The Dudley Group NHS
NHS Foundation Trust

Trust Headquarters
Russells Hall Hospital
Dudley
West Midlands
DY1 2HQ

FREEDOM OF INFORMATION ACT 2000 - Ref: FOI/011116

With reference to your FOI request that was received on 17/04/2012 in connection with ' Trust's IT Strategy and IT budget.'

Your request for information has now been considered and the information requested is enclosed.

Further information about your rights is also available from the Information Commissioner at:

Information Commissioner
Wycliffe House
Water Lane
Wilmslow
Cheshire SK9 5AF
Tel: 0303 123 1113
Fax: 01625 524510
www.ico.gov.uk

Yours sincerely

Information Governance Manager
Room 34a, First Floor, Esk House, Russells Hall Hospital, Dudley, DY1 2HQ
Email: FOI@dgh.nhs.uk

The Dudley Group NHS
NHS Foundation Trust

Please find the responses to your request in turn below:

The Trust's current IT/Healthcare Informatics Strategy (120) -
Please see attached file.

The Trust's spending on IT/Healthcare Informatics as a percentage of the Trust's total budget for the last 10 years -
The Trust has contracted with Siemens Healthcare (via Summit Healthcare) for the provision of IT Services. The total value is estimated at £3.6m pa. This contract is included within the Trusts Private Finance Initiative (PFI) Project Agreement (PA). The full range of services is paid for by means of a single Unitary Payment and Tariff Adjuster Mechanism which does not identify specific costs /contractual details. The current IT Services Contract runs till March 2020. The contract covers an IT Managed Service based upon an Output Based Specification included in the overall PFI Agreement. Trust turnover is approx. £280m so % of spend on IT is approx. 1.3%.

HealthSystems

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FOUNDATION TRUST

Informatics Strategic Review
Dudley Group of Hospitals

Final v1.0

Date: December 2010

HealthSystems

Contents

1. EXECUTIVE SUMMARY

HealthSystems were commissioned in the Spring of 2010 to conduct a strategic review of IT to support the Trust for the next 5 years. The review included examination of the existing systems, the contract to supply them and the support and infrastructure provided.

The Trust contracted with its Private Finance prime contractor for 15 years to supply applications infrastructure and support for what was known then as a Level 3 Electronic Patient Record system. That has not been fully delivered to date and there are omissions in functionality from what was recognised as a level three solution.

The contractual arrangements and software require to be refreshed. The Trust is launching a major programme of process changes as part of its Cost Improvement Programme and the strategic context for systems has been changed significantly by recent policy consultation papers emanating from the Department of Health. All of this leads us to recommend that the Trust has a single enterprise wide application that covers all areas of functionality. We argue the case for this on the basis of the need to change processes and the need to be able to reflect those changes in the IT systems. Applications of this type can make significant contributions to enabling first class, safe and economic patient care.

We propose therefore that the Trust should:

- Appoint a head of informatics with accountability and responsibility for all informatics across the organisation
- With Summit Healthcare conduct a Solution Review and include a number of recognised market leading products in order to gain a view of the suitability of the Oasis patient administration system and Soarian applications going forward. This exercise will also provide an opportunity to re-engage the Trust staff in the commitment to implement a system;
- That the existing contract arrangements are re-configured so that configuration and support skills are available in house so as to enable changes to be made to the system going forward;
- That the infrastructure supporting the application be brought up to date and industry strength.

We believe that the changes will take between 18 months and 2 years to achieve but will place the Trust at the forefront of providers using IT systems to enable the delivery of first class, safe and economic care and provide improvements in patients experience of using the services.

Group Managing Director, HealthSystems

2. INTRODUCTION

The Dudley Group of Hospitals has commissioned this high level strategic review to identify the options for the Trust in moving forward with informatics provision over the next 3 to 5 years.

The objectives of this review are as follows:

- To review the current state with regard to provision of informatics in the Trust.
- To assess whether the current state is fit for purpose in supporting both the current operational needs of the Trust and the short, medium and longer term strategic objectives and identify any shortfall.
- Develop an options appraisal that enables the Trust to take the necessary decisions in moving forward with an informatics strategy.

> ***'Good clinical and service performance management information will only flow from an information strategy that is focused on delivering the information required to support best care to individual patients and best practice from individual professionals on a day to day basis'[1].***

APPROACH

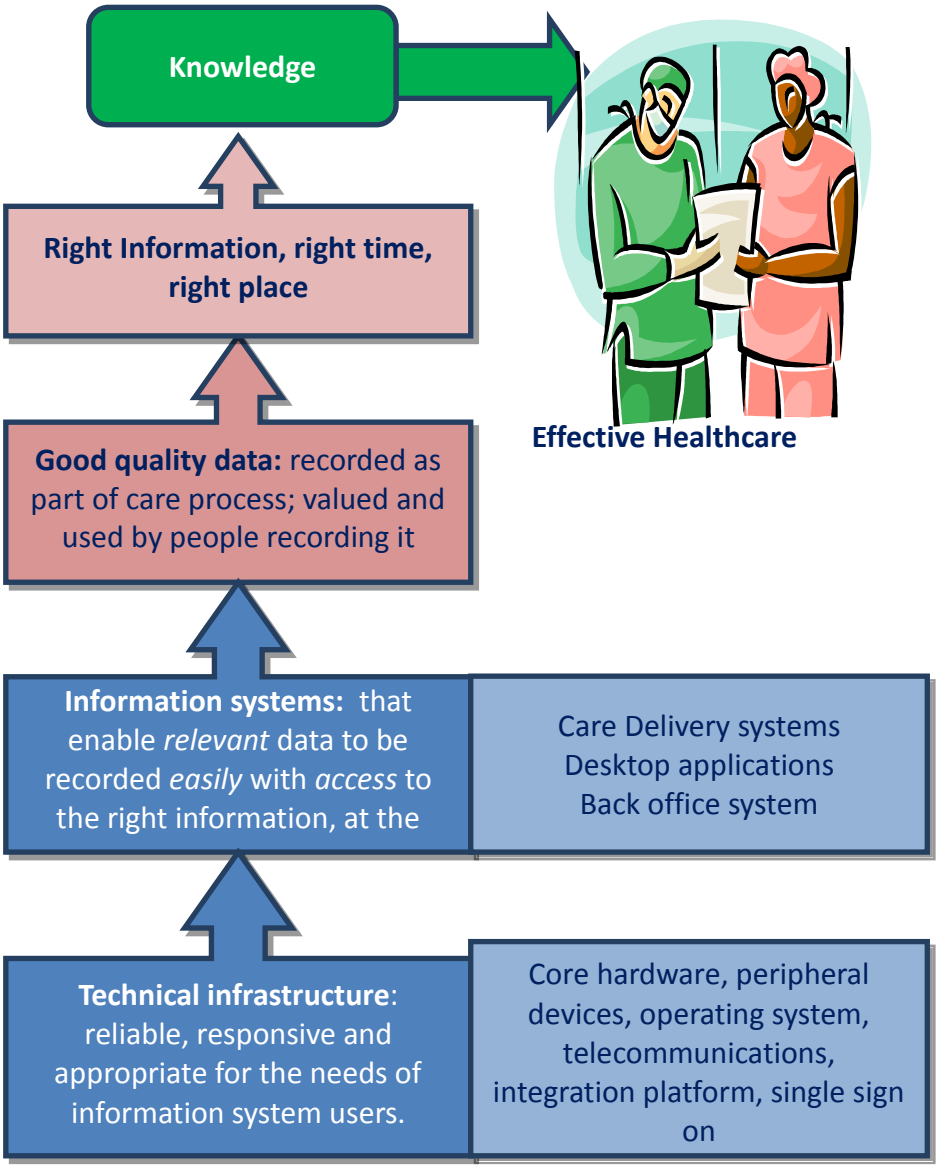
The core business processes within the Trust are concerned with the delivery of patient care so this review is primarily concerned with patient-related information systems, services and the supporting technical infrastructure.

The strategic review has been conducted as follows:

- a series of structured interviews with key individuals within the Trust, (a list of contributors is provided in Appendix 1);
- a review of previous strategy documents relating to informatics including the PwC IT strategy and the IT strategy produced by the IT department.
- a review of the Trust's strategic objectives, particularly those relating to the Transformation Programme (Year 1);
- analysis of the high level care process with emphasis on the key opportunities that have been identified as part of the Transformation Programme;
- a gap analysis that compares current system provision with the functions that are required to support the core processes within the Trust; and
- consideration of the options that are available to the Trust and how these fit with the organization's strategic objectives.

Principles Applied

Effective healthcare is dependent on two primary factors: the commitment of the care professionals that deliver care and the knowledge they require to provide the most effective and best quality care. Knowledge comes from being informed about the patient and the patient's condition. The diagram below illustrates the importance of information, the building blocks that support an effective informatics structure and the principles that apply in ensuring the right information is provided at the right time to enable effective care.



The term informatics has been used within this report to describe the combined information management and information technology services. Information management and information technology are wholly interdependent but comprise different, but equally important skill sets.

To be effective the different elements within informatics have to work together, particularly at a strategic level, to a common set of objectives. There are significant opportunities for failure in considering informatics provision within an NHS organisation and the Trust must ensure that risk is properly managed and those opportunities to use technology are identified and correctly implemented. Technical failure could have significant impact on business continuity, security and patient confidentiality which will be compromised if appropriate standards and policies are not applied and maintained.

The primary role of informatics is to ensure that the right information is provided at the right time, in the right place to support the delivery of care. The information systems and the technical infrastructure must therefore be fit for purpose, designed and operated to achieve this objective and in so doing reduce the clinical and corporate risk exposure for the Trust

If this primary objective is achieved along with the necessary commitment to managing the associated change, the organization will have good quality, relevant data to use for the secondary purposes of monitoring performance, finance, research and service planning.
These are simple principles that are well understood but must be kept at the forefront of considerations about the strategic direction of information systems and the supporting infrastructure. Based on these principles and the need to optimize business processes across the organization this review has used three critical success factors in considering the way forward for informatics in the Trust:

- **Informatics leadership:** clear, unambiguous, strategic leadership for information management and technology that is closely aligned to the Trust's strategic objectives and is able to make an effective contribution at the right level in the organization.

- **Information Systems and technical infrastructure:** Systems, technologies and services that are fit or purpose and are designed to support the delivery of care across the organization with the capability to respond to changing business requirements.
- **Benefits Realization:** A clear understanding that technology is only an enabler of change; benefits are achieved through changing processes supported by appropriate technology and services. This requires significant commitment from the top of the organization, effective clinical leadership and stakeholder engagement and responsive informatics services.

3. STRATEGIC CONTEXT

The strategic context for this review has changed significantly during the course of its preparation. There is a new Government with a significant reform agenda, the main principle of which is the removal of health purchasing decisions from Strategic Health Authorities and Primary Care Teams and placing them with practice-based commissioning hubs. The publication of the "Information Revolution" consultation paper clearly identifies expectations for the development of informatics, whilst consulting on the mechanisms for achieving these. The consultation outlines some key principles:

- Patients and service users to be in clear control of their care;
- Patients and service users to be active participants in their care;
- Patient or service user consultation and good clinical & professional practice;
- Meeting the needs of individuals and local communities;
- Range of organisations being able to offer service information to a variety of audiences:
- Connect & join up systems;
- Openness, transparency & comparability.

It will be clear that, in addition to supporting improved clinical and operational performance, there will need to be an intensified focus on outward-facing information to enable purchasing decisions by GPs and choices being made by patients.

Whilst previous national initiatives have resulted in a range of 'consumer-focused' information being placed into the public domain, these tend to be disparate and disconnected. There is an opportunity to review the strategic purpose and 'look and feel' of the Trust's website and the provision of access to information by GPs in terms of order communications and discharge letters etc. The continued and further development of a market economy of providers means that there is a clear role for information in providing competitive advantage for the Trust in its own local health economy.

Additionally the integration of the Primary Care Trust (PCT) provider services, including the IT services, is now a reality and an active plan is being conducted between Trust and PCT IT teams.

The role of information has changed from one of being reactive to requests within the NHS for provision of data to one of the information function having a clear proactive role in supporting the strategic direction and values of the Trust: coming up with ways that technology can be used to reduce cost, increase efficiency and improve the quality of the patient's experience. Additionally the impact of the use of modern technology to interact with staff and for staff to interact with the Trust can be a key enabler of change.

If a Trust, as is the case with Dudley Group of Hospitals, is embarking on transformational change in the way that it operates then information, technology, both applications and devices, have a key role to play in enabling the transformation.

Direction has been given by the Year 1 Strategic Objectives which have been developed as part of the Trust's Transformation Programme. Whilst it is recognised that this is currently in draft, it provides the strategic objectives and the direction of travel for the organization that is a pre-requisite for the informatics strategy.

There are 6 main themes that define the strategic priorities for the next year based on the QIPP framework as part of implementing the Next Stage Review:

- Quality;
- Innovation;
- Productivity;
- Prevention;
- Staff Engagement;
- Patient Experience.

The Trust has placed the emphasis very clearly on improving quality as opposed to growth 'making great care and great value our business'.

The recent audit for the Clinical Negligence Scheme (CNST) has resulted in a £1.4 million increase in the insurance premium, making this a key priority to address. The Trust aims to achieve excellence ratings across the NHSLA (NHS Litigation Authority), CQC (Care Quality Commission) and CNST standards.

The emphasis on quality is against a background of having to achieve a saving of between £8 and £10 million, which requires significant emphasis on improving efficiency and effectiveness. The key opportunities that the Trust has identified for the next year relate to reducing bed days and out-patient sessions.

These cost-saving opportunities have been assessed as:

- £6 million saving in reducing pre-operative length of stay;
- £3 million saving in reducing out-patient cancellations; and
- £1 million saving for avoidable OP follow-ups and DNAs.

The Trust should consider the presentation of progress on these objectives in the public domain. There is an opportunity to explain how the changes benefit patients, the local community and the local economy. The Trust will be able to demonstrate that increased efficiency leads to improved care.
It would be prudent for the Trust to take a lead within the local healthcare community in defining the information to be provided to support benchmarking and contribute to any national activity to define any new comparison data.

The Trust will also have the challenge, as well as the opportunity, of incorporating the Transforming Community Services (TCS) agenda into its strategic planning with adult community services coming under the control of the Trust and the possibility of some or all of children's services.
The transformation programme has focussed on the following areas:

- Applying innovation by rolling out best practice in clinical care including application of enhanced recovery techniques and alternative means of anaesthesia.
- Improving productivity, the following areas are key areas of focus:
  - All directorates are focused on looking at improving process and skill mix using a Lean pathway for out-patients; Productive Theatres and Productive Ward initiatives.
  - Diagnostics requires some restructuring to consolidate blood sciences and establish a single, multi-skilled unit that will deal with 80% to 85% of activity supported by a smaller specialist team. Electronic requesting has a key role to play in streamlining diagnostic processes and reducing administration and unnecessary testing.
  - Patient level costing requires improved stock management and tracking of patients, drug stock management and high cost items specifically. Out-patients – phone system, bookings, all have problems.
  - Transforming Community Services is a significant challenge particularly given the lack of informatics support in community.

There will be a need to rationalise systems across acute and community services.

- The efficiencies that can be achieved from digitising documents are also seen as an area that can deliver benefits both for clinical and non-clinical documents.

Strategic Options

STRATEGIC OPPORTUNITY	FUNCTIONALITY
Better management of facilities & resources	Enterprise resource scheduling. Bed management (real time ADT)
Improved management and use of medications	e-Prescribing
Improved information to manage performance, planning, patient safety	Single patient activity database
Community services	Mobile computing

Information and communication systems and technologies have a key role to play in supporting the organization in achieving its strategic objectives and it is unlikely that the Trust will achieve the required savings if information systems are not seen as a key enabler in delivery of the Transformation Programme. Given the current state of core systems within the Trust the key challenge for informatics will be in balancing the short term needs with a longer term strategy that will reap the required benefits for the Trust in efficiency and effectiveness.

4. HIGH LEVEL BUSINESS PROCESSES

As outlined above, effective information provision, whether this is for the primary purpose of delivering care or for a secondary purpose, starts with good data quality. This can only be achieved if data collection is as closely aligned to the core business processes as possible and the people collecting the data see value in the data they collect and/or in the information derived from it.

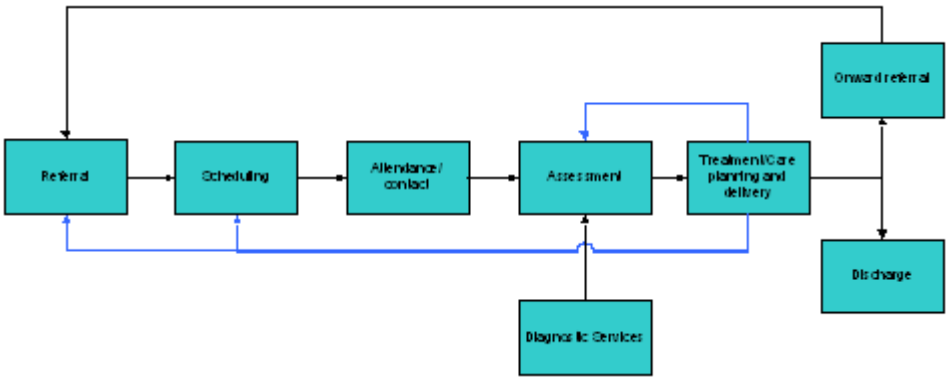
To be effective therefore, information systems must be deployed to support the delivery of clinical care, at the point of care. Moreover there should be a capability to support the continuity of care across organizations as it is often the handoffs between services and care settings that present the greatest bottlenecks in the care process. This is particularly true in acute care given the

pressures associated with managing demand and optimizing throughput, which is given significant emphasis in the Transformation Programme.

There is also a clear opportunity for the Trust as a result of Transforming Community Services to extend the reach of information systems to the adult community care setting that may enable mutual benefits to be realized across acute and community care settings.

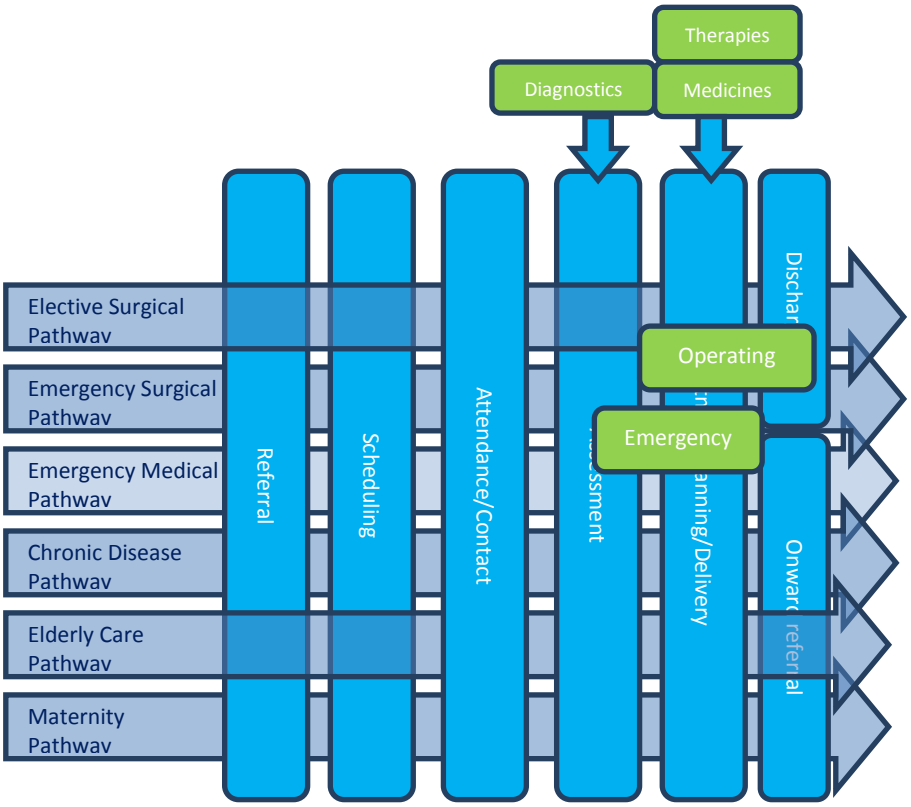
In order to identify how systems can best support patient care the processes involved need to be understood. The diagram below shows the key processes concerned with the delivery of care within an acute care organization, but equally apply across care settings as well.

The systems that support these processes need to be patient/client centric and must enable these core processes to be optimized across the whole organization in order to support the continuity of care across primary, acute, community and social care settings where appropriate. The recent announcement that acute hospitals will be penalised for re-admission within 30 days of a discharge emphasises an on-going responsibility post discharge. The case for 'outward-facing' information systems is growing.



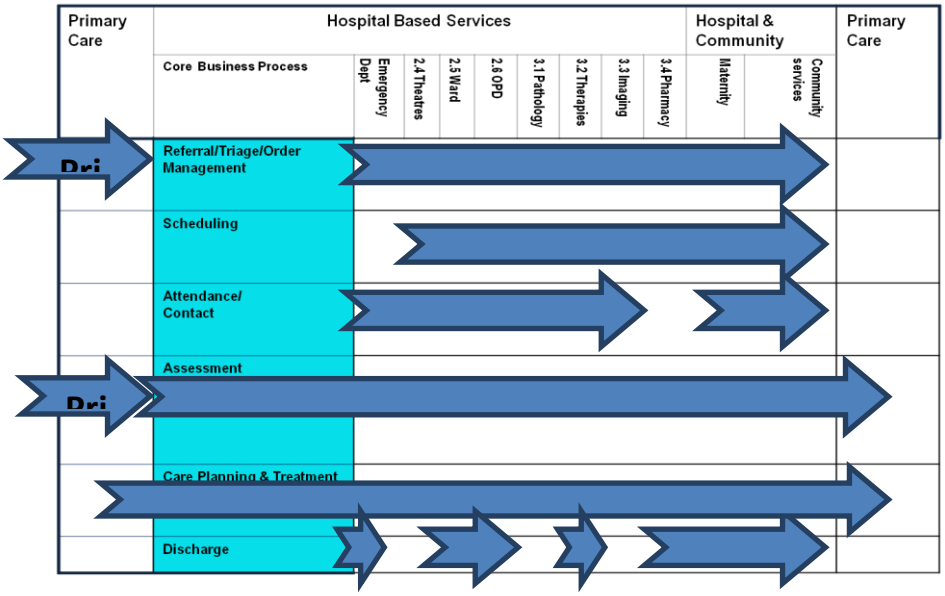
There will clearly be variation in how these processes are applied for different clinical pathways and for different settings or services; an assessment conducted in the emergency department will be different from a multi-disciplinary assessment for an elderly care patient but there will be significant commonality in the basic process, particularly for processes such as scheduling. The diagram below illustrates how the core vertical business processes align with the clinical pathways and some of the clinical services and clinical support services.
If patients and service users are to 'in clear control' of their care, and 'active participants', then there will be benefit in ensuring that pathways are understandable, in some format, by patients and service users. Considering

this when reviewing pathways may help align processes and services to the desired outcomes.

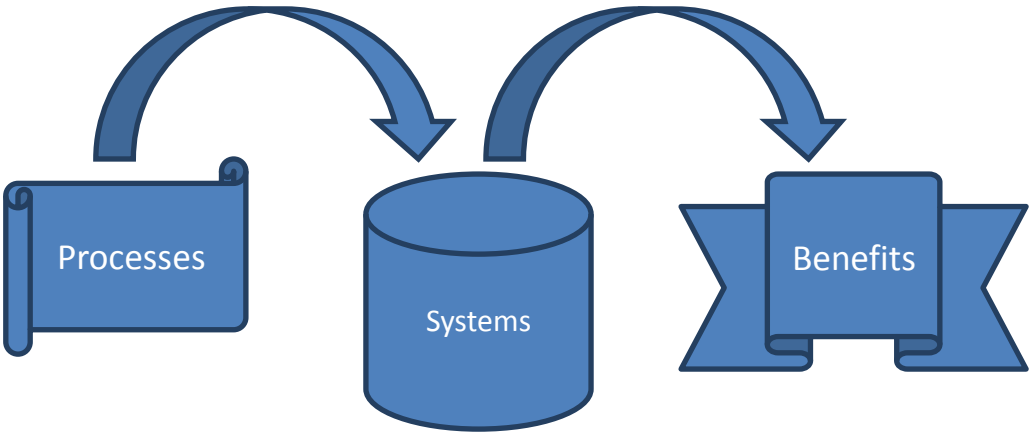


In the past, departmental based patient systems have allowed a fragmented approach to develop that is department-centric not patient-centric. Scheduling, for example, is conducted in different ways for out-patients, imaging, therapy services, which makes it difficult to schedule multiple events for a patient, to schedule events across a pathway of care or to align resources such as equipment, people and facilities related to a scheduled event. Departmental systems reinforce existing practices within departments, reducing the opportunities for optimizing patient-centric care across the organization, which would improve efficiency and productivity. Clearly, there may be a valid need for some departmental systems, where the processes involved deviate from corporate standards or where a corporate solution does not adequately support specific needs, but the principle of corporate-wide functionality, where possible, needs to be maintained.

The diagram below is a simple illustration of how these core processes relate to the departments or services within an organization, (using the clinical service references adopted by the Transformation Programme), and how system functionality needs to be aligned with the whole process of care working across departments.



In order to harness the benefits from process work being conducted as part of the transformation programme it is necessary for the new processes to be part of the configuration of the IT systems that support the ways of working as illustrated below.



The enabling bridge is to translate process into configuration

The assessment that has been conducted as part of this review is based on the effectiveness of current systems in supporting these core processes across departments and services as well as the specific departmental needs, which clearly still exist, as well as the handoffs between different care settings.

5. CURRENT STATE

In order to get an understanding of the current state of informatics provision within the Trust, a number of individuals were interviewed across the Trust. The interviews focused on informatics to support clinical services and clinical support services. There is clearly a need to consider the information support to other functions, such as Human Resources and Finance, as informatics planning develops within the Trust.

Summit Healthcare and Siemens were not involved in these discussions, which link IM&T strategy to organisational priorities. Clearly, these organisations will contribute to discussions on how to deliver the strategic objectives.

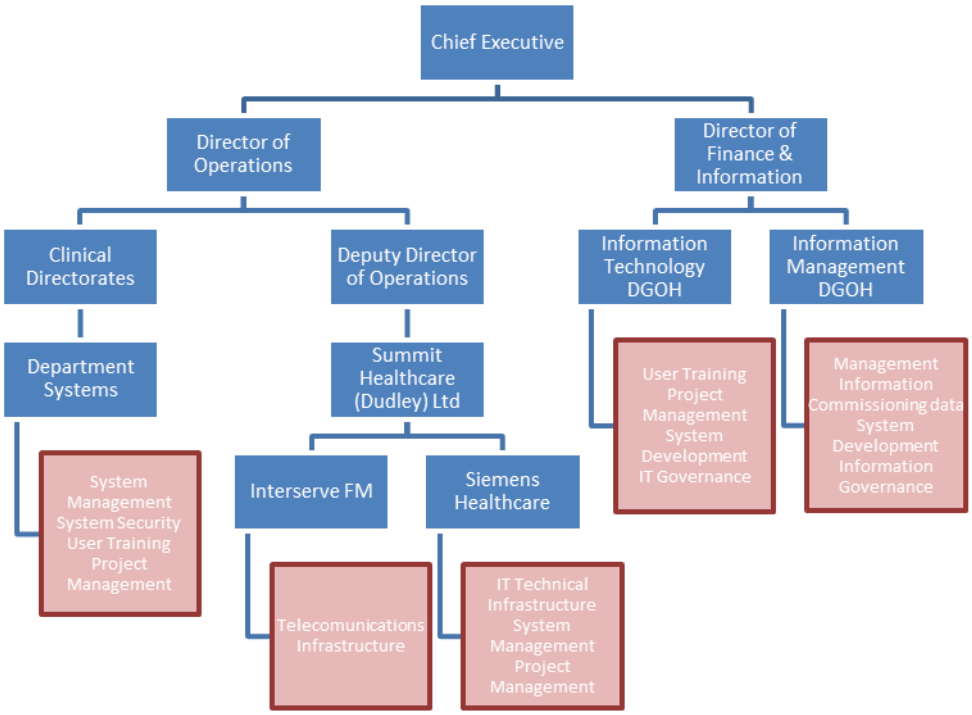
The critical success factors that have been identified above were applied in structuring the information gathering process:

- Is there strong strategic leadership for information management and technology that is closely aligned to the strategic objectives of the Trust and is able to translate the strategic and operational requirements of the organization into appropriate informatics solutions?
- Are the current systems, technologies and services fit for purpose and effective in supporting core business processes across the organization?
- Are the system and services suppliers capable of delivering to the Trust's operational and strategic IM&T requirements?

The following is a summary of the findings from this high level assessment.

INFORMATICS SERVICES STRUCTURE

The high level representation of the reporting lines and the core services provided are shown below. Currently, there are multiple reporting lines for the totality of informatics services within the Trust.



- Siemens manage the core technical infrastructure including the main hardware, operating systems, peripheral hardware (desktops etc.), system interfacing, network and the core information systems. This is provided through the PFI contract with Summit Healthcare subcontracted to Siemens Healthcare. Siemens also provide the project management for systems implementation and upgrades working with the corresponding project management support within IT.

- "Information Technology DGOH" serves three main functions:

    - Managing the contract with Siemens to ensure they are delivering to the Trust's requirements.
    - Providing the Trust's project management support for core system implementation such as Oasis and Soarian.
    - Managing the Trust's intranet, The Hub.

- "Information Management DGOH" is responsible for providing management information derived from the core information systems, including the information required to support payment by results and other commissioning related data. In addition they have a small development team that develops bespoke systems for specific data collection requirements.

- ”Departmental Systems” includes a number of clinical services including Radiology, Pharmacy and Pathology who provide a mixture of system management, project management and system training services independently from IT.

The management of non-patient related systems is provided in a number of ways, some of which are within the Siemens and IT remit whereas others are not.

It is very clear from the views expressed within the Trust that the fragmented approach to informatics within the Trust is having a profound effect on the ability to deliver an effective, strategically focussed informatics service that works to corporate objectives and corporate standards.

The Transformation Programme has identified that the multiplicity of systems and lack of a coherent strategy for informatics will constrain the ability to achieve productivity targets.
Anecdotal information suggests that system management, particularly that which sits outside of the core team’s responsibility, are not applying proper standards or policy in relation to system security which exposes the Trust to risk in terms of system failure and security. What is clear is that the Trust does not currently have a mechanism for determining whether policies and standards are being adhered to for all systems in use.

There is evidence that decision making relating to informatics is severely compromised, as a result of the structure that exists at the moment.
There are two key factors to consider:

- lack of proactive support from Siemens;
- lack of overall accountability, ownership and direction at a senior level for informatics
    - This can result in decision-making being taken at an inappropriate level or decisions not being taken at all.
    - This situation will hamper the establishment and maintenance of a single strategic direction.

The consequences of these factors can be seen in

- The multiplicity of systems with localised management arrangements;
- Resource-intensive local ‘work-arounds’ that actually duplicate data collected elsewhere in the organisation;
- A disconnection between accountability for the quality of information systems within the Trust and the responsibility and authority to manage that quality;
- Over-commitment of information services staff.

The observations made in the PWC IT strategy are still relevant, although this needs to be extended to cover the full informatics service not just IT:

- Too few experienced resources, (this relates to headcount, not the experience of those staff in place), particularly where these resources do not report to a central informatics function.
- The morale of the current in-house teams has been impacted negatively by the lack of strategic direction in the past and multiple/ conflicting demands on time and direction. This frustration is compounded by the inadequate responses to Trust requirements by the Trust's IT services supplier.

The Trust needs to establish a clear and robust framework for Programme and Project management of informatics and informatics-supported activity.

- Programmes and projects need to be explicitly linked into strategic objectives at the appropriate level.
- Responsible Officers need to have the authority to allocate resources as required, within an agreed budget, including business change and process redesign.
- Project resource requirements need to be established, agreed, and provided.
- Benefits realisation needs to be managed, often across multiple departments.

In the absence of such a framework, projects will be undertaken with insufficient resources and will, consequently, probably be delivered late and fail to deliver significant improvement to the organisation as a whole. Projects that require low levels of investment will, typically, displace larger-scale projects that would deliver more benefit. The outcome is a series of low-scale, reactive projects that deliver localised improvements, maybe to the detriment of the organisation as a whole.
There is evidence of this situation having been in place within the Trust. There is evidence of the 'patchy' implementation of some key elements of functionality, allowing potentially redundant processes to be retained and no obvious benefit realization in real terms. An observation from one interviewee summarises this:

> ***'All implementations have been painful, all of which haven't enhanced user experience'.***

Despite the very best efforts of the internal services, there is a very evident lack of confidence in the way informatics services support the Trust's business activities generally which has led to a gradual move towards departments

demanding their own solutions. Unless addressed, this will result in further fragmentation of informatics services, increasing both the risk and cost for the Trust with limited qualitative or quantitative benefit.

PATIENT INFORMATION SYSTEMS

There are a number of key observations that can be made in assessing whether the current systems, technologies and services are fit for purpose and effective in supporting core business processes across the organization:

- The developing capabilities that exist, or are planned, by the suppliers of the Trust's existing core systems are not visible to the Trust. There may be potential to extend the use of existing core systems to better support the Trust in responding to changing demands. This requires direct dialogue with the system suppliers to review their developments and identify if these can be used to optimize processes. This is precluded through the contractual relationship with Summit/Siemens as they make the decisions on what is presented to the Trust but are too remote from the business objectives and interests of the Trust to do this effectively and are potentially compromised by commercial interest.

- Given the multiple reporting lines for informatics related issues, there is no one individual within the Trust who has a comprehensive view of the systems in use and how they can be best utilized to respond to changing requirements. Coupled with the lack of visibility of developing capabilities of some of the core systems, decisions are made at the wrong level in the organization which in turn encourages the proliferation of work around solutions, use of sub-optimal functionality or increasing demands for departmental solutions.

- The technical infrastructure does not adequately support the effective use of the core systems. Slow network connections and unreliable wireless connectivity reduce efficiency and in some cases result in systems not being used at all. Ward-only wireless is patchy, too slow and is out of date. There has been little or no consultation with the Trust on what the clinical requirements are in defining the wireless requirements. There is also no automatic reset of computers if they drop off the network and have to be moved.

- Although IT has responsibility for system security this cannot be properly managed given the multiplicity of systems and reporting lines.

- There is a very clear distinction that has been made between the two core patient systems Oasis and Soarian. Oasis is seen as an administrative system and Soarian as a clinical system. This distinction prevents opportunities to identify how the combined functionality of Oasis and Soarian can best be deployed to support the whole clinical process. This is further complicated by the apparent lack of support from Siemens in

identifying optimal solutions from existing systems in response to changing demands.

- The development of work around solutions that exist across the organisation where core systems have failed to meet the Trust's requirements, have produced numerous examples of duplicate data entry, additional resources being required to support these work arounds and a distrust of the management information that is derived from the data collected on the Trust's multiple systems.

- There is a very evident lack of confidence in the core systems that are deployed within the Trust. However, there is recognition that there is potential to make better use of the systems and there are examples of success in the way systems are used.

- There is recognition that multiple information systems limit the achievement of innovative developments that rely on corporate wide application.

- The transfer of adult community services to the Trust under the TCS developments will further add to an already fragmented informatics provision within the Trust and will inhibit the opportunities to improve both the quality and cost of services that span care settings.

The following table provides a list of the main patient related information systems that support some of the Trust's core business processes identifying whether the system is hosted and managed by Siemens or internally. The Trust department indicates the department within the Trust that has primary responsibility for the system including project management, user training etc.

System / Technology	Function	Service Provider	Trust Dept	Comments/Observations
Soarian Clinicals	• The Trust's primary Electronic Patient Record (EPR) system, • Only certain functions have been deployed within the Trust including ○ results reporting for Pathology and Radiology and ○ order entry for Radiology, Cardiology and Lung function but not Pathology - this is dependent on the next upgrade to Soarian (C6). ○ Other functions include order entry and clinical notes but for limited services and ○ infection control alerting.	Siemens	IT Dept	• Adequate at providing results view although can be slow to access, particularly in logging onto the system as there is no single sign-on currently. • There is a plan to feed all results into Soarian including Cardiology, ECG and lung function. • There is currently no 'inbox' facility for results, therefore the user has to go into the patient record to view results. Functionality exists to provide an inbox facility but has not been deployed as yet. • Soarian has administrative functionality but this is not UK-compliant which means the Oasis Patient Administration Systems has to be used in conjunction with Soarian to record event based data. • Soarian has ePrescribing functionality but Siemens appear unwilling to introduce a UK compliant version. • System configuration changes require the Trust to define the required change and issue a

System / Technology	Function	Service Provider	Trust Dept	Comments/Observations
				Change Control Notice (CCN). Siemens then issue a specification for approval. It can take up to 6 months to get even relatively minor changes completed. • Soarian has workflow functionality that includes support for discharge planning, SMS text messaging and ability to trigger bleep notification. This is currently only being used for infection control alerts. • The clinical notes functionality is being used by some services but this tends to be in response to a request as opposed to a strategic rollout. Dieticians are creating letters in MS Word and then cut and paste this into a clinical note. The paper copy goes to the patient and the electronic version is retained within Soarian. • CCU have piloted clinical assessment and observations functionality but this was discontinued. • Discharge letters are supported, based on data derived from what has been entered into the systems. Users can select the data they want to appear in the letter. ePrescribing functionality

System / Technology	Function	Service Provider	Trust Dept	Comments/Observations
				which is not UK compliant within Soarian would be required to enable TTO's to be recorded. The Trust is currently using the JAC discharge summary rather than the Soarian version. • The operating room development for Soarian, has been in beta testing for 2 years. There is no confidence from Theatres that the solution will be delivered which has led to demands for a separate theatres system. • The use of electronic test requesting in OPD is seen as too time consuming. • There is no concrete roadmap for Soarian after the next 2 releases. • The GI Unit are able to use electronic ordering but require a printed copy of the request. The print out however fails to print the lower part of the form which may contain clinical information and is therefore clinically unsafe. It is understood that this could be resolved but the Siemens support services who are delivering the contract are unable to rectify the

System / Technology	Function	Service Provider	Trust Dept	Comments/Observations
				problem.
Oasis/ Choose and Book	• Trust's Patient Administration System providing the Patient Master Index (PMI), outpatient appointments including the interface with Choose and Book; waiting list administration and admission transfer and discharge events for inpatients and day cases. • Administrative and clinical data for Maternity • Provides the main activity data for CDS and PbR submissions.	Siemens	IT Dept	• Bed management function within Oasis is not deployed within the Trust. At any one time there could be as many as 70+ outliers that are invisible to Trust which is a patient safety risk as well as inefficient. • Oasis has both clinical and administrative functionality including A&E and theatre management, order entry and results reporting. Only PAS functionality is used.
(PACS)	• Primary digital image repository. Allows the storage of DICOM images in a central location allowing access across DGoH.	Siemens	Radiology	• Magicweb is used to provide access to images outside of Radiology. This apparently has a limited life.
CRIS Radiology System	• Scheduling of radiology events. • Radiology reporting and interface to PACS	Hosted by Siemens	System managed by Radiology	• New system manager has been appointed with full access to all management level functionality including the ability to delete audit trails. There is no accountability to the central IT Dept for this role.
Theatre System	• This provides basic level theatre activity and is a system that was originally developed in-house.	Siemens	Theatres	• There is significant resource required to manage the data that is recorded on the theatre system. A dedicated information analyst spends a significant percentage of time

System / Technology	Function	Service Provider	Trust Dept	Comments/Observations
				each week validating data and converting it into meaningful management information.
Unisoft GI System	• Supports data collection for GI.	Hosted by Siemens	Managed by dept	
Renal System			Renal	• Renal has an interface to Pathology for results. It has been agreed with IT that a renal summary will be held in Soarian with detailed results held within the Renal system.
Clinisys LabCentre	• Provides all Pathology IT functionality.	Siemens	Pathology	• GPs have the ability to electronically request Pathology through Indigo 4 which interfaces to the Pathology system. The results for GP requested tests are held in Soarian if there is an NHS number but these are held as unsolicited results. • The Trust has not implemented electronic requesting for Pathology as this requires the latest Soarian upgrade to facilitate this.
JAC Omnicell Ward Stock control	• Pharmacy stock control system • Provides functionality to support electronic discharge summaries.	Siemens	Pharmacy	• JAC provides the functionality to support electronic discharge summaries. Junior doctors are required to type in the TTO drugs and other clinical data. The discharge summary is then sent electronically to Pharmacy including the summary of the patient event and recommendations.

System / Technology	Function	Service Provider	Trust Dept	Comments/Observations
				• The JAC system is not compatible with a third of GP systems therefore the discharge summary has to be emailed to GPs. • The electronic discharge summary functionality was considered cumbersome and data entered by junior doctors was in some cases incomplete when checked by the consultant. • The Omnicell ward stock control system is being piloted in selected wards including EAU and has been seen as successful.
CareVue ITU system		Hosted by Siemens		• CareVue ITU system. The clinical details of a patient in ITU are recorded in CareVue. Once the patient is moved to another ward a summary of the interventions in ITU is produced and sent to Soarian. CareVue has a direct interface with the Pathology system but not to the GI or renal systems.
Ardentia Data Warehouse	Trust's primary solution for business intelligence and income recovery. Data extracts from Oasis and other in-house data collection systems are used to populate the data warehouse.	Supported by Ardentia, business critical elements of Ardentia	Information Management	• Data from Soarian is not extracted to feed into the data warehouse. • The data warehouse has two parts to it, the business critical data is held on a resilient technical infrastructure supported by Asckey to ensure that data that is used for income recovery is appropriately maintained. The in-

System / Technology	Function	Service Provider	Trust Dept	Comments/Observations
		hosted by Asckey.		house data bases that have been created using Ardentia are held on a less resilient infrastructure managed by Siemens which means that if the hardware fails the data recorded on these in-house systems is at risk of being lost. This includes CQIN, Lucentis, VTE and MRSA data collection systems.
Local data collection systems	Lucentis, MRSA, VTE, CQUIN	Managed in-house	Information Management	
The Hub	Primary access portal for clinical and non-clinical IT systems. Also primary communication system for internal organisation.	In-house	IT Dept	• The Hub is the only service that is supported by the IT department. • The Trust uses this as a back office system as well as a front end to clinicals. The use of The Hub to manage theatre lists is seen as inappropriate. • There has never been a clear direction for the Hub. • Lack of version control and document management for Trust wide policies, procedures and protocols is a major area to rectify in line with achieving the required quality standards for CQC, NHSLA and CNST.
Technical infrastructure	A majority of the Trust's hardware and peripheral devices are managed by Siemens with the exceptions identified above.	Siemens	IT Dept	• Industry standard best practice in the management of the Trust's IT is not apparent in terms of the service provided by Siemens.

System / Technology	Function	Service Provider	Trust Dept	Comments/Observations
				• It is unclear from interviews as to where the responsibility sits for IM&T Strategy. • There is a clear need for effective wireless networking capability to enable the use of tablets and ward based computing devices to support accurate and timely recording of clinical data. There is evidence that discharges are delayed due to the fact that medical staff need to record discharge summary data using the main ward terminals as the mobile devices on the ward are invariably unresponsive. • The current JAC solution is now mission critical and is hosted on a virtual server but has not shadow facilities.

CAPABILITY OF SUPPLIERS

In considering the current state of informatics for the Trust, it is important to consider whether the suppliers of informatics-related services have demonstrated a capability to deliver to the Trust's operational and strategic IM&T requirements. Clearly from the assessment of how informatics services are structured there are effectively multiple service suppliers both internal and external to the Trust. Siemens are the principal supplier of the Trust's core systems and the main technical infrastructure and provide a majority of the help desk services. They have also been required to respond to the Trust's changing business requirements as well as delivering on the original requirement to provide a level 3 EPR with the addition of electronic prescribing.

Based on evidence from the interviews the following assessment has been made:

- Siemens as a service provider appear to be effective and capable in provision of help desk and user support services, i.e. those services that can be easily measured and are well defined. There is recognition that there are a number of very capable individuals who are committed to delivering a high quality and responsive service.
- In relation to the management of the technical infrastructure, there is evidence that warrants major concern about the adequacy of tactical and strategic planning. A project has been initiated to examine, from a multiple party perspective, the best planning of the network and wireless provision
- The key concern that has been echoed across the organisation has been in relation to how Siemens respond to developments required by the Trust. There is consistent evidence that Siemens have failed to deliver reliable and effective solutions representative of a level 3 EPR and have failed to provide workable solutions including but not limited to a solution for the Emergency Department and a data warehouse capability. The emphasis has been placed on delivery to the letter of the contract without considering what is ***effective*** in supporting the Trust's business requirements. There is some recognition that the Trust in the past may not have identified the business needs clearly enough. There is a major concern around Siemens' support for Soarian: there is no UK customer base and no identifiable marketing strategy for the product in the UK. Soarian has significant functional capability but the apparent lack of willingness and capability to provide even minor modifications to allow the product to function effectively is the biggest risk for the Trust in retaining this solution.

CHANGE MANAGEMENT

One of the critical success factors in implementing an effective and sustainable informatics strategy is the ability to realize benefits. Realizing the benefits of investment in informatics as part of the infrastructure around the delivery of care is contingent on effective usage. This can only be achieved if the systems implemented become an integral, supporting part of the core delivery process and not an additional task. The implementation of new systems creates opportunities to review processes and redesign them with the support of technological innovation.

To date the experience within the Trust appears to have lacked this very critical factor for success in previous system implementations. The project management effort has concentrated on delivery of the systems and user training, not on delivery of improved processes. Although the Trust retain some project management resource within the organization this is limited in terms of skill mix and capacity to deliver benefit outcomes as opposed to project outputs.

The lack of effective programme and project management governance that is focussed on delivering benefit outcomes has contributed to the lack of benefit realization in the past. Similarly the fact that the rollout of clinical system functionality has been more reactive than proactive serves to reinforce existing practices or simply provide solutions to particular problems as opposed to a whole systems approach.

6. GAP ANALYSIS

There are a number of themes which have featured consistently in discussions where the informatics response to the challenges the Trust faces has appeared deficient. This is from the perspective of business as usual as well as support for the transformation programme. These themes are as follows:

- Supporting the Trust in optimizing core business processes.
- Supporting the Trust's current needs in managing demand and capacity.
- Securing income recovery, including support for Payment by Results.
- Responding to new national and local information demands.
- Achieving competitive advantage and identifying the Dudley Group of Hospitals as the provider of high quality, cost effective services in the West Midlands.
- Enabling an effective transition of adult community services and leveraging opportunities to optimize delivery of care processes across care settings.
- Enabling transformation of services to improve quality and reduce cost.
- Improving patient safety.

- Providing effective management information to support performance management, service planning and clinical governance.

The table below reflects the observations from the discussions and provides examples of where there are gaps in effective informatics provision.

Theme	Gap Identified	Examples
Optimizing Core Business Processes	The core systems deployed within the Trust do not support optimal business processes. Multiple systems each performing similar tasks reduce the opportunity for enterprise wide processes, particularly scheduling and resource management. Out-patient management, bed management, A&E, Theatres and pathology requesting have been identified as primary areas where processes could be improved significantly if supported by effective informatics solutions.	• Multiple data entry across the Trust has resulted in avoidable additional resources being deployed, data quality errors and potential for patient safety risk. • The work around solutions that have had to be implemented for processes such as RTT monitoring have increased administrative effort. • The use of different systems to manage elective in-patients and theatre bookings results in double entry of data and significant manual effort in data quality management. • The emergency department employ dedicated staffing resource: 'patient trackers' who are required to track patients through the department to ensure breach times are not exceeded. They also track and chase results and liaise with the bed managers and input attendance/discharge information into Oasis. An effective system will alleviate the requirement for dedicated staff to perform these functions. •
Demand and Capacity	The Trust does not have effective systems support in identifying demand or capacity for inpatient beds, operating theatres or out-patient clinics. Given the additional pressure to reduce bed days that will require optimum use of ward and theatre capacity	• There is a significant issue with outliers across the Trust which presents not just a capacity issue but also a patient safety risk. (Figures quoted as 60 outliers at any one time). The lack of effective bed management capability means that outliers are not

Theme	Gap Identified	Examples
	and out-patient attendances, bed management and clinic management support is a critical requirement.	identified to bed managers and are not repatriated with the correct wards • There is a significant resource used within the Trust in managing beds which is largely a manual process which requires visiting each ward to update the bed state. This could be significantly reduced with an effective bed management system. • Significant manual effort is required to manage theatre capacity given the inadequate theatre system. • Out-patient capacity cannot be adequately managed as there is little information available on the use of clinic facilities and resources. • There are inefficient and time consuming processes involved in processing out-patient attendances including the retrieval of casenotes for clinics. This is a combination of slow network connections and the way in which slots are released for Choose and Book. This has a knock on effect for RTT monitoring and a resource intensive work around process is then required to counter the ineffectiveness of the systems.
Income recovery	The processes associated with collecting data to support income recovery including duplicate data entry and use of multiple systems presents risk for the Trust in either failing to record data correctly or completely.	

Theme	Gap Identified	Examples
Responding to new requirements	Unless new information requirements are mandated through data set change notices (DSCNs), internal or national developments are only progressed by Siemens after protracted contract change requests. There are increasing information requirements that are mandated but are not via DSCNs such as CQUIN targets. Siemens have consistently failed to deliver on the change requests that have been identified. This has resulted in many areas by-passing IT and Siemens including the decision to acquire a service from Asckey for the data warehouse.	• Local databases for VTE, Lucentis, MRSA and CQUIN have been developed to avoid the delays associated with CCNs requested of Siemens.
Competitive advantage	The lack of effective core information systems across the Trust reduces the opportunity for the Trust to optimize business processes and identify opportunities for service development. The Trust is constrained in being able to operate leaner processes and reduce cost by ineffective informatics provision. Additionally, if patients, service users etc. are not made aware effectively of the competitive advantage of the Trust, it will not influence their choice of care provider. Presenting the advantage externally will become increasingly significant.	
Community services	The opportunity to incorporate community based services within the DGOH service portfolio provides an added complexity to the current informatics provision if this is retained within the current contractual framework. The track record for Siemens in terms of	

Theme	Gap Identified	Examples
	high cost developments and low return will be a constraint for the Trust in seeking to optimize processes across acute and community care settings.	
Transformation	• The transformation programme have identified numerous constraints concerned with informatics support in relation to the achievement of transformation objectives. This largely concerns ineffective bed management, out-patient capacity management and theatre management. In addition eRequesting for pathology and ePrescribing are seen as key enabling technologies that would achieve savings.	• Discharge planning is not adequately supported by information systems which reduces the opportunity to reduce length of stay. Currently there is an Access database that is used across the healthcare community by discharge co-ordinators to track patients ready for discharge. The lack of an economy based solution reduces the ability to effectively manage transition and continuity of patients across settings.
Patient Safety	• Failure to deliver ePrescribing	
Management Information	• Some Departmental systems have poor provision for management information. • Separate systems generate differing versions of management information, creating uncertainty.	• Theatres have 2 FTEs to produce management reporting from the system.

7. STRATEGIC OPTIONS

The Trust executive see the strategic priority as an informatics services that is fit for purpose that will contribute to reducing clinical and corporate risk for the Trust[1].

The strategic objective for the Trust is clearly to progress to a full electronic patient record solution that enables the Trust to fully optimize its core business processes and progress towards a paperless or paper-light environment.

There are a number of elements to be considered in the strategic context, these include:

- ***Technical infrastructure and services;***
- ***Application architecture and functionality;***
- ***User support;***
- ***Informatics capability***
- ***Resources.***

Before looking at the options that the Trust can consider in achieving this objective, a clear definition of the high level requirements for an EPR need to be understood.

7.1. CHARACTERISTICS AND COMPONENTS OF AN EPR

The 'Electronic Patient Record' is the term given to the patient information system (or systems) that has the ***primary purpose of improving the efficiency and effectiveness of the patient journey*** by automating clinical workflow and supporting improvements in the quality and effectiveness of patient care. In so doing the data that is collected creates a comprehensive, multi-disciplinary longitudinal record for each individual patient which is used in turn to support the continuity of care, at the point of care. The following definition of an EPR is adapted from the HIMSS definition[2]:

[1] Paul Harrison, DGOH Medical Director

[2] (Healthcare Information and Management Systems Society, a US and European not-for profit organisation dedicated to promoting a better understanding of health care information and management systems).

HealthSystems

> ***An EPR is*** *'A longitudinal collection of electronic health information about individual patients that is capable of being shared within and across different health care settings, by being embedded in a network-connected enterprise-wide information system. Its purpose is to provide a complete record of patient encounters that are created as a by-product of automating and streamlining workflow in health care settings and to increase safety through evidence-based decision support, quality management, and outcomes reporting'.*

The critical pre-requisites for the creation of an EPR, regardless of how this is achieved, are as follows:

- **Interoperability** – which enables patient records to be brought together independent of systems, platforms or hardware with the ability to communicate patient related information within and across care settings.

- **Accountability** – this is concerned with the failsafe and clear identification of the originator of data relating to the patient that necessitates a signature to be attached to the relevant components within the record and a security infrastructure that involves access control mechanisms at each data entry point.

- **Data integrity** - No data can be corrupted or lost and the meaning and context of data must be consistently conveyed to the user.

- **Availability** - All systems must be available 24 hours a day, every day of the year.

- **Auditability -** All systems and record entries must be capable of being audited.
- **Usability** – user acceptance is critical to achieving business improvement which demands intuitive and responsive systems that follow the clinical workflow.

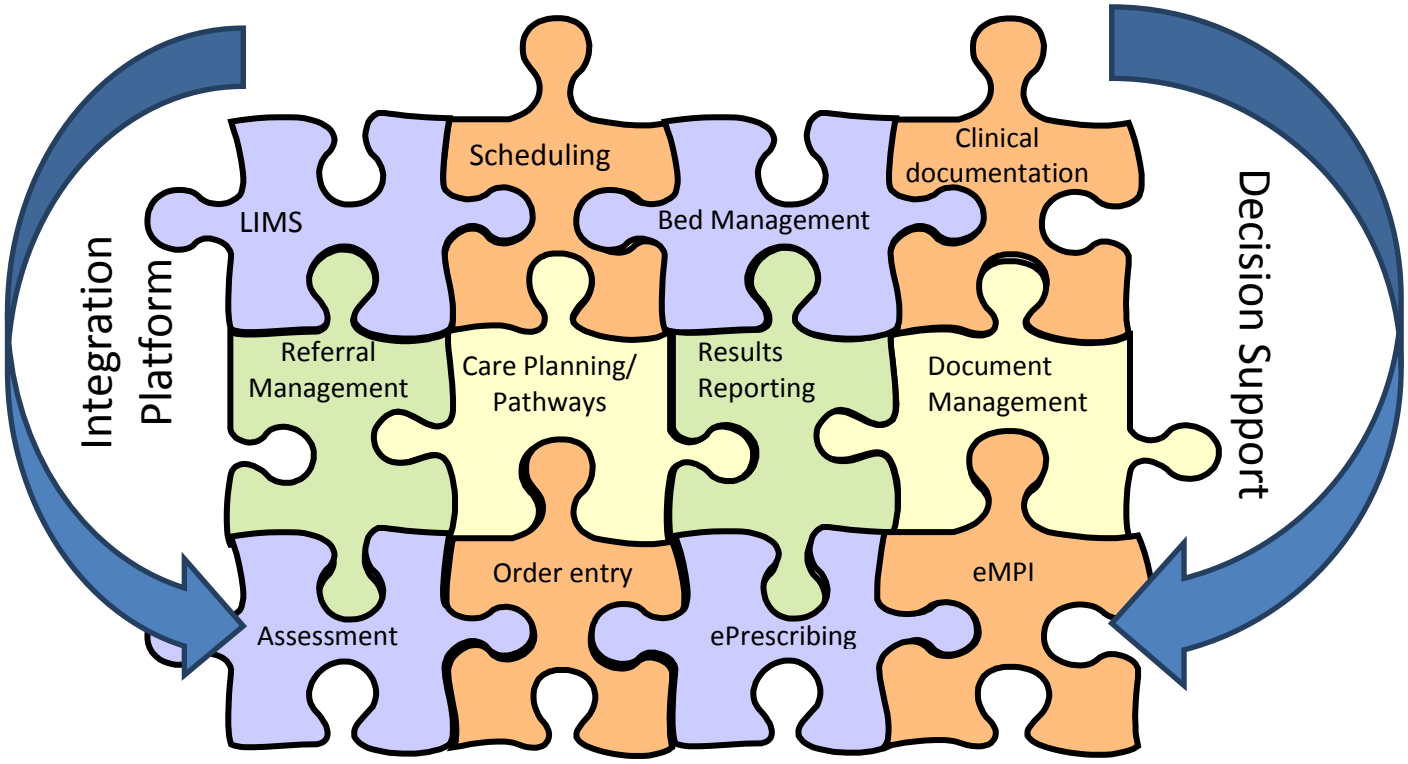
The functional components which align to the core processes are listed in Appendix 3 for reference.

The nature of the healthcare systems market historically has distinguished administrative systems from clinical systems except for those suppliers who provide a single solution to meet all requirements. This has resulted in core functions which ideally should reside at a corporate level being replicated

within each departmental system, reinforcing silo based processes. This militates against the achievement of streamlined business processes that function across the organisation and focus on the patient rather than the department.

The term EPR needs therefore to represent Enterprise Patient Record as well as Electronic Patient Record with a closer alignment between corporate business processes and the corresponding system functionality. This will enable optimal efficiency and effectiveness for the patient, care professionals and the organisation. This does not preclude the fact that whereas functions may be similar across services and specialties, the data that is collected will be different and therefore systems need to be capable of being configured to meet specific data collection needs.

These functions must be brought together through an effective integration platform that is proven within the healthcare domain to ensure that the components are integrated at the data level, the presentation level, providing a common look and feel and a single log on for the user, and at a functional level in terms of supporting optimal processes seamlessly.



There are two main options that the Trust can adopt as a strategic solution to achieving an EPR:

- Single vendor EPR solution that provides a majority of this functionality within an already integrated environment that will reduce the integration risk for the Trust and will provide a proven solution that has been designed for component functions to co-exist and work together. The specific functional components however may not provide the optimal support that bespoke applications deliver.

- A multi-vendor solution that relies on integrating disparate application systems into a comprehensive distributed information system. The advantage of this option is that it recognises that investment has already been made in existing systems that may be fit for purpose and seeks to augment these with only the components that are missing or need to be replaced. It is however highly reliant on an effective and robust integration strategy that will minimise the risks associated with integrating applications that typically are not designed to cooperate and in particular getting suppliers to work together to achieve a successful outcome. The multi-vendor solution has a number of variations associated with it depending on the nature of the functional components and the starting point for the organization.

There are a number of critical considerations which apply whatever option is preferred. This assumes that the EPR which is delivered is the interactive, multi-disciplinary tool that will assist the caregiver in the delivery of care, at the point of care:

- the organisation being committed to and prepared for significant change to clinical and business processes;
- the system or systems that are selected providing intuitive, effective and rapid access for users to support real time data entry at the point of care;
- ensuring a robust and reliable technical infrastructure is in place that has the appropriate business continuity and disaster recovery assurance for a mission critical system; and
- the functionality of the system or systems and the user interface is consistent to the extent that users are unaware that they may be using different systems to perform specific tasks.

7.2. Integration Strategy

The key dependency which exists in meeting some of these critical considerations is the level of integration that is able to be achieved and the capability of heterogeneous application systems to interoperate in the case of a multi-vendor solution. Integration is key whether it is a single vendor solution in that an integration platform will be defined for the Trust by the supplier, or in the case of a multi-vendor solution an integration platform will

need to be selected that will dictate to some extent the choices that are available to the Trust in terms of the component systems that are procured.
The process of integration is a difficult task, as individual applications typically are not designed to cooperate. It cannot be stressed enough that the successful achievement of an effective EPR solution is wholly dependent on an effective integration strategy that will ensure data integrity and also enables the context and meaning of data exchanged between systems to be maintained. It should also minimise the need to move between different systems for the user and ensure functionality is aligned to core business processes as closely as possible.

7.3. Technical Infrastructure and Services

Efficient and effective information systems, supporting the delivery of care and capturing care activities undertaken, require reliable and effective technical infrastructure and services.
Patient care takes place 24 hours per day with a significant part of it taking place away from a desk.
Systems have to be operational 24 hours per day and available from the point where care is being provided.
This leads inevitably to three requirements:

- Applications need to be running on a resilient environment that supports 24-hour working;
- Networks need to be pervasive and provide high-speed connection to those applications;
- Devices for accessing applications need to be mobile, to move with the caregiver to the patient.

In addition, support services need to be available 24 hours per day. There will be occasions where something goes wrong with infrastructure or services and these will impact upon care provided, if not corrected rapidly.

7.4. Strategic Options

The following table identifies the options for the Trust incorporating the two options which can be described as either:

- a ***rip and replace approach***, a single vendor EPR solution that replaces a majority of the existing systems: or
- a ***surround and replace*** approach (multi-vendor solutions brought together through an systems integration solution)

In considering the strategic options for the Trust the following criteria has been applied to assess the strategic fit of each option for the DGOH:

- Strategic goal

- Timing
- Cost
- Risk
- Benefit
- Organizational impact

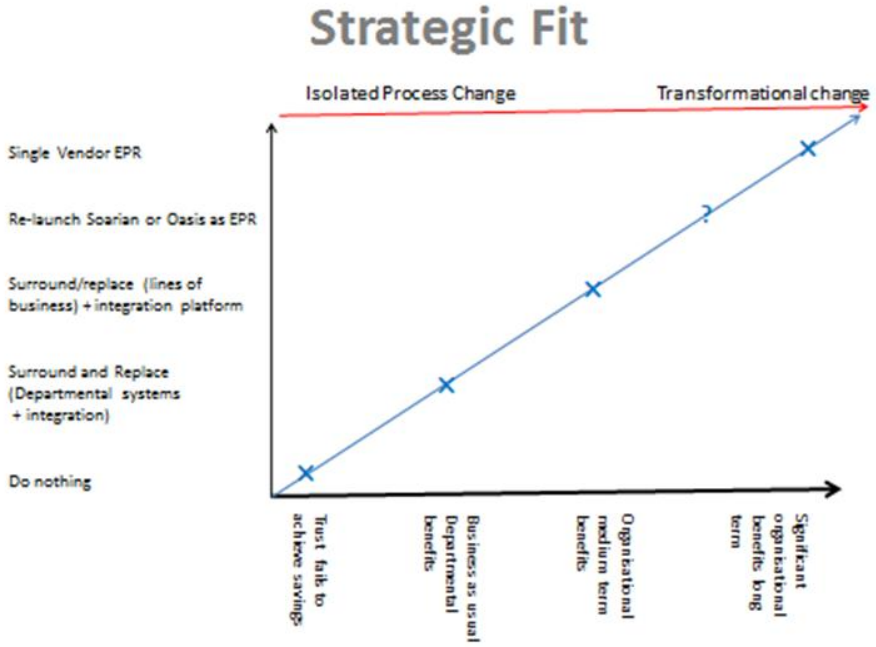
Option	Strategic Goal	Timing	Indicative Cost	Risk	Benefit	Organizational Impact
Do nothing	Fails to support strategic objectives.		Lost income Cost in continuing to support ineffective solutions and work around solutions.	High risk. Failure of systems, interfacing and technical infrastructure. Income risk in failure to support PbR Patient safety risk.	Dis- benefit in failing to support optimal business processes.	Failure of some transformation objectives due to lack of enabling technology. Encourages further resource intensive work-arounds.
'Surround and Replace' strategy based on existing or replacement PAS and departmental systems.	Achieves short term objectives for some areas, e.g. Emergency Department but compromise medium and longer term objectives.	12 to 18 months to complete business cases and implement systems. 12 to 24 months if PAS needs to be replaced.	PAS: £2m Departmental systems: £100k to £200k Integration platform £1m-£2m	Medium risk in integration and management of multiple suppliers	Dis- benefits in failing to optimize trust wide processes	Reinforces departmental ways of working.
'Surround and Replace' based on core enterprise wide components	Supports strategic goal of optimizing processes across the organisation	12 to 36 months to achieve	£100k to £400k for component systems. Clinical functionality Integration	May be some processes that are not adequately supported by solutions currently on the market. Medium risk in terms of	Enables streamlined, efficient processes to be supported across the	Significant commitment from Trust to enable organizational change Some departmental compromise in working with generic functionality.

Option	Strategic Goal	Timing	Indicative Cost	Risk	Benefit	Organizational Impact
			platform (£1m-£2m	integration and management of system suppliers. New approach that is being adopted by some organizations but not yet proven as a strategic solution.	organization.	
Relaunch Soarian or Oasis as EPR solution	Neither system has demonstrated success as a strategic EPR solution in the UK. The Trust is advised to conduct a 'Solution Review', to encompass alternative systems, to validate the preferred future platform.	As these are existing solutions implementation plans could be initiated within a few months.	£100-200k, dependent upon the viability of 'out of the box' functionality in the products.	Soarian does not have a position in the UK market which is a high and un- manageable risk for the Trust. Oasis is a developing product and has some good functionality. It hasn't had the best reputation in the market but may be changing.	If either solution can demonstrate capability to meet Trust requirements there is potential to achieve organization wide benefits.	Would require a major re-launch and assurance from the suppliers that they are capable of delivering to Trust requirements. Significant commitment from Trust to enable organizational change, made more challenging by the past history with these solutions.
Single vendor	Supports the	18-24 months	£20m (over 10	Success depends on	Patient safety	Significant commitment from

Option	Strategic Goal	Timing	Indicative Cost	Risk	Benefit	Organizational Impact
EPR solution	strategic goals for the organization provided it is seen as part of a change programme.	procurement. (Could be reduced if procured by Summit/Siemens but would require the Solution Review to recommend this course of action) 12 months for core functionality to be implemented. 3-4 years for full implementation.	years) excluding change management. £30m over 10 years including change management support.	significant commitment to process change. May be a compromise for some specific departments.	benefits Enables more effective and efficient service provision.	Trust to enable organizational change.

CONCLUSION

The following diagram illustrates the balance between the options available to the Trust and the likely achievable benefits arising.



The Trust is committed to transformational change. Consequently, the timing and organizational readiness is right to justify a single vendor EPR and this would appear to be the optimum solution for the Trust. The lack of confidence in a majority of the existing systems looks unlikely to provide a platform for a 'surround and replace' approach.

The options identified above however are not mutually exclusive in that the longer term strategy for the Trust may require some shorter term solutions to be considered, provided they are cost effective and are prioritised against the need to support the major transformational objectives.

The process of selecting and preparing for the implementation of a single vendor EPR solution will take some time even if the procurement time is reduced by virtue of retaining systems within the PFI contract. Realistically it will be a minimum of 12 months assuming Summit effect the procurement on behalf of the Trust for a single vendor EPR.

It cannot be stressed enough that the Trust must be in control of selection of the solution through a robust Solution Review process.

The Trust is not getting best value out of the existing systems that are used within the Trust. There is significant functionality within Soarian that could be deployed to support improved processes, however the lack of commitment to make even apparently minor modifications to the solution that would enable this to work rule this out as even an interim solution.

The Oasis solution is marketed as an EPR solution and has a number of recent developments that may make this an option for the Trust as an interim solution to support year one objectives assuming a single vendor EPR solution is the direction of travel. It is recommended that the Trust define what is required as a minimum to support short term transformation objectives and allow Oasis to demonstrate how this can be supported.

8. THE WAY FORWARD

8.1. INFORMATICS CONTRIBUTION

There is a key contribution to be made to the business of the Trust by Informatics particularly in the light of:

- the need referred to elsewhere to be proactive enabling the Trust's agenda,
- to support the transformation of processes in the Trust;
- the proposed White Paper reforms which require 'outward facing' information targeted at both purchasers – GP practice based commissioning consortia and patients as consumers exercising choice;

The business systems that are proposed are a step change; the Trust has had the benefit of gaining knowledge and experience from the current systems. Whilst recognising that they may be deficient in part, the corporate knowledge that has been gained should be exploited and augmented. Moving to a full enterprise-wide system however is wholly dependent on adequate programme and project management resourcing that is focussed on delivery of business benefit outcomes.

It is proposed that the current Information Services and IT departments should be merged into a single organisation and that consideration of the merging of the resulting organisation with the PCT IT department should actively be considered as part of Transforming Community Services (TCS).
The gathering together of a set of resources, with a broader set of skills and competencies will create a number of opportunities, including:

- Economies of scale in hosting , systems administration, storage, development and skills acquisition ;
- Acquisition of skills;
- Breaking the monopoly supply situation held by Siemens;
- Headroom in staff utilisation which can be allocated to projects;
- Provision of a peer group of professionals;
- Provision of a career structure;
- A broader range of projects, and opportunities for all staff within the department;
- The opportunity to apply experience to problems leading to faster resolution and application of lessons learnt.

Integration on this scale is a significant project and will require dedicated resource focussed on achieving a successful outcome. Once stabilised a significant new set of skills will be required.

Once the Trust has selected the enterprise product it wants to migrate to it is proposed that the application skills in terms of business analysis, process analysis and mapping and the resulting configuration skills should all be part of the new department staffed at a level sufficient to ensure the Trust retains control of the applications and reporting from it.

The proposal to deliberately exploit the Hub (SharePoint tools) will require a set of associated skills to develop and maintain applications in house that will contribute some quick wins.

The first task of the new department will be to take stock of the estate, systems, skills and competencies in place, the second will be to develop an interim plan and ensure that the organisation, job descriptions and skills and competencies are in place to deliver the plan.

An essential part of the functions of the department will be the ability to communicate with the users of systems in the hospital and organise feedback in a positive way to suggest changes to existing systems in harmony with the suppliers of externally sourced systems. In the case of the enterprise wide system chosen, the Trust should seek to develop a direct relationship with the application provider. Successful models such as the Homerton with the Cerner Corporation, Wirral with TDS, and others endorse the success of this arrangement.

8.2. INFORMATICS CONTRIBUTION – INNOVATION

An additional aspect that is key to the success of an Informatics Department is innovation. It is hard when focussed on day to day operations to undertake horizon-scanning and seek to innovate in the application of medical and technical devices, applications in health.

Exploring innovations is a key element of job satisfaction of those involved and creates a working environment where people want to work and aspire to join.

A tried and tested contributor to enabling this is a link to a local educational establishment which has a research capability, wants a link with a local employer and has relevant courses on the syllabus. This kind of relationship provides an incubator for new staff and provides opportunities for work placement thereby providing 'head-room' in the resource pool to undertake new projects.

It is key to the success of achieving the values of the Informatics Department that it should be seen to innovate and positively manages its reputation for innovation, delivery and support of applications and technology.

8.3. Informatics Contribution to Transformation (Year 1)

The opportunities that have been identified relate to the key targets and actions for year 1 of the Transformation Programme, referenced to the high level clinical delivery process.

The following table identifies the contribution informatics can make to the Transformation Programme.

The first stage will be the integration of the current Information and IT departments under a single leadership structure reporting at executive level in the Trust.

Opportunity	Contribution of Informatics	Implications and considerations for Trust (Year 1)
Out-patient Services		
1. Improve efficiency and effectiveness in utilization of out-patient facilities and optimize scheduling of appointments to maximize use of out-patient resources, reduce cancellations and DNAs.	Enterprise wide resource scheduling solution that enables facilities, staff, patient and equipment to be scheduled more effectively. Management information that is produced from an effective resource scheduling solution enabling effective monitoring of the use of facilities, resources and equipment and monitoring of new to follow-up ratios. Implement a telephone based solution in addressing DNAs.	Review available solutions including Oasis solution and other bespoke scheduling solutions. Evaluate if Oasis will provide short, medium or longer term solution to optimize management of out-patients Consider implementing enterprise resource scheduling, interfaced to Oasis MPI, if Oasis fails to meet the requirement. Implement clinical coding for out-patients to increase opportunity of improved income recovery.
2. Improve the efficiency and effectiveness of out-patient clinics and support one stop shops etc.	Availability of all clinical documentation required in out-patients electronically, reducing reliance on paper based records. Provides a summary of plan of management and interpretation of results and management plan. Can assist in reducing admissions as can illuminate previous investigations. Provision of electronic ordering and result reporting in out-patients. Could reduce handoffs and resourcing and could reduce follow-up appointments where these are purely for communication of results. Apply technologies that assist in rapid data entry at the point of care.	Consideration of moving towards a fully electronic patient record in out-patients based on electronic document management for existing paper based records, electronic ordering and results, access to all clinical letters and ability to document clinical letters in out-patients. Explore approach of other hospitals who are progressing this approach. Look at potential of Oasis to provide electronic requesting and results reporting compared to Soarian to evaluate whether this can be used for the next 2-3 years.
3. Patient check-in system, patient	Self-check in system to reduce staffing requirement in	Identify potential self-check-in solutions with a view

Opportunity	Contribution of Informatics	Implications and considerations for Trust (Year 1)
communication systems, waiting times.	out-patients and improve data quality.	to integrating this with a future EPR solution.
4. Improve efficiency and effectiveness of health records service.	Electronic document management will provide a solution to providing access to clinical records currently on paper and will reduce the need to retrieve paper. Current health records resources can be redeployed into scanning activity and gradually reduce over time in line with a longer term EPR strategy.	Business case to be completed for EDM. Market test EDM solutions and ensure appropriate standards are met for integration with a future EPR solution. This is a long term investment that will continue and will work with a future EPR solution.
5. Triage systems requirement for more robust triage processes across trust, Staff not aware of alternative paths of treatment. Could divert to community based provision. And also looking for capacity management for particular services. No point sending to walk in if full.	Better use of Choose and Book for referral protocols	Exploit Hub/SharePoint for capacity management fed from patient systems?
6. Some specialties are not presenting alternative pathways and helping GPs for alternative pathway provision. Triple 1 number better use of this. GP default is sending to hospital, front end filter.		
Urgent Care		
1. Improve tracking and management	Whiteboard/visual patient status system in	Review the Oasis solution, including against other ED

Opportunity	Contribution of Informatics	Implications and considerations for Trust (Year 1)
of patients through emergency department.	emergency department.	solutions, using scripted scenarios of how the process needs to be supported. Based the Solution Review consider any business case for an ED system in light of the Trust's chosen strategic option.
2. Improve bed/capacity management processes.	Bed management systems that enable rapid admission, transfer and discharge to be recorded with effective on- line display including drill down facilities to identify current and planned bed state.	Although bed management systems will support better management of beds, this requirement is dependent on a commitment to real-time data entry of in-patient activity by all ward staff.
Ward Processes		
1. Improve bed management and patient throughput reducing length of stay 2. Between 60 and 100 delayed discharges at any one time.	Bed management systems that incorporate planned discharge dates. Support for discharge planning incorporating service ordering and workflow to facilitate earlier discharge.	Electronic ordering and referral solutions that enable better planning and demand management across care services and care settings can provide a first step towards better discharge planning with more proactive workflow management as part of a longer term EPR solution. Review the Oasis solution, including against other bed management solutions, using scripted scenarios of how the process needs to be supported. Based on the outcome of the Solution Review, consider any business case for a bed management system.
3. Reduce pre-operative length of stay	Resource scheduling and electronic ordering solutions will support better management of pre-op assessment.	Review the Oasis solution, including against other bespoke scheduling solutions. Evaluate if Oasis will provide short, medium or longer term solution to optimize management of out-

Opportunity	Contribution of Informatics	Implications and considerations for Trust (Year 1)
		patients
4. Nurse led protocols	Electronic access to passive decision support that provides access to documented protocols. Implementation of active decision support that invokes protocols as an integral part of workflow/care pathways within an EPR solution with triggers/alerts to carry out actions at scheduled intervals.	Depending on the integration solution that is provided, electronic access to protocols must be provided. Implementation of active decision support will require significant clinical input in terms of defining decision points, tasks and workflow rules. This should be implemented gradually and monitored to ensure adherence. Ideally this needs to be part of a fully integrated EPR solution, although elements of decision support can be invoked within specific functions.
5. Need to know how we flag patients to particular specialities, flags to clinical nurse specialist to get clinical care more quickly.	Outlier management and proper use of ADT	? Hub SharePoint for provision of bed management data including outliers etc.
Theatres		
1. Introduce patient level costing		
2. Agreed targets for procedure timings		This could be provided from Oasis but the solution would need to be reviewed by the Trust as fit for purpose.
3. Improve theatre utilization	Provision of effective theatre management solution that will use data derived directly from operational scheduling and resource management systems to provide required management information on use of theatres.	Review the Oasis solution, including against other bespoke scheduling solutions. Evaluate if Oasis will provide short, medium or longer term solution to optimize management of out-patients.

Opportunity	Contribution of Informatics	Implications and considerations for Trust (Year 1)
	Theatres would like to schedule theatre lists in line with demand presented from each consultant's waiting list. Currently there is a significant resource required to juggle theatre sessions to meet demand. There is also a need to understand the rate of conversion from outpatients and link the procedure to average operating time to enable more effective scheduling. The associated scheduling of resources then needs to be accommodated.	
Clinical Support Services		
- **Pharmacy**		
1. Improve quality and timeliness of inputs to the service to reduce rework	Electronic prescribing will enable more effective and safer prescribing. Currently controls on prescribing are poor. From patient safety point of view some drugs are time critical in terms of administration. There have been 3 incidents in relation to drugs for Parkinson's where patients have gone rigid. Pharmacists currently make 500 interventions per and most relate to significant issues where the patient could come to harm. 40% of drugs prescribed on discharge need intervention. As a result of monitoring prescribing pharmacists have little time to have a conversation with the patient about taking drugs appropriately. Med364 reduces possibility of the wrong box being taken out and administered.	Whilst there are undoubtedly benefits in implementing an ePrescribing solution as a solution independent from an integrated EPR, the full benefits will come from a solution that is integrated with results and effective in-patient bed management. Consideration should be given to whether ePrescribing is introduced as part of an EPR solution or as a component. ePrescribing is often implemented in the later phases of an EPR solution so there may be a gap of 4 years before an full EPR solution delivers this functionality. Further rollout of electronic storage of drugs based on trial within EAU. This could improve accessibility to Pharmacy if there is improved automation. Version 4.46 of the JAC Pharmacy solution will enable

Opportunity	Contribution of Informatics	Implications and considerations for Trust (Year 1)
	PbR also requires identification of drugs	a thin client deployment. Given that JAC is already on the wards by virtue of the electronic discharge summary, the use of the current JAC solution could be extended to get drug carts out on wards which would enable mobile dispensing.
- **Diagnostics**		
1. Reduce volume of unnecessary tests	Implementation of electronic requesting.	This should be a key priority for the Trust ahead of ePrescribing. The Trust should consider the short term options which will include looking at the Oasis solution and the solution that currently exists for GPs and bespoke order communications solutions such as Plumtree. The efficiencies that can be gained from eRequesting may outweigh the disadvantage of having to swap to another solution if an integrated EPR is the chosen strategic solution. Use of Soarian which is already used for eRequesting of Radiology must be considered but is reliant on Soarian meeting pathology requirements in a timely way. Single sign on needs to be explored to make use of existing systems viable.
Transforming Community Services	This is both a challenge for informatics and a significant opportunity. There will be a need to rationalise systems across acute and community	–

Opportunity	Contribution of Informatics	Implications and considerations for Trust (Year 1)
	services but also the opportunity to pool skilled resources.	

8.4. Action Plan

Given the current state of core systems within the Trust the key challenge for informatics will be in balancing the short term needs with a longer term strategy that will reap the required benefits for the Trust in efficiency and effectiveness.

An important aid in planning next steps is to prioritise the key areas of functionality that will deliver the most benefit either as interim solutions or as part of a more strategic plan.

As part of the national Health Informatics Review, clinical stakeholders identified a "minimum specification of functionality" that would make a system acceptable to them, specifically in secondary care. The intent was to identify the essential functionality that will create a pull effect from clinicians who see it as useful and valuable in conducting day-to-day business. This will create a 'tipping point' in the acceptability and demand for the strategic IT systems.

The "minimum specification of functionality" was defined as five key elements (the 'Clinical 5') for secondary care which are:

1. a Patient Administration System (PAS) with integration with other systems and sophisticated reporting
2. Order Communications and Diagnostics Reporting (including all pathology and radiology tests and tests ordered in primary care)
3. Letters with coding (discharge summaries, clinic and Accident and Emergency letters)
4. Scheduling (for beds, tests, theatres etc.)
5. e-Prescribing (including 'To Take Out' (TTO) medicines)

Given that there is potential for more value to be gained from the Oasis PAS than is currently provided through the Siemens contract, the four remaining areas of functionality could be seen as the main priorities in terms of considering the roadmap:

- Order communications and results reporting is partially implemented within the Trust and the options for progressing this have been identified.
- Providing a central repository for clinical letters is already planned for the Trust and should be progressed as this would not compromise future strategic solutions and should be seen as a key short term priority.
- Scheduling, based on current state, is failing to meet the requirements of the Trust and will be a major block to achieving some of the transformation objectives identified. This should be explored further as a matter of urgency in at least getting better support out of existing systems. The data for the transformation programme has quoted 94,000 cancellations out of the 160,000 appointments made.

- ePrescribing does present a more challenging decision for the Trust if a single vendor EPR solution is identified as the strategic option. Implementing an interim ePrescribing solution will be costly in terms of resource but it is unlikely that this would be implemented until further into an EPR implementation. There may be an option to interface an interim ePrescribing solution to a new EPR solution to get best value out of an interim solution and the cost benefit over a 5 year period may still warrant this investment. A business case should be done using work already completed to consider this.

In the light of the significant requirement to enable the redesign of processes within the Trust and substantial business benefits to be harvested through the correct implementation of functionality to be exploited and business benefits to be harvested we recommend that the Trust reviews the current solution (Oasis PAS and Soarian clinicals) against COTS products available to-day. The market has gained considerable experience of enterprise wide solutions as a consequence not least of the national programme (The Last Word, Cerner Millennium and Lorenzo) and the revitalisation of the market as a consequence of the changes to the national programme. We propose that a Solution Review is conducted with up to three other products over a period of six months so that an understanding of the best means of achieving the strategic goals can be identified and then discussed with the PFI provider.

We propose also that in the short term functionality be developed on the Hub once it has been stabilised and can form the foundation for local development on the basis of removing and reengineering the multitude of form filling processes in use in the Trust as well as providing some 'quick win' applications to get the user community on side.

We recognise that there is a major public relations exercise required to put a sense of excitement and commitment to make IT work within the daily lives and jobs of the staff of the Trust. There is a need for IT to have much greater profile and be engaged in the management decisions of the Trust.

One of the key lessons from the experience of the National Programme for IT over the past seven years has been the vital importance of clinical engagement in the execution of any strategy. It is recognised from the feedback generated from a variety of sources including ad hoc clinical meetings that there needs to be a re-engagement with the clinical directorates within the Trust to demonstrate the delivery of their respective clinical agendas through the strategy.

The exercise of the Solution Review should be used as an opportunity to re-engage the clinical community and clinical directors through showing how their objectives can be delivered through the use of technology.

We propose that as part of the Listening in Action programme specific attention be paid to the IT systems and infrastructure in the Trust to determine from staff their big problems generated by use of the current IT and their views of potential 'quick wins'. We would anticipate that a User Council with appropriate staff and functional representation will be formed during 2011 to harness the enthusiasm of staff.

The table below identifies an action plan that the Trust should consider in making the decisions for informatics strategic direction and enabling the right decisions to be made.

Action		Dependency	Benefit	Risk	Timing
1	Appoint head of informatics with accountability and responsibility for all informatics across the organisation. This should be at board level ideally or at least aligned to a board level position that has responsibility for the overall Transformation Programme. Restructure informatics reporting lines to this role. Ideally bring responsibility for patient systems and information back into the Trust and away from Siemens although the technical infrastructure and support services such as help desk could be retained.				Immediate
2	Confirm Siemens intentions for marketing Soarian in the UK to inform the strategic options regarding Soarian as a potential strategic option.	None	Clarity on development 'roadmap'.		Immediate
3	Review potential of Oasis solution to provide interim benefits and evaluate as the basis of a surround and replace option for a longer term strategy. This should focus specifically on improvements for OPD, bed management, theatres and ED.	None	Plan for delivery of interim benefits using existing systems.	Insufficient knowledge made available to the Trust to determine the potential of Oasis.	Immediate
4	Review option to procure separate ED solution as an interim ahead of full EPR solution.	Dependent upon action 3.	Potential deployment of an ED solution earlier than might otherwise be achieved.	Deployed ED solution may have a short life – 3-5 years.	Upon completion of Action 3.
5	Feasibility study/business case for implementing	Ensure the			

Action		Dependency	Benefit	Risk	Timing
	electronic document management	solution meets appropriate interoperability standards to enable integration with a future EPR solution.			
6	Identify technical solution for creating corporate wide repository for clinical letters that can be incorporated within a future EPR solution.				
7	Feasibility study of achieving electronic patient record for outpatients	Dependent on outcome of action 2 and action 3 and/or 4.			
8	Identify options to progress electronic order entry. This may include: • Retaining Soarian results reporting and implementing a 3rd party order entry solution ahead of an EPR solution. • Replace Soarian order entry and result reporting with Oasis. • Replace Soarian result reporting with 3rd party order entry and results reporting solution as an interim solution or as part of a	Dependent on 1,2 and 3			

Action		Dependency	Benefit	Risk	Timing
	component based EPR.				

APPENDICES

APPENDIX 1 – LIST OF CONTRIBUTORS

Contributor	Position/Role
Steve Cotton	Head of IT
Sarah Gibson-Jones	EPR Clinical Lead
David Bareford	Consultant Haematologist
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Kevin Shine	Head of Information
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Karen Hanson	General Manager
Sarah Watkins	Oasis Programme Manager
Dr Morab Labib	Clinical Director for Diagnostics
Peter Howell	Head, BMS
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Jannine Hewlett	

HealthSystems

APPENDIX 2 – CURRENT ISSUES AND IMPACT ON KEY TRANSFORMATION AREAS

Service Affected	Requirement	Current Position
Management of DNAs	Telephone service to provide a reminder to patients about forthcoming appointment.	Siemens had provided a pilot facility to enable this to be trialled but it has not been rolled out as there appears to be no support from the IT Supplier for rolling out the service. Service has not been rolled out.
OPD	Lack of visibility of how rooms are being used.	Rooms allocated to consultant "en bloc" and it is assumed that they are going to use these rooms – no flexibility in looking at rooms.
	Speed and Performance	Reports don't print off in numerical order. It takes 20 to 30 minutes to run report. Only have 15 secs to book an appointment on Oasis with CAB link – speed is major issue with new version as it is web based. It takes 3 to 4 hours to run patient letters per day. 19 reschedules took over hour.
	Printing pulling lists by tracking location	Because Oasis doesn't print tracking location on pulling list, sorted by runner, someone enters from Oasis list to Excel spreadsheets for all clinics for notes not in library.
	Greater control over re-scheduling patient appointments.	Hospital initiated rescheduling – there is a significant amount of this – this will have a significant impact upon the Trust's ability to manage capacity. There are no simulation models. When clinics cancelled or reduced, Oasis moves the patient without considering previous cancellations and no 'rippling': patients can be moved several times and quite far down the line. The system provides no warning that a patient has been moved more than once or moved beyond a defined period. This is almost certain to impact upon New: Follow Up ratios.

Service Affected	Requirement	Current Position
	OP Booking team need to be able to manage calls more effectively.	There is currently no visual call management mechanism. The department can obtain reports on call volumes but cannot review in 'real time' how many calls have to be dealt with. There is no information on 'abandoned calls' – where the caller hung up after waiting – so it is not possible to determine the correct resourcing level. Routing system on phones is being explored, to reduce phone waiting time. (Previously, internal calls took priority over external calls. The 6 month trial of the appointment confirmation service is now complete but not rolled out. There are known to be alternative providers to the system used in the pilot. Some of these could offer additional services, such as digital dictation.
	Improve compliance with filing structure in notes.	There has been poor compliance. Additionally, it has been too easy to create a temporary folder, which isn't tracked. Making some changes on this in June: Temporary folders will be tracked and issued centrally. It has been estimated that it would cost £1.3m to update all active notes to comply with the agreed filing structure. This would be required prior to any attempt to scan them and would be an obstacle to electronic document management.
	More efficient and effective management of referrals.	There are multiple 'routes of entry' for referrals – CAB, paper referrals form GPs(approx. 400 per month), tertiary referrals etc.– paper referrals are received into Centafile 2 miles down road. These are tracked in with a bar code and then sent for grading. There is not a robust count in count back. It is possible for referrals to take several weeks to return.
Emergency Department	Tracking getting to 4 hr target. Triage and workflow and guidelines and protocols. Interrogate system for audit and appraisals. Coding for commissioning.	Developments have come out very expensive. For example: a request for case card want breach time printed on Cas card – book in time + 4 hours – came in as £4k. Too expensive to do so rejected. Atos have presented trust based data that own staff can't access. Has enabled

Service Affected	Requirement	Current Position
	Improved process for finding a bed. Elec requesting and result review. Access to notes and ECGs. Quick logging in and out. (332 pats seen on Monday.) Rapid Assessment Triage runs.	improvements way dept operates.
Theatre Management	Ability to monitor theatre utilization. Ability to book a Theatre in Out-Patients Improved speed of booking planned admissions. Waiting List arranged chronologically. Ability to connect equipment with IT interfaces via Trust infrastructure.	Information analyst employed specifically for theatres. Spends 1 day per week collating data required to monitor theatre utilization. Currently using a diary facility on the Hub to book 'Out-patient Theatres'.
Bed management	Real time capture of Admissions, Transfers & Discharges. Capture 'estimated discharge date', clinical discharge date and physical discharge date and (free text) explanation for any discrepancy. Facility to audit estimated vs. actual discharge dates.	The Trust is not doing real time admissions, transfers and discharges. Actual physical discharge date being recorded.
18 weeks RTT monitoring	Manage patients along pathways in accordance with operational targets.	Multiple systems are being used to support this. Mainly based on extracts from systems into Excel etc. for manipulation and analysis. There are systems and process issues within and outside the Trust that are confounding attempts to manage this process in a streamlined way.

Service Affected	Requirement	Current Position
Clinical	Information systems available to inform, and capture information, during the normal workflow. Mobile technology. Easy access to results (and requesting) Single Sign-on/ simplified access	Information is not available in an integrated form, allowing efficient and effective consideration of the patient record. Some useful systems are approaching the end of their life. Mobile technology is required, to support usage of systems.
Pharmacy and ePrescribing	Electronic prescribing. Single Sign-on	e-prescribing not delivered. Currently requires log-in to both JAC and Soarian
Information Management	Effective and timely production of information.	Ardentia warehouse in place. Dedicated data warehouse manager. Ardentia is mirrored on third-party servers and onsite, to provide resilience. Also use other extracts from Oasis/Theatres/CRIS/ESR not Soarian. However, this is too much to pipe through N3 connection to Asckey so retain much on the local data warehouse, which is on unsupported servers. There is re-keying of data, where it cannot be extracted from systems.
Maternity	No clear specific requirement at this stage.	Maternity – used in entirety, only look at blood results in Soarian.
Pathology	Systems require modernisation.	An array of systems, developed and delivered at separate times. All ageing.

APPENDIX 3 - FUNCTIONAL COMPONENTS OF AN EPR

Given that the primary purpose of an EPR solution is to improve the efficiency and effectiveness of the patient journey, the functionality of an EPR solution needs to be aligned with the key processes involved in the patient journey that are at the basis of all patient care across all care settings.

- **eMPI –** Single Master Index across all patient systems

- **Referral Management** – ability to log receipt of incoming referrals including those via Choose and Book, define a priority for action and assign to a care professional. This can overlap with electronic requesting particularly for internal services.

- **Enterprise resource scheduling** – ability to schedule single and multiple events along with the corresponding participants in an event including the patient and care professional(s) as well as the facilities and equipment that are required to support the event. This would include scheduling an out-patient visit, radiology event, pre-assessment visit and theatre slot for example as one automated process with all associated human resources, facilities and equipment scheduled as part of this process.

- **Demand management** – ability to record patient details and procedure details for patients waiting for scheduled care whether day case, elective in-patient. This may be part of the referral management and/or scheduling functions in some systems. The capability to produce the required monitoring of demand either in terms of waiting times or volumes needs to be supported.

- **Out-patient clinic management** – ability to record attendances at out-patient clinics either scheduled or unscheduled.

- **Day case and in-patient admission and transfer and discharge** (ADT) – ability to support the recording of in-patient admission to a hospital bed, bed and consultant transfers, planned and actual discharge of the patient. The functionality must enable real time recording of these activities and must be part of or feed into the bed management function.

- **Bed Management** – ability to see current and planned state of bed availability and occupancy in real time to enable planning of discharges and admissions and increase throughput.

- **Operating Theatre Management** – ability to manage theatre utilisation, patient flow through theatres, equipment management within theatres

and provide links to clinical data associated with operative procedures. This will link closely with enterprise resource scheduling.

- **Structured clinical assessment** – ability to record clinical assessment and observations with the ability to tailor structured assessments to the specific needs of each service.

- **Clinical noting/documentation** – ability to automate the acquisition of clinical notes, letters and documentation so these can be shared electronically as part of a clinical record and can be distributed to recipients outside of the organisation. The information which populates the documents should be derived where possible from data entered into the system and facilitated through effective use of technologies that support rapid data entry in a clinical environment.

- **Electronic Requesting and result reporting** – ability to order or request specific services including but not limited to diagnostic tests and to receive a corresponding result electronically.

- **Radiology–** ability to manage radiology modalities and provide the required links to PACS including accession numbers and to provide Radiology reports.

- **Laboratory departmental systems** – ability to support analysis processes involved in pathology testing and provision of test results.

- **PACS** – picture archive and communications system which enables the acquisition, archive and communication of digital medical images.

- **Care planning/pathway management** – ability to support planning of care through application of decision support and workflow management.

- **Clinical coding and Grouping**– attribution of ICD and OPCS codes and a corresponding HRG group to identify the main diagnoses and procedures that are relevant to an in-patient, day case and out-patient event. Where possible coding should be derived from the use of clinical terms (Snomed CT) that are entered as part of the clinical process.

- **Decision support** – passive decision support enables the presentation of guidelines and protocols at the point of care as a reference point to support evidenced based care. Active decision support relies on an underlying inference engine that operates across an EPR solution that will enable rules to be created that will control alerts, reminders, workflow tasks and notifications to support clinicians in effecting evidence based care.

- **Longitudinal EPR view** – presentation of a summary of all the patient's care interventions over time across all systems.

- **Prevention, screening and surveillance** – the ability to support screening and surveillance services through the identification of cohorts of patients who meet screening criteria, disease registers and call and recall processes.

- **Information Management** – the information that is derived from the data collected as a by-product of patient care that supports the Trust's clinical and business information needs.

- **Document management** – ability to store documentation that originates from paper either to incorporate existing paper based records into the EPR or to enable externally or internally generated paper documents to be held as part of the full electronic record.