

The aim is to improve the health and wellbeing by shifting the balance from unplanned hospital care to more coordinated and planned care based within the community. In addition, services would be provided as close to home as possible, in the person's home where needed, utilising multidisciplinary working and technology.

The increasing number of elderly patients, especially those who are frail and have multiple long-term conditions, are not best served by a hospital-based service. The Care Closer to Home model focuses currently on strengthening existing services within the community in line with what the public have said.

The Outline Business Case (OBC), 'Transforming Health and Social Care in Calderdale and Greater Huddersfield' was published in November 2014. The case describes options for delivering health care across the CCGs with consolidation of acute services with planned activity in one of the Trust's two hospitals and unplanned activity in the other hospital.

2.2.2 The Trust's Vision

The Trust's future vision is as follows:

"We will work with partner organisations to understand the individual needs of patients and together, deliver outstanding compassionate care which transforms the welfare of the communities we serve."

The response to this vision and the key principles are:

- ***Keeping the base safe*** – ensuring there is no drop-in performance during turbulent times.
- ***Transforming care*** e changing the way that we and others work to improve care.
- ***Improvement & Innovation through Strategic Alliance*** – we will work with our partners to provide the right care at the right time and in right place.

2.2.3 Four Values and Behaviours

The Four Pillars describes the values and behaviours the Trust expects to help meet its vision above. Delivery of an integrated EPR supports all four pillars within this Framework.

- **We put the patient first** – Having a comprehensive real-time Electronic Patient Record which supports the delivery of clinical services will vastly improve the outcomes for our patients.
- **We go see** – In order to deliver the benefits described in this FBC we will review all our processes and clinical practices. This will ensure that when digitised they are not only supported by modern technology but are also robust and reflect best practice.
- **We work together to get results** – The delivery of a comprehensive Electronic Patient Record which all healthcare professionals can access and contribute to will help us work together to deliver the best results for our patients.
- **We do the Must Do's** – We will build the 'Must Do's' into our electronic workflow systems. This will ensure these systems prompt and validate that the appropriate tasks/interventions are completed in a timely manner.

2.2.4 The Trust Strategic Objectives

Through this vision and values the Trust aims to deliver a number of strategic goals, these include:

- To transform care
- Improve the patient experience
- Deliver the regulations
- Develop the organisation for the future
- Enable staff
- Develop talent
- Develop a business approach
- Work with our communities

In order for the Trust to achieve its strategic goals, particularly transforming care and improving the patient experience it is recognised that the way services are provided must be transformed. Part of this transformation is to be able to provide seamless care both within the Trust and between the Trust and its partners in the local health economy. This seamless and integrated care can only become a reality if it is underpinned by seamless and integrated information. In order to achieve this, the Trust needs to have a single electronic patient record such that every member of staff has access to the information they need, when they need it, and wherever they are working, without having to look for a piece of paper, wait for a computer or ask the patient again and again.

2.2.5 Key Trust Strategies

The current environment is one of the most challenging financial environments faced by the NHS. On the back of this the Trust is facing one of its most difficult financial times with increased scrutiny from Monitor. The Trust will have to achieve very significant efficiency savings whilst improving quality of care. This section of the document outlines the key local strategies which the Trust took into consideration when producing this business case.

2.2.5.1 Quality Improvement Strategy

The Trust Quality Improvement Strategy makes explicit our commitment to improve patient safety, clinical effectiveness and patient experience through the adoption of ambitious goals which will demonstrate the Trust's ambition to be the premier provider of acute hospital and community care.

2.2.5.2 The Trust's Digital Strategy

EPR systems are recognised as being significant enablers for healthcare organisations to fully establish themselves as a credible leading provider of integrated health care in the 21st Century. The national agenda demands digital record keeping in all NHS Trusts by 2018. The one to seven HIMSS rating scale for IT deployment in healthcare organisations has shown that by achieving Level 6 or 7 an organisation sees significant qualitative and quantitative benefits (See Appendix 1 HIMSS Europe EMR Adoption Model).

The Trust's 'Digital Strategy' describes how technology will drive transformation in the way we deliver services to patients and carers. The strategy also considers the future by providing scenarios of how the delivery of the strategy will improve both the outcomes and the experience for patients by providing easily accessible relevant information at the right time in the right place.

The hypothesis underpinning this strategy is that many of the service improvements, new developments and efficiency gains proposed by the Trust and divisional business plans rely on a modern and robust IT infrastructure and good quality and relevant information provision.

The underpinning principle is that 'real time patient information will always be at hand for us and our partners to provide the best seamless care'. The Trust's vision is for a patient centric comprehensive clinical record for every patient viewable from acute, community and primary care as well as from social care environments. This comprehensive electronic patient record combines all the administrative and clinical information about a patient, where the user – be they a doctor, nurse, therapist, clerk, secretary or manager – can access all the information about that patient which is relevant to them in a single place in an intuitive, direct and easy way.

This strategy demonstrates the Trust's intention to work with partners to provide joined up care to our patients. This approach, further emphasised by Trust's participation in the Health & Social Care Strategic review for Calderdale and Kirklees which is likely result in a major site reconfiguration, requires the adoption of IT technologies to support closer working.

The Trust is aware of the complexity of what it is trying to achieve and recognises that it is not where it needs to be on the national digital roadmap. As part of its digital roadmap, the Trust aspires to achieve HIMSS Level 6 accreditation shortly after it goes live with the core EPR Functionality. However, the Trust’s aspiration is that in partnership with Cerner that will lead to the achievement of Stage 7 on the [HIMSS](#) Model.

The Trust has a strategy of back scanning for its existing paper records with the initial focus on medical records. This will capitalise on the work done by other acute Trusts who have introduced similar technologies.

Some of the key gaps between the ‘now’ and the Trust’s digital vision are:

- It is difficult (and sometimes impossible) to get a single view of the patient from multiple current systems.
- Systems are predominantly administrative focused rather than clinical focused.
- Some of our applications and processes are unnecessarily complex having evolved in a piecemeal way.
- Information about the patient often doesn’t follow the patient as they move through care settings.
- Re-engineered care pathways cannot be sustainably implemented without modernisation of IM&T.
- There is no current provision for clinical decision support in clinical systems, including access to knowledge bases in the context of the clinical process, decision support rules enforced for order communications.
- Trust management and clinicians do not have a ‘real-time’ view of activity and performance across the Trust.
- Users of information systems in the Trust often have to use more than one ‘log in’ process to access information about a single patient.

2.3 Strategic Objectives

The table below shows how investment in this project will successfully deliver the Trust’s strategic objectives.

Strategic Objectives	EPR Deliverables
The patient’s record will be held electronically	<ul style="list-style-type: none"> • Ensure clinical information is collected electronically as part of the clinical process and forms the patient record which is accessed easily by appropriate staff.
Underpin and enable improvements to clinical care and patient safety	<ul style="list-style-type: none"> • Introduce standardised evidence-based protocols to be used in the assessment of patients, to support decision making and clinical management by all staff. • Introduce clinical pathways to improve support for the management of patients including those with long-term conditions, providing a more responsive service. • Improve monitoring and prevention of hospital acquired infections.

Strategic Objectives	EPR Deliverables
	<ul style="list-style-type: none"> • Provide better management information to allow the Trust to identify and monitor areas for improvement in quality and outcomes. • Improve patient safety via measures such as at-risk alerts and positive patient I.D. (PPID). • Provide order communications and electronic prescribing to reduce clinical risk and errors. • Introduce electronic prescribing and medicines administration to increase the convenience and efficiency of prescribing and to reduce drug costs. • Active patient monitoring to alert clinician to deteriorating patient.
<p>Patient centred systems will be deployed, with sophisticated enterprise wide scheduling</p>	<ul style="list-style-type: none"> • Deploy patient centred systems, with enterprise-wide scheduling to utilise expensive resources in the most efficient way. • Provide support for scheduling and running ‘one stop shop’ clinics.
<p>Tracking and communication systems, utilising RFID technology will ensure that progress through the patient journey can be monitored in real-time and delays minimised</p>	<ul style="list-style-type: none"> • Provide the ability to locate patients and track movements in real time and provide an audit trail in the event of infection outbreak. • Provide tracking and communication systems to ensure that progress through the patient pathway can be monitored and delays minimised.
<p>Patients will be given access to a summary of their own health record and eventually control of it</p>	<ul style="list-style-type: none"> • Offer patients access to an electronic summary of their own health record via the Patient Portal, which they will be able to share with other health professionals involved in their care. • Increase patient satisfaction via improved communication, for example by providing transparency about timescales and choices about their care options. Tools may include the ability for patients to access their record online, highly configurable patient letters, access to patient information leaflets and providing two-way SMS communication. • Ability to communicate via the Patient Portal with their clinician
<p>The provision of systems that actively support best practice and efficiency</p>	<ul style="list-style-type: none"> • Support clinicians through system generated work lists, which will prompt them for action, moving patients through care process. • Provide access to guidelines and knowledge which will support decision making about patients’ treatment and care and to support lifelong learning including best practice, evidence and access to online databases. • Allow clinicians to communicate rapidly with each other within the Trust,

Strategic Objectives	EPR Deliverables
	<p>as well as across organisational boundaries. This could include forwarding results or documents to clinical colleagues for advice or an opinion.</p> <ul style="list-style-type: none"> • Provide access to information to evaluate the effectiveness of the treatment and care given to patients, including clinical outcome indicators, such as rates of perioperative deaths, complications, complexity of case mix, etc. • Incorporate decision support to encourage clinicians to make requests which are cost effective, avoid duplication and are in line with clinical best practice. • Take a change management approach to systems implementation, to optimise benefits by transforming existing process, introducing new working practices and reducing clinical time spent on administration. E.g. streamline process for passing referral letters to consultants; enable less onerous clinic set up. • Record data once as part of the operational process (less duplication, more clinical involvement), leading to improved data quality to support coding and costing.
Partnership working beyond the hospital	<ul style="list-style-type: none"> • Providing high quality, timely clinical correspondence, including discharge information to GPs & communication with other agencies such as social services • Enable a Health Information Exchange system across the health and social care economy to share information in the best interests of the patient

Figure 2_2 Strategic Objectives linked to EPR Deliverables

2.3.1 Investment Objectives

In light of the national and local strategic drivers, the Trust has identified the following investment objectives which are fundamental to the success of this programme.

Investment Objective	Definition
Facilitate the delivery of new models of care	By 2017 to provide the technical and organisational infrastructure to underpin the transformation of care processes by the EPR
Improve the quality of care and clinical safety	By 2018 to have demonstrated tangible improvement in these measures through the use of the electronic patient record. (HIMSS 6)
Provide staff with a single point of access to all relevant information about a patient	By 2017 to extend the access for all staff to the information they need to do their job
Support an improvement in the efficiency, and	By 2018 to have realised the identified benefits

Investment Objective	Definition
thus productivity, of the operation of the Trust	thus, both improving service quality and reducing cost
Reduce LoS by improving discharge processes	By 2018 to have evidence of further improvements in the reduction of LoS
Financial stability by generating cash –releasing benefits	By 2018 to have net benefit from the EPR programme
Improve the patient experience	By 2017 to have evidenced improvement in the patient experience through use of the integrated record
Facilitate the seamless flow of information to follow the patient between the Trust and other partner organisations	By 2017 to have all relevant information on a patient follow them on their care pathway across the health economy

Figure 2_3 Strategic Objectives linked to Trust Corporate Objectives

2.4 The Case for Change

This section summarises the case for change based on the analysis of current IM&T capabilities and the Trust's strategic aims.

2.4.1 The Business Case for Change

As can be seen from the national and local drivers, the use of digital services is increasing in profile and is essential to the delivery of patient care. The business case for change includes:

- The need to develop a single clinical view of patient information that enables early but safe clinical intervention and treatment:
- Resolving multiple separate systems into a coherent integrated platform
- Reducing reliance on paper records
- Providing staff with access to all the information about that patient that is relevant to the task they are doing in a single place in an intuitive, direct and easy way.

This need to provide a higher standard of patient care through the provision of real-time data capture and systems integration results in:

- Reducing errors and improving patient safety
- Reducing clinical variation
- The requirement to deliver service improvements, new developments and efficiency gains which rely on a modern and robust IT infrastructure and good quality, relevant information provision.
- Improving quality and therefore patient experience
- Improving efficiency (reducing unit cost and streamlining back office functions)

- Improving scheduling to ensure that the patient's visit to the hospital will be as short as possible and expensive resources are utilised in the most efficient way.
- Providing Trust management and clinicians with a 'real-time' view of activity and performance across the Trust.
- Improving operational and management reporting
- Transforming care and therefore improving the patient experience
- Introducing electronic prescribing and medicines administration to allow the Trust to reduce potential adverse drug events and increase the convenience and efficiency of prescribing, whilst reducing drug costs.
- Providing decision support which will help prevent duplicate requests, or request tests which are not cost effective. It also decreases the risk of requesting tests against clinical best practice. There is also a need to flag and proactively alert staff to patient specific information.
- Providing care pathways functionality which will allow the Trust to deliver sustainable consistent and safe care based on best practice.
- Providing support to help users track and manage patients through the care process supporting the Plan for Every Patient.
- Allowing clinicians to securely forward results or documents to clinical colleagues for advice or an opinion either within or outside the Trust.
- Improving communication with patients via strategies such as providing information about condition and treatments electronically and allowing access to their own electronic medical record.
- Extending services beyond the walls of the hospitals
- Providing support for a patient centric comprehensive clinical record for each patient viewable from acute, community and primary care as well as from social care environments.
- Improving communication with stakeholders and allowing the Trust to provide discharge information (including prescriptions) electronically and access to the clinical record to all GPs using other systems through the Health Information Exchange
- Improving management of litigation risks

2.5 Current State of IM&T

The Trust has for some time recognised the need to move away from paper and a reliance on manual processes to an electronic record with a seamless integration of systems both within and external to the hospital setting. The Trust has achieved some success using existing systems and developing systems in house. However, the evidence suggests that continuing to use existing systems in this way is unlikely to result in a fully integrated medical record. Therefore, the CEO has sponsored an ambitious clinically led IM&T Modernisation Programme, supported by our commissioners. This programme will ultimately deliver a digital care environment and fundamentally change the way we deliver services to patients and the public.

The transformation programme started 2 years ago with the Trust upgrading its IM&T infrastructure. Measures included:

- the upgrade of its network to a highly resilient, CISCO certified infrastructure,

- building a data centre,
- a major desktop replacement programme;
- roll out of a wireless network across all Trust sites.

This amounts to £10m investment in readiness for the introduction of a digital environment and EPR.

2.5.1 The Technical Case for Change

The Technical Case for Change includes:

- The current MS DOS based PAS is old and is appearing increasingly archaic to users accustomed to Windows and web-based software.
- The current PAS does not allow provide bi-directional interfacing. Information entered in disparate systems cannot feedback to PAS.
- There is a risk that the current PAS will be retired in the near future. This risk increases year on year as the number of users of the system reduces and the supplier must focus on developing and supporting their latest PAS systems.
- The PASWeb Clinical Portal technology platform is aged, in house developed and does not provide enough flexibility to meet the changing needs of the organisation. It is not compatible with modern integration standards thereby inhibiting data sharing between systems and preventing a common look and feel across Trust systems. As a bespoke system there are risks around the ongoing function and development of PASWeb to meet clinical demands and a resultant effect on keeping the base safe.
- Patient information is held in a system centric rather than patient centric way resulting in the need to open multiple systems with multiple logins.

2.6 User Requirements

The high-level user requirements for a solution are:

- intuitive yet sophisticated end user experience;
- a resilient, highly available solution;
- highly functional EPR with good references in NHS;
- single Trust wide scheduling to maximise the use of resources and increase patient convenience;
- comprehensive inpatient management to support real time Admissions Discharges Transfers (ADT) which must include whiteboards with 'drag and drop' capability;
- broad EPR functionality that facilitate the Trust's goal to achieve Stage 7 on the [HIMSS](#) EMR European Adoption Model;
- good incorporation of technologies to improve efficiency and access to systems on wards and in clinical areas, for example, digital pens, tablets;
- flexible configurability of products to allow capture of structured clinical datasets and annotation of diagrams;
- good clinical view of outpatient clinics including capture of procedures and outcomes;
- clinical decision support including access to knowledge bases in the context of clinical process;

- electronic prescribing and medicines administration to increase the convenience and efficiency of the prescription writing process;
- the ability to share information electronically with care providers outside the Trust including sending discharge summaries to GPs;
- provision of sophisticated, yet easy to use management information functionality relevant to clinicians, managers and other users, including dashboards and standardised reports.

2.7 Benefits

This programme provides the Trust with the opportunity to realise significant benefits through the functionality provided by an EPR system.

2.7.1 High Level Anticipated Benefits

The table below identifies the high-level benefit that would be realised from implementing an EPR linked to the Trust’s strategic objectives. The Financial Case describes the approach the trust has taken to the quantification of the financial benefits that underpin this investment.

Trust Objective	Benefit
<p>Facilitate the delivery of new models of care</p> <p>By 2017 to provide the technical and organisational infrastructure to underpin the transformation of care processes by the EPR</p>	<p>Improves Patient Care and Safety</p>
	<ul style="list-style-type: none"> • Provides access to systems and information from anywhere, enabling out of hospital care. • Allows community pharmacists to view a patient’s TTO prescription and proactively make updates in the case of none compliance issues. • Provides real-time clinical decision support and advice/guidelines/interactions/contraindications.
	<p>Improves Working Practices</p>
	<ul style="list-style-type: none"> • Provides change management approach to systems implementation, to optimise benefits by transforming existing process, introducing new working practices and reducing clinical time spent on administration. E.g. streamline process for passing referral letters to consultants; enable less onerous clinic set up.
	<p>Improves Management Reporting</p>
	<ul style="list-style-type: none"> • Provides relevant and reliable information to assess the health of the population and transform services to meet local priorities in healthcare.

Trust Objective	Benefit
<p>Improve the quality of care and clinical safety</p> <p>By 2017 to have demonstrated tangible improvement in these measures through the use of the electronic patient record. (HIMSS 6)</p>	<p>Improves support for patient care</p> <ul style="list-style-type: none"> • Provides alerts and rules for abnormal results/risk factors such as allergies/children at risk/safety alerts etc. • Improves safety & security (positive patient I.D.). • Provides real time clinical decision support and advice/guidelines/interactions/contraindications • Improves the scope for using protocols & electronic clinical data capture to improve the quality of clinical record keeping whilst reducing the time taken to input data • Improves patient tracking to enable real time bed management, improving bed utilisation. Ability to locate patients and track journeys in real time and provide an audit trail in the event of infection outbreak. • Reduction in adverse drug events through e-Prescribing combined with clinical documentation • Replacement of hand written notes reducing clinical risk • Streamlined electronic handover of electronic record between A&E and the ward.
	<p>Improves management of litigation risks</p>
	<ul style="list-style-type: none"> • Reduces litigation risks through full availability of records and improved audit trails. • Better information reduces the amount of time required to perform root cause analysis when investigating complaints.
	<p>Improves Management Reporting</p> <ul style="list-style-type: none"> • Better management information allows the Trust to monitor and identify areas for improvement in quality and outcomes.
<p>Provide staff with a single point of access to all relevant information about a patient</p> <p>By 2015 to extend the access for all staff to the information they need to do their job</p>	<p>Improves Support for Patient Care</p> <ul style="list-style-type: none"> • Provides a clinician ‘single system’ view of patient information. • Improves the management of requests and results and provides access to more timely information. • Reduced clinical risk as clinicians are less likely to miss follow up actions e.g. actioning test results, scheduling investigations etc.
	<p>Reduces wastage</p> <ul style="list-style-type: none"> • Having access to information at the point of need will reduced the number of unnecessary additional appointments for tests, follow up care

Trust Objective	Benefit
<p>Support an improvement in the efficiency, and thus productivity, of the operation of the Trust</p> <p>By 2016 to have realised the identified benefits thus both improving service quality and reducing cost</p>	<p>Improves Working Practices</p> <ul style="list-style-type: none"> Improves data quality to support coding and costing (e.g. less duplication, more clinical involvement in data capture). Allows the Trust to actively manage breach dates including RTT, cancer wait times and the 28-day rule. Real time bed management information reduces the need for bed managers to spend time ‘walking the hospital’. Bed managers can prioritise bed requests based on the clinical need indicated by clinicians.
	<p>Improves efficiency</p> <ul style="list-style-type: none"> Optimises Trust wide scheduling to reduce waiting times for appointments and admissions. Improves bed scheduling increasing bed utilisation and patient throughput. Optimised production and streamlining of clinical correspondence.
	<p>Reduces waste</p> <ul style="list-style-type: none"> Sophisticated scheduling functionality allows the Trust to easily identify and utilise vacant slots. Reduces administrative time.
	<p>Financial stability by generating cash – releasing benefits</p> <p>By 2016 to have net benefit from the EPR programme</p>
<p>Improves Scheduling</p> <ul style="list-style-type: none"> Provides efficient scheduling of resources (Trust wide) and leads to reduction of DNAs. 	
<p>Reduces waste and duplication</p>	

Trust Objective	Benefit
	<ul style="list-style-type: none"> • Eliminates duplicate tests/examinations due to unavailability of previous results; • Reduces the drugs budgets by improving decision support, compliance with the formulary, and reducing wastage. <p>Improves Management Reporting</p> <ul style="list-style-type: none"> • Provides flexible analysis & reporting tools for managers to undertake simple queries for themselves thereby releasing Information Department staff time. • Data capture and reporting capabilities better support national CQUIN payments <p>Release of Existing IM&T Costs</p> <ul style="list-style-type: none"> • Cessation or reduction of maintenance and support costs associated with current PAS and other systems.
<p>Reduce LoS by improving discharge processes</p> <p>By 2015 to have evidence of further improvements in the reduction of LoS</p>	<p>Improves working practices</p> <ul style="list-style-type: none"> • Improves patient tracking to enable real time bed management, improving bed utilisation • Facilitates timely discharge leading to a reduction in length of stay. • Integrated tracking of Estimated Discharge Dates (EDD) allows better discharge planning and bed utilisation.
<p>Improve the patient experience</p> <p>By 2015 to have evidenced improvement in the patient experience through use of the integrated record</p>	<p>Improves patient convenience</p> <ul style="list-style-type: none"> • Improves patient convenience by providing support for scheduling and running 'one stop shop' clinics. <p>Improves patient communications</p> <ul style="list-style-type: none"> • Improves information and education about condition and treatments to patients electronically. • Improves the configurability of patient letters to include information about timescales etc. • Offers patients access to a Patient Portal of their own health record, which they will be able to share with other health professionals involved in their care

Trust Objective	Benefit
<p>Facilitate the seamless flow of information to follow the patient between the Trust and other partner organisations</p> <p>By 2015 to have all relevant information on a patient follow them on their care pathway across the health economy</p>	<p>Improves working with other care providers</p> <ul style="list-style-type: none"> • Allows community pharmacists to view a patient’s TTO prescription and proactively make updates in the case of none compliance issues. • Provides treatment pathways which include care to be provided in the community. • Facilitates electronic communication with GP’s and improves quality and timeliness of clinical correspondence, including discharge information. • Delivers speedier patient discharge through co-ordination with transport services, community staff and social services.

Table 2_1 Mapping of EPR Benefits to Trust Objectives

2.7.2 Evidence of Benefits delivery in the NHS

There is no single, off the shelf set of benefits that can be taken and applied to an organisation, although the Trust has sought overseas evidence, with limited but recent EPR evidence from London Trusts and guidance via NHS Clinical Advisory Boards e.g. NICE, Colleges etc. to support its own benefit profile. The scale of benefits delivery also depends heavily on each Trust’s starting point and their ability to transform the way in which they work.

A 2013 study² in England conducted by PWC and quoted by the Secretary of State estimates potential national annual savings of £4.4bn through the increasing the use of technology in the NHS. This is in addition to those outlined in the Department of Health’s information strategy, where a further £5bn saving over ten years is available (DH impact assessment figures).

Of this £4.4bn, £1.7bn is considered to be available through four priority actions, the majority of which are low to medium cost to implement, and are possible to implement in a 3e5 year period:

- Driving the rollout and use of e-Prescribing in secondary care and the Electronic Prescription Service (EPS) in primary care. Potential benefit – c.£270M+ p.a.
- Driving the better use of information to aid the postoperative care of patients. Potential benefit –unquantified
- Driving the use of acute operational performance information to enable commissioners to achieve contractual savings. Potential benefit – c.£860M+ p.a.
- Ensuring the widespread provision of complete and accurate clinical and attendance information to clinicians and carers at the point of care via digital portals or other similar solutions. Potential benefit – c.£560M+ p.a.

Some of these are pertinent to the acute Trust, however there is benefits to the whole health economy (e.g. performance information to commissioners) and we would envisage a Trust wide EPR would have benefits beyond the four walls of the hospital.

² (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213291/DoHeRevieweofeInformationeandTechnologyUseFinaleReporteV2.pdf)

In addition, with the latest wave of demands being placed on the Trust and the need to show demonstrable evidence of benefits delivery, the BMJ Evidence Centre has developed a product that supports clinical pathway standardisation. Order Sets place evidence-based medicine at the heart of the clinical workflow, supporting decision making and increasing the efficiency of treatment.

Order Sets are standardised care protocols, which help to improve patient outcomes, reduce costs and support clinical decision making. They are electronic versions of our current care bundles aiming to ensure 100% of patients receive 100% of the evidenced treatment for their condition. Developing these within an EPR ensures sustainable transformation resulting in:

- Reduced medical errors;
- Reduced costs;
- Reduced mortality rate;
- Reduced length of stay;
- Reduced admission and readmission rates;
- Reduced inappropriate tests;
- Reduced inappropriate drug prescriptions and medication related errors;
- Reduced complication rates;
- Freeing up clinical time;
- Ensuring consistency of clinical processes.

Estimations show that Order Sets can help hospitals achieve efficiency savings of between £6.4m e £38m per acute trust per year on average. If Order Sets implementation affects every patient equally throughout the whole hospital, this could mean annually between £9,800 a n d £59,000 per hospital bed or between £73.60 and £443 per hospital admission between £73.60 and £443.

2.8 Conclusions

The following key conclusions have been drawn from the Strategic Case:

- Significant investment is required in complex patient centric information systems, especially those systems that directly supporting clinicians in caring for patients;
- This proposed investment is a key enabler for in meeting the Trust's overall strategic objectives;
- This proposed investment is in direct alignment with the national strategy (Safer Hospitals, Safer Wards);
- There is strong evidence that an investment in an EPR can deliver a range of financial and clinical benefits.

3 ECONOMIC CASE

3.1 Introduction

This section of the business case looks at the options for achieving the Trust’s strategic investment objectives; scores and ranks these; and proposes a preferred approach.

The Trust has identified a number of approaches for meeting its investment objectives.

3.2 Outline Business Case

3.2.1 Options Overview

The Outline Business Case identified a list of five shortlist options described in the table below.

Option	Description
A Best of Breed EPR	Each element is sourced from a different supplier shown to provide the best capability and value for money for that required function
B Best of Suite EPR	A core set of functions is sourced from a single supplier where these elements are naturally integrated. This core is as large as practicable. Outside of the core then systems are procured on a best capability and value for money basis but ensuring they interface tightly with the core EPR
B Plus Extended Best of Suite EPR	As per Best of Suite but with a planned intention to add to the core as required and potentially replace some of the individual systems with the core.
C Single Integrated EPR	The complete range of required functionality is sourced from a single supplier who provided a fully integrated EPR
D Do Minimum	Current systems are maintained with minimal upgrades to meet statutory requirements

Figure 3_1: EPR Options Summary

3.2.2 Options Evaluation

This section outlines the Trust’s evaluation of the five identified short list options.

Do Minimum Option

The “Do Minimum” option was discounted early in the evaluation for the following reasons:

- Current systems are incapable of supporting the full functionality required to underpin the Trust’s strategic goals, constraining the ambitions of the Trust in the achievement of some clinical and patient benefits and inhibiting the aspiration of going ‘paper-light’;
- It will not be possible to implement the transformed care processes required with the existing systems;

- Without significant further investment there will be a limited opportunity for IM&T to contribute further to the Trust agenda in the following areas:
 - Reducing errors and improving patient safety
 - Extending services beyond the walls of the hospital
 - Improving efficiency (reducing unit cost and streamlining back office functions)
 - Whilst the current PAS functions well at present, it is at high risk of not being supportable, with little notice, not only introducing major risks but also not providing the Trust with sufficient time to source a replacement
 - The continuing development costs of maintaining current systems, whilst continuing to meet statutory requirements, will not provide any tangible return.

Although this option was discounted it is included in the cost analysis for comparison as Option D “Do Minimum”.

Other Options

The Trust considered a range of options for sourcing a complete EPR, ranging from a single supplier providing the complete solution to a fully ‘best of breed’ model where every element was selected for the functionality offered and then integrated together to form the EPR. Figure 3 below is a schematic representation of the current status of EPR solutions in the UK. It compares the costs and risks of implementing a range of EPR solutions.

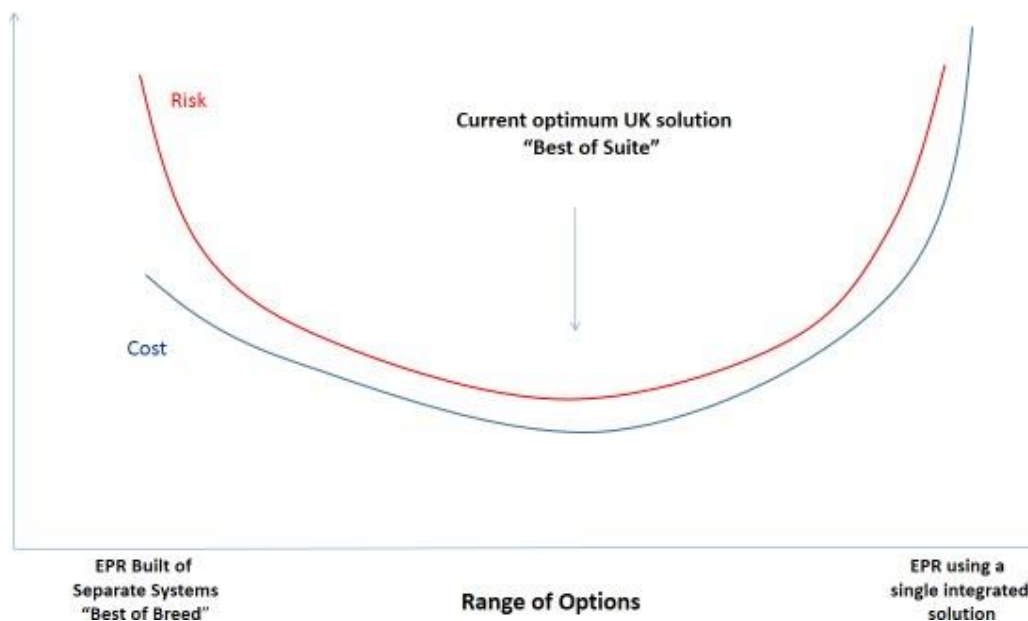


Figure 3_2 _ Risk and cost comparison for EPR options

This graph demonstrates that there are no proven suppliers able to provide the complete solution where every single element is both functionally fully fit for purpose and best in its class. There are suppliers who have a very integrated single solution, however, some of the modules within this solution do not meet the needs of individual specialties or departments or are not yet deployed in the UK

At the other end of the spectrum there are major risks and escalating costs in trying to create the fully integrated single patient record through the use of a wide range of separately sourced applications. In addition, maintaining this type of solution would require significantly more specialist staff to develop and maintain the data and the interfaces. The European HIMSS organisation has stated that it doesn't believe it is possible to achieve the higher levels of accreditation within its model via this approach.

3.2.3 Preferred Option

In conclusion, as has been established by a majority of UK Trusts in this area, the Trust concludes that the most effective route is to select an option that is a 'best of suite'. Best of suite is a term used to convey a solution comprised of a core EPR with as much as practically possible coming from a single supplier supplemented by some 'best of breed' systems. This 'best of breed' functionality is likely to be migrated to the core EPR functions as soon as practically possible. As such the preferred option is described as Option B plus.

On the basis of this analysis the Trust proceeded to procurement with a set of output-based requirements to be met by a single integrated solution supplemented by 'best of breed' systems where appropriate.

3.3 Procurement

3.3.1 Introduction

The EPR system has been procured using the OJEU Competitive Dialogue procedure, which adopted the following staged approach that is outlined in this section:

- Stage One: Pre-Qualification
- Stage Two: Dialogue
- Stage Three: Contract Award

3.3.2 Stage One _ Pre-Qualification

- **27 March 2014** e an OJEU Contract Notice was raised for the provision of an EPR Enabled transformation programme.
- **28 April 2014** – at PQQ response deadline eight Potential Providers had submitted their responses.
- **29 May 2014** e three shortlisted Potential Providers were invited to Participate in Dialogue.

3.3.3 Stage Two _ Dialogue

The objective of this stage was to enable the Trust to assign Preferred Bidder status by building on the information presented and evaluated at the Proposal stage and to further evaluate the suitability of suppliers in terms of:

- their ability to meet the Trust's EPR enabled transformation agenda and to enable delivery of a range of benefits;
- their ability to meet the Trust's requirements as defined by the Output Based Specification (OBS);
- their ability to provide the Trust with the required level of confidence in assurance in their ability to deliver on time with a high degree of quality;

- the usability of the solution;
- their ability to demonstrate capability of successful use of the proposed solution in an operational environment at another healthcare organisation;
- Value for Money (VFM);
- their ability to mitigate key financial, delivery and support risks.

The key dates in stage 2 were:

- **28 July 2014** e the Trust received two³ responses to its EPR Invitation to Submit Initial Proposals (ISIP), which were reviewed, and clarification points raised that formed the basis of further dialogue session agendas.
- **31 October 2014** e Dialogue was closed, and two Potential Providers were Invited to Submit Final Tenders (ISFT).
- **14 November 2014** e the Trust received two Final Tenders received from Potential Providers.
- **19 December 2014** e the Board of Directors approved the award of preferred bidder status to Cerner.

ISFT EVALUATION CRITERIA	MAX SCORE	Another	CERNER
RETURN on INVESTMENT	40 <i>of which</i>		
Total Cost of Ownership	20		17.7
Benefits Case Studies	10		10.0
Benefits Proposals	10		10.0
Subtotal			37.7
TRUST FUNCTIONAL REQUIREMENTS	20 <i>of which</i>		
Functional Requirements	17.5		16.2
Technical Requirements	2.5		2.2
Subtotal			18.4
KEY CONTRACT CONTENT	22.5 <i>of which</i>		
Commercial Structure and Innovation	5		3.0
Service Levels	5		3.0
Implementation and Delivery	5		3.0
Technical	2.5		2.0
Transformation & Partnership	5		4.0
Subtotal			15.0

³ One Potential Provider withdrew from the procurement.

ISFT EVALUATION CRITERIA	MAX SCORE	Another	CERNER
DEMONSTRATIONS & REFERENCE SITES	20 <i>of which</i>		
Solution Demonstrations	10		8.0
Reference Site Visits and Conference Calls	10		8.0
Subtotal			16.0
TOTAL			87.1

Figure 3_3: Final Tender Evaluation Outcome

3.3.4 Stage Four – Contract Award

The purpose of this stage was to enable the Trust to finalise and agree the contract with Cerner, the Preferred Bidder, and gain approval of its FBC in order to award contract.

3.4 Further Options Analysis

3.4.1 Introduction

A range of further options were also analysed as follows:

1. The costs, benefits, pros and cons of a collaboration with BTHFT versus a Trust only EPR provision;
2. The costs, benefits, pros and cons of a solution hosting and managed service provided by Cerner (RHO) versus a solution hosting and management service provided by the Trust on its own premises (CHO).

These options formed the basis of variant proposals submitted by Cerner at the Final Tender stage and therefore can legitimately be taken up and contracted for.

The full economic analysis details are available on request.

3.4.2 Key Assumptions

The following table the key assumptions that underpin the options appraisal:

ASSUMPTIONS
The Economic Analysis excludes VAT, inflation & Capital Charges.
Optimism bias has been included at 2% on all costs.
Benefits are profiled based on Benefits Tracker Version 0.2 71 15.xlsx provided by Dave Lang.
Cerner charges have been apportioned 48% CHFT & 52% BTHFT.
Pay costs have been apportioned as follows: 100% CHFT funded roles; 100% BTHFT funded roles; 50% CHFT, 50% BTHFT jointly funded roles.
All implementation pay and non-pay costs have been capitalised.

ASSUMPTIONS
All existing funded role costs have been identified on the savings line 'Currently Funded Roles'.
The investment period is 01/02/2015 e 31/01/2025.
Trust pay costs are incurred over the period 01/03/2015 e 31/01/2015.
All Trust non-medical and non-contract roles are based on Agenda for Change 14/15 midpoint values plus 23%.
The only Trust non-pay costs relate to encoder software.
The Trusts will need to employ additional resources to support a Client Hosted model.
Trust pay costs for contracting with Cerner on a single Trust basis will be 60% of the total pay costs for a joint contracted solution.
The Trust will need to fund hardware refresh costs in Year 6 under a Client Hosted model.
Cerner option charges are based on both Final Tender core & variant responses.

Table 3_1 Key Assumptions

3.4.3 Options Description

The following table describes each option:

Option	Description
OPTION 1 e CHFT Joint RHO	The Trust delivering an EPR in collaboration with BTHFT. Cerner will provide a hosted solution from its data centre.
OPTION 2 e CHFT Joint CHO	The Trust delivering an EPR in collaboration with BTHFT. The Trust will provide a hosted solution from its own data centre.
OPTION 3 e CHFT Alone RHO	The Trust delivering an EPR on its own. Cerner will provide a hosted solution from its data centre.
OPTION 4 e CHFT Alone CHO	The Trust delivering an EPR on its own. Cerner will provide a hosted solution from its data centre.

3.4.4 Options Analysis

The outcome of this analysis is summarised in the table below. Please note that the analysis below excludes VAT, capital charges, depreciation and inflation.

	OPTION 1 (Joint RHO)	OPTION 2 (Joint CHO)	OPTION 3 (CHFT Alone RHO)	OPTION 4 (CHFT Alone CHO)
Capital Costs				
Revenue Costs				
Benefits				
Risks				
COSTS & RISKS NET BENEFITS				
NET PRESENT VALUE (NPV)				

Figure 3_4 Economic Options Appraisal

3.4.5 Sensitivity Analysis

A number of sensitivity scenarios were applied to the base options analysis. The results of this analysis are summarised in the table below.

	RANK			
	OPTION 1 (Joint RHO)	OPTION 2 (Joint CHO)	OPTION 3 (CHFT Alone RHO)	OPTION 4 (CHFT Alone CHO)
Baseline NPV	1	2	4	3
All Options Capital Costs Increase by 25%	1	2	4	3
All Options Capital Costs Increase by 50%	1	2	3	4
All Options Revenue Costs Increase by 10%	1	2	4	3
All Options Revenue Costs Increase by 20%	1	2	4	3
All Options Revenue Costs Decrease by 10%	1	2	4	3
All Options Revenue Costs Decrease by 20%	1	2	3	4

Table 3_2 Sensitivity Analysis

The sensitivity analysis demonstrates that Option 1 – CHFT Joint RHO is the top ranked option under each scenario.

3.4.6 Conclusions

The key conclusions from the analysis are as follows:

- The options where the Trust collaborates with BTHFT have a significantly better NPV (in excess of £5m) than where the Trust contracts for the solution alone;
- The Remote Hosted Option (RHO), whereby Cerner hosts the solution, has a very similar NPV to the Client Hosted Option (CHO), whereby the Trust hosts the solution, in spite of the fact that Cerner is providing a much wider scope of services.

The recommendation is that the Trust should proceed with its preferred option of a Cerner hosted solution and a collaboration with BTHFT.

3.5 Conclusions

The following key conclusions have been drawn from the Economic Case:

- The EPR procurement utilised a robust and highly structured approach that provided an auditable and objective process.
- The Cerner Final Tender offered the best value for money and was awarded the preferred bidder status on that basis.
- The collaboration with BTHFT in conjunction with a hosted solution provided by Cerner offers the best value for money.

4 COMMERCIAL CASE

4.1 Introduction

This section of the FBC sets out the negotiated arrangements for provision of the EPR system by Cerner.

4.2 Contracted Services

4.2.1 Core Functional Services

The core scope of the Cerner solution is to provide an EPR solution to replace and supplement current systems. These core requirements are described in the table below. Please note that the use of R and N in the final column of this table, and in the tables for other requirements, simply denote whether Cerner will be replacing (R) an existing Trust system or implementing new (N) functionality.

Requirement	Description	Type
Patient Master Index	<p>The PMI will be at the core of the Trust's patient based electronic services. The PMI will contain records for every patient who has had contact with the Trust and for whom medical records, hard copy or otherwise, should exist.</p> <p>The system will support direct lookup from PAS to the Patient Demographic Service (PDS).</p> <p>The system will include functionality to assign different types of Trust definable alerts for example: allergies, patient alerts and risk to staff, which will be visible across the system.</p>	R
Pathway Management and Tracking	<p>The system will manage patients from referral to treatment. The system will provide flexibility and allow the Trust to define waiting targets based on specialty. It will allow individual patients to be proactively managed from referral to treatment whilst providing functionality to allow bottlenecks and potential areas for service improvement to be identified.</p>	R
Outpatients	<p>The system will support both electronic and paper referrals and be fully compliant with Choose & Book. The system will provide a workflow to manage referrals and store referral letters.</p> <p>The system will provide comprehensive outpatient management functionality to cover all clinic and out-patient activities including Joint and MDT clinics. Flexible clinic set up and organisation will allow the Trust to create and update sessions easily. Functionality will include streamlined appointment booking, rescheduling and cancelling. Patients will be tracked throughout their journey and patient self-check-in provided.</p>	N
Community Activity and Caseload	<p>The system will support the management of all Community activity including contacts that takes place outside of the main hospital site. This will include activity that takes place in patient's homes, nursing and residential homes, schools, residential intermediate care centres</p>	R

Requirement	Description	Type
Management	and outpatient-based clinic management. The system will provide full caseload management functionality covering the whole community pathway and including waiting lists where relevant	
Elective Admissions List and TCI Management	The system will provide functionality to manage waiting lists for inpatient and day case treatment which will provide streamlined processes to enable patients to be added to the waiting list and where appropriate booked for admission. The system will provide streamlined functionality to allow the admission, transfer and discharge of patients in real time.	R
Admitted Patient Care and Bed Management	The system will provide comprehensive bed management functionality to allow the Trust to monitor current and prospective bed availability at a ward, hospital and Trust level. This will allow the Trust to maximise the use of beds and reduce administrative overheads.	R
Case note Tracking	The system will provide functionality to manage patients' paper records including the ability to track, request and reserve case notes. The system will allow multiple case note volumes to be created and tracked separately.	R
Coding	The system will incorporate encoding systems fully integrated with PAS and clinical functionality. All clinical coding classifications, coding systems and mappings, i.e. ICD10, OPCS 4, SNOMED (CT), Read and Clinical Terms Version 3 (CTV3) for the encoding of patient diagnostic and operation data will be available. The system will also include an integrated HRG grouper that will calculate HRGs in real time.	R
Commissioning	This system will provide support for tariffs and Payment by Results. Functionality will allow the Trust to proactively monitor and manage performance against contracts. Functionality will allow the Trust to proactively monitor and manage performance against contracts	R
Emergency Department	The system will support the real time management of the A&E Department including the use of tools such as whiteboards. The system will be configurable to meet the Trust's workflow and allow users to monitor patients throughout their visit including the ability to clearly identify their stage of treatment and waiting time information.	R
Order Communications	The system will support: patient based clinical diagnostic orders, for example, pathology and radiology; other patient based clinical orders, for example physiotherapy and cardiology; patient based non-clinical orders, for example transport and patient meals; and non-patient	R

Requirement	Description	Type
	based supply orders, e.g. ward stock, general supplies.	
e-Prescribing and Medicines Management	The system will support all types of prescribing will be supported including inpatient, outpatient and TTO prescribing, dispensing and medicines administration	N
Integrated Care Planning	The system will provide clinical process & management tools to support workflow routing, and integrated care pathway management in accordance with best practice. Patients will follow/flow along a particular care management pathway. Patient information is recorded during the course of that journey.	N
The Clinical Record, Clinical Noting and Information	The system will provide a fully integrated clinical record. Clinical noting functions will be provided for all specialties and care professionals. The system will allow the Trust to create and define data capture forms for the purpose of clinical documentation including observation and assessment. The system will also provide comprehensive clinical information functionality including support for clinical audit.	N
Clinical Decision Support	The system will provide decision support for all healthcare care professionals to ensure that risks including certain diseases and conditions are systematically identified and managed in accordance with best practice.	N
Shared Pathways and Decision Making	The system will include a clinical portal for patient access that draws its information from the full range of systems within the EPR scope and also from existing Trust systems. The system will also facilitate the sharing of pathways and decision making.	N
External Communications	The system will provide clinical, patient centric information (including letters with Clinical Coding). This will include discharge summaries and all types of clinical correspondence. The system will include the capability to communicate with patients, GPs and other referrers. This will include the capability to send communications electronically.	R
Management Information	The system will produce all mandatory and statutory reports required by the NHS including Commissioning Data Sets. It will also provide a comprehensive range of management information and operational reports operational reports to support the management of patients at the Trust. An offline analysis and near real time reporting capability across the whole of the solution will also prove the capability to integrate data from other sources. This system will also provide support for tariffs and Payment by Results.	R

Figure 4_1: Core Functional Services

4.2.2 Additional Functional Services

Whilst the previous section outlines the core functional scope of the initial purchase, the contract also enables the Trust to procure additional services from Cerner. The Trust has reserved the right to source these needs by any manner and at a time of its choosing. However, to better realise the Trust's strategic ambitions the Trust may secure optional EPR components through the EPR supplier.

These optional additions provide an opportunity to supplement, over time, the core requirements with additional systems and functionality to deliver a completely seamless system with full maximal integration.

The following is functionality that the Trust is likely to want to add to the 'core suite' over the lifetime of the contract.

Solutions	Solution Notes and Assumptions
Laboratory Information System (PathNet)	Cerner PathNet provides a fully automated, closed loop workflow that integrates the lab workflow into the patient record in the EPR, enabling the lab technicians to be informed about, and involved in patient care and decision making.
Pharmacy stock Control (PharmNet)	The Pharmacy Stock Control Solution is fully integrated with PharmNet applications that are used to automate the pharmacy workflow. The PharmNet applications automate the clinical, dispensing, and stock control functions of pharmacists, pharmacy technicians and other personnel involved in the pharmacy workflow.
Radiology Management (RadNet)	RadNet integrates the processes within a radiology department into the EPR.
Critical care (iNet)	iNet includes the acquisition, viewing, and clinician documentation of patient results specific to a critical care environment.
CareAware Vitalslink	The CareAware VitalsLink™ solution is a combination of hardware and software that enables a clinician to largely automate the process of recording vital signs at the bedside.
CareAware iBus (Device integration)	CareAware iBus is a software application intended for use in the transportation, calculation, aggregation and derivation of data between medical devices and external systems used in a clinical setting for the purpose of automating data collection and clinical information management.
Lighthouse Content	Cerner's Quality and Performance Improvement solutions Cerner's Lighthouse methodology complement existing process improvement strategies. Lighthouse solutions and services, combine tools, process maps, actionable content, reporting, training materials and clinical change management expertise.
Power Trials	Power Trials is Cerner's suite of solutions that support clinical trials. Power Trials facilitates clinical trial enrolment by unifying the patient care process with the identification of clinical research candidates.

Figure 4_2: Additional Functional Services

4.2.3 Associated Services

Under the contract Cerner will also provide a range of nonfunctional services as follows:

- Programme and project management of the implementation;
- Subject Matter Experts (SMEs)/product specialists;
- Train the Trainer (TTT);
- Uploading of data from existing Trust systems being replaced into the PAS;
- Supporting the Trust's change management and benefits realisation programme;
- System documentation (training manuals, system specifications, interface specifications etc.);
- Hosting and managed services;
- Interoperability, interfacing and integration;
- Helpdesk;
- Maintenance and support.

4.3 Approach to Risk Transfer

The purpose of this section is to outline how a generic set of risks (design, build, funding and operational) are to be apportioned between the Trust and Cerner. The governing principle is that risk is allocated to the party best able to manage it.

The following risk transfer matrix details how these risks are apportioned for this particular programme.

Risk Category	Risk Name	Risk Description	Trust	Cerner
Business risks The risk that the Trust cannot meet its business imperatives.	Reputational risk	The risk that there will be an undermining of patients'/media's perception of the Trust's ability to fulfil its business requirements – for example, adverse publicity concerning an operational problem.	100%	
Service risks The risk that the service is not fit for purpose.	Design risk	The risk that the design cannot deliver the services to the required quality standards.	50%	50%
	Build risk	The risk that the provision of services is not completed on time, to budget and to specification.		100%
	Programme intelligence risk	The risk that the quality of initial intelligence (due diligence) will impact on the likelihood of unforeseen problems occurring.	50%	50%

Risk Category	Risk Name	Risk Description	Trust	Cerner
	Procurement risk	The risk that can arise from the contractual arrangements between two parties – for example, the capabilities of the supplier when a dispute occurs.	50%	50%
	Operational risk	The risk that operating costs vary from budget and that performance standards slip or that a service cannot be provided.		100%
	Availability and performance risk	The risk that the quality of service provided is less than that required under the contract.		100%
	Demand risk	The risk that the demand for the service does not match the levels planned, projected or assumed.	50%	50%
	Volume risk	The risk that actual usage of the service varies from the levels forecast.	50%	50%
	Maintenance risk	The risk that the costs of keeping the assets in good condition vary from budget.	50%	50%
	Technology risk	The risk that changes in technology result in services being provided using sub-optimal technical solutions.		100%
	Funding risk	The risk that the availability of funding leads to delays and reductions in scope as a result of reduced monies.	100%	
	Residual value risk	The risk relating to the uncertainty of the values of physical assets at the end of the contract period.		100%
External environmental risks The risks faced by society as a whole.	Economic risk	The risk that programme outcomes are sensitive to economic influences – for example, where actual inflation differs from assumed inflation rates.	100%	
	Legislative risk	The risk that legislative change increases costs. This can be divided into secondary legislative risk (for example, changes to corporate taxes) and primary legislative risk (for example, specific changes which affect a particular programme).	100%	

Risk Category	Risk Name	Risk Description	Trust	Cerner
	Policy risk	The risk of changes in policy direction leading to unforeseen change. Again, this can either be general to all or specific to a particular programme.	100%	

Figure 4_3: Risk Apportionment

4.4 Key Cerner Contract Terms

This section summarise the key elements of the contract between Cerner and the Trust.

4.4.1 The Contract

The contract form is the Model Services Contract developed by the Crown Commercial Service and the Government Legal Service. The Model Services Contract provides a set of model terms and conditions for major services contracts (value over £10m) that are published for use by Government departments and many other public sector organisations. The Trust's legal and procurement advisors undertook some customisation of these model terms to provide greater relevance to an EPR based contract.

4.4.2 Agreed Charging Profile

The payment mechanism agreed with Cerner (excluding VAT) with respect to the proposed products and services is specified in the table below (£k):

14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	TOTAL
488	2,711	4,027	1,041	1,041	1,041	1,041	1,041	1,041	1,041	1,041	15,387

Figure 4_4: Cerner Annual Charges (£k)

Delay deductions (see section 4.4.4) and service credits (see section 4.4.6) will be applied against these charges should Cerner fail to its implementation and support obligations.

4.4.3 Contract Length

The contract will run for 10 years with optional extensions up to a further five years.

4.4.4 Implementation Acceptance

The implementation milestones that must meet are specified in the table below. Each milestone has a set of acceptance criteria associated with it.

Milestones	Milestone Description
M1	Align Stage Complete
M2	Pre-Future State Validation Event

Milestones	Milestone Description
M3	Engage Gateway
M4	Phase 1 Service Commencement
M5	Acceptance Milestone
M6	Phase 1 meds rollout complete

Figure 4_5: Acceptance Criteria

For each day of delay after 2 months following the M4 Milestone “Service Commencement Key Milestone” Cerner will be penalised 0.1% of the deployment charges.

4.4.5 Termination

After an initial minimum period of three years the Trust has the right to terminate the contract at its convenience with a minimum 12 month written notice period. However, the Trust would need to pay a termination payment of 25% of the remote hosting charges that would have been charged by Cerner to the Trust from the termination date to the end of the contract. This right is primarily designed to allow termination should there be unforeseen changes to the organisation of the Trust such as merger.

In addition to the above, the Trust has the following of rights of termination in the event of circumstances including:

- any material default which cannot be remedied;
- corruption;
- any guarantor ceases to guarantee the contract;
- the Contractor decides to withdraw their product/support;
- material breach of another agreement with that Contractor;
- Cerner fails to achieve the go-live milestone within six months solely due to the fault of Cerner;
- Cerner fails to meet the following for 6 consecutive months:
 - The Service Levels for one or more Severity 1 Service Failures; and
 - The Service Levels for two or more Severity 2 Service Failures; and
 - The Service Levels for ninety percent (90%) of Severity 3 Service Failures; and
 - The deliverables under a Performance Improvement Plan have not been met (and / or continue not to be met).

4.4.6 Service Levels & Service Credits

Service credits will apply should Cerner fail to meet any of the following service levels:

4.4.6.1 Availability

Should availability fall below 99.9% in any month (approximately 5 hours) then Trust will receive financial credits as set out in the table below.

Service Level Failure		Service Credit
Upper	Lower	%age of Remote Hosting Charges
100%	≥99.9%	0%
<99.9%	≥99.5%	2%
<99.5%	≥99%	5%
<99%	≥98.5%	10%
<98.5%	≥98%	15%
<98%	≥95%	20%
<95%	≥90%	30%
<90%		50%

Figure 4_6: Availability Service Level

4.4.6.2 Software Support Fix Time Service Levels

Cerner’s Software Support Fix Times will be monitored against the Service Levels as set out in the table below. Priority descriptions are provided within Appendix 2.

In the event that Priority 1 (Critical) or Priority 2 (High) software fixes are not responded to or resolved within the Service Levels the following shall apply:

- A maximum of two Fix Time Service Credits can be claimed in any one calendar month.
- Each Fix Time Service Credit shall have a defined unit with its value being 5% of the monthly Software Maintenance Charge.

If Priority 3 (Medium) or 4 (Low) or 5 (Question) software fixes are not responded to or resolved in the times assigned to them then these will be discussed at the next review meeting and if necessary escalated in accordance with the escalation procedure.

Level	Priority	Fix Time Resolution Service Level	Service Credits Apply
1	Critical	2 Hours	Yes
2	High	6 Hours	Yes

⁴ ‘Available’ is defined as when End Users are able to access and utilise all the functions of the Supplier System and/or the Services.

Level	Priority	Fix Time Resolution Service Level	Service Credits Apply
3	Medium	3 Working Days	No
4	Low	6 Working Days	No
5	Question	1 Working Day	No

Figure 4_7: Software Support Fix Time Service Levels

4.4.6.3 Measured Transactions

Cerner will warrant that the response times for 75% of measured transactions shall not exceed two seconds. An example of a measured transaction would be retrieval of a patient record. Should the service level fall below the target response times due to a Cerner fault/issue, then Cerner will be responsible for taking corrective action at its own cost. Furthermore, the Trust can declare the system as unavailable.

4.5 Trust – BTHFT Contract

If the Trust intends to execute contracts with both Cerner and BTHFT it is essential that both these contracts protect the Trust in the event of either Cerner or BTHFT not fulfilling their specified obligations. The key aspects of the Trust e BTHFT contract is set out below.

- The Trust enters into a contract with Cerner in respect of both its own and BTHFT's requirements;
- Any specific solution configurations required by BTHFT are incorporated in the requirements set out in the Output Based Specification;
- The Trust, BTHFT and Cerner enter into a side letter confirming that Cerner will invoice BTHFT for its share of the charges (though the Trust will remain responsible to Cerner for ensuring BTHFT makes the payments);
- The Trust and BTHFT enter into a collaboration agreement setting out:
 - the terms under which BTHFT will be entitled to use the EPR solution (including service levels);
 - BTHFT's obligation to pay Cerner its share of the charges;
 - BTHFT's obligation to meet its responsibilities in relation to the implementation and use of the EPR solution (based on the relevant responsibilities set out in the supplier contract);
 - any services provided by the Trust to BTHFT on the basis that the Trust is the signatory of the EPR Contract (e.g. contract management and administration) and any payment made by BTHFT to the Trust in respect of those services;
 - how the parties will manage the EPR Contract, anticipated to be through the use of a joint governance board, including in relation to:
 - implementation of the EPR solution;
 - reviewing the performance of the supplier under the supplier contract;
 - considering changes to the EPR solution and services provided under the supplier contract; and

- resolving any dispute between the Trusts in relation to the EPR solution;
- the circumstances in which BTHFT would be entitled to terminate its use of the EPR solution and the financial implications of doing so (based on the terms of the Cerner contract); and
- each Trust’s commitment to the collaboration in terms of resources and effort.

The table below summarises the key risks of this approach and how they can be mitigated.

Issue	Risk	Mitigation
Failure by BTHFT to comply with responsibility (e.g. during implementation), notably given difficulty of separating Trusts’ responsibilities.	The Trust is liable to Cerner for BTHFT’s failure under the Cerner agreement.	<ul style="list-style-type: none"> • Collaboration agreement requires BTHFT to comply with responsibility, so failure would put BTHFT in breach. • Governance model under collaboration agreement designed to resolve failures by Trusts to comply with their responsibilities. • Breach of responsibility mechanism in Cerner agreement requires Cerner to notify The Trust and mitigate the effects of the breach.
Failure by BTHFT to pay	The Trust is liable to Cerner for BTHFT’s failure under the Cerner agreement.	<ul style="list-style-type: none"> • Side letter between the Trusts and Cerner makes clear that BTHFT is required to pay. • Collaboration agreement requires BTHFT to pay Cerner, so failure would put BTHFT in breach.
Breach by Cerner affecting BTHFT (e.g. late delivery, breach of SLA).	The Trust is liable to BTHFT for Cerner’s breach under the collaboration agreement.	<ul style="list-style-type: none"> • The Cerner agreement requires Cerner to provide a solution to both the Trust and BTHFT so Cerner in breach of its agreement. • Governance model under collaboration agreement designed to allow Trusts to agree approach to seeking remedies from Cerner.
The Trust wishes to change the solution.	The Trust will need to obtain BTHFT’s agreement to any changes to the collaboration agreement.	<ul style="list-style-type: none"> • Collaboration agreement may not restrict the Trust from making changes to the solution. • Governance model under the collaboration agreement

Issue	Risk	Mitigation
		designed to allow the Trusts to agree any changes to the solution, where necessary. <ul style="list-style-type: none"> • The Cerner agreement does not require the Trust to obtain BTHFT’s agreement to any changes.
BTHFT wishes to change the solution	The Trust would need to make changes to the Cerner agreement.	<ul style="list-style-type: none"> • The collaboration agreement should not allow BTHFT to make changes unless this were possible under the Cerner agreement. • Governance model under the collaboration agreement designed to allow the Trusts to agree any changes to the solution, where proposed by BTHFT. • BTHFT has no right to make changes to the Cerner agreement. • The Cerner agreement enables the Trust to agree changes with Cerner through the change control procedure.
Cerner wishes to change the solution	The Trust would need to make changes to the collaboration agreement.	<ul style="list-style-type: none"> • Cerner cannot make changes to the solution unilaterally – the Trust would have to agree the changes through the change control procedure. • Governance model under the collaboration agreement designed to allow the Trusts to agree any changes to the solution, where proposed by Cerner.
Termination by BTHFT only – breach by Cerner	The Trust would need to terminate part of the Cerner agreement.	<ul style="list-style-type: none"> • BTHFT would have no right to terminate the Cerner agreement. • BTHFT should only be able to terminate the collaboration agreement for material breach or

Issue	Risk	Mitigation
		<p>insolvency in line with the Trust’s termination rights under the Cerner agreement.</p> <ul style="list-style-type: none"> • Where BTHFT is entitled to terminate the collaboration agreement, the Trust should be entitled to terminate the relevant part of the Cerner agreement.
Termination by the Trust – breach by Cerner	The Trust would need to terminate the Cerner agreement and collaboration agreement; BTHFT would have no right to continue with Cerner.	<ul style="list-style-type: none"> • The Trust is entitled to terminate the Cerner agreement for material breach and other breach reasons. • Where the Trust is entitled to terminate the Cerner agreement, it should also be entitled to terminate the collaboration agreement.
Termination by BTHFT e convenience	The Trust would need to terminate part of the Cerner agreement and pay a termination payment to Cerner.	<ul style="list-style-type: none"> • Where BTHFT is entitled to terminate the collaboration agreement, the Trust should be entitled to terminate the relevant part of the Cerner agreement. • The Trust entitled to terminate the Cerner agreement for convenience subject to paying a termination payment. • BTHFT should only be able to terminate the collaboration agreement for convenience in line with the Trust’s termination rights under the Cerner agreement.
Termination by The Trust e convenience	The Trust would need to terminate the Cerner agreement and collaboration agreement; BTHFT would have no right to continue with Cerner.	<ul style="list-style-type: none"> • The Trust is entitled to terminate the Cerner agreement for convenience subject to paying a termination payment. • Where the Trust is entitled to terminate the Cerner agreement, it should also be

Issue	Risk	Mitigation
		entitled to terminate the collaboration agreement.
Termination by Cerner – breach	The Trust would need to terminate the collaboration agreement.	<ul style="list-style-type: none"> • Where Cerner terminates the Cerner agreement, the Trust should be entitled to terminate the collaboration agreement.

Table 4_1 BTHFT Key Contract Risks & Mitigations

4.6 Conclusions

The following key conclusions have been drawn from the Commercial Case:

- The contract scope reflects that approved within the OBC;
- The Cerner total charges are less than the supplier budget approved within the OBC;
- There is appropriate risk apportionment between Cerner and the Trust;
- The Cerner contract offers significant protection for the Trust;
- There is an appropriate level of risk protection for the Trust via the collaboration agreement with BTHFT.

5 FINANCIAL CASE

This section evaluates the affordability of the investment.

The full financial analysis is available on request.

5.1 Costs

This section details the capital and revenue costs of the investment.

5.1.1 Capital Costs

The table below details the capital costs of the investment:

	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	TOTAL
PAY COSTS												
Excluding VAT												
Irrecoverable VAT												
Optimism Bias 9 Total Costs Irrecoverable VAT only												
Inflation 9 Optimism Bias 9 Total Costs Irrecoverable VAT only												
Excluding VAT												
Irrecoverable VAT												
Optimism Bias 9 Total Costs Irrecoverable VAT only												
Inflation 9 Optimism Bias 9 Total Costs Irrecoverable VAT only												
Excluding VAT												
Irrecoverable VAT												
Optimism Bias 9 Total Costs Irrecoverable VAT only												
Inflation 9 Optimism Bias 9 Total Costs Irrecoverable VAT only												
Excluding VAT												
Irrecoverable VAT												
Optimism Bias 9 Total Costs Irrecoverable VAT only												
Inflation 9 Optimism Bias 9 Total Costs Irrecoverable VAT only												

Table 511 Capital Costs

5.1.2 Revenue Costs

The table below details the revenue costs of the investment:

	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	TOTAL
PAY COSTS												
Excluding VAT	-											
Irrecoverable VAT	-											
Optimism Bias. Total Costs Irrecoverable VAT only	-											
Inflation. Optimism Bias. Total Costs Irrecoverable VAT only	-											
 												
Excluding VAT	-											
Irrecoverable VAT	-											
Optimism Bias. Total Costs Irrecoverable VAT only	-											
Inflation. Optimism Bias. Total Costs Irrecoverable VAT only	-											
 												
Excluding VAT												
Irrecoverable VAT												
Optimism Bias. Total Costs Irrecoverable VAT only												
Inflation. Optimism Bias. Total Costs Irrecoverable VAT only												
 												
Excluding VAT												
Irrecoverable VAT												
Optimism Bias. Total Costs Irrecoverable VAT only												
Inflation. Optimism Bias. Total Costs Irrecoverable VAT only												

Table 512 Revenue Costs

5.2 Savings

This section details the savings associated with the investment.

5.2.1 Displaced IT System Costs

Supplier	System	2014/15 Costs	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Total
Trust	PAS & PASWeb Licenses	135,000	F	F	56,250	135,000	135,000	135,000	135,000	135,000	135,000	135,000	33,750	1,035,000
Trust	PAS & PASWeb Support	175,000	F	F	72,917	175,000	175,000	175,000	175,000	175,000	175,000	175,000	43,750	1,341,667
Sunquest ICE	ICE (Order Comms)	69,232	F	F	28,847	69,232	69,232	69,232	69,232	69,232	69,232	69,232	17,308	530,779
Trust	Hardware		F				60,000	12,000	12,000	12,000	12,000	60,000	12,000	180,000
TOTAL		379,232	£	£	158,013	379,232	439,232	391,232	391,232	391,232	391,232	439,232	106,808	2,980,637

Table 513 Displaced IT System Costs

5.2.2 Benefits

This section describes the benefits that will be realised by the investment.

5.2.2.1 Introduction

The Outline Business Case (OBC) identified and quantified benefits at a high level. Supplier's ability to propose and deliver a range of cash and non-cash releasing benefits formed a core part of the procurement. As such, since the OBC, benefits plans have been developed and enhanced in conjunction with both clinical and operational leads and Cerner.

This Benefits Profile identifies the approach, range, type and quantum of the benefits that will be delivered by the implementation of the solution and the associated process changes (see Table 5H4 Financial Benefits Profile).

The solutions will provide significant benefits through the functionality provided by the system. Other benefits will require staff within the Trust to change the way they work in order to achieve improvements in efficiency or in the quality of the work they do, which will be enabled by access to the EPR. Although the solutions will enable many wide-ranging benefits for patients and staff, it is the staff using the systems and the new processes that they engender that will actually achieve these benefits.

It is not just the Trust that will benefit from the EPR programme, key strategic partners such as GPs will also gain from the ability to interact electronically and better share patient information

5.2.3 The Cerner Approach

Cerner has worked with the Trust to identify and estimate expected project benefits and to establish at the potential savings available, aligned to Trust strategic imperatives. These benefits will be continually reviewed, revalidated and refined throughout the project lifecycle, ensuring that the estimates are achievable while taking into account the level of benefit attributable to the solution and recognising that the technology is an integral part of a wider change programme.

As part of this refinement process Cerner will work with the Trust to review existing processes and data to establish benefit opportunities and to validate assumptions made. It is imperative to accurately baseline processes and current data to understand where there are opportunities for improvement and the potential savings that could be achieved. It is the Cerner belief that the long term vision and desired benefits should drive the solution scope, determining which workflows and areas of functionality will be automated to achieve the expected end result.

5.2.4 Benefit Quantification

5.2.4.1 Introduction

It is generally recognised that the published evidence around the benefits of an electronic patient record in the NHS is generally poor. This is a result of a number of factors including piecemeal development and deployment of electronic systems over a prolonged period of time, lack of collection of baseline data, majority of benefits relating to a US health service financial model, difficulties in separating the effects of the electronic record and system change, and consideration of evidence collection after the system is in place. Therefore, there is variable quality and quantity of evidence often focusing on specific clinic problems or areas. Length of stay is often used a metric for analysis.

It must be remembered that the EPR will affect every single patient that walks through our doors and have an impact on the safety and quality of care. Many studies look at the effect of electronic systems on individual conditions e.g. sepsis. These show improvements in length of stay. We have used these individual cases to collate an overall estimated reduction in length of stay (3.5%). However, by applying the same structured assessment and management to other conditions across the Trust and other efficiencies in practice is likely to produce greater reductions. This is evidenced in a US hospital system in 2005 (Evanston) that realised an 11% reduction in length of stay (from 3.8 to 3.4 days). In terms of the financial case we have only used the reductions where there is evidence and so expect there will be additional financial savings over and above our conservative estimate and the other associated qualitative benefits.

5.2.4.2 Approach to benefit quantification

Through the procurement process the EPR companies were requested to provide a number of benefits both cash and non-cash releasing based on their prior experience and evidence of implementing their systems in hospitals both in the UK and overseas. As previously described these were evaluated as part of the procurement process.

As part of these submissions suppliers visited the Trust and explored our current levels of activity and tailored their benefits to our organisation. They provided evidence of benefit realisation from their systems in similar sized organisations.

Alongside this we have conducted a thorough literature search to explore the evidence based in the peer reviewed published literature. This literature is supplier agnostic and followed a structured search techniques followed by review of available literature focusing on higher grades of evidence such as systematic reviews.

We then ran a series of benefit workshops with senior clinicians and management within the organisation to validate the applicability of these benefits with our organisation. Through over 12 hours of healthy discussion a consensus was reached as to the achievable direct financial benefits of the EPR. A risk adjustment was applied to each benefit taking into account the evidence and current service improvement projects. Careful consideration was placed on not double counting with other benefit cases or with current service improvement projects. It is well recognised that an EPR implementation drives and supports service change and transformation although the financial amounts directly attributable to an EPR is difficult to quantify.

A discussion was had around the confidence around this direct financial benefit and the group at the workshop stated that this was a conservative estimate and there were likely to be greater benefits available. They acknowledged that many of the benefits were in isolation and many would work together to further generate savings.

There is a range of indirect financial and quality benefits that are not included in the financial case as are difficult to quantify but are included as part of the business case as the investment in a high quality electronic patient record will enable us to drive out many more quality improvements to benefit our patients and deliver further savings over its lifetime.

This business case is part of an overall modernisation programme that has a number of tactical deployments and care was made to ensure no double counting with the financial benefits in those business cases e.g. scanned notes, maternity EPR, theatre systems. It was also recognised the organisation's baseline IT infrastructure through systems such as PASWeb.

5.2.4.3 Definitions

Direct financial benefits include:

- Cash releasing benefits H where expenditure is no longer required such as staff redundancy or savings on materials / consumables
- Income recovery / protection H where the IT system can accurately record and code all of the activity within the organisation. We are aware that commissioners have limited financial resources, and this may enable improved negotiating position for contracts. There may also be improved protection of income through ensuring not subjected to financial penalties such as CQUINs

Indirect financial benefits are not part of the financial benefits but include:

- Cost avoidance H avoiding additional for example where improved efficiency in working allow more patients to be seen by same number of staff
- Quality / service improvement H the EPR will be a catalyst for transforming the care we deliver to patients and generate improvements in patient safety, outcomes, less clinical variation, patient satisfaction, reduced mortality and morbidity. It is difficult to quantify these and to attribute to specific technology implementation and are often the result of numerous factors resulting in business change.

5.2.4.4 Direct financial benefits

- **Length of stay**

Much of the literature and the supplier case studies and initiatives focused on the improvement and cost saving by reducing length of stay. However, it is difficult to release this benefit in cash releasing terms without closing the associated beds and staffing associated with that ward.

Therefore, a number of case studies focusing on reducing length of stay or avoiding admission / readmission were collated to provide an overall reduction in number of beds. These included:

- Sepsis
- Adverse Drug Events / Missed Doses
- Pressure Ulcers
- Reduced variability of care, improved patient flow.
- Discharge before noon / improved discharge process
- Avoiding unnecessary emergency admission

Through the ongoing active monitoring of patients at home following discharge and early detection of high risk patients for readmission within 30 days the Virtual Ward team expect to reduce the number of 30day readmissions thus removing those bed days from the system however these were counted as an individual cash releasing benefit due to the payment structure around 30-day readmission. Avoiding unnecessary emergency admissions is through improved information available to clinicians at the point of contact through the internal electronic patient record (available to primary and secondary care) as well as direct access to a summary of the primary care record directly through the EPR. This will enable clinicians to make informed decision making at the patient side and has been

shown to reduce emergency admission rates. These also have financial benefits for the whole health economy by avoiding admissions.

Through clinical decision support tools that actively monitor patient observations and results altering clinicians to the deteriorating patient and improved completion of pathways / care bundles, patients with sepsis are detected early with evidence-based management initiated in a timely fashion thus reducing morbidity and mortality. This will reduce length of stay, but also have a positive impact on qualitative factors such as HSMR rates and patient experience.

Combining these produced a reduction of 9339-9989 bed days per year equating to 26-28 beds across the Trust (3.5%). Evidence from 2005 at Evanston Healthcare who were one of the first hospitals to implement a full integrated electronic medical record showed an 11% reduction in length of stay from 3.8 to 3.4 days so our estimate is conservative and likely to produce increased benefit. The 26-28 beds were translated to one ward closure (20 beds) saving £1m pa.

- **E-Prescribing**

The evidence for reduction in medication errors and missed doses with e-Prescribing and Medicines Administration is strong. The only cash releasing benefit recognised is with reduced length of stay (reduced harm from adverse drug events, improved LOS from avoidance of missed doses). Other indirect benefits include improved patient experience, releasing time to care for clinicians and nurses, reduced claims and complaints.

Through improved formulary use, reduced drug wastage and appropriate prescribing on order sets e.g. antibiotics these systems have been shown to reduce drug spend. It has been estimated that up to 5% of the drug budget in the NHS is wasted. Much work has been done to improve drug spend at CHFT and therefore a modest 1% saving has been included in discussion with pharmacy colleagues.

- **Coding**

Clear documentation, use of ordersets based on presenting complaint or condition and improved encoding software have been shown to significantly improve the tariff per finished consultant episode (11% at Barts in UK). As this is embedding within the daily practice of clinicians the quality of coding improves and the effect is sustained over time. On an estimate saving of 1% this would generate additional income of £1.38m however the group recognised the current work being performed in the PMO and therefore a risk adjustment of 50% was applied to this amount. It was also noted that there may be limited additional funding from Commissioners to pay for this, however a full clear accurate picture of our business would be beneficial in negotiation regarding contracts. Qualitative benefits of improved coding could impact positively on HSMR and SHMI.

5.2.4.5 Indirect Financial and Quality Benefits

Whilst the direct financial benefits are included in this business case it is vitally important to recognise the indirect financial benefits.

- **Improvements in patient safety**

The contribution that an electronic system with clinical decision support can make to patient safety is high. Clinical decision support aids clinicians to reduce pure mistakes as well as

those through lack of knowledge, for example the complex world of drug interactions. Importantly deficits in care can be actively monitored e.g. patient assessment completion visible live of ward whiteboard, so that action can be taken immediately to ensure that patient receives the appropriate quality care rather than auditing retrospectively when there is no chance to remedy. A study in 2009 showed hospitals with EPR with clinical decision support had fewer complications, lower mortality rates and lower costs.

- **Patient Monitoring**

With increasingly busy wards and shift pattern working of doctors the deteriorating patient can be missed. Individual observations may not be interpreted in line with previous observations due to for example a new chart or moving from A&E to ward or inexperienced staff. Blood test results may not yet have been chased and viewed or handed on and missed so the complete picture of the patient's condition overlooked. Sepsis monitoring has been described previously through the use of algorithms in the system watching for the observations and investigations of all patients to pick out the ones deteriorating. Other algorithms are available and being developed for other conditions such as Acute Kidney Injury allowing earlier detection and management which will likely improve length of stay. Other e=Prescribing alerts occur if a patient condition has change between a medication being prescribed and ready to be administered e.g. has gone into renal failure after a drug has been prescribed to change the dose appropriately

- **Efficiency in working**

By having a single source of truth about a patient with view in to the primary care record we can ensure a clinician about to see a patient has all the relevant information he / she needs to make an informed decision. For example, the current processes of clinician sees letter on desk, requests notes (which takes a few days), clinician then reviews notes (next time at desk or after weekend / holiday) and makes decision is shortened by days or weeks by having all the information at their fingertips when they first see the letter.

Nursing staff spend a significant proportion of their day completing paper work (20/40%). With an electronic system, information need only be entered once reducing the number of times the patient is asked the same information and the information completed for one section automatically fills others. There have been time and motion studies showing significantly improved time for administrative tasks for nurses releasing time to care and improving patient experience. Improving time to care is likely to help improve staff job satisfaction and therefore improve staff retention.

Many tasks for junior doctors are improved through order sets and automatic completion of information e.g. electronic discharge summaries. There is reduced need for preparation of handover sheets which is current threatening the EWTD compliance of some rotas in the Trust. There is reduced need to chase results via telephone and other mundane jobs performed by junior staff. These all release doctor time to care as well as train improving the educational experience of our junior medical staff. It has been shown that medical student and junior doctor experience helps future recruitment of doctors to an organisation. This also reduces the risk of the GMC removing training posts from an organization threatening our current junior medical workforce.

The time taken to perform audit and service improvement is significantly decreased though easy reporting through the system. Staff time investigating serious incidents is reduced with

clear records and there are fewer patient complaints and claims. The systems can also produce reports of how individuals are using the system.

5.2.4.6 Conclusion

Those in the organisation who have seen electronic patient records in action do not doubt the qualitative benefits of the system and the organizational change that it drives.

We have then used the best evidence available in the published literature, information from Cerner from their experience and reviewed these with our clinical and management leads within the Trust to establish, as best we can, the direct financial benefits as presented in the economic business case. Those present acknowledged this was likely a conservative estimate and recognise that the quality benefits were difficult to put a cash releasing financial value to and have not been included in the financial case.

Integrated Electronic Patient Record Full Business Case

Benefit / enabler	Metric	Cerner Annual	Confidence	Adjusted Value	2015 B16	2016 B 17	2017 B 18	2018 B 19	2019 B 20	2020 B 21	2021 B 22	2022 B 23	2023 B 24	2024 B 25	Total
Electronic Patient record	Reduced Admin staff	298,768	1.0	298,768	£	89,630	239,014	298,768	298,768	298,768	298,768	298,768	298,768	298,768	2,420,021
Operational Costs	Reduced Costs	540,242	1.0	540,242	£	162,073	432,194	540,242	540,242	540,242	540,242	540,242	540,242	540,242	4,375,960
Bed Management	Reduced Admin Staff x4 band 3	87,548	1.0	87,548	£	26,264	70,038	87,548	87,548	87,548	87,548	87,548	87,548	87,548	709,139
Inappropriate Ordering of Tests	Reduced Number of Tests	148,872	1.0	148,872	£	44,662	119,098	148,872	148,872	148,872	148,872	148,872	148,872	148,872	1,205,863
Reduction in Pharmacy Costs				84,404				84,404	84,404	84,404	84,404	84,404	84,404	84,404	590,828
Electronic Prescribing & Med Man	Reduced Drug Costs	200,000	0.5	100,000	£	30,000	80,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	810,000
Improved Clinical Coding	Greater Income for same Outcome	1,380,000	0.5	690,000	£	207,000	552,000	690,000	690,000	690,000	690,000	690,000	690,000	690,000	5,589,000
Litigation Costs	Reduced Costs	354,611	0.5	177,306	£	53,192	141,844	177,306	177,306	177,306	177,306	177,306	177,306	177,306	1,436,175
Falls	Reduced number of Falls	11,150	0.5	5,575	£	1,673	4,460	5,575	5,575	5,575	5,575	5,575	5,575	5,575	45,158
DNA's	Reduction in Number of DNA's	338,352	0.4	135,341	£	40,602	108,273	135,341	135,341	135,341	135,341	135,341	135,341	135,341	1,096,260
Sepsis	Reduced Number of days (LOS)														8
Adverse Drug Effects / Missed Doses	Reduced Number of days (LOS)														8
Pressure Ulcers (Grade 3/4)	Reduced Number of days (LOS)														8
Acute Kidney Injury	Reduced Number of days (LOS)														8
Order Sets / Clinical Information	Reduced Number of days (LOS)														8
Discharge Process	Reduced Number of days (LOS)														8
Unnecessary Admissions	Reduced Number of days (LOS)														8
Close 1 Ward / Generate more income	Total Reduction in Bed Days	1,000,000		1,000,000		300,000	800,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	8,100,000
	Totals	4,359,543		3,268,055	£	955,095	2,546,921	3,268,055	3,268,055	3,268,055	3,268,055	3,268,055	3,268,055	3,268,055	26,378,404

Table 5+5 Financial Benefits Profile

5.3 Return on Investment & Cash Flow

The Return on Investment and cash flow position over a ten year period are summarised in the table below.

	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	TOTAL
CAPITAL												
Trust Pay												
Trust Non Pay												
Cerner												
Total Costs												
Irrecoverable VAT												
Optimism Bias @ 2% (Total Capital Costs including Irrecoverable VAT)												
Inflation (Total Capital Costs including Irrecoverable VAT & Optimism Bias)												
TOTAL CAPITAL COSTS												
REVENUE COSTS												
Trust Pay												
Trust Non-Pay												
Cerner												
Total Costs												
Irrecoverable VAT												
Optimism Bias @ 2% (Total Revenue Costs including Irrecoverable VAT)												
Inflation (Total Revenue Costs including Irrecoverable VAT & Optimism Bias)												
TOTAL REVENUE COSTS												
CHARGES												
Depreciation												
Interest @ 3.5%												
TOTAL CAPITAL CHARGES												
SAVINGS												
Currently Funded Roles												
Displaced IT System Costs												
Cash Releasing Benefits												
TOTAL SAVINGS												
RETURN ON INVESTMENT (REVENUE COSTS NET BENEFITS)												
CUMULATIVE RETURN ON INVESTMENT												
CASH OUTFLOW												

Figure 5+1: ROI & Cash Flow

5.4 Switching Values

Sensitivity analysis has been applied to the costs and benefits to identify the point at which a project will become economically unviable i.e. returns a negative ROI, by switching the values of the cost and benefits.

5.4.1 Baseline Position

The following scenarios would turn the positive ROI to an economically unviable position (negative ROI):

- An increase in total costs of more than 8% and a reduction in cashable benefits of more than 8%;
- A reduction in cashable benefits of more than 16%;
- An increase in total costs of more than 16%.

5.4.2 Stretch Financial Benefits

The following scenarios would turn the positive ROI to an economically unviable position (negative ROI):

- An increase in total costs of more than 22% and a reduction in cashable benefits of more than 22%;
- A reduction in cashable benefits of more than 38%;
- An increase in total costs of more than 53%.

5.5 Conclusions

The programme requires a Trust specific contribution of £24.1m (capital and revenue, not including capital charges and depreciation). It is forecast that Trust will realise savings of £30.2m with a positive Return on Investment (ROI, costs net benefits surplus) of £4.2m.

Please note that a conservative approach to assessing the financial benefits that could be achieved from the implementation of an EPR has been undertaken. The financial benefits, which underpin this FBC, total £26.4m over 10 years, peaking at an annual figure of £3.3m per year. The financial benefits, agreed with Cerner during the procurement, totalled £35.9m over 10 years, peaking at an annual figure of £4.4m per year. This 'stretch' target would achieve a positive Return on Investment (costs net benefits surplus) of £13.8m.

6 MANAGEMENT CASE

The purpose of this section of the business case is to demonstrate the achievability of the programme by setting out how it will be managed to ensure the desired outcomes are delivered. This will include:

- the key challenges to the overall programme that need to be addressed in this Management case;
- the overall programme management and governance;
- the specific approaches within the implementation to manage:
- business change management and benefits realisation;
- scope change management; and
- the identification of an initial risk log and the approach to the management of those risks.

6.1 Methodology

The EPR Programme is an IT enabled change programme and will be executed accordingly. To ensure that the transformation of the Trust's clinical and administrative process deliver the benefits enumerated in the business case, the programme team will work in partnership with all of the relevant departmental and executive stakeholders in the organisation, maintaining close alignment with other Trust transformation projects.

The programme team also recognises the difficulty in achieving transformational goals and their associated benefits in the NHS. Therefore the team will incorporate lessons learned from successful change programmes across the NHS in terms of methods and processes. The team will also look at previous IT change projects at the Trust to incorporate any lessons into the EPR approach. The project and benefits will also input and contribute to the new established Project Management Office (PMO) within the Trust.

In addition, the programme team will employ best practice in business change developed more broadly across civil and commercial enterprises in order to use the most effective techniques in the execution of the transformation agenda.

The programme will use best practice methodologies for project and programme management: PRINCE 2 for project management and Managing Successful Programmes (MSP) for the overall programme. Both of these methods are sponsored by the Office of Government and Commerce. The overall aim is to deliver the agreed and contracted series of deliverables and outcomes that can be tracked against time, cost and effort for the duration of the programme.

6.2 Key Challenges

The following five key challenges have been identified that will need to be addressed during the EPR enabled transformation programme.

6.2.1 Challenge 1 – The Management of Change

There are a multitude of changes that this investment will introduce and lay at the heart of this transformation programme. The key changes are as follows:

- The cultural changes involved in moving from paper to digital record keeping;

- The process changes that are required to fully exploit the benefits of the technology.
- These changes will need to be managed to ensure the success of the programme.

6.2.2 Challenge 2 – Executive Leadership

- It is recognised that Executive commitment is required to ensure the implementation is delivered according to key performance targets (time, quality, cost) whilst the Trust continues to provide high quality services to its patients.
- This will be a significant transformation programme affecting all service areas, but also presents the greatest opportunity for change and transformation to support the Trust OBC.
- A key mitigation is Executive sponsorship via a Board appointed Senior Responsible Officer (SRO) who will provide leadership for this programme and act as the interface with the Board.

6.2.3 Challenge 3 – Clinical Engagement

- The user groups upon which the success of the programme will be most dependent are medical and nursing staff. It is imperative that these groups are proactively engaged throughout the implementation. CCIOs have been recruited and will have responsibility for managing business change within clinical areas.

6.2.4 Challenge 4 – Capacity & Capability

- The implementation of an EPR will be a major undertaking for the Trust with significant resource implications. There is the opportunity for The Health Informatics Service (THIS) to deliver a significant proportion of this additional resource but the split of this responsibility between the Trust and THIS will need to be agreed. Whilst additional specialist resources will be employed, there will be a dependence on a range of existing Trust and THIS personnel. For example, the Trust IM&T support is provided by THIS. It is expected that THIS will continue to support the ‘business as usual’ operation of IM&T through the programme. It is imperative that the impact to core Trust services is not affected by this undertaking. The full engagement of operational management will be critical to the successful management of this challenge.

The partnership with BTHFT will provide opportunity to achieve economies of scale in relation to resources and will enable flexing of staffing to meet peaks and troughs in demand. This pooling of resources provides the opportunity to more effectively share skills and experience and has the potential to be a more attractive employment opportunity.

6.2.5 Challenge 5 – Training

- Ensuring that all staff has an appropriate level of training to ensure they can confidently use the system is critical to the success of the Programme. The main criteria for ensuring a successful training programme are as follows:
 - High quality training staff with the relevant experience;
 - Recognises the specific training needs of individuals;
 - Is flexible to meet operational demands and staff working patterns;
 - Trust staff commitment to training and therefore high attendance;
 - Management commitment to release staff for training

6.3 Governance

This section describes the approach to management of the programme and its associated governance structure.

6.3.1 Implementation Assumptions

The contract with the supplier will have a joint (single) implementation plan for the Trust and BTHFT. This will mean that there will be a need for a single strategy and management structure for delivering the plan. In most cases this will be delivered by a joint generic resource, however, some areas will need resources specific to the organisation, examples are:

- Data Migration;
- Integration;
- Some SMEs where there are existing systems as they may be specific to the Trust;
- 80% of the system will come pre-configured from previous NHS deployments and will be the same for both organisations;
- Wherever possible the other 20% of the system will be configured the same for both organisations.

There will not be enough resources locally to support the implementation, so the teams will be a blend of internal and external resources

There will be some new roles associated with the EPR, e.g. system manager, which will be required post implementation. It would make sense to employ these permanently, if possible out of the existing workforce. There will be other roles such as testers that may be full time during the implementation, and that there will be a residual requirement after go-live, although at a much-reduced level that will need to be included in existing / new roles relating to the EPR.

New functionality will be added to the core product over the lifetime of the contract, but this will not necessarily be the same functionality for both Trusts. For example, one Trust may decide to take the suppliers RIS/PACs whilst the other organisation may wish to continue with its existing system or procure from another source.

It will not be acceptable for one organisation to not meet its obligations or resources as agreed in the implementation plan.

6.3.2 Governance Consequences

Both Trusts will need to take responsibility for delivering their organisations obligations to meet milestones. However, this will be delivered via a joint governance structure with each organisation clearly understanding and agreeing to its commitments

The Trusts will need to decide who will employ any permanent staff taken on to support the EPR and similarly who / how any contracts will be let for additional temporary resources. One suggestion is to set up an agency specifically for this purpose.

The Trusts have a huge amount of synergy between the two Full Business Cases to ensure the programme is going to have the confidence of both organisations to be able to deliver the clinical and non-clinical benefits associated with the programme.

The programme will need a robust governance structure in place in order for successful delivery. This governance structure must reflect the partnership working principles of the programme and must not favour one organisation over the other.

6.3.3 Proposed Governance Structure

The proposed governance structure is detailed below.

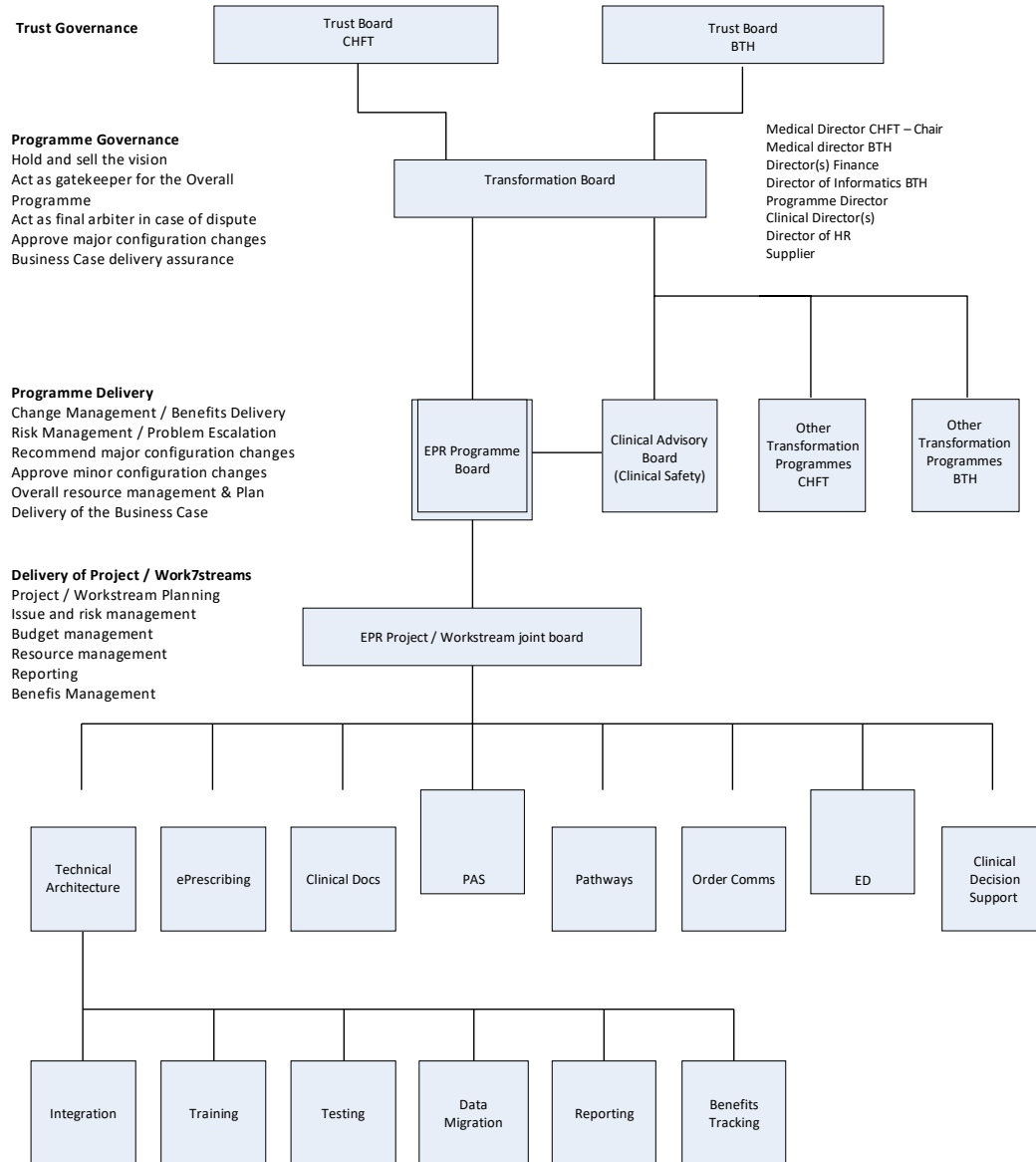


Figure 6V1 Proposed Governance Structure

6.3.4 Business as Usual Assumptions

The two Trusts will continue to share joint resources after go-live. The scope of these joint support arrangements is listed below:

- A shared training team for on-going training will be established.
- There will be a single mechanism for managing the service delivery and the associated contract e.g. support, contract monitoring, performance monitoring, out of hours, etc.
- Some configuration changes will affect both organisations.
- Informatics Enabled Transformation will continue into the foreseeable future.
- It will be a different structure governance that is required to manage Business as Usual from the one set up to manage the implementation, in fact there may have to be parallel running of the two structures for a short period of time.
- There will need to be a process for agreeing upgrades, testing them and releasing them into the live environment.
- There will need strong continuing clinical input into the programme both to ensure continued clinical safety and resolve any IG issues that arise.
- New Programme / Project structures will be put in place to manage any further developments.

6.3.5 Programme Board

The Programme Board will provide governance and leadership for the programme. The Board will include representation from senior users and clinicians, senior business owners and senior technical owners and the CCG.

The Programme Board is responsible for ensuring that the outcomes of the programme achieve the desired benefits. The Programme Board will authorise, review and actively manage programme risks, issues, opportunities, plans and interfaces into the relevant Trust service departments. The Programme Board will authorise or cancel work as required to control the programme and continuously review the business case. The Programme Board will be jointly chaired by the Directors of Information from CHFT and BTHFT and includes executive management and Cerner representatives. The Programme Board will be accountable to the Transformation Board which will be ultimately responsible to the Trust Board(s).

6.3.5.1 Project Teams

An EPR Project Team will be established that reports to the Programme Board and will be responsible for the day-to-day activities of the individual projects. The projects will identify a series of workstreams within which work packages will be developed to generate the tracked deliverables comprising the stages of the project. Each stage will be reviewed and signed off by the programme Board before commencement of the next stage. The Project Teams will be chaired by the respective Programme Managers and will include management representation from suppliers.

The Project Teams will review and authorise changes arising from project issues and 'requests for change' arising from project groups via aligned change boards representing the users, owners and suppliers. Changes to the scope of the Programme will be referred to the Programme Board for approval.

6.3.5.2 The Clinical Advisory Group

The Clinical Advisory Group (CAG), chaired by the Medical Informatics Leads will provide overall clinical direction and approval for the clinical aspects of the programme. The day to day clinical direction for the programme will be provided by a Clinical Design Team with responsibility for ensuring that the clinical processes and workflows produced by the programme are compliant with NHS regulations and best medical practice. The Clinical Design Team will also be responsible for arbitration between departments where workflows or processes cross departmental boundaries, and for driving to a decision as to how these will be implemented.

6.4 High Level Implementation Plan

A high level implementation plan for the programme is shown below.

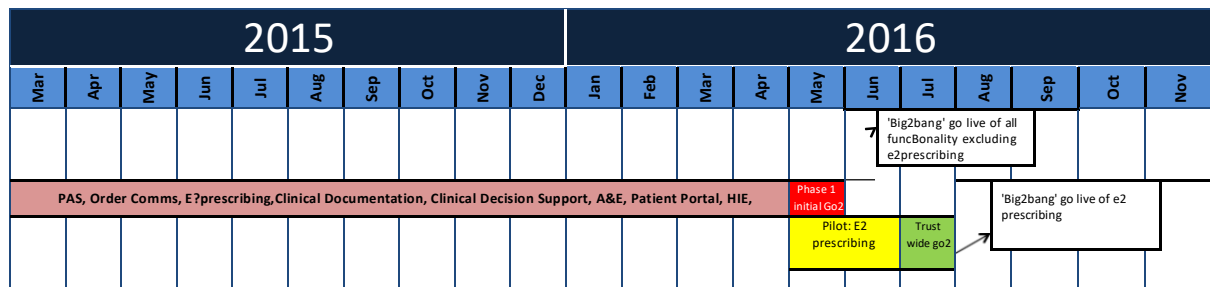


Figure 6V2 High Level Implementation Plan

6.4.1 Cerner Deployment Methodology

There will be four key stages during the Deployment Phase:

1. Align
2. Engage
3. Activate
4. Measure

6.4.1.1 Align

This stage incorporates the project startup and current state review activities. During this Stage Cerner will work with the Trust to develop a high level strategic roadmap, refine and document a detailed scope, confirm the Trust’s understanding of the benefits, assess readiness and define strategies to address work stream requirements. Throughout the Align stage Cerner will work collaboratively with the Trust to understand the current state of the organisation in terms of people, process and technology to understand current workflow’s, people’s behaviours and surrounding technology and to plan for the implementation. There are two key events, which take place during the Align Stage, which are the Project Kickoff and the Align Event. Project Kickoff is an event that is led by Trust senior leadership with support from Cerner to promote awareness for the project, articulate the key benefits and engage with the wider project team and stakeholder community. The Align Event is led by Cerner to present the findings of the Current State Review and the Draft Transition Plan. The Align stage concludes on the achievement of the Align Gateway.

6.4.1.2 Engage

This stage incorporates all of the design, build and testing work for the configuration of the Cerner solution. Throughout the Engage Stage regular checks are completed to ensure the design and build

supports the planned benefit targets. Testing will commence during this stage with Unit testing, System Testing and Integration Testing. The Engage Stage concludes on the achievement of the Engage Gateway.

6.4.1.3 Activate

The Cerner Support Service shall be available to the Trust directly following Service Commencement and shall be used for the logging and management of incidents from that point in time.

6.4.1.4 Measure

During this Stage Cerner will support the Trust following the Service Commencement Milestone period and work with the Trust to complete a joint Post Conversion Assessment. Benefits will be measured and monitored by the Trust during this Stage and compliance against agreed workflows assessed and documented.

6.5 Transformation Strategy

The transformation approach will use industry best practice and lessons learned from other NHS change programmes. The core elements of this approach can broadly be explained by the following points:

- **Creating a compelling story:** Change and reasons for change need to be explained to the organisation in a way that makes sense to them and ideally incorporates staff into the process of story creation.
- **Role Modelling:** Senior management and thought leaders within the organisation must be seen to actively support the change and model it in their behaviour.
- **Reinforcing mechanisms:** Incentives for change must motivate proper behaviour, disincentives must discourage unhelpful behaviour.
- **Capability Building:** The organisation must grow its organic capability in order to implement the changes that are asked of them. This can include learning new skills to as part of the change programme but also learning skills in how to implement change and becoming part of a change culture.
- **Measuring Change:** Continual measurement and feedback will be integral to the EPR transformation programme
- **Governance:** Robust governance arrangements that are tightly integrated into the overall transformation initiatives within the Trust.

To ensure a successful transformation programme that will release the benefits identified there are a number of critical success factors that have been identified that need to be in place:

- Senior clinical engagement embracing change in process and practice
- Dedicated SMEs resource with clear understanding of as is process (both clinical & administrative), benefits & reporting requirements
- Clear communication strategy
- Engagement at all levels in the organisation
- Notification of input required
- Integrated clinical and technical teams
- Supplier knowledge and solution access

- Planning and preparation
- Identifying quick wins

The Trust's leadership teams acknowledge these critical success factors.

6.5.1 Change Management Structure

Maximising the realisation of benefits from the implementation of an EPR is dependent on the successful management of change. It is essential that the programme is clinically led and billed as an opportunity for service modernisation in which IM&T is a critical enabler, rather than an IM&T programme. In other words, the Trust must integrate people, process and technology changes to maximise the potential benefits from the implementation of IM&T solutions.

6.5.2 Approach

Change Management is often the biggest risk to successfully exploiting a new IT system. There is usually resistance to change and a temptation to use the system like the old one, rather than utilise the newer features to support process improvement. This can lead to loss of efficiency rather than productivity gain. Therefore, a systematic approach to planning, initiating, controlling and effecting change processes is essential. It is foreseen that a number of clinicians will join the programme team in order to achieve clinically led change.

The Trust's clear and tested approach to change management will incorporate the activities of strategic alignment, stakeholder engagement, process redesign and benefits management in a straightforward and pragmatic approach. The Trust will utilise internal area experts (Subject Matter Experts – SMEs) and supplier involvement to deliver the change management function. The existing LEAN work being run very successfully in the Trust forms a strong basis for the additional change management work. Work will continue to be underpinned by a LEAN methodology to avoid duplication and eliminate waste.

A critical factor in the maximisation of benefit from clinical solutions will be to drive towards universal adoption with the following goals:

- All tests, all referrals, all discharge summaries and clinical correspondence and all notes will need to be available within EPR
- Once electronic prescribing is available all drug administration will need to be undertaken through the use of the EPR
- All patient contact administrative processes will need to be reflected within the EPR
- The location of a patient will be recorded in real-time with accurate information on the clinician responsible for the patient's care also being maintained accurately at all times.

It is envisaged that as the EPR is introduced these requirements will be managed within a new policy framework enforcing the use of the new processes and standard operating procedures.

The following key strands of work and will be closely linked to the Benefits Realisation Structure:

- **Stakeholder engagement** / ensuring comprehensive stakeholder engagement is maintained throughout the programme.
- **Culture** – a strategy and delivery plan to ensure that the culture change that needs to be addressed is enabled to allow the organisation to effect the work practice changes.

- **Process** – a methodology, toolset and delivery plan to document existing business processes, identify and prioritise benefits and agree and document new business processes that will deliver the change in working practice.
- **Communications** – delivery of a comprehensive communications strategy and delivery plan to ensure an effective mechanism for communication is enabled both to and from stakeholders.

6.5.3 Benefits Realisation Structure

Any IT system, no matter how well implemented, will not deliver significant benefits unless the organisation makes the necessary changes to processes to deliver benefits. The Trust will adopt a benefits management approach. This approach will include the following key requirements:

- the desired benefits must be clearly identified agreed set within a clear organizational goal;
- the means by which the realisation of each benefit will be demonstrated needs to be defined in advance;
- each benefit should be assigned a benefit owner with responsibility for ensuring that realisation of the benefit actually occurs;
- there will be a clear action plan to achieve each benefit;
- stakeholders need to be encouraged to identify barriers to change and develop plans to overcome these barriers;
- benefits need to be measured and tracked so that any necessary corrective action can be taken;
- post implementation reviews need to include a review of benefits realisation, so that action to obtain unrealised benefits can be taken.

A Benefits Register will be initiated at the start of the programme and further developed throughout the early stages, with detailed work on analysing 'asis' and 'to be' processes across the organisation. A Benefits Realisation Plan will be developed during the implementation phase to identify how benefits will be delivered. As part of the development of the Benefits Realisation Plan, benefits will be reviewed to:

- assess the ability of the organisation to achieve the benefit (i.e. ranging from easy to difficult depending on the factors influencing the benefit);
- identify the level of action and change required.

As previously described there is a lack of quality evidence of EPR. We intend to use this opportunity to ensure data is collected pre and post go live to publish literature pertaining to the qualitative and quantitative benefits of an EPR in the current NHS. This will be supported through research posts we are currently in discussion with the deaneries and raise the profile for the Trust and Cerner.

Dis/benefits

Not all outcomes will be positive and there will often be some dis-benefits (negative benefits) from the programme. Dis-benefits will be identified, measured and tracked in the same way as benefits. For example, introduction of new processes may involve additional time spent on administration for one area of the workforce. It is important that this is measured to determine whether the dis-benefits are outweighed by benefits achieved in other areas as a result of the change.

6.6 Communications Management Strategy

A Communications Strategy and Plan will be developed for this programme which will describe the communications context, approach, objectives, core messages, communication methods, timing, critical success factors, communication mechanisms and action plans throughout the programme lifecycle.

The strategy will align with the Trust communications and narrative and will be revised and updated as the programme progresses and, for each phase, will define in detail how stakeholders at all levels will be kept informed of programme activities.

6.7 Training

The Trust recognises that effective training is central to the successful implementation of new systems and processes. In support of the quality assurance of training processes, the IT training team is accredited in the delivery of training through the Training Accreditation Programme (TAP). The Trust acknowledges that the implementation of the preferred option will have far reaching consequences for Trust processes and training provision.

It is envisaged that training will be delivered to the Trust training team who will then work with the Change Team to incorporate new working practices into the design of the training that will be delivered to end users. An estimate of 4 FTEs over the first two years of the programme has been made based on the experience of other similar organisations.

It is anticipated that 'system awareness' sessions will be provided to all staff groups prior to their official training sessions in order that they have an overview of the system.

A training plan will be developed in consultation with the supplier. The Training Plan will identify the recommended configuration of training and associated training days, the resources required for delivery of the training (including the number of trainers; number, location and capacity of rooms; and infrastructure and equipment requirements).

The training plan must ensure Trust staff have a level of basic IT competency and specific system skills to allow them to use the new system successfully. The training plan will outline the training methodologies to be used such as classroom training, drop in sessions and eLearning. The training team will develop learning materials 0 detailed user guides specific to staff roles, quick reference documents and eLearning packages. All locally defined processes as agreed with the change management team will be included in the learning materials and training sessions. The Change team will develop a Standard Operating Procedures document as agreed with the Programme Team and this will be regularly updated.

The training plan must also take account of the difficulties and cost of obtaining backfill staff in busy areas when training clinical staff and the lack of opportunities to practice skills in the working environment. These costs are included in the business case and it is important that there is senior leadership to ensure staff are released to receive training.

As well as scheduled courses there will be targeted training where a significant need is identified for a particular group of staff or for using a specific part of a system.

The Trust believes that the use of super users can be a major factor in the success of a programme. Super users will be identified early in the development of the training programme and used to smooth the implementation and provide support to staff both during and after go-live and to

support ongoing configuration of the solution over the life of the investment. A detailed Go Live plan will be created outlining the support to be provided by the IT Trainers, Change Managers and Super Users to support staff through the transition period.

6.8 Interdependencies

This programme has the following interdependencies:

- The Trust's transformation and change programmes;
- The Trust IM&T strategy.

6.9 Risk Management Strategy

This section considers arrangements for the on-going management of risk. This includes a structured approach to identifying, assessing and controlling risks that emerge through the course of the programme lifecycle, as set out below:

Measurement 0 Risks identified previously during the options evaluation phase will need to be reviewed to assess any issues that may cause problems. High impact, high probability risks will clearly need most attention.

Minimisation – Actions will need to be taken to ensure that risks are reduced.

Mentioning Programme managers will explain to the Programme Board the process used to identify and analyse risks and then the major risks should be outlined, together with the likelihood of their occurrence and the consequence if they do.

Monitoring – Programme and Project risks should be monitored and managed to make it less likely that they will happen and to minimise the impact if they do. A Risk Register will be created which lists risks in priority order. For each risk, the register might include:

- risk number and description;
- consequence if risk happens;
- probability (high, medium or low);
- planned actions to mitigate the risk;
- contingency plan (what to do if the risk happens);
- risk owner (a member of the programme team);
- status (e.g. closed: no longer a risk).

Modifying V At the end of each programme stage, there should be a review. Risks identified at the outset will be assessed to determine whether they were managed successfully, and what should happen next time with the benefit of hindsight.

A full risk allocation matrix is provided below including:

- the probability of the risk occurring (likelihood);
- the impact if it were to occur;
- mitigation actions;
- an assessment of the possibility of transferring the risk to the supplier (taking into account which party is best placed to manage the risk).

Risk Area	Risks Classification (H/M/L)	Trust Management & Mitigation
Implementation risks		
Implementation cost overrun	M	This risk has been partly transferred to the preferred supplier; however the supplier will have dependencies on the Trust in fulfilment of their obligations.
Implementation timescale overrun	M	This risk has been partly transferred to the preferred supplier; however the supplier will have dependencies on the Trust in fulfilment of their obligations.
Inadequate skills to implement	M	The Trust will complement its existing skills with specialist contract resources.
Trust operational/clinical staff not released from operational duties	H	The Trust will need to implement backfill arrangements for staff that are involved in programme delivery, either as core members of the project or need to be trained in programme solutions.
Operational risks		
Benefits not fully realised	M	The Trust has developed a robust benefits realisation methodology and approach.
Disaster/system failure	M	Technical failure has been transferred to the preferred supplier. The Trust will retain the risk of business continuity.
Resistance or lack of user acceptance	H	The Trust has developed a robust benefits realisation methodology and approach.
Security or confidentiality breaches	M	The programme will improve the Trust's management of security or confidentiality breaches.
High cost to customise/change reqs.	M	The cost of specific customisation and changes will be higher with an external provider, but overall the amount of change will be reduced. A robust change control process has been designed by the Trust.

Table 6V1 Risk Apportionment

An initial risk log will be setup in line with the Risk Strategy.

6.10 Standards

6.10.1 Information Governance

The Trust Information Governance (IG) Strategy is consistent with the legal requirements and guidance issued by the NHS and the Office of the Information Commissioner. It encompasses the NHS Confidentiality Code of Conduct, NHS Records Management Code of Practice, Common law on confidentiality and the Information Governance Toolkit.

There is an Information Governance Manager who is member of the e-Health programme. Their role within the Trust is dealing with Freedom of Information requests, Data Protection (including data sharing across all health care), patient access to medical records and IT security. The IG Manager works closely with the Trust's Caldicott Guardian, SIRO and other senior managers. The Trust is monitored against the IG toolkit criteria and aims for year on year improvement. The Governance chain supporting this process is reviewed regularly at information Governance Steering Group, chaired by the Director of Resources and the minutes are then discussed by the Corporate Risk Committee and Scrutiny Committee.

The Trust has various high-level sharing protocols in place. These include protocols for sharing information across the county, incorporating all acute, primary care and ambulance services. Other protocols with other agencies are developed as required.

The programme and the chosen solutions must support the Trust in its aim to ensure that personal information is dealt with legally, securely, efficiently and effectively in order to deliver the best possible care. The Information Governance Manager and the Trust Caldicott Guardian will be involved throughout the programme to ensure Information Governance obligations are met.

The programme solutions will be required to meet a baseline for Information Governance Compliance and NHS Standard Contract Clauses for Information Governance & Freedom of Information.

6.10.2 Clinical Safety

The programme must support the Trust in its objective to deliver high quality and safe patient care. The chosen solution must comply with DSCN 14/2009 (Application of patient safety risk management to the manufacture of health software) as mandated by the NHS Information Standards Board. Risk assessment and sign off by the Trust Clinical Safety Officer will be required prior to go-live as per HSCIC directives.

Clinical safety will be a cornerstone of the programme and integral to its success from design, through implementation and delivery. The Trust recognises that clinical safety assurance is a distinct and separate process from usability assurance. Whilst the chosen solution will enable improvements in clinical safety, these benefits can only be achieved if clinicians and other users receive appropriate education and training.

6.11 Arrangements for Post Implementation Review

The outline arrangements for post implementation review and programme evaluation review will be established in accordance with best practice. These reviews ascertain the degree of success from the programme, and in particular the extent to which it:

- met its objectives;

- delivered planned levels of benefit;
- avoided or dealt with risks; and
- addressed the specific requirements as originally defined.

The review will also examine the efficacy of all elements of the working business solution to see if further improvements can be made to optimise the benefit delivered.

Issues will be incrementally captured during the programme to ensure lessons learned can shape best practice and result in greater long term programme success.

7 APPENDICES

Appendix 1. HIMSS Europe EMR Adoption Model

Healthcare Information and Management Systems Society Europe Electronic Medical Record Adoption Model.

European EMR Adoption Model SM	
Stage	Cumulative Capabilities
Stage 7	Complete EMR; CCD transactions to share data; Data warehousing feeding outcomes reports, quality assurance, and business intelligence; Data continuity with ED, ambulatory, OP.
Stage 6	Physician documentation interaction with full CDSS (structured templates related to clinical protocols trigger variance & compliance alerts) and Closed loop medication administration.
Stage 5	Full complement of PACS displaces all film-based images.
Stage 4	CPOE in at least one clinical service area and/or for medication (i.e. e-Prescribing); may have Clinical Decision Support based on clinical protocols.
Stage 3	Nursing/clinical documentation (flow sheets); may have Clinical Decision Support for error checking during order entry and/or PACS available outside Radiology.
Stage 2	Clinical Data Repository (CDR) / Electronic Patient Record; may have Controlled Medical Vocabulary, Clinical Decision Support (CDS) for rudimentary conflict checking, Document Imaging and health information exchange (HIE) capability.
Stage 1	Ancillaries – Lab, Radiology, Pharmacy – All installed OR processing LIS, RIS, PHIS data output online from external service providers.
Stage 0	All Three Ancillaries (LIS, RIS, PHIS) Not installed OR Not processing Lab, Radiology, Pharmacy data output online from external service providers.

Appendix 2. Service Levels and Service Incident Descriptions

The Severity Level descriptions for Service Incidents are described below in terms of their impact, together with some non-exhaustive examples of typical incidents which meet those criteria. Severity Level 1 is the highest (i.e. most serious) and Severity Level 4 the lowest (i.e. least serious).

Priority	Description	Examples
Severity Level 1	<ol style="list-style-type: none"> 1. An incident which, in the reasonable opinion of the Authority is an incident that is Business Critical relating to business outcome, including but not limited to, full loss of service or functionality to the Authority, regulatory or legal issue or impact on major project, affecting all End Users within a department. 2. An outage. Complete operational impairment of the Production Domain. Major impact on system Availability. Majority (greater than 50%) of concurrent End Users, across all locations are unable, to process transactions or access data critical to their ability to conduct daily business. The Authority's downtime procedures have been implemented and End Users have turned to agreed (paper) contingency procedures. AND No immediate bypass or alternative is available. 3. A major patient care or major safety conditions exist. 4. Loss of all Contractor provided functionality – the inability to access all components of the live production service (total loss of service) for all users. 	<ul style="list-style-type: none"> • Complete Millennium system is down End Users can log into Citrix but will not allow the End Users to log into applications • The Millennium application is causing all End Users on the Production Domain to experience a slow response, systems freezing for various departments and have resorted to paper as application is deemed unusable • Invocation of Disaster Recovery to fail over site due to a failure in the Millennium application • Order results are posting and displaying incorrectly for more than one patient • End Users are unable to access the Service due to a network loss within the Contractor's data centre • Complete loss of all printing

Priority	Description	Examples
<p>Severity Level 2</p>	<ul style="list-style-type: none"> • Loss of a critical production service component with the inability to access components of the service (total loss of component for one or more locations). Issue prevents clinicians being able to make clinical decisions. • A Significant percentage (>10% and <50%) of concurrent End Users are unable to process transactions or access data critical to their ability to conduct daily business. <p>AND</p> <p>No immediate bypass or alternative is available.</p> <ul style="list-style-type: none"> • Partial outage. A component of the Production Domain that is required to complete a critical workflow is non-functional for the majority of users who use that component. <p>AND</p> <p>No immediate bypass or alternative is available.</p> <ul style="list-style-type: none"> • A major financial impact. • Issue causes impact to the provision of patient care. • System performance degradation in the Production Domain that severely impacts or is likely to severely impact the End User’s ability to input data. 	<ul style="list-style-type: none"> • FirstNet crashing when End Users are attempting to register new patients • End Users cannot access PM Office • Millennium is slow or hanging and End Users in more than one department are unable to process transactions/ conversations in reasonable timescales • End Users unable to admit or discharge any patients in a single department and have reverted to paper records
<p>Severity Level 3</p>	<ul style="list-style-type: none"> • A component, minor application or procedure is down, unusable or difficult to 	<ul style="list-style-type: none"> • Proactive monitoring identified PDS advance trace failures. Local searches are still available.

Priority	Description	Examples
	<p>use. There is a moderate operational impact but no immediate financial impact or impact to patient care. One or more Authority locations are impacted.</p> <ul style="list-style-type: none"> System performance issues that limit End Users ability to input data. End User generated issue that has impacted upon patient or financial workflows. <p>1. Non-Production Domain(s) is unavailable.</p>	<ul style="list-style-type: none"> Issues with clinical record generation/printing, for example one of the following: <ul style="list-style-type: none"> Problem with printing from Medical Records Publishing on Powerchart Some correspondence letters are not printing Intermittent issues with viewing/updating patient information, for example one of the following: <ul style="list-style-type: none"> Unable to schedule an appointment Unable to view test results Unable to use worklists <p>End Users are unable to access Non-Production Domain(s)</p>
Severity Level 4	<ul style="list-style-type: none"> A component, procedure or personal application (not critical to the Authority) is unusable. Minimal impact to business. Single incident failure. Deferred maintenance is acceptable. Issues related to non-implemented functionality. 	<ul style="list-style-type: none"> Contractor applications have been hanging intermittently, affecting a few End Users in PM Office, Powerchart, Schappt book 0 when End Users try to complete an action, the system hangs and End Users have to log out and log back in Printing issues a single printer is not queuing prints or printing, or a single End User is unable to print clinical documents Patient phone numbers not printing on CAS cards Duplicated appointment template appearing Not all Conversations that are carried out on Millennium are generating an HL7 message Daily CDS extracts failed to complete
<p>The above Severity Levels shall also be applied where the Contractor ascertains, through proactive monitoring, that any of the above events are likely to occur.</p>		

Appendix 3. Financial Analysis Assumptions

The costs are built on the following key assumptions:

ASSUMPTIONS
The Financial Analysis includes irreclaimable VAT only (on Cerner Software and Trust contract roles) in the Return On Investment (RoI) calculation. All other VAT is assumed to be reclaimable.
All costs and benefits have been uplifted at the following rates: Pay 1.5% in 15/16 and 2.6% per year thereafter Non Pay 2.2% (third party costs & Cerner)
All capital is depreciated over 9 years.
Optimism bias has been included at 2% on all costs.
Benefits are profiled based on Benefits Tracker Version 0.2 701015.xlsx provided by Dave Lang.
Cerner charges have been apportioned 48% CHFT & 52% BTHFT.
Pay costs have been apportioned as follows: O 100% CHFT funded roles; O 100% BTHFT funded roles; O 50% CHFT, 50% BTHFT jointly funded roles.
All implementation pay and non-pay costs have been capitalised.
All existing funded role costs have been identified on the savings line 'Currently Funded Roles'.
The investment period is 01/02/2015 O 31/01/2025.
Trust pay costs are incurred over the period 01/03/2015 O 31/01/2015.
All Trust non-medical and non-contract roles are based on Agenda for Change 14/15 midpoint values plus 23%.
The only Trust non-pay costs relate to encoder software.
It is assumed that BTHFT Cerner charges for a Client Hosted model are 108% of the CHFT charges (the same proportion as Cerner proposed in their ISIP Financial Offer).
The Trust will incur additional risk costs in a Client Hosted model.

Table 7V1 Key Assumptions