States of Jersey

Health and Social Services Department (HSSD)

Integrated Care Record

Programme Implementation Review

Final Version

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Acknowledgement

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CDMI	(The NHS England) Clinical Digital Maturity Index
Closed Loop Medication Management	The tracking of medication using bar-coding or equivalent unique reference from prescribing thru dispensing to administration of the medication to the patient, significantly reducing the risk of error.
ePrescribing	The electronic generation, transmission and filling of a medical prescription, replacing paper
EMRAM	Electronic Medical Record Adoption Model
EPR	Electronic Patient Record
HIMSS	The Health Information Management Systems Society
HL7	Health Level 7 messaging standard for the exchange of health information between
HSSD	Health and Social Services Department
ICD10	International Classification of Diseases Standard
ICR	Integrated Care Record
MSP	Managing Successful Programmes, the UK programme management methodology
OGC	(The UK) Office of Government and Commerce
Order Comms	The electronic Order Communications System supplied by InterSystems
PAC Report	The States of Jersey Public Accounts Committee Report into the ICT Programme
PACS	Picture Archiving and Communications System
PAS	Patient Administration System
PFI/PPP	Private Finance Initiative and Public Private Partnerships
PRINCE	Projects in Controlled Environments, the UK project management methodology
RIS	Radiology Information System
SNOMED CT	A clinical coding terminology
TrakCare	The proprietary Patient Administration System supplied by InterSystems

Glossary

1. Executive Summary

1.1 Overview

This Report reviews the outcomes of the Jersey HSSD's Integrated Care Record (ICR) programme implementation and should be read in conjunction with Post Implementation Reviews of other elements of the programme

The objective of this Review is to evaluate benefits delivery, benchmark capability against experience elsewhere and consider the lessons learnt with a view to informing the next phase of the Programme.

The findings are based on a review of the Programme documentation, interviews with a number of key Stakeholders (project, operations and clinical) and a benchmarking exercise.

HSSD's ICT Strategy of 2001- 2005 outlined the need to develop an electronic patient record (EPR). An added imperative was the decision by their PAS supplier (EDS), to withdraw from the UK market following its failure to secure contracts awarded by the UK national programme, leaving no option but to plan to replace this system. In 2006, the programme was voted a £12 million budget by the States Assembly.

In 2006 HSSD began to detail its - vision for the implementation of an electronic Integrated Care Record.

Implementation of an ICR is a complex change management challenge and was significantly more ambitious than previous projects attempted by HSSD. The UK OGC recommended the competitive dialogue process was used to procure a solution. In 2006, Jersey appointed external procurement consultants, a detailed output-based specification was produced and in 2008, following limited competition, InterSystems was selected as the preferred Supplier. The cost of the procurement was significantly higher than anticipated and the process revealed that the budget was insufficient to deliver the entire vision. Consequently, the Project was split into two phases with the focus of Phase 1 on (i) replacing obsolete systems, (ii) investing in systems that offered the highest return on investment and (iii) putting the foundations in place for rollout of the full ICR Programme in the future.

The target delivery date was September 2010 but issues were identified during User Acceptance Testing, which resulted in a dispute with the Supplier and the implementation being delayed by nine months. The supplier agreed to supply the order communications module and implementation support free of charge by way of a settlement. This was implemented over a two year period, concluding in 2013.

1.2 Outcomes and Benefits

This Review found that phase 1 of the Programme has been a great success. The Programme delivered against all major objectives, installing new Patient Administration, Child Health, Pharmacy, RIS/PACS and Order Communications systems. Full EPR solutions were implemented in A&E and Maternity (with some qualifications).

Headline benefits delivered by the solution are as follows:

- £0.4 million p.a. in cash releasing savings mainly from implementation of PACS.

- £1.7 million p.a. in cost avoidance measures through improvements in efficiency.

- Improved patient care by making much patient information available electronically at all times to those with authority to access the information including a full history of pathology tests and radiology examinations.

- Improvements in efficiency arising from the introduction of electronic order communications.

- A significant improvement in patient safety through audited verification of diagnostic tests and reports.

- Operational improvements include a real time view of bed status enabling real time bed management.

- Improvements in immunisation rates from around 85% in 2006 to around 95% in 2013.

- Evidence exists that a more patient centred service is emerging, e.g. Social Care workers have electronic access to planned discharges and regular meetings are now held with Discharge Coordinators at the Hospital to pre-empt patient needs.

- Improvements in the ability to produce timely management information to inform audit, planning and performance management.

- A modern, reliable, sustainable and flexible technology infrastructure that forms the foundation of a full electronic patient record in phase 2.

- Most importantly, to continue to provide health care. Without the Programme HSSD would effectively have been left with no patient administration system. This would have made the whole organisation unsustainable.

1.3   Lessons Learnt

The Programme was in general, well managed with good practice adopted in relation to change management, benefits realisation and risk management although the lack of documentary evidence after implementation suggests follow-up actions were not always recorded.

Whilst implementation of the PAS was delayed by nine months, deferring delivery of some benefits, a good settlement was negotiated with the Supplier resulting in additional benefits. Notwithstanding the delay, two years for implementation of replacement PAS and ancillary systems still represents a good achievement in comparison to equivalent UK programmes, e.g. recent implementations of the Cerner Millennium PAS by Croydon Healthcare, South London Healthcare NHS Trust's Queen Elizabeth Hospital and Imperial College Healthcare NHS Trusts, were all delayed by several months.

Key lessons learnt (and being addressed) include:

- The need to invest in internal capacity and capability to reduce reliance on external consultants, reduce costs and ensure continuity of resource post implementation.

- The need to develop an information culture throughout HSSD, without which data capture and the consequential effect on data quality will present issues. HSSD's current Informatics Strategy addresses this, re-enforced by a recent review by the Comptroller and Auditor General. HSSD is making progress in this area through the implementation of the Informatics Strategy.

1.4   General Observations

Some general observations include the following:

- It is important to develop a constructive learning environment and a 'no blame' culture on programmes. It was apparent from the interviews that the atmosphere on the Programme was at times charged and this presented challenges to effective collaborative working. This can lead to defensive behaviours including the creation of excessive levels of documentation.

- MSP and PRINCE are excellent governance and delivery frameworks and ensure high levels of accountability and better results. However, they are frameworks and should be tailored appropriately to ensure they don't become over process oriented and 'suffocate' resourcefulness. Whilst all work should be performed to a high standard not everything has to be done perfectly. The effort invested in any task should reflect the value added. HSSD could consider how to create a more dynamic and agile environment for project delivery, whilst at the same time ensuring appropriate governance and accountability, e.g. adoption of the Agile Scrum methodology, a key principle of which is a recognition that users of the system don't always understand what they want/need. Trafford General Hospital is cited as an example of a Trust that has successfully used an Agile approach to clinical systems development.

- Quality Assurance is not the same as quality inspection. Quality should be 'lived' - project staff should lead by example and feel comfortable getting 'stuck-in' on a day-to-day basis.

- There appeared to be a lack of communication of the success of the programme both internally and externally. Implementation of a new system is difficult. Staff across all areas invested their time and effort to overcome challenges and make the implementation a success. Though it is still useful to document benefits and lessons learnt in this report, it is now 3 years after the implementation of the new PAS and far more could have been done to ensure that the whole organisation was aware of the achievements and felt able to share in the success.

- Project teams need to be 'agile' as the projects transition from procurement through development to UAT, implementation and follow up. Project teams appeared to be well represented at senior level, but as the projects progressed, they could have benefited from input from people in a position to ensure that changes were driven though and full benefits realised.

- There was a lack of practical experience and learning from ICR implementations elsewhere. This led to a tendency to be over ambitious in the configuration of the solution, which only became apparent when issues were identified by UAT. However, this practical experience will help to inform phase 2 of the development.

1.5 Conclusions

Progress made by Jersey HSSD in implementing an ICR compares favourably with other jurisdictions including the UK and USA. Informal benchmarking against ICT maturity models suggests that HSSD has moved from the bottom to the middle of frequency distributions illustrating EPR adoption trends but HSSD might consider commissioning a formal assessment against the EMRAM model to help inform the future ICR roadmap. Successful implementation of phase 2 should place Jersey in the top quartile but this would be in comparison to today's benchmarks, which are constantly shifting. In particular, over 50% of UK Trusts now have e-prescribing in place and this should be treated as a priority because of the clinical benefits that can be delivered.

The Project delivered good value for money. A direct comparison with the National Programme in England would be misleading, on account of the scale and ambition of the latter. However, it is worth noting that the budget on the National Programme increased from £2 billion to £12 billion (12% of NHS budget adjusted in today's terms) and the Programme was widely considered to be a failure. In contrast, HSSD's budget was £12 million against a total HSSD budget of £200 million (6% of budget) and Phase 1 of the programme largely delivered against its mandate. A more recent example is the Cambridge University Hospitals (CUH) Trust EPIC eHospital Programme, which has taken a 'big bang' approach to implementation of an EPR and went live in October 2014. CUH turns over £700 million and the total cost of the programme is forecast to be £200 million over 10 years.

The ICR programme has not been without its challenges or its critics. Indeed, some of the comments in the main body of this report may be construed as critical. However, implementing change on this scale is very difficult. The challenges faced by HSSD are typical of those faced by major EPR programmes everywhere. For example, the ICT Director at the Isle of Wight NHS Trust, which shares a number of characteristics with Jersey, described a similar set of challenges, including resistance to change, issues with the usability of their EPR solution and ongoing attempts to address and resolve these issues. Progress has tended to be incremental rather than revolutionary. A reference site visit to the Isle of Wight is recommended to see if anything can be learned from their experience.

HSSD has made significant progress toward implementing a full ICR. All of the foundations are in place for developing the solution. It is important that HSSD does not lose its nerve and continues to pursue the original vision. Key to future success will be the importance of organisational learning and the need to ensure that scarce resources are deployed as effectively as possible in pursuit of creating real value.

2.   Introduction

2.1   Purpose

This Report summarises the findings of a Programme Implementation Review (PIR) of the first phase of the States of Jersey Health and Social Services Department's (HSSD) Integrated Care Record (ICR) Programme.

The review follows a recommendation made in the States of Jersey Public Accounts Committee Report into the Programme, which noted that a Post Implementation Review had not yet been conducted[1].

The review was conducted by consultants from Capita Health Advisory Services.

2.2   Objectives

The objectives of the review were to:

- determine the extent to which the Programme delivered the outcomes and benefits identified in the Programme Initiation Document (2009);

- establish if the Programme delivered value for money to residents of Jersey;

- benchmark the current Informatics capability in HSSD against the Health Information Management Systems Society (HIMSS) adoption model and the NHS England Clinical Digital Maturity Model;

- assess whether it represented value for money by comparing the cost and benefits against equivalent programmes elsewhere including the UK Government's Connection for Health (CfH) programme and other crown dependency programmes, e.g. Guernsey;

- identify any lessons learnt, which could be used to inform the delivery of the second phase of the ICR programme;

- to inform the phase 2 funding submission; and

- formally close the first phase of the ICR Programme.

2.3   Approach

The approach adopted was as follows:

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[1] It is noted that PIRs of two key components of the ICR programme, the Picture Archiving and Communications (PACs) and Child Health systems had already been completed and it was always intended to review implementation of the Patient Administration System once delivery of electronic order communications was complete.

- A formal documentation review including the Programme Initiation Document, Detailed Business Case, Programme Board Minutes, Highlight Reports, Programme Registers, etc.,

- A review of the 2014 – 2018 Informatics Strategy

- A review of the Public Accounts Committee Report into the ICR Programme

- Interviews with key Stakeholders including:

    o The Director of Finance and IS

    o The Assistant Finance Director

    o The Operations Director

    o The States of Jersey Head of Information Services

    o The Clinical Lead on the Programme

    o An Emergency Department Doctor

    o The Head of Maternity Services

    o The Radiology PACS and Office Manager

    o The Chief Pharmacist at the Hospital

    o The Pathology Laboratory Manager

    o The Head of Public Healthcare Programmes

    o The Head of Health IT

- Informal benchmarking against the HIMSS Maturity model, the NHS England Clinical Digital Maturity Model, UK Connecting for Health Programme and other stand alone health economies considered to be a reasonable proxy for Jersey, e.g. the Isle of Wight.

2.4   Scope

Project Implementation reviews for the PACS/RIS and CHS systems were completed on conclusion of these Projects. The scope of this report is the ICR programme as a whole with specific focus on implementation of the Patient Administration System (TrakCare) and electronic Order Communications.

2.5   Assumptions

The main assumption made was that staff involved in delivery of the Programme provided transparent and unbiased information and opinions on the benefits and shortcomings of the implementation.

2.6   Constraints

The following constraints applied to completion of this assignment:

- The passing of time – significant Programme decisions were taken many years ago, many key decision makers and influencers have moved on and much of the evidence reflects individual and collective memory of the events in question.

- The time available to the Review Team to review historic programme documentation.

- There were 250 planned financial benefits in the 2008 benefits plan. It was not possible to follow up on each one to fully assess achievement. The benefits included in this report are thus the result of pragmatic assessment of the major financial benefits areas, many financial benefits achieved may not have been captured in this report.

3.   Context

3.1   Health Services in Jersey

Jersey is a crown dependency of Great Britain but is not part of the United Kingdom, nor of the European Union. The States of Jersey (SOJ) is the governing and legislative body for Jersey. The Minister for Health and Social Services is the legal entity with authority for social and public health matters. The Minister's Health and Social Services Department (HSSD) has regulatory and health and social protection functions, as well as providing a wide range of services to Jersey's 110,000 residents and seasonal visitors.

Whilst Jersey is not bound by UK law, regulations, or standards, it operates predominantly within the UK health and social care economies. It competes mainly with the UK for the recruitment and retention of its specialist staff and its population has aspirations for standards of living which compare favourably with the UK and other neighbouring countries. In common with other small and island jurisdictions, it faces the challenge of meeting those aspirations in the context of its small scale, and the logistical difficulties of being an island.

3.1.1   Service provision

HSSD directly provides:

- some primary health services from a hospital setting e.g. Community Dental Services for children aged 3 to 11;
- children and adult social services;
- secondary health care service;
- child and adult mental health services; and
- some continuing care services.

3.1.2   Service commissioning

HSSD commissions:

- community nursing and other community support services; these are sourced from independent local charitable organisations;
- specialist and tertiary services which are not provided locally; these are sourced from the National Health Service (NHS) in the UK and other UK providers; and
- some continuing care services; these are sourced locally from the private and charitable sectors.

HSSD is not currently responsible for providing or commissioning General Practitioner Services, General Dental Practitioner Services and Optometry Services; these are provided as private commercial enterprises.

3.1.3   Budget

HSSD's budget in 2014 was approximately £200 million of which £110 million is allocated to Hospital services.

3.1.4   New Hospital

Plans are currently under consideration to build a new Hospital in St Helier.

3.2   Integrated Care Record

3.2.1   Definition and Vision

For several decades, Healthcare Organisations in advanced economies have been attempting to harness the power of information technology to digitise patient clinical data across the care pathway in the interests of efficiency and improved quality of care.

An electronic Integrated Care Record would provide clinicians with context specific real time information on the patient's medical and social care history at point of service, including all demographic data, clinical data and diagnostic tests.

The original vision for an ICR programme in Jersey included:

- making individual records available at all times across care settings to those with authority to access them;

- the provision of rich, relevant and accurate information to support management, planning, audit, inspection;

- improvements in patient safety through supporting best practice, and the communication of consistent, accurate and timely information ;

- improved efficiency through eliminating duplication of data and improved care processes;

- the organisation of services around individual needs rather than fitting individuals into existing service models; and

- supported by a modern, reliable, sustainable and flexible technology infrastructure.

3.2.2   Challenges

In practice (and with the benefit of hindsight), delivering an integrated care record has proved more challenging for healthcare organisations than had been anticipated 10 years ago and Jersey's experience is not atypical. There have been several high profile failures including (in part at least) the National Programme for IT in England. This is for a variety of reasons including:

- The reluctance of suppliers to accept the risk of outcomes based contracts.

- The natural tendency of communities of interest to resist changes to working practices.

- The need to configure software applications to meet national and local needs, e.g. where the software was originally developed under a different jurisdiction.

- The challenge of aligning software applications with clinical processes so that the applications work for the administrators and clinicians at point of service. Closely linked to this is the need to develop intuitive and useable software interfaces.

- The resources required to deliver change. The change programmes require that scarce clinical resource is assigned to the programme.

- The requirement to manage clinical risk and business as usual while the changes are implemented.

- The computing capacity and power required to process large volumes of data (although this issue has diminished as the cost of computer power has fallen).

- Legislation relating to patient confidentiality and data protection requiring the development of complex data security models.

3.2.3   Future Trends

This vision for an Integrated Care Record in Jersey is consistent with the vision developed elsewhere and was originally articulated more than a decade ago.

The key IT developments since the vision was originally set out are (i) the advent of mobile computing and (ii) the development of the Internet, and the potential these technologies offer to support self service and the empowerment of patients to participate in management of their own care records. Both these developments will need to be reflected in Phase 2 of the Programme. HSSDs current Informatics Strategy and the States of Jersey e-government vision both incorporate these developments and the opportunities they provide.

3.3   A brief history of the Jersey ICR Programme

In 2006, Jersey HSSD embarked on a programme to develop a digital care record in support of improvements in administrative and clinical efficiency, patient safety and quality of care. This was in response to an urgent requirement to modernise its ICT infrastructure (hardware and software), the potential offered by new technology and developments elsewhere, including the National Programme for IT in the UK. An added imperative was the decision by the US multinational, Electronic Data Systems (EDS), to withdraw from the UK market following its failure to secure contracts under the NPfIT programme. EDS supplied the Jersey patient administration system but EDS was no longer committed to developing the system and would eventually withdraw support.

HSSD secured £12 million in capital funding to support this vision from the States Assembly. It is understood that £12 million was at the lower end of an initial estimate and it was intended that the lifetime cost of the programme would be established through the procurement process. Given the relative newness of some of the technologies in question and the difficulty accurately specifying the solution requirements, the UK Office for Government and Commerce recommended the competitive dialogue process. This was standard advice following the introduction of competitive dialogue as a replacement for the negotiated procedure where some uncertainly existed over the final specification. It is typically more expensive for both

procurers and suppliers and would have represented a significant overhead given the relatively small scale of the contract in relation to equivalent projects on the UK.

HSCL was appointed as external consultants to assist with the procurement and a detailed output-based specification was produced. Competition was limited – InterSystems quickly emerged as the preferred supplier and the procurement process proved more protracted than anticipated. In 2008, it became apparent that the original high level budget estimate was insufficient to deliver the ICR vision in its entirety and the Programme was split into two phases.

Phase 1 prioritised replacement of the obsolete PAS and ancillary systems (maternity, A&E, child health), a replacement Pharmacy stock control system and RIS and PACs, which offered the highest return on investment. Phase 2 would deliver electronic Order Communications, ePrescribing and a full Electronic Patient Record to general medical and surgical wards.

Phase 1 of the programme was initiated in 2009 with a target implementation date of September 2010 for delivery of the new PAS, maternity and A&E systems. An interim Programme Manager and Project managers were appointed due to a lack of project management resource within HSSD. InterSystems application specialists worked alongside HSSD clinical and administrative staff to configure the system.

In autumn 2010, User Acceptance Testing revealed that elements of the configured system were unusable and the Programme was rescheduled. The Programme Management Team was of the view that the resource provided by InterSystems was insufficiently experienced to guide HSSD staff through the configuration process. A robust renegotiation followed resulting in InterSystems putting a stronger team on the ground. TrakCare eventually went live in the summer of 2011 nine months later than originally intended. As part of the settlement reached, InterSystems offered to supply the electronic Order Communications solution and implementation support free of charge. This had a real value of £800k to Jersey as these costs would have been incurred as part of Phase 2 and the solution was delivered earlier than would otherwise have been anticipated.

Order Communications for inpatients was successfully implemented across all services by 2013 alongside a number of smaller projects, e.g. breast and bowel cancer screening solutions, which were outside the scope of the ICR programme and had been deferred to allow resources to be focused on ICR.

3.4   PAC Report

The States of Jersey Public Accounts Committee published a report on the ICR Programme on the 17th July 2014. This report was critical of the Programme and a number of recommendations were made regarding future governance arrangements.

It is not intended to revisit the ground covered by the PAC report or to comment on the findings. Instead this report follows up the recommendation to conduct a formal Post Implementation Review to document what benefits were delivered by phase 1 of the Programme; benchmark Jersey's informatics capability following implementation of

several new systems and identify the lessons learnt, with a view to informing the second phase.

4. Review Findings - Programme Management

This section focuses on the effectiveness of programme management and delivery in the context of the main MSP functions of change management, quality assurance and risk management. In practice these functions are complementary and designed to work together rather than in isolation, e.g. if lack of clinical engagement was recognised as a risk, this could influence the approach to change management.

4.1 Procurement, Contract and Supplier Management

4.1.1 The Procurement

The competitive dialogue procedure was used to procure the solution following advice from the OGC. The competitive dialogue procedure can only be used in limited circumstances, e.g. where the contracting authority is unable to produce a complete output-based specification without discussing its needs in detail with suppliers or the solution is likely to be particularly complex and will require dialogue with bidders to conclude. It is generally used for complex procurements such as PFI/PPP projects.

The competitive dialogue procedure was introduced in 2004 and was intended to replace the negotiated procedure in all but exceptional circumstances following concerns that the negotiated procedure was distorting competition. Consequently, competitive dialogue was relatively new when HSSD initiated the procurement in 2006, with very few procurements completed.

In 2008, the OGC published a guidance note on competitive dialogue, which noted that:

> *'overall the procurement costs are likely to be higher for contracting authorities and for bidders than under the negotiated procedure' (which would have in turn been more expensive than the restricted procedure); and*

> *'following the competitive dialogue process is not easy. To effect a satisfactory result requires significant preparation, planning, and effort by the Contracting Authority. This includes early consideration of the likely number of bidders to involve and the likely balance of higher costs from a more complex process against the benefits in terms of increased value for money'.* [2]

In 2006, there would have been relatively few successful ICR implementations so there was limited experience for HSSD to draw upon, e.g. via reference site visits. Contracting for a solution would have been a significant challenge given HSSD's limited procurement experience. External Consultants were appointed to support the procurement and the general consensus is that they performed well. Competition was more limited than expected and InterSystems were quickly selected as the preferred supplier. This may have been a consequence of Jersey's relative isolation and the much larger healthcare contracts being awarded in the UK.

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[2] Competitive Dialogue in 2008, OGC/HMT Joint Guidance on using the Procedure

A consequence of adopting the Competitive Dialogue process was that Procurement costs were significantly higher than originally anticipated. However, it is difficult to see what alternative HSSD had given the advice received from the OGC. Nor would the costs have been fully predictable given the relative newness of Competitive Dialogue and the small number of completed procurements to reference.

Today, Competitive Dialogue is typically used for large and complex contracts, e.g. the Cambridge Older people's Healthcare Contract, which is currently being tendered, is estimated to be worth £800 million to the successful contractor over five years. This hasn't stopped several bidders qualifying out of the process relatively early on. If HSSD were to contract for an ICR today, it is unlikely that the Competitive Dialogue process would be used as the market for EPR solutions has matured and the contract is relatively small.

4.1.2   Contract and Supplier Management

A positive outcome of the competitive dialogue process was a robust contract and recourse to this was required during negotiation with InterSystems after shortcomings in supplier delivery and the system configuration were revealed by User Acceptance Testing. At this stage, there was a real risk that the Supplier relationship could have broken down. It is to the credit of the Programme Team that it was able to persuade InterSystems to put a stronger team on the ground and successfully implement Phase 1 of the Programme (albeit with a deferred completion date). The Programme Team also negotiated/secured the provision of the Order Communications module and appropriate Implementation Support free of charge.

4.2   Programme Delivery

The programme successfully delivered the following solution components, consistent with the phase 1 Programme mandate.

Target Delivery Date	Actual Delivery Date	Solution Component
Jan 2009	Jan 2009	McKesson Child health
Feb 2010	Feb 2010	Radiology Information System Picture Archiving and Communications System
Nov 2010	June 2011	New Pharmacy Stock Control System (JAC)
Nov 2010	June 2011	New Patient Administration System (TrakCare) including interfaces to ancillary systems for the exchange of patient demographics
Nov 2010	June 2011	Electronic Patient Record in Maternity and A&E (TrakCare)
NA	Jan 2014	Order Communications, Results Reporting and Verification Systems for Inpatients, Emergency Department and Outpatients (TrakCare) for pathology and radiology

4.3 Change Management

The Programme recognised the importance of change management at an early stage and it was originally intended that there would be a degree of risk sharing with the Contractor. In practice, there was little appetite for this on the part of InterSystems perhaps reflecting the aggressive approach to outcomes based contracting adopted by the National Programme in the UK.

The HSSD Team was therefore responsible for delivering the required change programme and the benefits. Change Teams were established around the Service Team structure to take forward the work in each area. This required SMT members to release staff time to support the work streams, which it was felt had the added benefit of facilitating organisational readiness for the wider HSSD business transformation programme.

Whilst there was a high degree of clinical engagement, it is noted that there were limited opportunities to backfill due to financial constraints and the intrinsic difficulty of obtaining cover for specialist staff. At least one interviewee commented that more experienced members of staff should have been seconded to the programme. There is also some evidence that too much reliance was placed on individual 'super users'. This caused both workload pressures for the individuals but also enabled those who were evangelical about the Programme, to effectively 'plough on alone', missing the opportunity to fully engage and carry the rest of the service with them.

One of the benefits of TrakCare is that it can be customised to support local business processes and clinical needs, which created a number of difficulties. InterSystems were unwilling to contract on the basis of outcomes but there was a reasonable

expectation that their developers would guide clinical staff in HSSD through the software configuration. In practise, whilst the InterSystems application specialists were competent in configuring the system, they had limited knowledge of the clinical setting or relevant implementation experience. HSSD clinical staff were given carte blanche, without due consideration being given to practicality or the configuration management implications, e.g. compatibility with future software releases. As a result, expectations were not effectively managed and much work completed for the Maternity and A&E implementations had to be rolled back. In some instances it was implemented but not widely used.

A traditional 'waterfall' approach to analysis and configuration of the system with support from InterSystems was adopted. A significant amount of effort went into the analysis of existing 'as-is' processes in order to inform design of the new 'to-be' processes. This type of approach ensures a high level of accountability but the value could be questioned given the opportunity afforded by a systems refresh to start from scratch. Neither did it produce the desired results, given that UAT revealed that elements of the initial solution were unusable. In future, HSSD could consider whether a more agile and iterative approach to systems configuration is possible with workshops and walk-in sessions so that staff whose time is at a premium are able to comment on/participate in the evolving solution without impacting on their operational responsibilities.

There was some evidence that the impact of changes was not always fully assessed such that benefits delivered in one clinical area had dis-benefits elsewhere, e.g. switching off printing following the implementation of order communications is proving difficult because the Microbiology laboratory process is not fully automated yet.

The Project teams had good representation by senior decision makers, but as the Projects progressed more input was needed from people working in front line services to ensure the smaller issues were addressed, which when combined can compromise the overall success of a Project.

4.4   Benefits Planning

The MSP methodology is centred on benefits realisation. The Benefits Plan produced by the Business Change Manager was systematic, with over 250 planned benefits recorded in a register including detailed baseline data and the assumptions on which the benefits estimate was based. However, benefits categorisation could have been clearer, which would have aided summation and reporting.

Financial benefits were categorised according to whether they were cash releasing or cost avoiding. The possibility of pricing risk was also considered, e.g. a reduced risk of successful litigation due to fewer medical errors and improvements in the audit data necessary to demonstrate due care. However, litigation rates in Jersey are much lower than in the UK so this was discounted. In future, HSSD could use guidance in the HM Treasury Green Book for valuing costs and benefits where there is no market value.

Benefits were assigned to Owners, who were required to sign-off that benefits which would accrue to their Service would be delivered. This committed some Departments, in particular Radiology to headcount reductions.

However, the Benefits Plan did not describe how delivery of the benefits would be verified, e.g. where multi-factorial factors applied, how the impact of the ICR programme would be teased out and accounted for. Furthermore, there is limited evidence of verification in the documentation (at least until this Review, which has attempted to confirm whether the planned benefits were delivered - see Section 5). In future, HSSD could consider the use of a proprietary benefits realisation methodology, e.g. Dimension 4, which has proved to be a very effective on UK programmes[3].

A further consequence is that HSSD missed the opportunity to publicise the undoubted success of the programme both internally and externally. Implementation of a new system is difficult. Staff across all areas invested much time and effort to overcome challenges and make the implementation a success. Though it is still useful to document benefits and lessons learnt in this report, it is now three years after the implementation of the new PAS and more could have been done to ensure that the whole organisation was aware of the achievements and share in the success at the time.

4.5 Resource Management

Jersey is a small Island with an economy heavily biased toward financial services and strict controls over immigration. The ability of HSSD to scale-up (and scale down) human resources is limited.

The ICR programme appointed interim staff from the UK on day rates and at least one senior Project Stakeholder is of the view that local employees were sidelined. Once the Programme was wound down in 2010, the interims were released resulting in a loss of continuity. Post implementation issues were not followed-up as effectively as they might have been and insufficient thought was given to handover to business-as-usual operations. The Programme did not fully anticipate the resource implications of supporting and developing the solution, e.g. there was no HSSD ICT Manager in post. Consequently, clinicians and managers who had started to appreciate the potential of TrakCare to improve the quality of management information were unable to get the support they needed, e.g. with data analysis and reporting.

The majority of Interviews highlighted the importance of investing in internal capacity and capability both now and in future and action has already been taken in this respect, with the appointment of a new Head of Health IT and the appointment of a Head of Informatics.

It is worth noting that interim staff often bring a high level of motivation, good practice and a breadth of experience and it is a question of striking a balance. Wherever possible, the use of interims should be limited to supplying niche skills, meeting short term constraints on capacity and an emphasis should be placed on skills transfer rather than role substitution.

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[3] For example, see http://ssaps.co.uk/strategic-issues/d4-dimension-four/

4.6   Quality Assurance

There are several definitions of quality. In the context of the ICR programme, the most appropriate definition is 'fitness for purpose', which will encompass functionality, usability and resilience. Quality management should be viewed as an active rather than a passive process, i.e. quality assurance is not the same as quality inspection.

The Programme produced a Quality Plan in accordance with MSP/PRINCE II methodologies. This articulated roles and responsibilities and was focused on management processes rather than product assurance. However, there was limited information on *how* quality assurance should be performed.

It is well established that issues with quality become progressively more expensive to resolve if they remain unidentified. By the time a product goes into User Acceptance Testing, the cost of resolving an issue can be 100 times higher than it would have been had the problem been identified at the design stage.

There were issues with configuration of the TrakCare system which were not identified until User Acceptance Testing resulting in the Programme being delayed by several months. It is possible that some of these issues could have been identified earlier if the Quality Assurance function had been more effective.

4.7   Risk and Issue Management

The Programme adopted a systematic approach to risk management in accordance with good practice. A comprehensive and detailed risk register was maintained, which recorded the threat, vulnerability, likely impact if the risk were to materialise and proposed containment plan.

It is noted that some of the risks identified actually materialised and many of the mitigating actions, including those relating to the most severe risks remained open in the Register. However, it is probable that the issues that these risks gave rise to would likely have been more severe had the risks not been identified in advance and failure to close the risks is more likely to be a record keeping issue rather than the result of neglect.

4.8   Handover to Operations

Handover of the Programme to 'business as usual' operations could have been more effective. It was evident that insufficient planning went into this and there is a sense that the programme ground to a halt. This is closely linked to the resourcing issue in that the Intersystems implementation team and the interim Programme team were offsite within a few weeks of go-live. A consequence of this was that by the time clinical staff had become aware of the capabilities of TrakCare, there was limited resource available to provide support.

5. Review Findings - Benefits Realisation

This section evaluates the extent to which the Programme delivered the desired outcomes in relation to financial savings and value, patient safety and quality of care.

5.1 Financial

The Programme systematically identified the potential benefits of the Programme, categorised them as 'cash releasing' or 'cost avoidance'. These were recorded in a Benefits Register which included the baseline (as-is) performance and detailed assumptions on which delivery of the benefit depended. There was also a corresponding dis-benefits register.

Approximately £6 million of benefits across phase 1 and 2 were identified in total, of which £2.5 million were cashable. Heads of Service signed-off against a shorter list of £1.8 million of benefits for Phase 1 of the Programme with the remainder to be delivered by Phase 2.

In practice, establishing the extent to which some of the benefits were realised is difficult because the causes are multi-factorial, e.g. a reduction in length of stay could reflect a shift toward treating people as day cases, changes in clinical protocol or pressure on beds.

This Review considered the key financial benefits of phase 1. These are those of the RIS-PACs programme, order communications and those relating to a reduction in bed use due to more efficient care processes. Across these areas, the Review confirmed that benefits totalling £2.1 million had been achieved. The majority of these benefits are cost avoidance, i.e. where cash has not been taken out of the system but time saved will contribute towards improved quality of care and capacity can be increased without the need for a corresponding increase in resources.

We have not systematically gone through each of the 250 plus initial benefits but rather concentrated on the major financial benefit areas of PACs and order communication. Specifically we have not included savings from implementation of the Child health system, or care records in Maternity or Accident and Emergency but there will be efficiency savings here. This will include efficiencies from reduced time searching for, obtaining and filing in case notes and reduced time to produce discharge letters.

The table below sets out the top level figures for savings in these areas. A more complete summary can be found in appendix A

Area	Benefit - £ per annum Cash releasing	Benefit - £ per annum resource reinvested	Total
Whole system		£1,088,360	£1,088,360
Radiology. RIS-PACs	£328,000	£36,000	£364,000
Order communications	£38,000	£587,000	£625,000

Total	£366,000	£1,711,360	£2,077,360

5.2   Efficiency

Improvements in efficiency are closely aligned with the delivery of financial benefits.

5.2.1   PACS/RIS

Prior to introduction of the new RIS, the department was using an outdated standalone RIS, which was no longer fit for purpose. Referrals were received on paper and all business processes were paper-based. These were processed, appointments scheduled and film taken. The film was processed and reviewed, the report sent back to the referrer on paper and the film filed. Requests and reports could go missing leading to further delays. If a film needed to be re-reviewed this had to be requested and the film had to be located.

With the new system, Order Communications is used to request radiology examinations, the RIS will schedule an appointment, and a digital image is taken and uploaded to PACS. Digital images are viewable immediately by clinicians, so for example fractures can be quickly diagnosed in A&E. The radiologist will also review and report electronically.

There is time saved in requesting, scheduling, processing, releasing results, retrieving past images for review, and the need for repeat images where films are lost.

There are also resources directly saved in terms of processing, films, paper and storage.

5.2.2   Order communication

Efficiencies include:

- Faster diagnosis, treatment and discharge due to faster turnaround of orders and results reports. There is a reduction in time clinicians spend in ordering and reviewing test results and it will also contribute to a reduction in time patients spend in the Hospital.

- The elimination of transcription errors due to illegibility of handwriting on request forms.

- Clerical staff do not have to spend time processing paper requests and results and do not have to file pathology test results into patient's case notes.

- Pathology staff do not need to spend time entering pathology test requests into their computer system, sorting paper test results for distribution, or phoning urgent results.

- A reduction in pre-printed forms and stationery costs.

- Reduction in the need for repeats tests when requests / results have gone missing.

5.2.3   Bed Management

Historically, bed management relied upon the bed manager touring each ward in the Hospital several times a day armed with a clipboard and post-it notes. With TrakCare the bed manager now has a real time view of the bed status. She can identify where beds are empty; beds where the patient is due to be discharged that day or on following days. Infection control is supported as alerts are triggered when a patient has a notifiable infection, or has a previous history of a notifiable infection. This will inform infection control procedures including influencing where patients are placed and identify if beds need to be closed for deep cleaning.

In practise, the Bed Manager still tours the wards to ensure that the bed status recorded is accurate as there can be delays in ward staff updating the system. However the system enables her to identify bed capacity and thus ensure that admissions can be scheduled efficiently.

The system can also be accessed by social service staff based at the hospital to inform discharge planning and help to avoid delayed discharges.

5.3   Clinical Effectiveness and Patient Safety

Phase 1 of the Programme has made a significant contribution to patient safety.

5.3.1   PACS

PACs enables images to be immediately available to all that need them together with reports for those images. This provides rich and timely information to inform diagnosis and treatment of patients.

5.3.2   Order Communications

This has ensured that:

- A full history of patient tests and results are available to all that need them at all times in TrakCare (rather than having to independently log into the ancillary systems). This provides rich timely information to inform diagnosis and treatment of patients and thus improve patient care

- Results are available in TrakCare on line and system will require verification that the result or image has been reviewed improving accountability and providing a clear audit trail of actions. This reduces the risk of clinicians missing important results which inform patient care. Verification rates in excess of 85% have been achieved across HSSD inpatient areas with a 97% compliance rate in A&E. This contrasts with an audit of patients' notes which found that less than 50% of notes had a full record of tests results with verification by the clinician.

- Orders for diagnostic tests are entered electronically guaranteeing delivery of the order and ensuring that exceptions, e.g. missing blood samples are detected.

- All results are recorded in the clinical record and HSSD is currently in the process of switching off printing of paper results for Inpatient diagnostics. Previously, paper results had to be filed and some were inevitably misplaced.

5.3.3   Bed Management

TrakCare helps the bed manager ensure that patients are placed in the appropriate ward for their condition, that there are no cancellations of admissions, and informs infection control. All of this contributes to clinical effectiveness and patient safety.

5.3.4   Public Health Programmes – Immunisation and Screening

There has been an exceptional improvement in immunisation rates, reducing the risk of individual infection and epidemics, since the new child health system was implemented.

In 2006 the vaccination coverage was 85% for DPT, 81% for MMR, 86% for Meningitis C, and 85% for HiB.

2013 annual statistics reveal that uptake is now very high:

- 98% of babies received their primary set of immunisations at two, three and four months old, including protection against diseases such as whooping cough and HiB meningitis

- over 95% of one year olds received the measles, mumps and rubella (MMR) vaccine

- more than 93% of children had their pre-school booster vaccine

This increase cannot be said to be solely due to system but has been achieved by implementing robust processes which are enabled by the system.

The system and processes introduced have improved the mechanism for identifying population eligible for vaccinations and Child Health checks

For breast screening, use of the PACs system together with the Commit system has led to reduce time taken to turnaround breast screening results and has improved process for reviewing mammography images. Two radiologists review independently and this reduces risk of missed diagnoses.

5.4   Electronic Patient record

Maternity Services and A&E have implemented an electronic patient record, i.e. clinical data is captured electronically to TrakCare.

5.4.1.1   Maternity Services

The capture of clinical observations and notes coupled with use of evidence based proformas has significantly improved patient safety.

With the exception of the Partogram, which is still paper based, all observations and clinical notes are recorded electronically often in real time.

Midwifes and clinicians are required to complete an electronic proforma following delivery, which ensures all necessary follow-up actions are taken according to the circumstances of the delivery, e.g. in the event of a perineal tear or post-partum

haemorrhage. This is particularly important for continuity of care and supports evidence based practice.

Links to the child health system has also meant that information on births can be directly exported, thus improving efficiency.

5.4.1.2　Accident and Emergency

A full history is taken on TrakCare, which can be difficult, e.g. it is not possible to annotate the notes with diagrams, and care is required to ensure that notes are comprehensive. Discharge letters are automatically generated with demographic and administrative details. However current notes are converted to a 'text block' and have to be reformatted. It is hoped to address this issue in a later software release.

Evidence based guidance is available to support clinicians but this is for reference purposes and not incorporated into a clinical workflow in terms of rules based decision support. Some templates were developed to support clinical service delivery but these are only used by a single physician.

However, A&E clinicians now have access to all clinical letters, data on previous A&E attendances and a schedule of past and future appointments and the improvement in access more than compensates for the difficulty taking a history, e.g. if an unconscious patient is taken to A&E as in the middle of the night, the A&E clinician can immediately access a full set of notes for previous patient A&E attendance history to aid diagnoses and inform care.

The introduction of electronic order communications and PACS means that clinicians can quickly access x-rays, diagnostic results and reports, e.g. if a fracture has been missed, remedial action can be taken very quickly.

5.4.2　Patient Centred Care

There is encouraging evidence emerging that the ICR programme has contributed to a more patient centred service. For example, Social Care and Community Health Nurses have access to TrakCare enabling them to establish if their patients have been admitted. An indirect consequence is that Social Workers and Community Nurses now attend meetings with the Hospital Discharge Coordinator, which has resulted in improvements in readiness at discharge, e.g. by ensuring appropriate nursing cover, rehab and personal care packages are in place and/or re-instated when the patient is discharged.

Less obvious is the impact of Order Communications, which has resulted in patients waiting less time for results and by implication treatment, a reduced likelihood of results being misplaced and consequently a reduced number of retests.

There was also anecdotal evidence of the scheduling capabilities of TrakCare working to the patient's benefit, e.g. through the scheduling of contiguous same day appointments for consultation and diagnostics.

5.4.3   Information Management, Planning and Decision Support

There have been improvements in information quality for planning and decision support and both management and clinicians have become increasingly aware of the value of the data locked up in the system.

However, improvements in management information been have been constrained by the lack of an 'information culture' in HSSD and shortcomings in data collection and quality. This is now at the core of the Informatics Strategy as reflected in recent appointments to the Service.

5.4.4   Information Security

The ICR solution has significantly improved information security. A higher proportion of clinical data, including clinical notes and the results of diagnostic tests are captured to TrakCare with access on a roles based 'need-to-know' basis and data access is logged for audit purposes.

HSSD is still some way off creating a fully paperless environment and paper based notes will remain in use for sometime not least because of the legacy, which would be prohibitively expensive to scan and digitise. However, the security of paper based notes has been improved to some extent through case note tracking, which requires staff to record when medical records have been 'pulled' and transferred between services. However, levels of compliance could be higher.

5.4.5   Demand Management, Capacity and Scalability

TrakCare provides a real time view of bed status, which is being used by the Bed Manager and Operations Director to help manage demand and capacity. However, it is dependent on Ward Nurses and Clerks maintaining the data and it is sometimes not viewed as a priority on the wards, e.g. the default discharge date of 7 days following admission is not always updated. Consequently the Bed Manager still does a tour of the Wards to verify and update bed status; time which could be better spent facilitating discharges. Nevertheless the system is a significant improvement on the past when the Bed Manager toured the Wards with a clip board and post-it notes.

The phase 1 implementation has contributed to significant efficiencies in the provision of inpatient care through faster availability of patient test results, reports and images, thus speeding decisions on diagnosis and treatment, leading to improved bed management and reducing delays in discharge. Between 2006 and 2013, length of stay reduced by 39% for surgery (from 4.2 to 2.6 days) and by 20% for medicine (from 7.7 to 6.2 days). Some of this reduction will be due to changes in clinical practice, e.g. through less invasive surgery. However, it is reasonable to attribute 13% of the reduction to the phase 1 implementation. This is supported by evidence of impact on length of stay from other ICR implementations.

5.5   Foundation for phase 2

Phase 1 of the Programme has laid the foundations to realise the original ICR vision. Phase 2 of the ICR will include full roll out of the electronic patient record across hospital services, e-prescribing, extension of order communications to primary care and integrated records with community services.

Thus the full infrastructure is there to enable EPR roll out, and a wealth of knowledge around implementation to inform change management. Once rolled out there will be further significant gains in efficiency and quality with each patient having a single electronic record that can be accessed by the clinician caring for them.

The infrastructure for order communications for primary care has been installed and again there is a wealth of knowledge about implementation.

E-prescribing will have enormous clinical benefits. The preferred system has been proven to integrate well with TrakCare elsewhere.

6. Benchmarking Value for Money

6.1 Review of UK programmes

6.1.1 The NHS National Programme for Information Technology (NPfIT) Programme

Established in 2004, the NHS National Programme for IT was ambitious programme to deliver a single electronic care record for patients in England and to connect 30,000 General practitioners to 300 hospitals, providing secure and audited access to these records by health professionals. At the time it was the largest civil IT project in the World.

Whilst the Programme successfully delivered the underpinning IT Infrastructure, (the Spine), many other components of the solution including the Integrated Care Records Service, ePrescribing and electronic appointments booking (Choose and Book) were severely delayed[4]. The budget escalated from £2.3 billion to £12 billion and the Programme became mired in controversy with damning reports by the National Audit Office and Public Accounts Committee. Contracts with suppliers were criticised for being over aggressive and the Supplier to the North East, East and East Midlands Clusters, Accenture pulled out. Fujitsu, which was responsible for the Southern cluster had its contract terminated.

A full history of the National Programme is beyond the scope or requirements of this Report. However, a consequence of its failings is that there is a renewed trend toward localising NHS IT services and many Trusts are contracting for new/replacement Electronic Patient Record systems.

It would probably be misleading to benchmark Jersey's ICR programme against the NPfIT. The NHS is financed and structured differently to the Jersey Health Service, the National Programme was breathtaking in its scale and ambition and it would have been able to realise scale economies when procuring the building blocks of the solution that Jersey HSSD could only dream of. However, a simple comparison is informative.

If the cost of the National Programme (£12 billion) as a ratio of the NHS budget in 2009 (£115 billion) is contrasted with the cost of the ICR programme (£12 million) as a ratio HSSD's combined budget for health and social care (£200 million) it would be reasonable to conclude that the HSSD ICR programme has performed very well, especially given the achievements of the ICR programme.

6.1.2 Isle of Wight ICR Programme

The Isle of Wight (IoW) is part of the UK and delivers services through the English NHS but shares a number of characteristics with Jersey. It is a relatively isolated and small Island with a population of 140,000. The NHS Trust is responsible for delivery of acute, community, mental health and ambulance services with a budget of £170 million. The Local Authority allocated a further £70 million budget for Social Care. All GPs are on local instances of the same version of a GP system (iNPS) and the Trust had invested

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4 See http://www.publications.parliament.uk/pa/cm200607/cmselect/cmpubacc/390/39006.htm

in Vision360 enabling a summary care record to be shared between Health care providers.

Following the winding-up of the UK National programme and shift to local ICT provision, the Trust had a number of older legacy systems in place including an iSoft PAS and Lab systems supplied by iSoft. The Trust's ICT Department decided to adopt an incremental best of breed approach to developing their EPR. A £3 million contract was placed with the systems integrator CGI (formally Logica) and the Trust integrated its A&E, and Prescribing system with the PAS. It also created a portal providing clinicians with access to a summary primary care record and ambulance records. It is still needs to integrate community, mental health, ophthalmology and endoscopy data.

The Trust also upgraded its PACS system and implemented ePrescribing at additional cost. Consequently, its ICR is more advanced than that of Jersey but their starting point was different in that it was not required to replace an unsupported Patient Administration System (although replacement of the IoW PAS is likely to be required in the near future on account of its age).

The Trust has had a rolling capital budget of approximately £2 million per annum which has declined to £1 million in 2013 and £500k in 2014 so a direct VfM comparison is difficult. However, capital spending by the Trust is likely to broadly equivalent to that of Jersey.

The ICT Director described a number of similar challenges to those experienced on Jersey including unwillingness on the part of some clinicians to engage and problems with the time it takes to record observations, notes and create discharge letters using the EPR. They are considering a number of methods to address these challenges including a 'hearts and minds' approach, e.g. by getting GPs who are used to clinical noting on their Practice systems to advise Consultants as well as new technology, such as digital dictation/voice recognition and digital pens.

6.1.3   Cambridge University Hospitals ICR Programme

A more recent example is the Cambridge University Hospitals (CUH) Trust EPIC eHospital Programme. Planning started in 2009 following years of underinvestment in ICT. Existing systems were nearing the end of their useful life. The programme took a big bang approach to implementation including an infrastructure refresh, implementation of a new PAS, full EPR and specialist applications including mobile computing. Over 200 clinical staff were seconded to the Programme and staff had over 200,000 hours of training in the nine weeks leading up to implementation.

The new systems went live on 25th October 2014 and so it is too early to comment on whether it has been a success. CUH is one of the largest NHS Trusts in England, turning over in excess of £700 million. The total cost of the programme is estimated to be £200 million over 10 years. Without more detailed information, making a direct comparison is difficult but the cost and achievements of the Jersey programme would appear to compare favourably.

6.1.4   Guernsey ICR Programme

A request for information was placed but not forthcoming at the time this Report was drafted.

6.2   Conclusions

The Jersey ICR programme compares favourably to other UK medical records programmes when the evidence is considered and did deliver value for money to Jersey residents. None of the Programmes considered above were without their challenges and no doubt all of them would have done some things differently when considered with the benefit of hindsight. They all faced similar problems including organisational capacity and capability, existing investments in legacy systems and the difficulty contracting for new systems all set against the rapid pace of technology change. Jersey's experience was similar and many of the lessons learned are now being applied to phase 2 of the Programme.

7. Benchmarking Informatics Maturity

We have looked at 2 benchmarking models

- HIMSS. Used across the US, Europe and Asia
- CDMI. Used in the UK mainly by trusts in England

This section describes the models and benchmarks Jersey against progress elsewhere.

7.1 The HIMSS Maturity Model

7.1.1 About HIMSS

HIMSS is a global, cause-based, not-for-profit organisation focused on better health through information technology (IT). HIMSS leads efforts to optimise health engagements and care outcomes using information technology.

Founded in 1961, HIMSS encompasses more than 52,000 individuals, of which more than two-thirds work in healthcare provider, governmental and not-for-profit organisations across the globe, plus over 600 corporations and 250 not-for-profit partner organisations. HIMSS is headquartered in Chicago and serves the global health IT community with additional offices in the United States, Europe, and Asia.

7.1.2 The Maturity Model

HIMSS Analytics ^{TM} has created an EMR Adoption Model that identifies the levels of electronic medical record (EMR) capabilities ranging from limited ancillary department systems through a paperless EMR environment. HIMSS Analytics has developed a methodology and algorithms to automatically score more than 5,000 U.S. and approximately 700 Canadian hospitals relative to their IT-enabled clinical transformation status, to provide peer comparisons for hospital organisations as they map their path to a complete EMR. HIMSS has recently established a presence in the European Union (EU) and an equivalent maturity model has been developed. This differs slightly from the US model with Stages 5 and 6 effectively reversed. The stages of the EU model are as follows:

Table 1 – HIMSS Europe EMRAM Adoption Model

Stage 0	The organization has not installed all of the three key ancillary department systems (laboratory, pharmacy, and radiology).
Stage 1	All three major ancillary clinical systems are installed (i.e., pharmacy, laboratory, and radiology).
Stage 2	Major ancillary clinical systems feed data to a clinical data repository (CDR) that provides physician access for reviewing all orders and results. The CDR *may* contain a controlled medical vocabulary, and the clinical decision support/rules engine (CDS) for rudimentary conflict checking. Information from document imaging systems may be linked to the CDR at this stage. The hospital may be health information exchange (HIE) capable at this stage and

	can share whatever information it has in the CDR with other patient care stakeholders.
Stage 3	Nursing/clinical documentation (e.g. vital signs, flow sheets, nursing notes, eMAR is required and is implemented and integrated with the CDR for at least one inpatient service in the hospital; care plan charting is scored with extra points. A first level of clinical decision support *may* be implemented to conduct error checking with order entry (i.e., drug/drug, drug/ food, drug/lab conflict checking normally found in the pharmacy information system). Medical image access from picture archive and communication systems (PACS) is available for access by physicians outside the Radiology department via the organization's intranet.
Stage 4	Computerised Practitioner Order Entry (CPOE) for use by any clinician licensed to create orders is added to the nursing and CD environment. There may be a second level of clinical decision support capabilities related to evidence based medicine protocols. If one inpatient service area has implemented CPOE with physicians entering orders and completed the previous stages, then this stage has been achieved.
Stage 5	A full complement of radiology PACS systems provides medical images to physicians via an intranet and displaces all film-based images. Cardiology PACS and document imaging are scored with extra points.
Stage 6	Full physician documentation with structured templates and discrete data is implemented for at least one inpatient care service area for progress notes, consultation notes, discharge summaries or problem list and diagnosis list maintenance. Level three of clinical decision support provides guidance for all clinician activities related to protocols and outcomes in the form of variance and compliance alerts. The closed loop medication administration with bar coded unit dose medications environment is fully implemented. The eMAR and bar coding or other auto identification technology, such as radio frequency identification (RFID), are implemented and integrated with CPOE and pharmacy to maximise point of care patient safety processes for medication administration. The 'five rights' of medication administration are verified at the bedside with scanning of the bar code on the unit dose medication and the patient ID.
Stage 7	The hospital no longer uses paper charts to deliver and manage patient care and has a mixture of discrete data, document images, and medical images within its EMR environment. Data warehousing is being used to analyse patterns of clinical data to improve quality of care and patient safety and care delivery efficiency. Clinical information can be readily shared via standardised electronic transactions (i.e. CCD) with all entities that are authorised to treat the patient or a health information exchange (i.e., other non-associated hospitals, ambulatory clinics, sub-acute environments, employers, payers and patients in a data sharing environment). The hospital demonstrates summary data continuity for all hospital services (e.g. inpatient, outpatient, ED, and with any owned or managed ambulatory clinics).

7.1.3 United States and EU EMR Adoption Model Trends

Table 2 is a frequency distribution of the percentage of Hospitals which have achieved a given stage on the HIMSS maturity model.

US adoption trends indicate that only 3% of Hospitals have achieved Level 7 and less than 20% have achieved level 6 or above. The significant majority 65% are clustered at stages 3- 5.

HIMSS Europe does not publish an equivalent frequency distribution but does list Hospitals that have been accredited at level 6 (approx 25) and level 7 (only three), the majority of which are in Spain or Germany. The UK does not appear to be represented possibly due to the influence of NPfIT and the US bias of the original model.

Table 2 – US EMR Adoption Model Trends[5]

United States EMR Adoption Model [SM]			
Stage	Cumulative Capabilities	2014 Q1	2014 Q2
Stage 7	Complete EMR; CCD transactions to share data; Data warehousing; Data continuity with ED, ambulatory, OP	3.1%	3.2%
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS	13.3%	15.0%
Stage 5	Closed loop medication administration	24.2%	27.5%
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	15.7%	15.3%
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	27.7%	25.4%
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have Document Imaging; HIE capable	7.2%	5.9%
Stage 1	Ancillaries - Lab, Rad, Pharmacy - All Installed	3.2%	2.8%
Stage 0	All Three Ancillaries Not Installed	5.6%	4.9%

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[5] See http://www.himssanalytics.org/emram/scoreTrends.aspx

7.1.4 Benchmarking Jersey against the HIMSS Model

Note that TrakCare provides the Clinical Data Repository referenced at Stage 2. In order to formally benchmark Jersey against the HIMSS model it would be necessary for the Head of Health IT (or similar) to complete an online questionnaire, estimated to take half a day to complete. The following comments do not therefore represent a formal assessment but provide an indication of where HSSD would be placed on the Index.

In order to be accredited as having achieved a given stage it is necessary for at least one inpatient department in the Hospital to have achieved all elements required by the stage and all previous stages.

Prior to the ICR programme, Jersey HSSD would have been at Level 0 of the HIMSS model as it did not have a PACS system installed.

Based on definition of the stages above, HSSD has **the majority of the components in place up to and including Level 5** although this does not guarantee that HSSD would be accredited as having reached this level. There is no reason why Jersey should not aspire to achieving Stage 6 in the second phase of the ICR programme.

Stage 1 – all three ancillary systems (Pathology, Pharmacy and Radiology) are in place.

Stage 2 – there is integration between TrakCare and the Laboratory System (Omnilab) for the purpose of viewing pathology results and integration with RIS/PACS (CRISS/Centricity) for viewing radiological reports and images.

Stage 3 – Maternity Services and the Emergency Department are using TrakCare for recording clinical notes and audit. Diagnostic images held in the PACS system can be viewed in TrakCare.

Stage 4 – HSSD has implemented full computerised practitioner order entry (Ordercomms) and results are verified electronically. Compliance exceeds 95% in A&E and the Hospital is in the process of switching off printing of paper results.

Stage 5 - A full complement of radiology PACS systems provides medical images to physicians via the CDR and has displaced all film-based images.

Stage 6 – Full closed loop medication management, in which a barcode is attached to the order and tracked from dispensing through to administration, is dependent on ePrescribing being implemented. It is intended to introduce ePrescribing in Phase 2 of the Project. Structured templates for physician documentation have been created for the Emergency Department. However these are not being used by all physicians.

Stage 7 – Achieving this stage would require not only implementation of the software but a significant change in culture in HSSD.

7.2 The NHS Clinical Digital Maturity Model

7.2.1 The Model

EHI Intelligence is the research division of eHealth Media, which publishes eHealth Insider. EHI intelligence in partnership with NHS England has developed a clinical digital maturity model for English hospitals.

The baseline index was created using data that EHI Intelligence obtained from NHS Trusts through Freedom of Information Requests. The index rates the underlying technical capabilities of the Trust in terms of the systems which have been installed. It does not rate the extent to which a Trust has made full use of the technical capabilities at its disposal to achieve the intended outcomes. It is intended to extend the model in future but at this stage it is best considered as immature.

It is a nine level model of a Trust's administrative and clinical systems (Figure 1). Hospital Trusts are scored according to the number of systems they have installed at each level, with three points being awarded for each system in place at levels 1 to 5, four points for levels 6 and 7 and five points for levels 8 to 9. The rationale for this is that levels 1 to 5 represent a foundation layer, with the majority of Trusts now having these systems in place.

In contrast to the HIMSS maturity model, the CDMI recognises the fact that Trusts' installation of systems at a higher level may not be dependent on installation at the lowers levels. Maturity is assessed as a simple score rather than achieving a given level of the index, accreditation at which (under the HIMSS model) is dependent on achieving all requirements at the lower levels.

However, by definition grouping the systems at different levels implies a degree of hierarchy and functional dependency as well as the degree of difficulty necessary to progress from one stage to the next. It could also indicate the level of benefits that could be achieved, with Trusts giving priority to implementing systems which will deliver the greatest benefits.

In this respect, it could be argued that the evidence gathered by EHI contradicts its own model since frequency distributions indicate that a significantly higher proportion of Trusts have systems installed at levels 8 and 9, which are centred on ePrescribing, than levels 6 and 7, which are centred on enterprise scheduling, clinical workflow and full EPR, i.e. by implication these must be more difficult and/or less beneficial or Trusts would have successfully implemented these systems first.

Figure 1 – Clinical Digital Maturity Model

9	Complex ePrescribing	Inpatient ePrescribing	Oncology ePrescribing	CDS in use in ePrescribing
8	Simple ePrescribing	Outpatient/ TTO ePrescribing		
7	Enterprise Scheduling	Scheduling (TrakCare)	Clinical Workflow	Blood Tracking (Pulse)
6	Clinical Noting and Document Management	Document Management	Clinical Noting (TrakCare)	Observations (Trak Care)
5	Order Communications, Diagnostic Reporting	Order Comms (TrakCare)	Diagnostic Reporting (TrakCare)	Bed Management(TrakCare)
4	Specialist Departments	Cardiology (PRISM)	Oncology	Critical Care (Ward Watcher)
3	Departments	A&E (TrakCare)	Theatres (TRakCare)	Maternity (TrakCare)
2	Core Ancillary	Pharmacy (JAC)	RIS (HSS) / PACS (GE)	Pathology (OmniLab)_
1	Foundation	Core PAS (TRakCare)	Basic Business Intelligence	Community PAS (Trak/EACE)
		Electronic Discharge Letters		

7.2.2 CDMI Level Completion
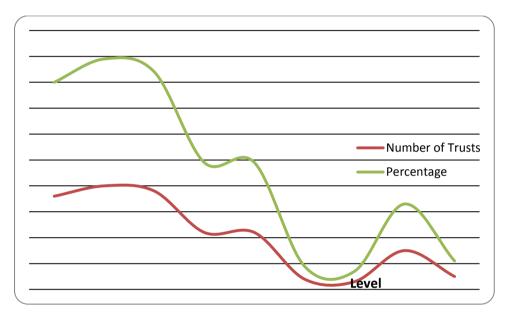
CDMI Level completion is analysed by Region. Unsurprisingly, London is the most advanced region given the large number of teaching Hospitals, population size and high revenue of London Hospitals. Big city Trusts are in a better position to collaborate on procurement, integrated care models and information sharing protocols. The South

of England is probably the best proxy for benchmarking Jersey since the Trusts tend to serve smaller cities. Figure 2 illustrates the distribution of Trusts in South of England against the index.

7.2.3   Benchmarking Jersey against the CDMI

HSSD has systems providing functional support up to and including Level 7 of the model with the exclusion of electronic discharge letters, a dedicated Oncology system and blood tracking. On this basis, HSSD would achieve a CDMI score of 65 points, which compares favourably with Trusts in the South of England (average score 65.9). This would place Jersey exactly on the boundaries of Quartile 2 (range 66 – 75 points) and Quartile 3 (Range 58 – 65 points).

Figure 2 – CDMI Level Completion in the South of England[6]

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[6] The Clinical Digital Maturity Index, 2013, EHI Intelligence

8. Conclusions and Recommendations

8.1 Programme Management and Delivery

This Review found that phase 1 of the Programme has been a great success. The Programme delivered against all major objectives, installing new Patient Administration, Child Health, Pharmacy, RIS/PACS and Order Communications systems. Full EPR solutions were implemented in A&E and Maternity (with some qualifications).

The programme was in general, well managed with good practice adopted in relation to change management, benefits realisation and risk management although the lack of documentary evidence after implementation suggests evidence of follow-up was lacking.

Whilst implementation of the PAS was delayed by nine months, deferring delivery of some benefits, a good settlement was negotiated with the Supplier resulting in additional benefits. Notwithstanding the delay, two years for implementation of replacement PAS and ancillary systems still represents a real achievement in comparison to equivalent UK programmes.

8.2 Benefits

Headline benefits delivered by the solution are as follows:

- £0.4 million p.a. in cash releasing savings mainly from implementation of PACS

- £1.7 million p.a. in cost avoidance through efficiency gains

- Improved patient care by making much patient information available electronically at all times to those with authority to access the information including a full history of pathology tests and radiology examinations

- Improvements in efficiency arising from the introduction of electronic order communications

- A significant improvement in patient safety through audited verification of diagnostic tests and reports.

- Operational improvements include a real time view of bed status enabling real time bed management

- Improvements in immunisation rates from around 85% in 2006 to around 95% in 2013

- Evidence exists that a more patient centred service is emerging, e.g. Social Care workers have electronic access to planned discharges and regular meetings are now held with Discharge Coordinators at the Hospital to pre-empt patient needs

- Improvements in the ability to produce timely management information to inform audit, planning and performance management.

- A modern, reliable, sustainable and flexible technology infrastructure that forms the foundation of a full electronic patient record in phase 2.

- Most importantly, to continue to provide health care. Without the programme the HSSD would effectively have been left with no patient administration system. This would have made the whole organisation unsustainable.

8.3 Benchmarking

Progress made by Jersey implementing an ICR compares favourably with other jurisdictions including the UK and USA. Various models exist for assessing progress by healthcare organisations toward implementing an EPR, including the Electronic Medical Records Adoption Model (EMRAM) developed by the HIMSS a US based 'not for profit' organisation and the NHS Clinical Digital Maturity Model developed by EHI Intelligence in the UK. Informal benchmarking against these models suggests that HSSD is in the middle of frequency distributions illustrating EPR adoption trends. Successful implementation of phase 2 could place Jersey in the top quartile but this would be in comparison to today's benchmarks.

8.4 Value for Money

The Project delivered good value for money. A direct comparison with the National Programme in England would be misleading, on account of the scale and ambition of the latter. However, the budget on the National Programme increased from £2 billion to £12 billion (12% of NHS budget adjusted in today's terms) and the Programme achieved limited success. In contrast, HSSD's budget was £12 million (6%) against a total HSSD budget of £200 million and Phase 1 of the programme largely delivered against its mandate.

A more recent example is the Cambridge University Hospitals (CUH) Trust EPIC eHospital Programme, which has taken a 'big bang' approach to implementation of an EPR and went live in October 2014. CUH turns over £700 million and the total cost of the programme is forecast to be £200 million over 10 years.

8.5 Lessons Learnt

A number of lessons were learnt by the Programme Team. HSSD has the benefit of continuity amongst many members of the original Team and these lessons are being actively addressed.

8.5.1 Software configuration and Customisation

A number of mistakes were made configuring the TrakCare software during phase 1, which were not revealed until User Acceptance Testing. HSSD now has clinicians aware of the pitfalls of over-zealous software customisation and should be in a position to advise their clinical colleagues when the EPR is rolled out to the remaining services in Phase 2. It should also be ensured that development is directed by a user group so a consensus is achieved around proposed changes.

8.5.2 Benefits Realisation

Whilst benefit planning on the Programme was excellent, there was a lack of follow through on benefits realisation. Benefits realisation is rarely as effective as it could be

and Jersey could look at a proprietary realisation methodology, e.g. Dimension 4, developed by Isochron. This places an emphasis on delivering benefits and has been successfully applied on UK Programmes.

Project teams need to be 'agile' as the projects transition from procurement through development to UAT, implementation and follow up. Project teams appeared to be well represented at senior level, but as the projects progressed, they could have benefited from input from people able to ensure that changes were driven though and full benefits realised.

There appeared to be a lack of communication of the success of the programme both internally and externally. Implementation of a new system is difficult. Staff across all areas invested their time and effort to overcome challenges and make the implementation a success. Though it is still useful to document benefits and lessons learnt in this report, it is now 3 years after the implementation of the new PAS and far more could have been done to ensure that the whole organisation was aware of the achievements and felt able to share in the success.

8.5.3   Project resourcing

There is a need to invest in internal capacity and capability to reduce reliance on external consultants, reduce costs and ensure continuity of resource post implementation. A Business Services Manager (Head of Health IT) was appointed a year ago and more recently a Head of Informatics has been recruited. Interim staff should be exclusively used to provide niche skills, short term constraints on capacity and where they are used, skills transfer and coaching should be a part of their remit.

8.5.4   Information Culture

There is a need to develop an information culture across HSSD, lack of which is contributing to poor practice in relation to data capture with a consequential effect on data quality. There is a lack of awareness on the part of some managers and clinicians of the potential to exploit information held in TrakCare to improve the efficiency and quality of service delivery.

Senior management are aware of this issue and are fully supportive of the recently recruited Head of Informatics post. A new generation of consultants and managers with experience elsewhere are driving change and demanding more information. Design and development of the new hospital will require an evidence base underpinned by high quality of information to demonstrate need and enable robust modelling of capacity and manpower, to understand how the services will deliver best practice and support specification of the specialist facilities. Consultants have a strong incentive to engage if they want to secure the best facilities for their practice and patients.

Furthermore, there are likely to be more financial constraints in the future. This will mean that bids for investment will need a strong, evidence based business case before funding is awarded, which will require high quality information. Whilst not akin to the UK model, commissioning is being developed in Jersey and internal and external services will be held to account if they are not seen to be making progress.

A programme of work is underway to model activity and understand unit costs. This has a high level of clinical engagement and will be used to inform and drive changes

in consultant behaviour. Aligned with this is the development of performance indicators and standard Board reporting. A report has gone to the Board recommending a minimum Dataset and various process and outcome measures.

An improvement plan is being developed to embed data quality needs in the Organisation. HSSD has purchased an eTraining product which will be used to support this initiative.

8.5.5   Organisation Culture

It is important to develop a constructive learning environment and a 'no blame' culture on Programmes. It was apparent from the interviews that the atmosphere on the Programme was at times charged. This can lead to defensive behaviours including the creation of excessive levels of documentation.

MSP and PRINCE are excellent governance and delivery frameworks and ensure high levels of accountability and better results. However, they are frameworks and should be tailored appropriately to ensure they don't become over process oriented and 'suffocate' resourcefulness. Whilst all work should be performed to a high standard not everything has to be done perfectly. The effort invested in any task should reflect the value added. HSSD could consider how to create a more dynamic and agile environment for project delivery, whilst at the same time ensuring appropriate governance and accountability.

Quality Assurance is not the same as quality inspection. Quality should be 'lived' - project staff should lead by example and feel comfortable getting 'stuck-in' on a day-to-day basis.

There was a lack of practical experience and learning from implementations elsewhere. This led to a tendency to be over ambitious in the configuration of the solution, which only became apparent when issues were identified by UAT. However, this practical experience will help to inform phase 2 of the development.

8.5.6   Handover to Business As Usual

Handover of the programme to operations could have been more effective. It was evident that insufficient planning went into this and there is a sense that the programme ground to a halt. This is closely linked to the resourcing issue in that the Intersystems implementation team and the interim Programme team were offsite within a few weeks of go-live. A consequence of this was that by the time clinical staff had become aware of the capabilities of TrakCare, there was limited resource available to provide support.

8.6   Recommendations

8.6.1   Benchmarking

It is recommended that HSSD undertakes a formal assessment against the HIMSS EMRAM model. HIMSS Europe will provide this service discreetly and free of charge. It would take the Head of Health IT manager approximately half a day to complete. Jersey has the majority of solution components in place up to and including level 5 of the model, which would place it on a comparable footing to the majority of Hospitals worldwide. However, HSSD could potentially score lower than is indicated in this Report. This could be viewed as a risk in that it might be construed as embarrassing.

A more positive interpretation is that it would provide some focus for remedial action if this is required in preparation for Phase 2 of the Programme.

Alignment with HIMSS would also provide access to collateral, a network of likeminded professionals and examples of best practice across Europe.

8.6.2   ePrescribing

The benefits of ePrescribing to improve safety, improve efficiency and reduce drugs budgets are well established. In 2001, the Audit Commission estimated the cost of medication errors at £500 million across the UK. In England there is a correlation between the implementation of ePrescribing and high performance. Policy makers in the UK view the implementation of ePrescribing as a priority and a significant proportion of the NHS innovation fund is earmarked for ePrescribing initiatives. In England ePrescribing has been adopted by at least 50% of Hospital Trusts and adoption is likely to accelerate. Jersey should view the implementation of ePrescribing as a priority for phase 2, if it wants to avoid falling behind.

8.6.3   Phase 2 - Looking to the Future

The ICR programme has not been without its challenges or its critics. Indeed, some of the comments in the main body of this report may be construed as critical. However, implementing change on this scale is very difficult. The challenges faced by HSSD are typical of those faced by major EPR programmes everywhere.

Worldwide, Hospital's are continuing to invest in new capabilities as the technologies mature, a new generation of tech savvy clinicians take the lead and patients demand the convenience of the digital economy, which they experience on a day-to-day basis in other realms of life, e.g. banking, insurance, entertainment and retail.

HSSD has made significant progress toward implementing a full ICR. All of the foundations are in place for developing the solution. It has a sound informatics strategy in place, which addresses a number of the issues identified in this Report. It is important that HSSD does not lose its nerve and continues to pursue the original vision, which should be a cornerstone of the Island's Health Policy, alongside development of the new Hospital and a shift in focus toward Community Care. Key to future success will be the importance of ongoing organisational learning and the need to ensure that scarce resources are deployed effectively in pursuit of real value.

9. Appendix A – Financial Benefits Realised

9.1 Whole system.

Ref	Benefit	Baseline Measurements	Assumptions	Benefit Value	£ p.a. Cash releasing	£ p.a. resource reinvested
4.6.10 1.5.11	Reduce average length of stay - release beds Including time savings from -order comms -PACS -improved bed management and discharge planning -EPR in A&E and maternity	Baseline data: 2006 - Surgical bed Average LOS = 4.2 days. Medical Bed Average LOS =- 7.7 days. . . 2013 measurement was Surgical average	Research has shown that ALOS can be reduced by up to 17% after implementation of ICR and process changes. Of this saving -5.5% from the implementation of PACS. Phase 1 achieved -6.5% come from automation of info Phase 1 most achieved with order comms - assume 5% reduction 5% comes from the implementation of integrated care pathways, partially achieved. 2.5% Total. 5.5%+5%+5% = 13% On top of this will be bed savings from better bed management and discharge planning. Thus 13% taken to be cautious estimate of reduction in LOS	Assume bed day costs £200 for medicine and £150 for surgery. If ALOS for surgery is reduced from 4.2 to 3.65 and the same number of patients discharged (around 5700 for 2004/2005/2006) then 3112 bed days saved. If ALOS for Medicine is reduced from 7.7 to 6.7 and the same number of patients discharged (around 2900 for 2004, 2005, 2006) then 2903 bed days saved. 3112x£150+2903*£200= £1,047,410 In 2013 the average length of stay had reduced to 2.6 days for surgery and 6.2 for medicine. This represents a 39% reduction from the 2006 figure for surgery and 20% for medicine. Some of this reduction will be due to changes in clinical practice, e.g. with more minimally invasive surgery. However it is reasonable to assume that much is due to ICR programme benefits. Over the same time period patients treated increased but no new beds opened thus reasonable to assume that reduction in Length of stay has contributed to avoidance of spend on new beds		**1,047,410**

Ref	Benefit	Baseline Measurements	Assumptions	Benefit Value	£ p.a. Cash releasing	£ p.a. resource reinvested
3.6.18	Improve the ability of outpatient staff to schedule and manage new appointments, follow up appointments	10,101 hours per annum spent managing and scheduling appointments	Assume that 35% of an outpatient clerk's time is spent managing and scheduling appointments. Assume there are 15 WTE staff in outpatient working on the scheduling and appointment management function. Total hours per annum spent undertaking this task = 10,101 hours. Estimate 30% of this time can be saved. 3030 hours saved. Assume outpatient clerk is paid £26,000 per annum and works 37 hours per week.	30% i.e. 3030 hours saved.		**40,950**
Total benefits Achieved						1,088,360

9.2 Order Comms

Ref	Benefit	Baseline Measurements	Assumptions	Benefit Value	£ p.a. Cash releasing	£ p.a. resource reinvested
1.2.11	Reduction/Elimination of transcription errors on pathology system due to illegibility of handwriting on request forms.	Number of calls made to query details on request form as they are illegible. Haematology - 3 times a day. Chemistry - 3 times a day. Microbiology - 4 times a day. Haematology - 36.5 hours per annum Chemistry - 36.5 hours per annum Microbiology - 48.5 hours per annum	Assume each call made by Pathology MLA and each call is average of 2 mins. Assume Pathology MLA is paid £30,000 per annum including on costs and works 37 hours a week. Workload split for Haematology (34% from GPs), Chemistry (65% from GPs), and Microbiology (55% from GPs). Value excludes GP orders	Haematology = 67% of time will be saved (36.5 hours) = 24.5 hours Chemistry = 35% of time will be saved (36.5 hours) 12.7 hours Microbiology = 45% of time will be saved (48.5 hours) 21.82 hours Total time saved = 59 hours per annum. £900		900
3.2.11	Reduce the time taken by Consultants and Registrars reviewing HO and SHO orders	Assume that there are 55 consultants and Registrars in JGH that each spend 30 minutes per day reviewing Juniors Orders. 10037 hours per annum spent on this task.	Assume that this task can be reduced by 50 % as the orders can be reviewed on line and can be flagged to show certain limits / criteria etc. Assume average pay for register / consultant = £85,000 per annum and they work 40 hours a week. 2080 hours per annum	50% of time saved. 5018 hours saved.		205,093

Ref	Benefit	Baseline Measurements	Assumptions	Benefit Value	£ p.a. Cash releasing	£ p.a. resource reinvested
3.4.04	Faster diagnosis and treatment in A&E due to improve ordering and results process	Estimate that each attendance at A&E requires 15 mins. of doctors/nurses time spent per patient on ordering tests/ filling out and processing forms and then obtaining/chasing results. There are approximately 40,000 A&E attendances per annum so approximately 10,000 hours per annum spent on this task.	Estimated cost savings based on staff cost of £46,000 per annum including on costs (based on A&E nurse even though this task involves doctors and nurses).	Estimated that 50% of this time could be saved. This is 5000 hours per annum saved.		119,542
3.6.10	On the wards, Junior doctors will reduce time spent on diagnostic tests (e.g. locate patients, status, place orders due to default entries, order sets, looking for results, checking results) Standard order sets will make ordering of pathology tests more simple and quicker. order comms will make the analysis of results simpler.	30 mins x 58,843 (number of bed days per annum) = 29,421 hours per annum spent on pathology tests (requests / results) for inpatients.	Have estimated that 25% of this time could be saved. Assume a Junior Doctor paid £46,000 per annum including on costs and works a 37 hour week.	Reduction of 25 % will save 7355 hours of time per annum (junior doctors)		175,847
4.5.05	The role of the discharge Clerk will be changed / removed (they will not have to file pathology test results into patient's case notes nor spend time tidying notes when they come down from the ward)	2 discharge clerks are employed part time and work 45 hours per week in total. They spend 2.5 hours per week collecting notes from the ward. They spend 3.5 hours per week producing and distributing the alpha and religion lists. They spend 2 hours per week - dealing with	Additional information includes average daily discharges (and therefore volume of notes handled). Discharge Clerks - instructions V1.0 (duties and responsibilities). Monthly Average deaths. Assume discharge clerk paid £25,000	45 hours of clerical time saved per week - 2340 hours per annum.	30,250	

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Ref	Benefit	Baseline Measurements	Assumptions	Benefit Value	£ p.a. Cash releasing	£ p.a. resource reinvested
		deceased notes and updating the IHS system (average deceased patients per month in stats available). 80% of their time is spend on tidying and tracing case notes and reporting misfiled documents. Between 55 and 65 patients discharged every day	per annum for 1 WTE and works a 37 hour week.			
5.3.13	Reduce time spent by ward clerks on handling and managing test requests and results and filing into the case notes	51,100 hours per annum spent on this task (10 wards - each ward spends 14 hours per week/5110 hours per annum)	Assume ward clerk (or nurse in her absence) spends 14 hours per week (approximately 40% of WTE) undertaking this task. Assume 10 wards. Assume for financial model that task undertaken by ward clerk who works 37 hours per week including on costs and paid £26,000 per annum.	80% of this time can be saved through order comms. 4088 hours per annum saved.		55,243
4.5.07	Pathology administration do not need to spend time sorting paper path test results for distribution.	Time spent pigeon holing reports and sorting ready for posting= 90 minutes per day. 547 hours per annum.	Information provided by Tracey Fullerton on 29/12/07 via Paul Berks. Have made calculations assuming that 50% of results are for GPs and will continue to be sent via paper results in short term. Assume that clerk undertakes this role (Paid £28,000 per annum including on costs and work 37 hours a week.)	Approximately 50% of this time (273 hours per annum) can be saved when OCM is implemented in hospital.		3,920

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Ref	Benefit	Baseline Measurements	Assumptions	Benefit Value	£ p.a. Cash releasing	£ p.a. resource reinvested
4.5.10	Pathology administration do not need to spend time entering pathology test requests into their computer system	Haematology and Chemistry & Microbiology spend 3-4 hours each day entering requests onto the pathology system. Assume 9 hours per day.	Assume request data entered by Pathology MLA paid £22,000 per annum including on costs and works 37 hours per week. 50% claimed initially as OCM for GPs will not be realised for some time.	The MLAs spend 9 hours/day/ across Haem/chem/micro and work a 5 day week 9 x 210 days = 1890 hours (0.98 wte)		21,560
4.6.06	Elimination of handwritten pathology test requests so reduction in pre-printed forms and stationery costs.	Chemistry (W000226) - £5,712 Haematology (W000221) - £4,119 Histology/Cytology (W000228) - £549 Immunology (W000223) - £189 Microbiology (W000225) - £3,374 Obstetric (W000227) - £1,000 Transfusion (W000222) - £459 Virology (W000224) - £548 Total cost for 2007 = £15,950	Have asked Paul Berks (20/11/07). Carmel obtained from Maurice in Supplies. Have assumed that 50% of costs can be released through implementation of Orders comms. All cannot be released until GPs are able to do electronic requesting.	£7975 per annum	7,975	
4.5.01	Pathology staff do not need to spend time phoning urgent results	Haematology phone urgent results 5 times a day. Chemistry phone urgent results 5 times a day. Microbiology phone urgent results 2 times a day. Total 12 times a day. Assume each phone call takes average of 5 minutes (includes bleeping, calling). 365 hours per annum spent on this task.	Assume task undertaken by LSO Grade. Assume paid £55,000 per annum including on costs. Assumptions on benefit value are based on a 50% reduction in call volumes dependent on the quality of alerting system on order comms.	Assume 50% of this time can be saved. 182.5 hours		5,225
Total Benefits Achieved					**38,225**	**587,330**

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9.3 RIS/PACS

Ref	Benefit	Baseline Measurements	Assumptions	Benefit Value	£ p.a. Cash releasing	£ p.a. resource reinvested
4.5.04	Radiology Staff do not need to communicate results verbally nor respond to telephone calls regarding results.	5% of Radiologist time spent on this task	Estimate 5% can be saved of a Radiologist time. Communication will still happen verbally but it will be reduced. Estimate £5,000.	£5,000 per annum will be saved		5,000
4.6.03	Elimination of handwritten radiology test requests so reduction in pre-printed forms and stationery costs.	Spend £12,000 per annum on stationery.		£12,000 of stationery costs saved per annum	12,000	
4.4.03	Reduction in staff responsible for fetching and filing x-ray films	Current staffing levels Reception 1 WTE Appointments 0.5 WTE Report filing 0.5 WTE Pre research 1.0 WTE Post research 1.0 WTE Writing up 1.0 WTE Clinics/fax and adds 1.8 WTE Film filing clerk 1.0 WTE OP x-ray reception 0.5 WTE Weekend clerk 0.16 WTE CT Clerk 0.63 WTE Post clerk 0.2 WTE Manager 1.0 WTE	ICR business case assumes 1 WTE can eventually be saved after parallel running process and only when films no longer required for clinics etc. Have assumed for financial calculation that clerks are paid £25,000 per annum including on costs and work 37 hours a week.	Posts not required after full ICR implementation (all functionality available and film library almost completely diminished) Report filing 0.5 WTE Pre research 1.0 WTE Writing up 1.0 WTE Clinics/fax and adds 0.9 WTE Film filing clerk 1.0 WTE Weekend clerk 0.16 WTE Post clerk 0.2 WTE = 4.76 WTE	119,000	
4.6.09	Eliminate film and chemistry costs	Current film costs per annum = £173,811. Annual income on film = £9481.	Money earned through sale of film and copies will not be available in future and needs to be deducted from any savings expected.	£164,500 per annum will be saved.	152,000	

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Ref	Benefit	Baseline Measurements	Assumptions	Benefit Value	£ p.a. Cash releasing	£ p.a. resource reinvested
4.6.04	Release maintenance charges associated with processor equipment	£33,310 spent on annual maintenance of processing equipment.	Retained cost of lasers, image manager & PACS manager 0% discount. Amount includes cost of servicing equipment replaced by DR.	Remove need to spend £33,310 per annum on servicing costs.	33,310	
4.6.03	Elimination of handwritten radiology test requests so reduction in pre-printed forms and stationery costs.	Spend £12,000 per annum on stationery.		£12,000 of stationery costs saved per annum	12,000	
1.4.09	Improve and automate the scheduling of radiology appointments	4617 hours per annum spent on this task at the moment	Assume that ICR will reduce the amount of time that staff spend on scheduling appointments using the current manual system. Have assumed that 4 WTE spend 60% of their time managing radiology appointments. Assume Radiology appointment staff are paid £26,000 per annum including on costs and work 37 hours per week. 4617 hours per annum spent on this task	Assume that 50% of time spent on scheduling and managing appointments can be saved. 2308 hours per annum saved.		31,196

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