Sheffield Teaching Hospitals NHS
NHS Foundation Trust

Outline Business Case for a Trust-wide Electronic Prescribing and Medicines Administration System

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Purpose of this Document

The purpose of this document is to explain the rationale for investing in the procurement and implementation of a Trust-wide Electronic Prescribing and Medicines Administration System.

VERSION CONTROL

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1 EXECUTIVE SUMMARY

1.1 General

1.1.1 This OBC is sponsored by the Chief Pharmacist with strong support from the Informatics Director.

1.1.2 It explains how an Electronic Prescribing and Medicines Administration (EPMA) system would fill a major systems gap in the Trust's clinical capability.

1.1.3 The Department of Health takes the view that clinicians in all acute hospitals should be supported by an EPMA system, and many leading Trusts in the UK now have this capability.

1.1.4 There are well known weaknesses associated with the present system of manual prescribing which is used throughout Sheffield Teaching Hospitals. These weaknesses adversely affect numerous clinical, operational and governance processes.

1.1.5 This situation could be rectified by acquiring an electronic system, provided that careful attention is paid to the lessons learnt from implementations elsewhere.

1.2 Scope

1.2.1 This OBC identifies a need to procure and implement a Trust-wide EPMA system which covers inpatients and outpatients across all sites, and which can contribute to delivering drugs on discharge (TTO) information to GPs.

1.2.2 Any lesser solution would fail to address the problems currently caused by manual prescribing and would not deliver the full range of modernisation benefits.

1.2.3 However, the pricing models for EPMA systems vary considerably and are often complicated. This makes it difficult to compare like-with-like in terms of VFM. Further, there is wide disparity between systems in terms of their functionality, ranging from basic to highly sophisticated.

1.2.4 Therefore, having regard to the present financial climate, it has been assumed that the Trust would best be served by a system offering mid-range functionality, which can then be developed cautiously over an extended period of time, as experience is gained with operating it.

1.3 Costs

1.3.1 The capital costs are estimated to be £1.6m.

1.3.2 The non-recurrent revenue costs are estimated to be £395k.

1.3.3 The recurrent revenue costs (including capital charges) are estimated to be £820k.

1.3.4 All are currently unfunded, and investment is sought from the Trust.

1.3.5 Such investment would be amply rewarded. Payback would easily be achieved within three years, after which the Trust would benefit from a multi-million pound surplus, as well as achieving numerous quality and operational benefits.

1.4 Financial Benefits

1.4.1 The STH Pharmacy Directorate has a proven track record of identifying and delivering financial benefits for the Trust. Consequently, this OBC is confident in highlighting opportunities for recurrent cost savings, additional income, and costs avoided. These

benefits undoubtedly exist and would greatly assist the Trust to improve its long-term financial position.

1.4.2 However, given the complexity of budgets within STH, it may not be easy to identify the correlation between all the Trust-wide monies involved and exactly which directorates are gaining the most benefit.

1.4.3 Hence it may be necessary to agree a mechanism between the Finance Director and General Managers for capturing the financial benefits and funding the non-recurrent and recurrent revenue costs from them, but this is not insurmountable.

1.5 Other Benefits

1.5.1 If approved, this scheme would:

- Improve patient safety.
- Improve operational effectiveness across the entire Trust, especially workflow.
- Improve working lives by freeing up staff time for higher priority tasks.
- Improve audit and accountability.
- Improve the discharge process.
- Improve infection control.
- Improve out of hours support (eg for the Hospital at Night).
- Improve links with primary care.
- Help to bring about the Paperless Hospital.

1.5.2 EPMA is a modernisation measure which would complement the Trust's drive for greater efficiency, bring benefit to almost all areas of the Trust, and thus raise standards overall.

1.6 Timescale

1.6.1 An outline implementation plan is provided, phased over FY 2013/14 and FY 2014/15.

1.7 Procurement Strategy

1.7.1 There are numerous potential suppliers of EPMA systems in the marketplace, and competition between them is fierce.

1.7.2 It will be essential to carry out an OJEU procurement in order to (1) ensure VFM, and (2) identify the supplier best able to meet the Trust's requirement for mid-range functionality which can be developed over time.

1.7.3 It should be noted that, given the complexity of the various pricing models for EPMA systems, the tender evaluation process is likely to be protracted. However, the only way to identify the true costs and benefits of such a system is to enter into an OJEU procurement and conduct a detailed - albeit lengthy – evaluation of the various offerings.

1.8 Risks

1.8.1 This is a medium risk scheme. It is a large and complex change management project, due to the sheer weight of detail involved across many clinical and other areas of the Trust. Moreover, no Project Manager has yet been appointed. This was originally

seen as a way of ensuring maximum freedom of action for the Trust but is now emerging as a risk. Above all, EPMA must be delivered with 100% accuracy, as there can be no margin for error with prescribing.

1.8.2 Put another way, this scheme offers abnormal benefits for abnormal risks.

1.8.3 That said, it is definitely achievable, although it will require drive and focus to sustain a protracted and demanding implementation for several years ahead.

1.8.4 If the Trust is willing to accept this effort and take the strain, then it will be well worthwhile, especially if this standalone scheme can also act as a major initial building brick towards an Electronic Patient Record (EPR).

1.9 Recommendations

1.9.1 Therefore the Trust is asked to:

- Approve this OBC.
- Authorise the issue of an OJEU Advert.
- Note that this EPMA system will be compatible with any future EPR which the Trust may wish to procure, provided that the OJEU Advert is carefully worded.
- Make a provisional allocation in the Capital Programme of £1,399,758 in FY 2013/14 and £247,016 in FY 2014/15.
- Advise on the preferred accounting mechanism for capturing the Trust-wide financial benefits and using them to fund the non-recurrent and recurrent revenue costs (because this potentially impacts on numerous directorate and departmental budgets).
- Note that effective project management arrangements must be in place before this scheme begins, in order to ensure that the financial benefits are delivered on schedule.

2 INTRODUCTION

2.1 General

2.1.1 This Outline Business Case (OBC) has been developed by the Pharmacy Directorate at Sheffield Teaching Hospitals (STH) NHS Foundation Trust and proposes the procurement and implementation of a Trust-wide Electronic Prescribing and Medicines Administration (EPMA) System.

2.1.2 It begins by explaining some key terminology in non-technical terms. Thereafter the document's format follows the standard NHS 5-Case Model.

2.2 Terminology

2.2.1 There are some terms which may be unfamiliar to readers and therefore need explanation. These are:

- **ePrescribing.** In the NHS, this is defined as "the utilisation of electronic systems to facilitate and enhance the communication of a prescription, aiding the choice, administration or supply of a medicine through decision support and providing a robust audit trail for the entire medicines use process". Thus ePrescribing replaces the paper prescription which the patient would otherwise carry or fax to the dispensary, instead sending it electronically so that it arrives there immediately. Importantly, the term also implies workflow improvements.

- **Medicines Administration.** This is the term used to describe the processes and behaviours whereby practitioners organise and record the administration of the correct type and dosage of medicines to the patient, including the authorisation of self-administration.

- **Medicines Management.** This is the term used to describe the system of processes and behaviours which determine how medicines are used by patients and the NHS. It is the entire process by which medicines are selected, procured, delivered, prescribed, administered and reviewed to optimise the contribution they make to produce informed and desired outcomes of patient care.

2.3 Background

2.3.1 Following widespread consultation, the Trust's Health Informatics Strategy was presented to the Board of Directors on 20 October 2010. This advocated the need for the Trust to procure an ePrescribing System for two main reasons.

2.3.2 First, the DH has long championed the concept of the so-called 'Clinical Five'. These are five key strategic information systems which are considered the minimum necessary to provide the functionality needed by clinicians in secondary care[1]. One of these five systems is ePrescribing. The Trust does not yet have such a capability, and hence there is a gap in system provision which needs to be filled.

2.3.3 Second, there are numerous potential improvements in operational efficiency and effectiveness, which can be achieved by an ePrescribing System. These include error

[1] These 'Clinical Five' systems are (1) PAS with integration to other systems and sophisticated reporting, (2) order communications and diagnostics reporting (including all pathology and radiology tests and tests ordered in primary care), (3) discharge letters (including coding, discharge summaries, as well as clinic and A&E letters), (4) scheduling (for beds, tests, theatres), and (5) ePrescribing (including TTO medicines).

prevention and risk reduction. Evidence from various UK clinical research reports[2] suggests that there is considerable scope for managing this process more effectively, and ePrescribing offers a powerful means of doing so.

2.3.4 Most large acute Trusts have recognised that optimum benefit is achieved when ePrescribing and medicines administration are brought together into a combined EPMA system, because of the synergies which result.

2.3.5 For these reasons, there is broad recognition that EPMA is the next major information system which should be implemented by the Trust. In January 2011 the (then) Informatics Director briefed the Director of Finance about the direction of travel. Consequently, initial action has already been taken to incorporate EPMA into the capital planning process, and sufficient support now exists for this OBC to be worthy of consideration.

2.4 Organisational Context

2.4.1 The STH Pharmacy Directorate forms part of Diagnostic and Therapeutic Services. Its role is to provide direct pharmacy support for:

- Northern General Hospital (NGH)
- Royal Hallamshire Hospital (RHH)
- Jessop Wing (JW)
- Weston Park Hospital (WPH)
- Charles Clifford Dental Hospital (CCDH)
- St Luke's Hospice
- Community Services.

2.4.2 To resource this, it has 295 FTE employees at an annual staffing cost of £10.1m.

2.4.3 The Trust's pharmacy service currently dispenses 960,000 individual prescriptions per annum, but there are probably at least another 500,000 prescriptions written and supplied from ward stocks. This means that although the Trust's total annual expenditure on medicines is over £76m, about a third is not subject to professional oversight by the pharmacy service at the time of prescribing and first administration.

2.4.4 It is noteworthy that the Trust already has experience of managing three small ePrescribing systems, namely, MetaVision (used by general critical care), PROTON (used by Renal), and Chemocare (used by cancer chemotherapy). These will soon be joined by a fourth, which is Medisoft (used by Ophthalmology).

2.4.5 In addition, a new GUM information system is about to be implemented, which is expected to be capable of generating an electronic prescription record for GUM inpatients initially, before being extended further.

2.4.6 The working assumption is that the prescribing functions of Renal and Ophthalmology would eventually migrate to the proposed EPMA system, whilst MetaVision and Chemocare would retain their stand-alone status (due to their highly specialised nature). The future relationship between the EPMA and GUM systems would need to be explored when the capabilities of both are better understood.

2.5 Aims

2.5.1 Therefore this OBC is submitted with the aim of securing favourable prioritisation for capital funding and Trust authorisation to proceed to OJEU/FBC stage.

[2] Most of these reports can be found at ePrescribing — NHS Connecting for Health.

2.5.2 A subsidiary aim is to update and consolidate all recent business planning work into one document for reference purposes.

2.6 Summary

2.6.1 This OBC follows a number of discussions which have taken place within the Trust since autumn 2010 and seeks approval in principle for purchase of an EPMA system.

3 STRATEGIC CASE

3.1 General

3.1.1 This Section explains the case for change and the requirement for procurement action.

3.1.2 It is longer than normally desirable, simply because the present manual prescribing system is so badly designed, and because there is so much room for improvement which needs to be explained.

3.2 Medication Errors & Patient Safety

3.2.1 It is widely recognised that medication errors occur in all NHS Trusts. Medicines are prescribed, supplied and administered to almost every patient attending hospital. Because so many different members of (often junior) staff are involved in these processes, the sheer scale means that medication errors are very likely to occur. This is compounded by the powerful nature of modern drugs meaning that any errors in drug choice or dosage have the potential to be very serious, even critical. In 2001, for example, the Audit Commission issued a report showing that nearly 1,200 patient deaths annually in the UK were due to medication errors[3]. The diagram at Appendix A shows how easily such errors can occur.

3.2.1.1 Insert local medication error information……..

3.2.2 However, it is well documented that reported incidents are only the tip of the iceberg, a fact supported by STH pharmacy staff who clarify and correct prescriptions on a daily basis. A recent audit undertaken by NHS Sheffield catalogued 226 documentation incidents on 160 TTOs received from STH. Numerous studies have been published world-wide attempting to quantify the scale of the problem. For example, the General Medical Council (GMC) published a report in December 2009 suggesting that the error rate for inpatient prescribing is 8.9%, and that about 2% of the errors made are critical or fatal[4]. Other research gives much higher figures, but for obvious reasons this GMC analysis is a useful benchmark to use.

3.2.3 On average, every STH inpatient has about 6 or 7 prescriptions associated with their hospital stay, whilst outpatients have considerably less. If we assume that the total number of prescriptions issued for STH patients is more than 1.5m annually, the GMC figures would broadly suggest that some 133,000 STH prescriptions could contain errors every year, or an average of 364 per day. Bearing this out, University Hospitals Birmingham NHS Foundation Trust estimates that its EPMA system traps up to 400 prescribing errors per day[5], which is a very similar figure. Moreover, Birmingham has recently reported that its EPMA system halved the number of medication errors and led to a 17% fall in deaths among emergency patients during a 12 month period[6]. Without an EPMA system, the risk trend must inevitably be upwards, given the constant pressure to achieve increased patient activity, and the trend towards more vulnerable elderly inpatients.

3.2.4 Once made, errors may not be corrected in time. Due to staffing limitations, STH pharmacists cannot visit all wards in order to review the content of prescription charts. For example, many pharmacists are covering two or three wards, and hence errors can easily escape detection until the next visit. The decision support software within an

[3] http://www.audit-commission.gov.uk/SiteCollectionDocuments/AuditCommissionReports/NationalStudies/nrspoonfulsugar.pdf
[4] GMC | An in depth investigation into causes of prescribing errors by foundation trainees in relation to their medical education - EQUIP study
[5] CSE Healthcare brochure entitled *PICS: e-Prescribing and rules-based clinical decision support*, 2010.
[6] http://www.ehi.co.uk/news/acute-care/7247

EPMA system coupled with the ability for pharmacy staff to clinically check prescriptions remotely would prevent many errors from reaching the patient.

3.2.5 A common reason for drug administration errors is dose omission, with 18.7% of reported STH medication incidents between August 2010 and January 2011 falling into this category. A Trust-wide audit conducted at STH during November 2010 identified a total of 356 omitted or delayed doses which were considered critical (defined by the NPSA as having the potential to cause death or serious harm). Of these, 165 could have been prevented by an EPMA system, because it would have the capability to prompt nurses when doses are due and ensure accurate documentation of all doses given.

3.2.6 This point is strengthened by more recent evidence. As part of the TAPS (Training & Action for Patient Safety) Project on improving patient safety, the MAU team looked at the number of omitted drug doses on MAU3 between January and June 2011. During that 20 week period a total of 2,744 doses should have been administered at 8am, of which 2,280 were actually recorded as administered, resulting in 464 (20%) of doses omitted. Of even more concern was the fact that 30.3% of the dose omissions had no reason stated on the prescription chart.

3.2.7 There is one area of special note. In March 2011 the DH extended the list of 'Never' events for which commissioners can recover the costs of the procedure in which the 'Never' event occurred and any necessary treatment that results from that event. Amongst this extended list are several events related to the prescription and administration of medicines. Of particular concern to STH is the inclusion of the categories entitled (1) 'Prescription, supply or administration of daily oral methotrexate to a patient for non-cancer treatment including supply to the patient with the instruction to take daily', and (2) 'Death or severe harm as a result of maladministration of Insulin by a health professional'.

3.2.8 With regard to 'Never' events involving methotrexate, there were 3 such incidents reported within the Trust between January 2010 and March 2011. Typically, the rebated cost of an elective rheumatology case involving methotrexate might be about £700, although rebates involving other specialties can sometimes be much higher. Hence it seems reasonable to assume that this could result in the Trust making a minimum annual saving of about £2,000 by using EPMA.

3.2.9 With regard to 'Never' events involving insulin, the Trust has not yet incurred a financial rebate. However an audit in 2010 identified approximately 4 prescribing errors per 100 diabetes bed days, and between 15 and 26 harm events per 100 diabetes bed days. In addition, the Infoflex database contains details of 12 events in a six month period which fall within the scope of the 'Never' event and, dependent on the resulting harm, could have led to cost recovery. The widespread dispersion of diabetes patients throughout the Trust makes estimation of the potential cost difficult, although a non-elective acute medicine episode may result in a rebated cost of £2,500 and a surgical episode between £2,000 and £6,000 depending on the specialty. The DH has suggested that cost recovery should be capped on a per event basis with a suggested £10,000 maximum. The decision support software within an EPMA system would significantly reduce the risk of these errors occurring and therefore avoid non-payment for that entire care episode, including any remedial treatment. In sum, it seems reasonable to assume that improved control of 'Never' events of all types could boost the Trust's income by about £50k per year.

3.2.10 The main consequence of inappropriate drug therapy is poor quality care for patients. In most cases, this means that the length of stay (LOS) will be increased, which has a detrimental effect on the wellbeing of the patient, as well as an immediate impact on the resources consumed by every other area or service in the Trust where care is delivered. In contrast, iSOFT claims that its EPMA system – based on experience at other Trusts –

could achieve a 4% reduction in LOS for STH and thus free 288 bed-days[7]. Whilst such claims are notoriously difficult to substantiate, this seems in line with most published literature about the benefits of EPMA.

3.2.11 There is also a direct cost resulting from medication errors. In 2008, for example, a thoughtful research paper issued by the University of Sheffield's School of Health and Related Research (ScHARR) showed that the annual NHS treatment costs for preventable Adverse Drug Events in a 400 bed hospital with 162,000 prescription orders per year was £599k. In contrast, the same cost for a hospital with electronic prescribing was £415k, ie an annual saving of £184k (subject to the implementation costs of computerisation not being excessive)[8]. When scaled up to the 2,000 beds of STH, this raises the possibility that the Trust could save £920k per year by using EPMA to trap medication errors. Whilst this may seem optimistic, discussions with EPMA suppliers indicate that STH could reasonably expect to save half of this figure annually, ie £460k.

3.2.12 Further, in a minority of high profile cases, medication errors can also result in serious reputational consequences involving the coroner, commissioners, and the local community/media. In such circumstances, comparisons will inevitably be made with many other Trusts which have concluded that implementing an EPMA system is a wise safeguard.

3.2.13 This is not to argue that an EPMA system eliminates medication errors. On the contrary, a cautious approach is needed because it can introduce certain new ones (although these are well known and can be avoided). However, an EPMA system functions in a very structured and disciplined way, using error traps, dosage ranges, clinical checks, electronic formulary, decision support, and so on. These 'smart' features check the prescription details against other facts in the patient's electronic medication record. This avoids the use of similar sounding drugs and prevents adverse drug interactions, since the patient's entire medication history is available on screen as a guide. Such greater clarity means that - overall - the number of prescribing errors will go down, and that patient safety will greatly improve.

3.3 Operational Effectiveness

3.3.1 The present system of manual prescribing is very time-consuming and inefficient. Many STH staff will be familiar with the scenario whereby the daily ward round takes place, after which a junior doctor follows to write prescriptions. This process is lengthy and often accompanied by a struggle to find the necessary drug charts which have 'wandered' from the bedside. Thus it can take about 15 minutes to assemble the right information and write a prescription, whereas this could be done electronically in one minute using an EPMA system which has all the necessary data immediately available on screen.

3.3.2 Moreover, it would be possible to take this one step further and prescribe during the ward round itself, thus permitting on-the-spot discussion of any prompts or advice which the EPMA system gives to the doctor through its clinical decision support tools.

3.3.3 Once the prescription has been issued, other working processes of the present system can also be tedious. There is often a series of poor information flows involved in transporting the prescription to the pharmacy, resolving queries about it, and then transporting the drugs to the ward. These exchanges can take up vast amounts of nursing and pharmacy time, especially on telephone 'call-backs'.

3.3.4 Instead, an EPMA system would transmit the prescription to the dispensary in real-time, and there would be far less likelihood of corrupted text, medication errors, or lengthy

[7] Indicative price quotation obtained from iSOFT in October 2011.
[8] Journal of Health Services Research and Policy, Vol 13, No 2, 2008: pages 85-91, and especially Table 5.

queries. The benefit would be an easing of workload for everyone involved, as well as reducing the number of delayed or missed doses of medicines for patients.

3.3.5 There is one particular area of wasted effort which is noteworthy. The current system of medication ordering and supply relies heavily on manual prompts, which results in a significant workload associated with unnecessary repeated dispensing of prescriptions. For example, a patient can be admitted to an MAU and have all medication ordered from pharmacy which is then dispensed, but the patient is subsequently transferred to another ward *without* their medication. Nursing staff on the new ward identify that they lack the patient's medication but do not realise that it has already been dispensed, so they re-order it from the pharmacy. Although dispensary staff may identify this as unnecessary duplication, and ward-based medicines management technicians can help to avoid the likelihood of this scenario occurring in the first place, neither system is foolproof and both rely heavily on active staff intervention. An EPMA system can link prescribing and dispensing records together in order to highlight when a patient's medicines have already been supplied, thus reducing both workload and medication costs.

3.3.6 An EPMA system offers other operational benefits too. It allows pharmacy staff to pre-screen and target high-risk patients and/or new patients, rather than having to review every Kardex every day. It also avoids the need to re-write inpatient prescription Kardexes and significantly speeds up the preparation of discharge prescriptions by avoiding the need to transcribe every individual drug entry. Importantly, it enables nursing staff to work from a worklist of doses due at each medication round, as opposed to the present laborious process of having to check every drug entry for every patient. In varying ways, these are benefits which support the Productive Ward and Releasing Time to Care initiatives. As evidence of this, University Hospitals Birmingham estimates a saving of 10 minutes per shift for ward nursing staff, and 30 minutes for ward clinical staff[9]. Similarly, iSOFT claims that the duration of a drug round at STH could be reduced by 20%[10].

3.3.7 Overall, the scope for improving operational effectiveness through the use of an ePrescribing System is extensive, especially when combined with Trust-wide wireless networking. It could transform clinical pathways. However, this cannot be achieved by the Pharmacy Directorate acting on its own. This process will require extensive negotiation, stakeholder involvement, change management, and innovation across the entire Trust.

3.4 Controlling Drug Expenditure

3.4.1 Even if the Trust never made prescribing errors, and even if operating processes were perfect, money is still wasted on prescribing medicines that are not the most cost-effective options.

3.4.2 In the light of this, many NHS Trusts have found EPMA to be highly beneficial as part of their cost reduction strategies. For example, iSOFT claims that - even in the best managed of Trusts - control of drug expenditure can usually be improved by between 2% and 5% when an EPMA system is implemented[11]. Further, the Head of Ascribe's ePrescribing Division reports that NHS Trusts can make savings in drugs costs of typically 6%[12]. Better still, a reputable US study in 2008 demonstrated ePrescribing cost savings which – when translated to STH – would equate to 7% of the Trust's drugs budget[13]. Finally, as an example of an even higher percentage, CSE Healthcare

[9] Indicative price quotation obtained from CSE Healthcare in June 2011.
[10] Indicative price quotation obtained from iSOFT in October 2011.
[11] Statement by Chris Wilmarsh, iSOFT Strategic Account Manager, in June 2011.
[12] http://www.ehi.co.uk/features/item.cfm?docId=352
[13] http://archinte.ama-assn.org/cgi/reprint/168/22/2433.pdf

Systems claims that its ePrescribing offering has achieved a proven benefit of 9.5% average saving on the drugs budget in critical care[14].

3.4.3 Of course there is a need to exercise caution towards these figures for many reasons. In the USA, there is a different healthcare environment (although the NHS is quite content to base much of its clinical trials data on US experience with new drugs). In the UK, every NHS Trust has a different level of investment in EPMA, every NHS ward has a different starting point in terms of its working practices, and there comes a point where cost savings cannot be achieved recurrently any more. However the percentages quoted above do seem fairly representative.

3.4.4 At STH, the annual budget for medicines is currently £76m. Hence even if cost savings could only made by EPMA at the *lower end* of these projections (say 2%), the improved choice of drugs would result in a minimum recurrent revenue saving to the Trust of £1.5m per annum for some years ahead. There is a very high level of confidence (say 90%) amongst STH pharmacy staff that this level of cost savings can be achieved.

3.4.5 However, there might be scope to do even better. Adopting a cautious approach, if cost savings were more towards the *upper end* of these projections (say, 5%), the recurrent revenue savings would deliver another £2.3m. Although this figure would taper off in due course, there is a reasonable level of confidence (say, 50%) amongst STH pharmacy staff that at least some part of this additional figure could be achieved. Numerous NHS Trusts have already concluded that such large potential savings cannot be ignored.

3.5 Securing Income

3.5.1 Due to present financial constraints, commissioners are understandably looking for every legitimate opportunity to save money.

3.5.2 In the field of pharmacy services, they are entitled to deny payment retrospectively if the Trust cannot substantiate contemporaneous compliance with NICE Guidelines. Similarly, the current government emphasis on CQUIN and other outcome measures highlights the need for documentation which evidences and justifies the income claimed. There is broad agreement within the Trust that income collection is sub-optimal, although current STH reporting systems are not sophisticated enough to permit accurate measurement of exactly how much is being lost at present.

3.5.3 There are many examples. In FY 2010/11 the Trust struggled to achieve the CQUIN target set for Venous Thromboembolism (VTE) prophylaxis risk assessment and did not achieve the maximum £649k income that was on offer for this. EPMA would have prompted a risk assessment, and hence the data to guarantee VTE compliance. As confirmation of this, United Hospitals Birmingham claims that its EPMA system has enabled it to achieve greater than 90% compliance on VTE assessments for inpatients[15].

3.5.4 In relation to PbR cost-per-case recharges at STH, audit work has shown a shortfall in excess of £200k during the first quarter of FY 2010/11 alone. Although systems have since been significantly tightened, this requires onerous levels of monitoring and manual intervention. The lack of a comprehensive reporting system directly linked to prescribing for individual patients means there is still a risk that the Trust is losing legitimate income on PbR high cost medicines, particularly each time that changes are made to the agreed list of PbR exclusions, because new manual systems constantly have to be developed to address this. EPMA would permit automatic coding of medicines as they are prescribed, thus ensuring 100% collection of PbR core tariff-excluded high cost medicines.

3.5.5 Further, patients attending day case units and A&E are liable for the standard NHS

[14] CSE Healthcare brochure entitled *PICS: e-Prescribing and rules-based clinical decision support*, 2010.
[15] University Hospitals Birmingham NHS Foundation Trust – Annual Report 2009/10.

prescription charge. Those that attend the dispensary to collect their prescription are appropriately charged, but the majority of patients are supplied with medicines using stock pre-packs (ie not individually booked out on the pharmacy computer system), and hence there is currently no satisfactory system in place to collect prescription charges (exact amount unknown, but based on pre-pack stock issues to these departments is estimated to be in excess of £25k pa). EPMA would allow patients to be appropriately identified and charged.

3.5.6 Another example is a recent review at STH which demonstrated the potential for Patient Access Scheme reimbursements and/or free stock from drug companies amounting to £894k. Although the Trust is now doing relatively well in obtaining appropriate monies, this is a huge undertaking and is very labour-intensive requiring the input of senior (Band 8) clinical staff to support it. EPMA would enable the automation of much of this work.

3.5.7 Another risk is loss of income associated with the hospital provision of long-term therapies which are excluded from national tariff payments. For example, there are some unlicensed medicines for specialist treatments which fall outside the tariff, but which can only be prescribed by secondary care. A recent review revealed a recurrent cost pressure of £67k for these in Neurosciences alone. Thus commissioners are being subsidised by long-term (sometimes life-long) provision of therapies for their patients, despite only paying an occasional follow-up OPD tariff charge which - by definition - does not include long term treatment costs. Whilst it is recognised that commissioning and contracting arrangements mean that many of the existing cost pressures will have to be borne by the Trust, EPMA would enable the Trust to monitor and report medicines usage down to individual patient level, thus allowing it to track and recharge all new expenditure where appropriate.

3.5.8 In summary, the Trust is currently failing to maximise income collection. This represents a hidden subsidy to commissioners, and EPMA would provide the level of granularity to justify the full income claimed. It is impossible to estimate how much income could be at stake, but subjectively it is probably around £250k per annum when aggregated from all the sources listed above.

3.6 Fraud Reduction

3.6.1 It is very difficult to judge the true extent of any fraud in the current prescribing processes of an acute hospital, such as STH. However, users of EPMA all over the world argue that such systems are very useful in reducing fraud and tampering incidents by eliminating the use of hand written material or printed prescriptions which can later be altered or lost before reaching the pharmacist. This feature is especially useful, not just for addictive drugs, but for any item in the dispensary which has abuse potential.

3.6.2 Further, the tighter control offered by EPMA would help to reduce stock loss, as well as the theft of those more mundane items which can simply be taken without resorting to fraud. Although very hard to assess, the total losses may amount to £75k per annum.

3.7 Medicines Reconciliation

3.7.1 The aim of medicines reconciliation is to ensure that medicines prescribed on hospital admission correspond to those that the patient was taking before admission, eg from the GP surgery. Ideally, NICE and NPSA recommend that this should be done within 24 hours of admission.

3.7.2 At present, STH has a medicines reconciliation rate of 71% across the Trust. The remaining gap is due to many causes, some of which are outside the Trust's control.

3.7.3 However, EPMA would deliver a significant quality improvement in this area, because it would provide a reliable record of medicines administered to a patient throughout their stay. This would give STH pharmacy staff a sound foundation on which to build the

reconciliation process. In particular, it would greatly contribute towards achieving medicines reconciliation in a timely manner for those patients who are re-admitted shortly after discharge, because there would already be a detailed hospital record in existence.

3.8 Contracting and Management Reporting

3.8.1 There are a number of areas where EPMA could help to tighten financial control.

3.8.2 Commissioners are currently uneasy about the way in which the Trust's paper-based systems are used to justify invoicing for cost per case drugs. The use of an EPMA system would give them greater transparency and confidence about the Trust's adherence to agreed protocols for the administration of these drugs.

3.8.3 The current JAC stock control system is unable to identify ward and department stock issues to specific patients, requiring an apportionment of these costs for Service Line Reporting (SLR). The introduction of EPMA would provide an additional management tool and enable greater refinement of Patient Level Costing.

3.8.4 STH directorates sometimes identify potential efficiency savings which could be realised by the adoption of a local formulary offering medicines with better VFM than those currently used. Such savings cannot be achieved at present because local formularies are difficult to enforce, whereas an EPMA system would make this much easier.

3.9 Clinical Decision Support

3.9.1 Situations often arise where it would be valuable for Trust staff to have clinical decision support available when prescribing. Such support should guide and remind users, but never replace clinical decision-making. It should also be capable of interrupting the workflow to force good practice, when necessary.

3.9.2 This facility is one of the most powerful aspects offered by an EPMA system. Typically, it covers drug contra-indication checking[16], drug allergy interaction checking, appropriate dosage checking, and duplicate therapy alerts. This enables users to avoid known risks and similar sounding drugs, as well as over-alerting.

3.9.3 In STH these facilities are likely to be helpful in preventing not only 'Never' events, but also in offering help and advice when dealing with those patient groups where factors like age and weight introduce greater complexity.

3.10 Formulary Compliance

3.10.1 The Trust has long maintained its own Medicines Formulary, which has been developed to reflect good evidence-based practice, good economic practice, national guidance, and current therapeutic opinion. It is constantly reviewed by the STH Medicines Management and Therapeutics Committee (MMTC).

3.10.2 However, there is always a requirement for some drugs and preparations to be used which are not in the formulary, for example, where the patient has a rare condition requiring a specific medication, where the formulary options have already been tried and not tolerated, or where a patient is admitted on a non-formulary drug that it is deemed unacceptable to change. Sometimes, though, the prescriber may simply not know what the formulary choices are. Pharmacy review and a one-off approval form are used to police non-formulary requests with reasonable success, but the system is cumbersome, bureaucratic, time-consuming and - on rare occasions - expediently circumvented.

[16] However this capability is subject to the existence of a suitable feed of SNOMED CT coded medical history.

3.10.3 One of the benefits of an EPMA system is that it can be set up to encourage compliance with the formulary by presenting formulary drugs as the first options. It is also possible to set up rules to control how certain drugs may be used to treat specific illnesses, or who is allowed to prescribe them (eg by specialty).

3.10.4 This would make available the relevant information to prescribers, reduce the inefficiencies around unnecessary non-formulary prescribing, improve cost-effectiveness, help with the controlled introduction of new drugs into the formulary, and ultimately benefit patient outcomes and throughput.

3.11 Infection Control

3.11.1 The progress being made by the Trust in reducing infectious diseases is well known. Some of these diseases are spontaneous, whilst others are due to cross-infection. As regards the latter, a significant modifiable risk factor is exposure to high risk antibiotics and the duration of such exposure. This means that improving the choice and duration of antibiotics given to patients can reduce the number of cases of cross infection.

3.11.2 It is inevitable that STH will be required to make further reductions in healthcare associated infections (HCAI) in future. Antibiotic stewardship is an important part of the drive to reduce the incidence of HCAI within the Trust.

3.11.3 In this context, an EPMA system would have a major impact on the ability of the Antimicrobial Therapy Team (ATT) to carry out antibiotic stewardship. It would improve adherence to the antimicrobial formulary. It would enable the development of a more comprehensive restricted antibiotic policy, which is not currently possible. It would improve the review of antimicrobials by restricting the duration for which certain antibiotics can be prescribed. It would support the switch from intravenous to oral antibiotics, where appropriate. It would also enable standard surgical prophylaxis bundles to be produced for each procedure. This would ensure that the correct antibiotic and number of doses are used and hence reduce the number of inappropriate post-operative doses which are administered.

3.11.4 Further, particular advantages would accrue from the proposed EPMA architecture at STH, because it includes a link to the Sunquest ICE results reporting system. EPMA would prompt the prescriber to send appropriate samples to Microbiology prior to the administration of antimicrobials. This would improve the process of reviewing broad spectrum antibiotics, which are known to be a driving force for Clostridium difficile associated disease. If a patient is known to be MRSA or C.difficile positive, the prescriber would be alerted to reconsider if a high-risk antimicrobial is prescribed. These actions would help to avoid relapses of infection, save nursing time, and reduce LOS.

3.11.5 As an indication, iSOFT estimates that – based on its experience in implementing EPMA systems in other large teaching hospitals - an EPMA system would result in a 10% reduction in the number of MRSA or C.difficile cases at STH[17]. Normally, the reduction would be greater, but this figure takes account of the spectrum/type of episodes at STH. Hence EPMA would help the Trust to avoid missing its C.difficile target which currently incurs a financial penalty of £500,000.

3.11.6 In summary, a major aspect of antibiotic stewardship is the monitoring and auditing of antimicrobial use. EPMA would help with both prospective and retrospective monitoring. It would allow microbiology and pharmacy services to review targeted antibiotics currently prescribed, improve the accuracy of reporting information, and enable ATT to conduct much larger audits in future.

[17] Indicative price quotation obtained from iSOFT in October 2011.

3.12 Accountability and Governance

3.12.1 An EPMA system puts all clinical staff on their mettle, because they know that every prescribing action or amendment can be traced back to them. Unlike the present rather muddled manual system, EPMA maintains a continuous, detailed and personalised audit trail.

3.12.2 It would enhance the reporting and investigation of all medication incidents by enabling more timely feedback to those involved and their supervisors. In this way, the Trust's response to complaints, concerns, incidents referred to the coroner, or challenges by commissioners would be greatly strengthened. In the worst case of (say) a police investigation on a ward, EPMA could be very powerful in swiftly exonerating those STH staff who are *not* involved.

3.12.3 EPMA could also improve audit work, which currently relies on time-consuming manual note-pulling and scrutiny of drug cards. It would vastly increase the capacity for clinical audit of prescribing and medicine management processes required to demonstrate compliance with external standards, such as those of the NHS Litigation Authority and Care Quality Commission.

3.13 Out of Hours Support

3.13.1 An EPMA system would strengthen the Trust's out-of-hours (OOH) capability in many ways.

3.13.2 At present the Trust has two resident pharmacists working until midnight, one on each campus, and each assisted by a (limited) supporting team. If the pharmacists had access to an EPMA system, they could access medicines as they are prescribed, or shortly after prescription. This would allow the prescriptions to be prioritised according to the most clinically urgent, thus reducing delays in the treatment of patients.

3.13.3 Another benefit is that more items would be processed within the hours when support is available, thus reducing the lone worker risks incurred by a resident pharmacist moving around the hospital at night.

3.13.4 There are similar advantages regarding OOH queries. At present if a prescription does not reach the pharmacist until after 5pm, any queries are handled by the on-call doctors who are likely to be unfamiliar with the patient being treated. This means that treatment is either delayed until the next day or given and then reviewed (which is wasteful of time and effort). Instead, an EPMA system would speed up transmission, thus ensuring that more prescriptions reached the pharmacist before 5pm, so that queries can be handled by the prescribing doctor.

3.13.5 Similarly, the resident pharmacists often remain in the dispensary between midnight and 1am in order to action items prescribed in the run-up to midnight. The more efficient initiation and transmission of prescriptions by EPMA would imply a reduction in the need for these regular overtime payments, although this cannot be confirmed until EPMA is fully operational. In any event, the real benefit is in terms of the patient getting appropriate treatment quicker.

3.13.6 Lastly, the more powerful and swifter information provided by an EPMA system would facilitate communications within the Hospital at Night team.

3.14 Medicines Administration

3.14.1 It is well known that difficulties and potential errors often beset nurses during the process of administering medicines. To counter this, some Trusts have introduced red tabards for nurses which say "Do not disturb – Drugs round in progress". This idea was recently investigated by STH which concluded that, although welcome in principle, it was not desirable (mainly for infection control reasons).

3.14.2 However, EPMA offers another way of providing valuable support for error reduction. For example, it can help by providing a worklist for nurses, improving the timeliness with which medicines are supplied to the ward, facilitating patient identification at the bedside, removing the problem of missing or illegible drug charts, prompting when doses are due, allowing easy review of previous medication history, extending the amount of information available during administration, and – importantly - recording the fact that the patient has actually taken the medication. This will be particularly helpful to nurses and other healthcare professionals.

3.15 Patient-Level Costing

3.15.1 EPMA would make a significant contribution to achieving patient-level costing. Currently the quantity and cost of drugs purchased from pharmacy is passed from the JAC stock control system to the Integra finance system at cost centre level via the (rekeyed) accounts payable interface.

3.15.2 However this only gives the Finance Directorate a partial picture. With the advent of an EPMA system, Integra or SLR (as appropriate) would receive an electronic feed of what has actually been administered from ward stocks, as shown in the diagram at Appendix B. Taken together, these two inputs would then move the Trust much closer towards achieving patient-level costing for medicines.

3.16 Stock Management

3.16.1 Although difficult to achieve (see Note 20 to Section 5.5.1.below), an electronic link between the EPMA system and the JAC stock control system would significantly improve the efficiency of medicines ordering processes for both ward stocks and individually-dispensed medicines, reducing stockholding, reducing repeat dispensing, and reducing the workload associated with the supply of medicines.

3.16.2 Availability of prescriptions on-line would speed up pharmacy validation processes and increase the amount of time that pharmacists can spend on other matters, such as face to face contact with patients.

3.16.3 Having the EPMA linked to the pharmacy stock control system would reduce the amount of time spent on data entry in the dispensary, and thus speed up dispensing.

3.17 FOI Requests

3.17.1 The Pharmacy Directorate received 12 Freedom of Information (FOI) requests relating to medicines during the first 11 months of 2011, but this figure excludes requests which go direct to clinical directorates bypassing pharmacy.

3.17.2 Irrespective of how FOI requests reach the Trust, responding to them consumes large amounts of staff time and effort. In some cases information requested is not captured or held in the existing pharmacy stock control system, so a full FOI response cannot be supplied. Whilst this is legally acceptable, an EPMA system would greatly help by providing a more informative reply to the requester.

3.18 Electronic Medication History

3.18.1 As already mentioned in Section 2.3.2 above, the DH has long championed the concept of the so-called ‘Clinical Five’ systems, including ePrescribing/EPMA.

3.18.2 The Trust does not yet have such a capability, and this has already been acknowledged in the Trust’s Informatics Strategy as being the greatest single gap in system provision.

3.18.3 This is because EPMA is not only beneficial from the viewpoint of drug therapy. It also provides an electronic database detailing the patient’s medication history. This history

can be viewed and updated by any doctor or healthcare professional with access rights. The advantage is that the acute history is complete, secure, and always current.

3.18.4 Hence EPMA is - in effect - a mini-EPR which can be used to inform other hospital information systems, or to feed into electronic discharge communications for GPs. This has obvious benefits in terms of modernising the Trust. It would make an important contribution towards achieving the Paperless Hospital.

3.19 Management of Long-Term Therapies (including Homecare)

3.19.1 The potential for an EPMA solution to manage patients' medication outside of the hospital environment, via a 'virtual ward' utilising the electronic medication history functionality, gives significant scope for increased visibility of patients on long-term therapies under the clinical supervision of hospital clinicians. This in turn potentially improves the governance, risk-management and cost-effectiveness of these therapies.

3.19.2 It is also a step towards the eventual prospect of improving integration with primary care, which is an important long-term goal. Ideally, STH pharmacy staff would wish to be able to view prescribing records in primary care databases, and vice versa. Recent progress in this area has been erratic, due to technical and confidentiality issues, but EPMA will greatly help towards building the right infrastructure for the future.

3.20 Supporting Research and Development

3.20.1 Identification of appropriate patients for recruitment into clinical trials is a significant challenge for any healthcare organisation. Disease databases and the records available in full EPR systems have a major role to play in managing this task, but use of the medication history information can also be of assistance (subject to appropriate information governance safeguards).

3.20.2 In addition, there are small, but nonetheless significant, risks associated with the treatment of patients recruited into clinical trials but where this information is not available to non-trial clinicians treating the patients under a separate episode of care. Including details of clinical trial medication in patients' EPMA records will reduce these risks.

3.21 Abolition of Prescription Stationery

3.21.1 If EPMA is implemented for inpatient, outpatient and discharge prescribing, there would no longer be any need for prescription charts and other stationery to be pre-printed.

3.21.2 A recent survey of Trust-wide stationery printing costs conducted by STH pharmacy staff showed that a total of £66k was spent in FY 2009/10 (full year), £74k in FY 2010/11 (full year), and £50k in FY 2011/12 so far (six months only).

3.21.3 Therefore it seems reasonable to conclude that £90k could be saved recurrently by the Trust as a result of going paperless and discontinuing the use of pre-printed stationery, albeit partially offset by the continued need to print some plain paper documents on demand (but at significantly lower cost).

3.22 Discharge Process & GP Communications

3.22.1 It is crucial that all patients' GPs are notified promptly of their discharge. This includes communication about their medication on discharge to enable GP records to be updated in time for accurate provision of the next prescription, and to arrange for monitoring where appropriate. Failure to meet this requirement can lead to medication errors post-discharge, which in some cases results in unnecessary readmission.

3.22.2 The standard NHS contract for acute services (2008) defines the obligation for acute trusts to issue the patient's discharge summary to the patient's GP within 24 hours of discharge[18].

3.22.3 A recent audit of 120 patients who were discharged from STH between July and September 2010 demonstrated that only 20% of TTOs were received by the GP within 24 hours, and the average time taken for delivery of the TTO to the GP was 8.61 days

3.22.4 As elsewhere in the NHS, it is well known that the present STH discharge process is slowed by numerous difficulties surrounding the paper copy of the TTO. This is due to a combination of factors, such as manual procedures (which are prone to error), disjointed communications (which slow the exchange of information), fluctuations in ward staffing (which inhibit timeliness of decision-making), and no standard delivery mechanism (which can be by fax, external mail, or hand).

3.22.5 Instead, EPMA holds out the very real prospect of speeding up the entire discharge process. When combined with the Trust's IC-Discharge Project (which is part of the ICE Programme), it will eventually enable messages containing TTO information and clinical detail to be transmitted electronically direct from STH wards to both EMIS and SystmOne GP practices. In this way, EPMA will do much to ensure that the Trust meets its contractual agreement to deliver immediate discharge summaries within 24 hours, and therefore reduce the risk of medication errors after discharge.

3.23 Competitive Advantage

3.23.1 STH lags behind several of its competitors and other local Trusts which are already making good progress with their EPMA systems.

3.23.2 Pennine Acute went live with its EPMA system in November 2011. Leeds Teaching Hospitals has a pilot implementation planned for late 2011. Doncaster and Bassetlaw DGH has long experience of using EPMA across the entire Trust, resulting in a major improvement in the quality of prescribing and workload management. Chesterfield DGH has begun its EPMA rollout, finding that prescribing and efficiency have improved considerably. Rotherham DGH will be implementing ePrescribing in January 2012. Barnsley DGH aspires to EPMA, although its business case has slowed. Sherwood Forest (Kings Mill) Hospitals went live with EPMA in May 2011. Royal Derby Hospital began a limited rollout of EPMA in spring 2011. University Hospitals of Leicester began piloting EPMA in summer 2011, and University Hospitals Birmingham has been developing its EPMA system for some time now.

3.23.3 Subject to affordability, procurement of an EPMA system would enable STH to keep pace with this trend and avoid conceding competitive advantage.

3.23.4 This will increasingly matter over the coming decade as the pace of change in the healthcare marketplace speeds up, and as commissioners increasingly look for capabilities which differentiate in favour of their patients. For example, GPs are likely to welcome any acute hospital equipped with EPMA, because it can contribute towards giving them early notification of a patient's drugs on discharge.

[18] The Standard NHS Contract for Acute Services and Supporting Guidance. Terms and Conditions for the provision of Health Services. Department of Health. Revised January 2008

3.24 Project Scope

3.24.1 Section 3 (Strategic Case) of this OBC has argued that an EPMA system would deliver numerous benefits for STH. Appendix B shows the proposed scope of the system required to provide such benefits.

3.24.2 The system would cover all inpatient, outpatient and daycare pharmacy services. Data entry would be achieved by using a combination of cart-mounted laptops or other mobile devices, as well as static PCs. There would also be a need for organisational development in order to communicate and adopt new ways of working.

3.25 Key Investment Objectives

3.25.1 These are to:

- Improve patient safety and outcomes.
- Increase operational effectiveness across the entire Trust.
- Secure income and make financial savings.
- Improve governance and accountability.
- Free up staff time for higher priority tasks.

3.26 Expected Benefits

3.26.1 Expected benefits for the Trust are:

Patient Safety		
Patients	Improved clinical care and outcomes.	Quality
Staff, Patients	Up-to-date, legible and comprehensive medication record.	Quality
Staff, Patients	Real-time decision support for drug dosing, allergies, interactions, etc.	Quality
Management	Reduced incidence of adverse drug events, thus reducing additional patient health complications, length of stay, and potential litigation.	Quality & Financial
Management, Staff, Patients	Process compliance to ensure agreed workflows and processes are adhered to in order to promote optimum performance and manage risk.	Quality
Management, Staff, Patients	Ability to strengthen antibiotic stewardship and thus aid infection control.	Quality
Management, Staff, Patients	Improved contribution to the GP discharge letter/summary process, thus leading to reductions in unnecessary readmissions.	Quality
Management, Staff, Patients	Improved communication across the Trust for all aspects of medicines management.	Quality
Management, Staff, Patients	Improved medicines reconciliation	Quality
Management, Staff, Patients	Better out of hours (OOH) support, eg for the Hospital at Night.	Quality
Staff, Patients	Smoother workflows with fewer peaks and troughs.	Quality
Staff, Patients	Drug rounds completed more efficiently.	Quality
Operational Performance		
Management	Automatic generation of a patient's drug usage and associated costs for use in the	Financial

	contracting process.	
Management	Ability to streamline drug orders based on priority and type (eg discharge or outpatient) thereby potentially freeing beds quicker, reducing patient waiting times and queues (eg in pharmacy) and providing patients with a more responsive service.	Financial
Management	Performance monitoring to provide information and data relating to operational and clinical effectiveness and aspects that require further improvements.	Financial
Management	Ability to deal with increased patient volumes without requiring an increase in resource (ie the ability to do more with the same).	Financial
Management	Ability to evidence work done when negotiating with commissioners.	Financial
Management	Ability to move closer towards patient level costing.	Financial
Management	Improved control in key cost centres such as drug formulary and prescribing protocols.	Financial
Staff	Right first time prescribing, reducing the volume of medication interventions thereby saving time for medical, nursing and pharmacy staff.	Financial
Staff	Visibility of a patient's medication through the prescribing, pharmacy and nursing processes thereby reducing time spent on dealing with telephone and other enquiries.	Financial
Clinical Governance		
Management	Increased visibility and management of clinical decisions and issues to identify what decisions are being made, by whom, why the decision was made and the resulting outcome.	Quality
Management	Enforcement of operational and clinical processes.	Quality
Management	Real-time monitoring of operational performance.	Quality
Management	Improved risk management by, for example, establishing links between risk and formulary management.	Quality
Management	Validation and visibility of centralised managed data sets.	Quality
Management	Improved ability to respond to FOI requests	Quality
Corporate Benefit		
Informatics	EPMA fills the last remaining gap in major information systems which support clinicians.	Capability
Service Development	EPMA will help to avoid conceding competitive advantage to other Trusts.	Capability

3.27 Fit with Trust Objectives

3.27.1 The fit with Trust objectives is very high. Implementation of an EPMA system will strongly contribute to the Trust's strategic vision in the following ways:

Achieve Clinical Excellence	• Improved reduction in prescribing risks • Improved reduction in medication errors

	• Improved clinical decision support • Improved formulary compliance • Improved antibiotic stewardship • Improved clinical pathways • Improved governance and audit • Improved ability to evidence work done • Improved discharge process
Be Patient Focussed	• Improved patient safety • Improved quality of care • Improved outcomes • Improved patient satisfaction
Engaged Staff	• Improved operational effectiveness • Improved modernisation • Improved staff morale (thru' more time for care) • Improved out of hours support

3.28 Summary

3.28.1 The present manual prescribing process is characterised by errors, risks, and delays which are potentially dangerous for patients, time-consuming for clinical staff, costly for budgets, and risky for the Trust.

3.28.2 Instead, an EPMA system will streamline the entire process, so that the right drug is more likely to be dispensed in the right situation with the right outcome.

3.28.3 Diagrams are provided which illustrate the difference between these two approaches (ie manual and electronic). Appendixes C and D highlight the extensive benefits which EPMA can deliver for STH in terms of inpatient workflow (eg for TTOs), whilst Appendixes E and F highlight the same in terms of outpatient workflow.

4 ECONOMIC CASE

4.1 General

4.1.1 An Option Appraisal has been carried out in order to consider the most advantageous non-financial way of delivering the benefits sought.

4.1.2 In conducting this appraisal, the EPMA business cases of several other NHS Trusts have been consulted. These contain a range of options which are sometimes (when viewed from the STH perspective) overly ambitious and costly.

4.1.3 Nevertheless, the points made below are designed to show that the work of these other NHS Trusts has been incorporated, and that every reasonable possibility has been considered.

4.2 Assumptions

4.2.1 There are three key assumptions which have underpinned this Appraisal.

4.2.2 First, it would be prudent to align EPMA with any future STH vision of procuring a commercial EPR system. The Trust's Informatics Strategy is currently under review, and this may lead to the planning and purchase of an EPR over time. Given that EPMA forms such an important part of EPR architecture, this co-ordinated approach would have great merit in terms of promoting electronic integration across the Trust. Although an EPMA system would be a *stand-alone* purchase, it could offer the added benefit of being the major *initial* component of a phased approach towards implementing a commercial EPR over a number of years. In this scenario, EPMA would need to have the potential capacity for scaleability and expansion in order to dovetail with EPR. In particular, it means that the OJEU Advert for any EPMA system would have to be carefully worded with an eye to the future, but this is easily done[19].

4.2.3 Second, it is assumed that there is no requirement to purchase an EPMA system 'bundled' with replacement of the existing JAC stock control system. Any such replacement of JAC would be unnecessarily wasteful. The JAC system has been in use in the Trust since 1990 and has probably cost the Trust a total of nearly £1m in running costs to date. Perhaps more importantly, there has also been a substantial investment in staff time and training in order to develop sound procedures around the system. As a result, the JAC system now provides good quality data, and there is no need to change it.

[19] To expand on this point, it would be feasible for the Trust to consider acquiring the Lorenzo EPR System (with its integrated EPMA capability) as an upgrade path for PatientCentre PAS. This course of action is outside the scope of this OBC. However, it may be helpful to explain some of the issues here. Computer Sciences Corporation (CSC) on behalf of NHS Connecting for Health (CfH) offers an EPMA capability as part of its Lorenzo Regional Care (LRC) EPR system. Put simply, it is only possible to acquire the Lorenzo EPMA system if a Trust also opts to buy the full-scale Lorenzo EPR system. This joint package is currently being implemented at United Hospitals of Morecambe Bay NHS Foundation Trust. However, Morecambe Bay is the only Trust in the UK to have taken the Lorenzo EPMA functionality so far. The software only covers TTO prescribing at present, arguably lacks what is required to meet the clinical needs of a large Trust like STH, and will not include full EPMA functionality until at least 2015. Even then, it will be immature and untried in a hospital setting, and so Lorenzo EPMA functionality is too far away for STH purposes at present, although the wider strategic merits of the Lorenzo EPR system as an upgrade path for PatientCentre PAS are certainly worthy of careful consideration. If the Trust decided to go ahead with that upgrade path, then it would be necessary to ensure (via the OJEU Advert) that any stand-alone EPMA system bought now was upwards compatible and capable of being integrated with the mature Lorenzo EPR system when it arrives. In this way, the Trust could ensure maximum future strategic benefit for relatively modest EPMA outlay today. See also Footnote 20 below. Although iSOFT is used as the example here, other possibilities exist in the marketplace.

4.2.4 Third, it is assumed that there is no benefit in trying to expand and develop the Trust's existing pharmacy-related systems into a bespoke EPMA system for STH. The main reason is that the Trust's existing suppliers (eg JAC, iSOFT, etc) would not agree, because they would prefer to sell us their specialist EPMA products. But even if this approach were contractually possible, it would be poor VFM. It is not normally Trust policy to develop in-house systems, because they are resource intensive, often risky, take too long, and need specialist long-term support. Instead, where appropriate commercial systems are available for purchase, this is the better route. In any event, this route does not preclude the Trust's existing suppliers (eg JAC, iSOFT, etc) from offering EPMA solutions which build on the product platforms which they already have in use at STH.

4.3 Long List of Options

4.3.1 With these assumptions in mind, a workshop was held on 7 February 2011 at which key stakeholders in the STH pharmacy service considered a wide range of possible ways in which a stand-alone EPMA system could be implemented across the Trust. These included implementing for inpatients only, outpatients only, certain sites only, or with only limited functionality.

4.3.2 All of these options were discounted as it soon became clear that only a Trust-wide EPMA system for both inpatients and outpatients would be capable of delivering all the benefits sought. Further, it was agreed any such system must include the following functionality:

- ePrescribing and Medicines Administration (EPMA).
- Integration - or interfacing - with the JAC stock control system
- Clinical decision support rules (ie which provide guidance).
- Prescribing rules (ie which are immutable).
- Pharmacy validation facilities (ie clinical pharmacy checks on prescriptions).
- Electronic drug chart.
- Links to other Trust systems.
- Access to information about GP treatment recommendations.
- Access to information about the home care delivery service of medicines.

4.3.3 In considering functionality, there is one aspect which merits closer examination. There are significantly different EPMA systems available in the marketplace at significantly different prices, and it is important to be clear about what the Trust wants. The main determinant of these differences lies in each system's approach to rules-based support.

4.3.4 It is axiomatic that STH requires a core of rules-based support to be available from the outset, and the goal would be progressively to develop this into a useful capability over a long period of time.

4.3.5 However, at least one EPMA system in the marketplace sets out with the paramount objective of achieving full rules-based support which is advanced, dynamic and responds to other parameters affecting the patient (eg blood test results, etc). This type of system requires much effort to implement and is something which has to be developed from active learning over many years. Such sophistication may be too complex and costly for

STH, although it could be appropriate if considered as part of a wider strategic drive towards full EPR.

4.3.6 On balance, however, the initial goal should be to avoid the type of EPMA functionality associated with a 'top-of-the-range' system. Instead, the functionality required by STH is likely to be found in a proven 'mid-range' system offering immediate benefits, coupled with a core of rules-based support which is capable of being developed pragmatically over the longer term. It follows that the Trust's OJEU Evaluation Criteria should require the preferred supplier to have a Product Roadmap which is compatible with the Trust's vision, resources, and affordability.

4.3.7 The exact detail of the functionality required can be defined in the Output Based Specification (OBS) at a future date, but from a strategic viewpoint the broad clinical and business requirement is clear.

4.4 Short List of Options

4.4.1 Therefore the option appraisal quickly reduces to this shortlist:

Figure 1 – Short List of Options

#	Option
Option 1	Do Nothing/Minimum.
Option 2	Procure a Trust-wide EPMA system from NHS Connecting for Health.
Option 3	Procure a Trust-wide EPMA system from the marketplace.

4.4.2 Some observations can be made about these options.

4.4.3 Option 1 may appear superficially attractive. However it is unsustainable in the current financial climate because it is inefficient and wastes money. Specifically, it is needlessly costly in terms of poor drug usage and staff time spent on unnecessary duplication of effort. Above all, it is inherently unsafe because the present paper-heavy process runs with a high level of risk attached to it. It also leads to limited medicines management information being available to the Trust with unfortunate consequences. For example, patients and staff find that manual processes are slow and inefficient, because there is no easy access to the patient's medication record as and when required. From the perspective of senior Trust management, there are weaknesses too. Patient-level costing is inadequate, and unnecessary (re)admissions are caused by poor communications with GPs. Lastly, there is no scope for 'Do Minimum' because a partial implementation of ePrescribing would not address the Trust-wide nature of these issues.

4.4.4 Option 2 recognises that much useful work has been carried out by NHS Connecting for Health in terms of specifying the functionality required of EPMA systems and disseminating how they can be used to improve patient safety. However, the Trust's past experience with other systems offered by the National Programme for IT has been a bruising one, and there is a widely held view that national contracts do not represent good VFM. Further, the government announced in September 2011 that it would be accelerating the dismantling of the National Programme. For all these reasons, Option 2 is regarded as untenable.

4.4.5 Option 3 is a more reliable approach. It involves undertaking an OJEU procurement in order to ensure that the Trust's detailed requirements are met by a mature product which represents good VFM. All past experience shows that this highly competitive process is the best way to drive down prices and ensure that the Trust gets the benefits that it wants. This approach also provides a welcome opportunity to survey the full range of

suppliers and products available, thus giving confidence that when the final choice is made, it cannot be bettered. And in any event it does not preclude CSC or iSOFT from submitting a tender response if they have a suitable offering available at the time.

4.5 Non-Financial Benefits Appraisal

4.5.1 Key stakeholders have reviewed the Short List against the following benefit criteria:

Figure 2 – Benefit Criteria

Benefit Criteria	Supporting definition
Patient Safety	• Reduction in prescribing errors. • Reduction in medicines administration errors. • Improved compliance with national and local prescribing protocols. • Reduced hospital acquired infections. • Improved clinical outcomes. • Positive impact on public perception of the Trust.
Operational effectiveness	• Enhanced recovery pathways, improved discharge planning, reduced waiting times to obtain TTOs, and reduced LOS. • Improved medicines' reconciliation. • Reduction in manual documentation. • Improved clinical communications. • Contemporaneous compliance with NICE guidelines to maximise income. • Audit trail proving to purchaser(s) that contracted income should be paid. • Potential scope for financial savings.
Deliverability	• Ease of handling the level of complexity and ambition involved in the project. • Likelihood of successful delivery of the system and its benefits. • Scaleability.
Adaptability	• Flexibility to cope with future changes affecting the pharmacy service. • Flexibility to develop into new areas of functionality. • Flexibility to help management to think ahead and anticipate what may be needed next.

4.5.2 A weighting exercise has been carried out as recommended in the Capital Investment Manual, and the results are as follows:

Figure 3 – Weighting of Benefit Criteria

Benefit Criteria	Weighting
Patient safety	50
Operational effectiveness	30
Deliverability	10
Adaptability	10
Total	**100**

4.5.3 The key stakeholders discussed and agreed a score for each of the three short-listed options on the basis of 0 (very poor) to 10 (excellent), which was then multiplied by the weighting in order to arrive at a weighted score. The results of this scoring exercise are shown below:

Figure 4 – Scoring of Options

		Option 1 Do Nothing	Option 2 Procure from CfH	Option 3 Procure from marketplace
Benefit Criteria	**Weight (wt)**	**Sc x wt = total**	**Sc x wt = total**	**Sc x wt = total**
Patient Safety	50	4 x 50 = 200	N/A	9 x 50 = 450
Operational effectiveness	30	4 x 30 = 120	N/A	8 x 50 = 400
Deliverability	10	10 x 10 = 100	N/A	8 x 10 = 80
Adaptability	10	4 x 10 = 40	N/A	8 x 10 = 80
Total Benefit Points		**460**	N/A	**1,010**
Ranking		**2nd**	N/A	**1st**

4.6 Preferred Option

4.6.1 Although the present paper-based approach (Option 1) is superficially attractive, it is unsustainable because of the risks and inefficiencies involved. Option 2 is non-viable.

4.6.2 Therefore the outcome is clearly in favour of moving to an electronic system (Option 3) which offers numerous qualitative and quantitative benefits for the Trust, patients and staff.

4.7 Summary

4.7.1 For all these reasons, the Option Appraisal concludes that Option 3 should be taken forward for financial analysis.

5 FINANCIAL CASE

5.1 General

5.1.1 This Section begins by describing the proposed timetable and identifying the estimated capital and revenue costs of the Preferred Option.

5.1.2 It then explains why Cost Per Benefit Point comparison with the Do Nothing/Minimum Option is not viable and ends by assessing the risks inherent in the proposed scheme.

5.2 Project Timetable

5.2.1 The outline project plan is at Appendix G.

5.2.2 A summary of the key dates is as follows:

Phase	Main Activities	From	To
Phase 1 – Project Initiation	• Formation of Project Board. • Project Initiation Document. • Outline Business Case (OBC).	Feb 2011	Jan 2012
Phase 2 – Procurement	• OJEU Advert. • Output-Based Specification. • Evaluation of Tenders. • Site Survey of Data Entry Devices. • Full Business Case (FBC). • Award of Contract.	Feb 2012	Mar 2013
Phase 3 – Implementation across 1st Tranche of Mainstream Clinical Directorates	• Detailed Design. • Implementation. • User training.	Apr 2013	Mar 2014
Phase 4 – Implementation across 2nd Tranche of Mainstream Clinical Directorates	• Continuation of Phase 3. • Detailed Design. • Implementation. • User training	Apr 2014	Mar 2015
Phase 5 – Benefits Realisation	• Final handover of system to users (as distinct from initial Go Live). • Consideration given to rollout to specialist EPMA user areas. • Post Implementation Review. • Enhancements.	Apr 2015	Ongoing

5.3 Asset Life

5.3.1 The Finance Directorate (Jenny Rutledge) has confirmed that the Trust would regard the asset life of an EPMA System as being eight years.

5.4 Assumptions

5.4.1 All costings have been carried out on the basis that the Trust requires the type of functionality discussed in Section 4.3 above. This is likely to be associated with a 'mid-range' EPMA system which has a core of rules-based support that can be expanded and developed over a long period.

5.4.2 All costings are based on indicative price quotations obtained from leading EPMA commercial suppliers in October 2011. The broad assumption has been made that the Trust could negotiate these prices downwards by 30% during an OJEU procurement, because such initial quotes are always over-inflated. It is important to note that this reduction has *already* been factored into the costs shown below (albeit adjusted somewhat to allow for the fact that UK inflation is currently running at about 5%).

5.4.3 All supplier costings reflect a 'typical' EPMA pricing model. But please note that there is wide variation in how the pricing models of the various commercial suppliers are structured. In particular, the approach to software licensing differs considerably, and there is much flexibility in how the financials can be adjusted to meet the needs of the customer. This means that the exact cost structures are unlikely to emerge until a detailed financial evaluation can be conducted of all tender responses. This will probably be a protracted process and may lead to some redistribution of monies between the proposed capital and revenue budgets at FBC stage.

5.4.4 All Trust costings are based on an appreciation of how EPMA suppliers conduct implementations. They tend to begin by setting up a Proof of Concept in pharmacy, plus a small number of wards/clinics, so that they can establish a reproducible plan for roll-out on a wider scale. *Thereafter the supplier usually assumes that the Trust will organise the roll-out on its own*, ie with only limited second-line external help, and so the resourcing implications of this 'arms-length' approach should not be underestimated.

5.5 Capital Costs

5.5.1 These are as follows:

Figure 5 - Capital Costs

	Item	Cost	Comments
Supplier Costs			
	EPMA application software license(s)	£400,000	See Note 1
	EPMA InterSystems Caché license(s)	£100,000	See Note 2
	EPMA interface to PatientCentre PAS	£10,000	See Note 3
	EPMA interface to Sunquest ICE system	£15,000	See Note 4
	EPMA interface to Integra system	£15,000	See Note 5
	EPMA interface to JAC system	£15,000	See Note 6
	EPMA interface to clinical portal	£10,000	See Note 8
	EPMA interface for discharge information	£15,000	See Note 7
	Professional services	£50,000	See Note 9
	VAT @ 20%	£126,000	See Note 10
	Sub-Total	£756,000	
Trust Costs			
	Servers	£145,000	See Note 11
	Data entry devices	£0	See Note 12
	Printers	£0	See Note 13
	MS-Office Licenses	£0	See Note 14
	Wireless infrastructure	£0	See Note 15
	Estates enabling works	£0	See Note 16
	Third party PAS interfacing costs	£15,000	See Note 17
	Third party ICE labs interfacing costs	£0	See Note 18
	Third party Integra or SLR interfacing costs	£10,000	See Note 19
	Third party interface to JAC system	£0	See Note 20
	Third party clinical portal interfacing costs	£0	See Note 21
	Third party ICE discharge interfacing costs	£18,000	See Note 22

	Item	Cost	Comments
	VAT @ 20%	£37,600	See Note 10
	Sub-Total	£225,600	
	Project Manager	£104,886	See Note 23
	Project Clinical Lead	£52,929	See Note 24
	Project Nursing Lead	£48,495	See Note 25
	Project Pharmacy Lead	£58,998	See Note 26
	Project IT Lead	£86,212	See Note 27
	Project Office(s)	£0	See Note 28
	Project Admin Support	£23,654	See Note 29
	Sub-Total	£375,174	
	Capital Supplies management charge	£10,000	See Note 30
	Consultancy	£80,000	See Note 31
	Contingency	£200,000	See Note 32
	Sub-Total	£290,000	
	TOTAL	**£1,646,774**	

Notes:

1. Covers cost for RHH, NGH, CCDH, WPH and JW, but excludes St Luke's Hospice. Most potential suppliers base their license costs on the Trust's total bed number, which then effectively becomes a site license. Using this approach, a total of 2,000 beds has been assumed for STH costing purposes. Expectation is for a total of about 6,500 users, of whom 450 would be concurrent.
2. Some suppliers make an additional charge for an InterSystems Caché license, which controls the number of concurrent users that can access the EPMA application. In this case, a total of 450 concurrent users has been assumed for STH. However, these licenses are sometimes supplied by a third party, in which case the preferred supplier may be content to allow STH to source them separately if it can purchase them at a more favourable price. Please note that where Caché licenses do not overtly feature in the supplier's offering, this does not mean that the estimated cost of £100k can be deleted from this OBC. On the contrary, that sum will almost certainly need to be folded back into the overall EPMA capital budget, because potential suppliers who do not identify Caché as a separate line item invariably charge more elsewhere in their application software licensing to compensate.
3. Covers cost of uni-directional inbound interface which is required for ADT purposes. Assumes that the preferred supplier will offer a standard HL7 (v2 or v3) interface specification which can be used with only minimal adaptation (and most suppliers do).
4. Covers cost of uni-directional inbound interface which is required to feed clinical chemistry and haematology results into EPMA. Assumes that the preferred supplier will offer a standard HL7 (v2 or v3) interface specification which can be used with only minimal adaptation (and most suppliers do).
5. Covers cost of uni-directional outbound interface which is required to feed information for PbR, SLR and budget management purposes. Assumes that the preferred supplier will offer a standard HL7 (v2 or v3) interface specification which can be used with only minimal adaptation (and most suppliers do).
6. Covers cost of uni-directional outbound interface which is required to feed information into the JAC stock control system for ordering, dispensing and stock control purposes. Assumes that the preferred supplier will offer a standard HL7 (v2 or v3) interface specification which can be used with only minimal adaptation (and most suppliers do). However, Note 20 below is such a major constraint that this interface may never be achievable, and thus no cost incurred at all.
7. Covers cost of uni-directional outbound interface which is required to feed drugs for discharge information to those GP systems able to receive it, using whatever STH corporate messaging arrangements are in place at the time. Assumes that the preferred supplier will offer a standard HL7 (v2 or v3) interface specification which can be used with only minimal adaptation (and most suppliers do). Please note that this line item makes no provision for

achieving access to GP treatment recommendations. The cost of this functionality would need to be explored with the preferred supplier and then planned as a future enhancement.

8. Covers cost of interfacing with the proposed STH clinical portal. Although not yet available, this portal would allow single sign-on for context synchronisation purposes (only), ie it would enable clinicians to access the same patient in any clinical application, including EPMA.
9. Covers project management, implementation, and go live support. Assumes that the preferred supplier will provide around 50 man-days of professional services @ £1,000 each and will not levy any extra charge for travel and subsistence expenses. This may seem a high figure. However, given the importance of having adequate user support during roll-out, it would be unwise to pare back supplier estimates in this area. Another factor is that there is currently a trend amongst suppliers towards putting their EPMA project manager on-site for longer than hitherto, because of the anticipated workload, which again drives up the cost. Any extra professional services days needed are likely to cost about £1,000 each (excl.VAT).
10. Assumes that the standard rate of VAT will remain at 20% for the foreseeable future. The Trust VAT Advisor has been consulted about the scope for VAT recovery. This is a complex issue which needs to be taken into account during the supplier evaluation process and contract negotiations, because it may be possible to structure the supplier's offering to ensure some VAT recovery under COS 14, although realistically this is unlikely to amount to all of the VAT identified in Figure 5.
11. Estimates. Assumes that additional capacity will need to be purchased for the Trust's virtual server infrastructure. The aim would be to provide a VMware server on each campus, each capable of running 6 virtual machines. Includes a cost allowance to cover the backup of 15TB of data. The figure of £145k covers the base operational requirement with minimal resilience. However, it is recognised that such a mission critical system would ideally require full (ie disaster recovery) resilience at much greater cost. This will need to be explored in detailed discussions when the preferred supplier has been identified, and the requirement - as necessary – would also need to be reflected in the supplier costings at FBC stage.
12. Is Nil. Assumes that cart-mounted laptops (or similar) will be provided by the Trust-wide wireless network project wherever these are not currently available on inpatient wards. Also assumes that the STH Next Generation Desktop Infrastructure programme will upgrade all PCs and desktop devices to Windows 7 over the coming years. EPMA suppliers recommend that thick client PCs or laptops should have a minimum specification of Windows XP or 7, dual core capability with at least 1.2GHz per core, plus 2GB RAM, 80GB hard drive, and either Ethernet or wireless connection. On present assumptions, the Trust will have complied with this specification by April 2014, albeit not everywhere at once. Hence it will be necessary to align the EPMA implementation plan with (1) the wireless network project's roll-out of cart-mounted laptops, and (2) the PC replacement programme. However, please note that additional (ie unforeseen) expenditure will be incurred in the event that the PC replacement programme does not achieve its objectives for any reason. For completeness, it is also worth mentioning that the possibility of clinical staff using their own personal (ie privately funded) mobile data entry devices is still under discussion within the Trust at present. Lastly, a Specification for data entry devices and peripherals is at Appendix H (showing which hardware the preferred supplier will typically expect the Trust to provide), and a Table is at Appendix I (showing which locations may need to be visited in order to validate that such hardware is in place). See also Figure 9 (Risk Analysis) below.
13. Is Nil. Assumes no requirement for any additional printers. However, if needed, these would be provided through the Managed Print Service. No capital cost is involved for the equipment, but there is a charge of 2p per sheet for mono printing and 7p for colour printing.
14. Is Nil. Assumes that all data entry devices already have MS-Office installed, or that licenses are not needed because the EPMA application is self-contained and can operate without MS-Office (and most do).
15. Is Nil. Assumes that all costs have been funded by the Trust-wide wireless network project.
16. Assumes no requirement for new power points or data points, as wards will use either existing PCs or existing wireless cart-mounted laptops.
17. Estimate from iSOFT Strategic Accounts Manager.
18. Is Nil. Assumes that lab results would be delivered at no extra cost from the Trust's integration environment which links the APEX system to the ICE system.
19. Assumes that no suitable General Ledger or Purchase Ledger interface is already held by the Trust, and that new work has to be undertaken by Integra at its end, which may include creating a pre-processing file. The figure quoted also assumes that the requirement is for standard interfacing with no unusual features. Alternatively, there may be a need to integrate with Service Line Reporting (SLR).
20. Is Nil. If JAC becomes the preferred supplier, an electronic link between the JAC stock control system and the EPMA system is likely to be possible within JAC's overall contract

price. However, if JAC does not become the preferred supplier, the JAC stock control system cannot currently interface with a non-JAC EPMA system. Work is under way to change JAC's file structure to permit this, but it will take several years to achieve. In the meantime, some form of manual transcription (ie dual entry) would be needed between the two systems.

21. Is Nil. The proposed STH clinical portal does not yet exist. When any such portal is procured in future, it is assumed that third party integration with EPMA will be specified as a functional requirement, and that the cost of providing it will be included in the portal's purchase price (ie on the basis that both ends of the interface will use industry standard software).
22. Sunquest has already done some work on automatically inserting TTO information into a letter created within the ICE Clinical Letters module, and the expectation would be to build on this.
23. Covers one midpoint AFC Band 8a Senior Project Manager @ £52,443pa with on-costs on full-time basis over two financial years. Role is to plan, resource, manage and communicate the project, working in close co-operation with the supplier's project manager.
24. Covers one SHO at S2 Band 2a @ £70,572pa with on-costs on full-time basis pro rata'd over 9 months of the pilot period and roll-out preparation. Role is to examine current working practices and design new ones for implementation across the Trust. Post ceases when rollout begins.
25. Covers one midpoint AFC Band 7 Ward Manager/Sister @ £43,106pa with on-costs on full-time basis pro rata'd over 9 months of the pilot period and rollout preparation during Year 1, but thereafter reducing to 0.3 WTE during the rollout itself until the end of Year 2. Role is to be domain expert, liaise with the Project Clinical Lead, examine proposed new working practices, identify potential points of failure, advise on suitable mitigations, and (later) approve any variations to those working practices which may be required in local care settings as the roll-out proceeds.
26. Covers one midpoint AFC Band 8A Pharmacist @ £52,443pa with on-costs on full-time basis pro rata'd over 9 months of the pilot period and roll-out preparation during Year 1, but thereafter reducing to 0.3 WTE during the rollout itself until the end of Year 2. Role is to configure the system, ensure that it is implemented in a way that is fit for purpose, carry out user acceptance testing, and control the drugs database during the rollout.
27. Covers one midpoint AFC Band 7 IT Lead @ £43,106pa with on-costs on full-time basis over two financial years. Role is to organise installation and testing of all necessary hardware and software, liaise with all interested parties over interfacing, and carry out user acceptance testing, especially of interfaces. After implementation is over, this post is expected to become a recurrent revenue cost and transition into providing full-time IT support for the EPMA system.
28. Is Nil. Assumes that the Trust will provide and fund office space on each Campus as a base where the supplier's project staff can meet with Trust project staff. Will need desks, chairs, telephones, stationery, cleaning, etc. If not, these items will have to be funded from Contingency.
29. Assumes that 2 days per week (0.4 FTE) of mid-point AFC Band 5 admin support will be required for two years @ £11,827pa with on-costs. This support could be provided by either the Informatics Programme Office or a separate source.
30. Covers cost of OJEU procurement and evaluation process. No VAT involved.
31. Covers combined cost of Outline Business Case, Output Based Specification, and Full Business Case. Assumes that some of this work may be undertaken by an external commercial consultancy in future. Includes VAT.
32. Is approx 15% of the total capital cost. Is intended to cover the unforeseen, and especially (1) any estimating errors or price changes, (2) any additional interfacing costs, (3) any additional hardware costs, (4) any funding shortfall incurred in setting up the two Project Offices, (5) any additional user training costs (eg around the need for more backfilling), or (6) any additional project management costs. Whilst this may seem a long list, it is likely that – with good management - only some of these possibilities will actually materialise.

5.5.2 As regards the capital costs, there is currently no funding allocated for this purpose.

5.5.3 The background is as follows: The Trust-wide Wireless Network Project is already approved within the Trust's Capital Programme for FY 2011/12 and 2012/13 at a cost of £2,596k. This is £500k less than was originally planned, due to financial pressures within the overall 5 year capital plan. In order to support the delivery of the Health Informatics Strategy in future years, the £1m IT ring-fenced envelope has also been uplifted by a further £1m each year from FY 2012/13 to 2014/15. One of the key

priorities in delivering this Strategy after implementation of the Wireless Networking scheme is the development of EPMA.

5.5.4 Therefore the Trust is asked to approve a provisional allocation of £1.6m within the Capital Programme spread across FY 2013/14 and 2014/15 in order to progress the EPMA scheme. Because of the way in which EPMA suppliers deliver their projects, the invoicing of capital costs is likely to be heavily 'front-loaded'. Hence it is judged that £1,399,758 (ie 85% of the total capital cost) will be needed in FY 2013/14 and £247,016 (ie 15% of the total capital cost) in FY 2014/15.

5.6 Non-Recurrent Revenue Costs

5.6.1 There are as follows:

Figure 6 – Non-Recurrent Revenue Costs

	Item	Cost	Comments
Supplier Costs			
	User Training	£15,000	See Note 1
	VAT @ 20%	£3,000	See Note 2
	Sub-Total	£18,000	
Trust Costs			
	Training Team Leader	£86,212	See Note 3
	Training Team	£290,720	See Note 4
	Sub-Total	£376,932	
	TOTAL	**£394,932**	

Notes:

1. Assumes that the Supplier will provide about 15 man-days of user training on a 'Train-The-Trainer' basis and will not levy any extra charge for travel and subsistence expenses. A series of courses would be held in order to train up enough STH trainers to cascade EPMA knowledge. In the longer term, arrangements will be made to incorporate EPMA into the doctors and nurses induction training (which might include using CBT). Overall, the implementation and training package from the supplier also usually includes business process training and review, file building, configuration training, shadowing of the Trust's implementation team during their initial training sessions on the pilot wards, floor walking, and review of the Trust's training material.
2. VAT is recoverable under COS 65.
3. Assumes that it will be necessary to recruit one midpoint AFC Band 7 Trainer as a permanent post @ £43,106pa with on-costs, initially for the two years of implementation, but thereafter to provide long-term support. Because there can be no margin for error when prescribing, the Trust's training effort must be carried out to the highest standard. Hence this post will provide leadership for the training team, ensure consistency of approach, and act as the overall anchorpoint. After the two years of implementation, this post will become a recurrent revenue cost in order to maintain continuity (See Note 13 of Figure 7 below).
4. Assumes that it will be necessary to recruit five midpoint AFC Band 6 Trainers on fixed term contracts or secondments @ £36,340pa each with on-costs for the two years of implementation. This will provide a sufficiently large team to cope with the many practical difficulties of delivering training to 6,500 doctors and nurses over two years. The Head of Learning and Development would prefer to recruit these trainers as needed and start them on a staggered basis as the implementation builds momentum. Hence an allowance of 20% has been deducted from the total staffing cost in order to reflect the financial benefit of such staggered recruiting. Beyond that, much will depend on the preferred supplier's approach, the detailed implementation plan, and whether the supplier would be willing to deliver the 15 man-days of user training over an extended timespan which more closely meets the Trust's requirements. Lastly, the expectation is that when cascading begins, these trainers will be assisted by champions/superusers in each clinical area, and that

clinical directorates will be willing to bear all the costs associated with releasing their staff for training.

5.6.2 These non-recurrent revenue costs are currently unfunded.

5.7 Revenue Costs

5.7.1 These are summarised next:

Figure 7 – Recurrent Revenue Costs

	Item	Cost	Comments
Supplier Costs			
	Annual support and maintenance charge for the EPMA application software license(s)	£130,000	See Note 1
	Annual support and maintenance charge for the EPMA InterSystems Caché license(s)	£30,000	See Note 2
	Annual support and maintenance charge for FDBE drug file	£90,000	See Note 3
	VAT @ 20%	£50,000	See Note 4
	Sub-Total	£300,000	
Trust Costs			
	Annual IT Services charges	£0	See Note 5
	Third party PAS interface support charge	£3,000	See Note 6
	Third party Integra interface support charge	£3,000	See Note 7
	Third party ICE interface support charge	£3,500	See Note 8
	Annual escrow charge	£600	See Note 9
	VAT @ 20%	£2,020	See Note 10
	Sub-Total	£12,120	
	System Managers	£129,318	See Note 11
	Pharmacists	£62,931	See Note 12
	Trainer	£43,106	See Note 13
	IT Support	£43,106	See Note 14
	Sub-Total	£278,461	
	Power charges	£0	See Note 15
	Capital charges	£228,943	See Note 16
	Sub-Total	£228,943	
	TOTAL	**£819,524**	

Notes:

1. Assumes that 24/7 cover is required, and that the charge is calculated at about 25% of the supplier's total invoiced capital costs including EPMA interfaces (excl.VAT). This charge is normally payable annually in advance as soon as the first clinical area goes live. If Go Live occurs mid-year, the charge is pro rata'd accordingly. It covers helpdesk telephone support, agreed response arrangements, and periodic software patches and updates. Typically, the contract is reviewed annually and includes an annual increase of 4.6% for RPIX, although every effort would be made to reduce this in contract negotiations. Lastly, this Note should be read in conjunction with the next one, because both budgetary figures may need to be rolled-up together.
2. Assumes 450 concurrent users. Please note that where InterSystems Caché licenses do not overtly feature in the supplier's offering, this does not mean that the estimated cost of £30k can be deleted from this OBC. On the contrary, that sum will almost certainly need to be folded back into the overall EPMA revenue budget, because suppliers who do not identify Caché as a separate line item invariably charge more elsewhere in their application

software licensing to compensate.

3. Covers cost of FDBE's Multilex Drug Data File (MDDF) which is often embedded in EPMA products. MDDF holds clinical and commercial information on over 75,000 pharmaceutical products and packs (plus contra-indications, allergy checking, side effects and warnings) and thus provides active clinical decision support about matters which clinicians may have overlooked. FDBE pricing is complex and - at the time of writing - not entirely clear. Hence a cautious approach has been taken. The figure given here is based on FDBE's standard pricing of £33 (excl.VAT) per bed per annum, subject to a minimum annual charge of £5,500. STH has 2,000 beds, giving a total cost of £66k (excl.VAT). Further, the preferred supplier might apply a management fee, which could total another £24k per annum (excl.VAT) and would effectively bring the standard price to £45 per bed per annum, or a total cost of £90k (excl.VAT). On the other hand, the preferred supplier may be content to allow STH to source MDDF separately, if the Trust can purchase it at a more favourable price. All figures are subject to annual increase at RPI, which potential suppliers suggest would be around 3%.
4. VAT is normally recoverable on annual support and maintenance contracts.
5. Is Nil. Assumes that no new annual networking or support charges will be levied by IT Services, because these are already being paid on all the data entry devices in use on wards and clinics when EPMA implementation begins. In particular, it assumes that the revenue consequences of the devices to be purchased as part of the Trust-wide Wireless Network Project are funded by the Trust.
6. Estimate iSOFT Strategic Accounts Manager. Is subject to annual increase at RPI.
7. Estimate from Integra National Sales Manager.
8. Estimate from Sunquest Sales & Marketing Manager.
9. Escrow is a method whereby the National Computing Centre (NCC) Manchester is paid a fee to act as trusted third party and hold the supplier's source code on behalf of STH, thus ensuring that if the supplier can no longer support it for any reason, the code can be released quickly and legally to the Trust, which can then continue to operate the system normally. Opinions differ about the utility of this service, and whether or not it really does reduce risk. However, most leading EPMA suppliers have already lodged their code in this way, and so it is assumed that STH would wish to buy the basic annual service, although more expensive levels of escrow agreement are available.
10. VAT is normally recoverable on annual support and maintenance contracts.
11. Covers three WTE AFC Band 7 members of staff @ £43,106pa each with on-costs. Role is to provide support on 24/7 basis, as this will quickly become a mission critical system like PACS. Each person must have a pharmacy background and, ideally, should be separate from the pharmacy system administrator(s). Tasks are to liaise with clinicians, carry out troubleshooting, implement local configuration settings (eg formulary), manage new functions given in updates, liaise with third parties about the drug dictionary, oversee privileges and roles for users across the Trust, analyse data, derive maximum benefits from interfacing, and investigate any user complaints about how system is functioning.
12. Covers two 0.6 WTE Pharmacists, both at midpoint AFC Band 8a @ £52,443pa each with on-costs. Suppliers recommend two posts in order to ensure cover for leave, sickness, etc. Role is to control the drugs database and manage updates, this being important for the credibility and success of the system.
13. Covers one Trainer at mid-point AFC Band 7 @ £43,106pa with on-costs. Suppliers recommend the need to retain a good training capability for some years after formal implementation ends in order to train new champions/superusers, introduce new functionality, respond to service reconfiguration needs, carry out refresher training, respond to changes in prescribing legislation, and cover any training gaps which arise outside formal induction training (eg caused by the F1 rotation and/or locums). Recurrent revenue funding of this post will only begin after the two implementation years have elapsed (See Note 3 of Figure 6 above).
14. Covers one WTE IT support specialist at mid-point AFC Band 7 @ £43,106pa with on-costs. Role is to support the system on full-time basis.
15. Is Nil. Assumes that existing PCs will be used, for which energy costs are already being incurred.
16. Assumes asset life of eight years. Given the long implementation period, capital charges would have to be levied in two tranches. The first tranche would begin on 1 April 2014 and cost £116,081pa. The second would begin on 1 April 2015 and would raise the total cost payable to £228,943pa.

5.7.2 These recurrent revenue costs are currently unfunded.

5.8 Managed Service Option

5.8.1 There is also the possibility of pursuing a 5-Year Managed Service. This is shown below for the sake of completeness, although these typical figures ***exclude*** Trust costs.

Figure 8 – Supplier's Managed Service Costs

Cost Elements	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Implementation Planning Study	£30,000					£30,000
Service Fee	£200,000	£200,000	£200,000	£200,000	£200,000	£1,000,000
						£1,030,000

5.8.2 The main advantages are (1) the lower requirement for capital, (2) no VAT is payable provided that certain HMRC criteria are met, and (3) no capital charges are payable on the supplier's costs.

5.8.3 The main disadvantages are that this option excludes (1) Trust costs, and (2) any capital charges associated with them.

5.8.4 A detailed VFM analysis would be needed to determine whether it is worth pursuing this option. At present there are too many variables, and so a VFM analysis can only be carried out with any confidence when the preferred supplier's costs are known, ie at FBC stage.

5.8.5 Having touched on the Managed Service Option, the mainstream discussion of capital and revenue matters is now resumed below.

5.9 Cost Savings

5.9.1 There is concensus within the STH Pharmacy Directorate that the following cost savings are achievable from an EPMA system:

#	Financial Benefit	Rationale	Source
CS1	Reduction in cost of Trust-wide medication errors, including missed doses = £460k.	Based on metrics from academic research and the experience of other Trusts.	See Section 3.2.11 above
CS2	90% likelihood of achieving £1,500k reduction in Trust-wide annual medicines expenditure = £1,350k.	Based on metrics from hospitals already using EPMA. Judged by STH pharmacy staff to be the lower limit of what might confidently be achieved.	See Section 3.4.4 above (which includes the gains from Section 3.3.5).
#	**Financial Benefit**	**Rationale**	**Source**

CS3	50% likelihood of achieving a further £2,300k reduction in Trust-wide annual medicines expenditure = £1,150k.	Based on metrics from hospitals already using EPMA. Judged by STH pharmacy staff to be the upper limit of what might reasonably be achieved.	See Section 3.4.5 above
CS4	Abolition of Trust-wide prescription charts = £90k.	Known to be the annual cost saved by no longer pre-printing prescription charts and other stationery, although there will still be some requirement for hardcopies of discharge prescriptions to be given to patients.	See Section 3.21.3 above
TOTAL	**£3,050k**		

5.9.2 Given the lengthy implementation period, these cost savings will take time to come on stream and be fully realised. Thereafter their effectiveness will progressively decline, ie as their initial success reduces the scope for further success.

5.9.3 In order to reflect this 'bell' curve, it is assumed that 25% of these cost savings would become available in FY 2014/15, 50% in FY 2015/16, 100% in FY 2016/17, 100% in FY 2017/18, 50% in FY 2018/19, and then only 25% in succeeding years.

5.10 Additional Income

5.10.1 There is concensus within the STH Pharmacy Directorate that an EPMA system could deliver the following additional income to the Trust:

#	Financial Benefit	Rationale	Source
INC1	Reduction in cost of rebates due to 'Never' events = £50k.	Estimated by STH pharmacy staff to be the extra income likely to be generated annually by avoiding rebates for 'Never' events.	See Section 3.2.9 above
INC2	Additional Trust-wide income = £250k.	Estimated by STH pharmacy staff to be the extra income likely to be secured annually from commissioners and drug companies.	See Section 3.5.8 above
TOTAL	**£300k**		

5.10.2 Again, given the lengthy implementation period, it is assumed that only 50% of this income would become available in FY 2014/15, and then 100% in succeeding years.

5.11 Costs Avoided

5.11.1 Whilst recognising that cost avoidance does not necessarily translate into a 'true' budgetary saving to the Trust, it is worth noting the financial value of the following items:

#	Financial Benefit	Rationale	Source
CA1	Avoidance of future potential fraud, stock loss and theft from the supply chain = Difficult to judge, but perhaps £75k per annum?	EPMA would introduce greater accountability amongst staff and hence reduce the scope for misuse of prescribing and dispensing processes.	See Section 3.6.2 above
CA2	Optimising antibiotic use will contribute to the present multi-faceted approach towards reducing HCAIs (C.diff in particular) and thereby reduce the likelihood of the Trust incurring financial penalties attached to HCAI-related targets/objectives = Very difficult to measure cause and effect, and hence the financial benefit is probably best left as unknown.	EPMA would contribute to avoiding the penalty for missing the Trust's C.diff. target which is currently £500k.	See Section 3.11.5 above
TOTAL	**At least £75k per annum**		

5.12 Cost Per Benefit Point

5.12.1 At this point, it would be normal to compare the costs of the Preferred Option with those of the Do Nothing Option and carry out an NPV analysis of the Cost Per Benefit Point.

5.12.2 This would lead into a Sensitivity Analysis which would identify the switching point that confirms the correct outcome.

5.12.3 However, it is not viable to do this because:

- The costs of the Do Nothing Option are already funded as part of the Trust's base budget.
- It would be fruitless to try and cost up the effort devoted to the current manual prescribing and medicines administration process by doctors (including locums), nurses (including agency staff) and pharmacists across so many different wards, clinics, shifts, and budgets.

- The EPMA business cases which we have seen from other Trusts do not attempt any such comparison.

5.12.4 Accordingly, this OBC now proceeds to consider Affordability.

5.13 Affordability

5.13.1 The whole life costs are shown in the Table at Appendix J.

5.13.2 This Table shows that payback would easily be achieved within three years, after which the Trust would benefit from a multi-million pound surplus, as well as achieving all the quality and operational benefits already described.

5.14 Risk Analysis

5.14.1 A Risk Analysis has been carried out.

5.14.2 This scheme is of medium risk. The task of procuring and implementing the right system with user support over an extended period of time and within the required financial envelope will be unusually challenging, due to the sheer weight of detail involved.

5.14.3 This task calls for a very capable and strong-minded Project Manager who (ideally) remains in post on a full-time basis for the duration of the project, and who has a good grasp of the financials (or is closely assisted by someone who does). This should not be interpreted as suggesting that the budget is inadequate, but rather that this is a complex project which could easily become destabilised by a lack of continuity, or by any failure to correctly balance the expectations of the various stakeholders involved.

5.14.4 Much drive will be needed in order to stay on track during the procurement and evaluation process (which will be lengthy), the contract negotiation process (which will be weighty), the implementation process (which will be arduous), and the change management process (which will be extensive). There are many matters of minor detail which could easily divert attention or derail the project, unless there is a single-minded and unwavering focus on winning through over what will be a very long haul. In short, it will be essential to maintain momentum at every stage.

5.14.5 That said, it should be noted that no dedicated Project Manager has yet been identified. This post was originally left open in order to give the Trust the maximum freedom of action, because there are many ways in which a Project Manager could be generated. The rationale was that the procurement process during 2012 would probably be consultancy-led (and there is still about £60k of the consultancy budget available for this purpose). This would allow time to complete the various HR processes and get a good project manager into post by 1 April 2013. This person might be an existing STH project manager, a secondment from within the Trust, a newly recruited appointment, or an external consultant. However, uncertainty over the project manager is now emerging as a significant risk. There needs to be a coherent approach towards identifying the right person(s) who can maintain momentum on a dedicated basis during 2012 and beyond. The project should not begin until effective project management arrangements are in place, because otherwise delays will occur, and the financial benefits of the scheme will not be delivered on time.

5.14.6 Because of this, it is recommended that a formal Risk Potential Assessment (RPA) should be conducted as a high priority in order to identify the types of risk, and the overall level of risk, associated with this scheme.

5.14.7 These key points are included below:

Figure 9 – Risk Analysis

Ref	Risk	Mitigation
R1	A large amount of detailed work lies ahead in 2012. Unless effective project management arrangements are put in place quickly, there will be no-one driving the timetable, progress will slow, and the financial benefits of EPMA will be delayed.	Assuming approval of this OBC, there is an urgent need for the Chief Pharmacist and the Informatics Director to discuss how best to generate a dedicated project manager. Also, the EPMA Project Board. should be activated, and a formal RPA should be conducted.
R2	Section 5 (Financial Case) of this OBC rests on reducing the preferred supplier's indicative prices by 30%. This may not prove to be possible.	Unlikely. There are numerous suppliers in the marketplace and intense competition to sell EPMA products. Given the present economic downturn in the UK, suppliers will trim their best-and-final offers to the bone if they seriously believe that they might win an order. Failing that, the Trust's system could be built progressively over a longer timescale as financing permits.
R3	There is a financial risk that the costs of this procurement may escalate to the point, especially if more sophisticated add-on 'extras' are desired for the system.	The OBC costings are a synthesis of those provided by some of the leading suppliers in the UK. They should not be too wide of the mark, provided that the underlying assumptions which accompany them are fully appreciated. The EPMA Project Board will be given strict guidance by CIT concerning the capital planning budget, and the entire procurement process will have to be tightly conducted within that financial envelope. If extra costs emerge, then a case would have to be made that they are justified by extra benefits. Even so, the financial position of the Trust will always be the guiding factor.
R4	There may be insufficient data entry points on wards and clinics, which could result in users having to queue to use the EPMA system, or in a need to fund more hardware.	Noted, but the advent of the Trust-wide Wireless Network will transform data entry during the years ahead. As wireless take-up becomes the norm, this concern will recede. But if this risk should materialise, it would be open to the Project Board either to use its contingency funding or to slow the project until deployment of mobile data entry devices becomes more widespread.
R5	Whilst the benefits outweigh the disadvantages, there are still clinical risks associated with implementing an EPMA system. In particular, it is possible to have ostensibly similar hospitals, but their clinical processes will be so different that the system should not be configured for them in the same way.	There is much published literature available about the clinical risks of EPMA. This has been issued by (for example) NHS Connecting for Health, the NPSA, and commercial suppliers. The lessons learnt will be taken into account when designing and implementing the Trust's system.

Ref	Risk	Mitigation
R6	It is important not to underestimate the additional workload which the EPMA project will impose on the Pharmacy Directorate's staff, which may slow progress.	Noted. This OBC makes provision for backfilling, the level of which can be increased by the Project Board and funded from contingency, if it proves necessary.
R7	The Trust may eventually become so dependent on EPMA that any loss of service would be highly damaging to the Trust. Trust staff may become de-skilled in the use of hardcopy.	The EPMA system will be included in the Trust's Business Continuity Plan. Provision will be made to revert to manual systems, albeit that these will be slower.
R8	Clinical staff may have unrealistic expectations of how fast EPMA can be implemented, and how much benefit can be achieved from the system.	Formal channels of project communication will be established in due course in order to set staff expectations. It is important to note that there will need to be a great deal of negotiating and communicating in order to move the project successfully through each clinical directorate/specialty in turn.
R9	There are particular risks associated with using an electronic system to prescribe opioid medicines. This is because the doses at which they can be used vary by tenfold.	This is well understood by all those involved with marketing, implementing and using EPMA systems. NHS Connecting for Health has issued specific guidance on this subject, which the Project Board will heed.
R10	After initial enthusiasm, the change management effort wanes, due to the protracted nature of the project, and because so many other STH initiatives are likely to overtake the project and compete for staff time.	This reinforces the need for effective project management arrangements, so that momentum is maintained. Also, clear benefit realisation targets must be set and monitored, so that corrective action can be swiftly taken.
R11	There may be insufficient user training capacity to roll-out the system fast enough.	Noted. This is a serious issue which will need to be carefully monitored. It is very difficult to identify in advance the exact training resources needed for STH without knowing who will be the preferred supplier. However, the Trust's Head of Learning and Development is aware of this issue. She has already advised on the correct level of resourcing required, which is reflected in Figure 7 (Non-Recurrent Revenue Costs), and she has been invited to join the Project Board, so that she can advise further.

5.14.8 In due course this analysis will be incorporated into a formal Project Risk Register.

5.15 Financial Status of Pharmacy Directorate

5.15.1 After eight months of FY 2011/12, the Pharmacy Directorate is currently in a break-even position against its delegated budgets of £10.5m. The Directorate has a sound establishment control procedure, and has reduced its reliance on Agency Staff and overtime significantly from the same period last year, although this is somewhat constrained by the Trust's Vacancy Control Procedures.

5.15.2 The Directorate has also delivered its Productivity & Efficiency schemes in their entirety for the last two consecutive financial years. Although the unmet targets carried forward from FY 2009/10 are a cause for concern, the Pharmacy Directorate is developing appropriate plans to address this.

5.16 Commissioner Support

5.16.1 It is most unlikely that commissioners will make any direct contribution towards the revenue costs of EPMA, as this will be regarded as a project to be funded internally from income at national tariff and local prices.

5.16.2 However, commissioners are always very supportive of modernisation measures which will improve the quality of patient care, and they are likely to be particularly welcoming of the improved communication which this system will foster between the Trust and primary care.

5.16.3 In particular, the implementation of EPMA will contribute to better and more timely information to GPs about prescribing in outpatients and at inpatient discharge.

5.16.4 Hence this scheme is likely to be helpful during the annual contract negotiations, because it will provide tangible evidence of improvements being made by the Trust at no extra cost to commissioners.

5.16.5 EPMA will also enable the Trust to provide much more robust data to demonstrate the clinical appropriateness of drug treatment, compliance with NICE guidance, CQUINS targets, commissioning contracts and treatment guidelines, and so satisfy commissioners that they are getting good VFM from the Trust.

5.17 Summary

5.17.1 It is difficult to estimate the cost of an EPMA system accurately because the offerings of potential suppliers differ so widely in terms of their functionality and cost models.

5.17.2 However, the cost estimates above have been derived from numerous discussions with some of the leading suppliers in the marketplace. They are thought to be a very good indication of what would be necessary for successful implementation and long-term maintenance of the system.

5.17.3 Finally, there is added complexity because many of the cost savings and areas of potential additional income straddle different clinical directorates and budgets. Hence there is a need to agree a financial mechanism for capturing them and using them to fund the revenue consequences of the EPMA system.

6 COMMERCIAL CASE

6.1 General

6.1.1 This Section considers whether the objectives of this project can be met by the marketplace.

6.2 Market Survey

6.2.1 A market survey has been carried out. There are numerous suppliers claiming to offer EPMA systems. These include Aktosoft, Ascribe, Cambio, Cerner, CIS Healthcare (Theriak), CSE Healthcare Systems (PICS/Oceano), EPIC, iSOFT[20], JAC, McKesson, Meditech, Orion, System C, Varian, and others.

6.2.2 However it will be very important for the Trust to seek a product which is:

- Mature and stable.
- Scaleable (because of the volume of the Trust's workload, and because of the need to align with any future EPR system).
- Affordable.
- Designed for use in the UK.
- Capable of being adapted and enhanced over time at the Trust's pace.
- Capable of facilitating the rotation of medical staff between local Trusts.

6.3 Procurement Strategy

6.3.1 In order to comply with Trust SFIs and achieve VFM, it will be essential to carry out an OJEU procurement.

6.3.2 There are other options open to the Trust, such as using the Additional Supply Capability & Capacity (ASCC) route, or using the Government Procurement Service (previously

[20] iSOFT was acquired by Computer Sciences Corporation (CSC) in August 2011 and offers four EPMA products. These merit explanation in order to avoid confusing them. First, iSOFT is currently developing the Lorenzo Regional Care (LRC) EPMA product for NHS Connecting for Health. As already discussed in Footnote 19 above, this is only in use at United Hospitals of Morecambe Bay NHSFT so far and will not be fully available until well beyond 2015. Second, iSOFT is also developing a more modularised version of LRC, known as the Lorenzo Enterprise Platform. This places greater emphasis on clinical functionality and is an attempt to overcome the rather narrow functional EPMA specification of LRC. But again, it is not yet fully available. Third, the iSOFT Clinical Manager (iCM) product is available. This began life as an order communications and results reporting system, which has since evolved a degree of EPMA capability. It is currently used by Salford Royal NHSFT, Kings College Hospital NHSFT, and Derby Hospitals NHSFT. However it is a dated product and is no longer considered suitable by iSOFT for enterprise-scale purposes. As a result, although iSOFT will continue to maintain and develop the iCM product for existing customers, there is no long-term commitment to expanding it into a strategic solution. Lastly, there is the MedChart system which was acquired from the Australian HATRIX company. This is a purpose-built EPMA system which is specifically designed for use by large hospitals. It has been anglicised for the UK and is used by Pennine Acute Hospital NHSFT, Stockport NHSFT, Harrogate and District NHSFT, and University Hospitals of Leicester NHS Trust. It is now iSOFT's strategic EPMA offering for large enterprises and will be compatible with Lorenzo in due course. Thus, of the four iSOFT systems on the horizon at the time of writing, the one most likely to be offered to STH is upwards-compatible MedChart, pending the arrival of LRC as a fully mature product in the longer term.

known as Buying Solutions), but these do not offer the full range of EPMA suppliers available in the marketplace and would thus restrict our leverage on price.

6.3.3 It is very likely that over 20 potential suppliers will respond to the OJEU Advert in the first instance. However, pre-qualification screening is expected to quickly reduce the field to a small number of (probably) the market leaders.

6.4 Summary

6.4.1 Commercial suppliers are well able to meet the Trust's requirements.

6.4.2 An OJEU procurement would be necessary. Although the evaluation process is likely to be long and complex (because of the difficulty of comparing like-with-like), there are not expected to be any significant procurement issues.

7 MANAGEMENT CASE

7.1 General

7.1.1 This Section considers whether the necessary management expertise exists within the Trust to successfully deliver the project and achieve the expected benefits.

7.2 Programme Management Methodology

7.2.1 EPMA will form part of the wider portfolio of projects which is managed by the Health Informatics Programme Board.

7.2.2 Accordingly, close liaison will be maintained between the EPMA Project Manager and the Trust's Informatics Programme Office and its staff, especially concerning matters which could involve interfacing with any future EPR.

7.3 Project Management Methodology

7.3.1 The project will be managed in accordance with PRINCE2 principles.

7.4 Project Board

7.4.1 The composition of the EPMA Project Board has already been agreed in order to give direction to the project and ensure that the business case is delivered.

7.4.2 It will be chaired by Chief Pharmacist and includes:

- Clinical Representative.
- Deputy Clinical Representative.
- Nursing Representative.
- Senior User Representative.
- Senior Supplier Representative and Capital Budgetholder.
- General Manager, Diagnostic and Therapeutic Services (optional attendance whenever he wishes).
- Pharmacy Representative.
- EPMA Supplier's Representative(s) when nominated.

7.5 Project Manager

7.5.1 A very capable Project Manager will be required.

7.5.2 There is a large of amount of detailed work to be carried out during 2012, and Section 5.14 (Risk Analysis) has already drawn attention to the urgent need to (1) activate the Project Board, (2) generate a dedicated project manager, and (3) conduct a formal RPA. The project must not begin until these matters have been resolved.

7.6 Project Team

7.6.1 The Project Manager will be assisted by a Trust Project Team providing input and advice, as necessary. The composition of this team is likely to change, depending on the stage

of the work being undertaken.

7.7 Project Organisational Structure

7.7.1 The detailed structure is at Appendix K.

7.8 Lessons Learnt Elsewhere

7.8.1 In order to ensure a successful implementation, other Trusts report the following lessons learnt:

- Management support should start at the very top.
- A dedicated and properly resourced multidisciplinary team is essential from the outset for planning, implementation, and continuing support.
- Good IT infrastructure and hardware must be in place.
- EPMA should be part of the wider IT strategic direction.
- Understand the information governance requirements and their impact.
- Do not underestimate the user training requirements.
- Communication is key at every stage.
- Listen to users, otherwise they will find workarounds.
- Good interfacing is essential in order to improve dataflows.
- Be careful not to introduce new types of prescribing errors (eg for opioids) [21].
- Implementation never stops.
- Scope the scheme in order to maximise benefits.

7.8.2 These points have led many STH stakeholders to conclude that it will be important to undertake a transformational project which involves procuring a mid-range system with some element of rules-based intelligence, rather than just automating the present paper-based approach.

7.9 Change Management

7.9.1 This is a potentially large and complex project. It will require excellent communication and co-ordination with an extensive range of stakeholders across the entire range of STH clinical staff.

7.9.2 An outline change management plan is at Appendix L.

7.10 Benefits Realisation

7.10.1 Benefits Realisation will be a key focus of this project.

[21] E-Health Insider :: E-prescribing: safer than paper?

7.10.2 The Business Case is already owned by Chief Pharmacist. The Benefits Manager will be xxx. As part of her role, she will ensure that named benefit owners are identified and made responsible for harvesting each specific benefit.

7.11 Post-Implementation Review

7.11.1 An evaluation review of the project will be conducted within 3 to 6 months of implementation in order to assess whether the benefits are being delivered and what lessons can be learnt.

7.12 Summary

7.12.1 The necessary management expertise already exists, and the Pharmacy Directorate has sound structures ready to ensure delivery.

8 CONCLUSION

8.1 Preferred Solution

8.1.1 The present manual prescribing process is characterised by errors, risks, and delays which are potentially dangerous for patients, time-consuming for clinical staff, costly for budgets, and risky for the Trust.

8.1.2 Instead, an EPMA system would streamline the entire process so that the right drug is more likely to be dispensed in the right situation with the right outcome.

8.1.3 The capital costs are estimated to be £1.6m. The non-recurrent revenue costs are estimated to be £395k. The recurrent revenue costs are estimated to be £820k.

8.2 Consequences of Not Approving this Business Case

8.2.1 If this business case is unsuccessful, the consequences will be:

- Lost opportunity to achieve major financial benefits.
- Failure to modernise.
- Continued prescribing risks (at a time when validation checks are not universal).
- Continued medication errors (at a time when patient activity is rising inexorably).
- Continued operational inefficiencies, especially around the discharge process.
- Falling behind other Trusts, both locally and nationally.
- Failure to achieve one of the DH 'Clinical Five' systems.
- Damage to morale of clinical staff, due to continuance of outdated practices.
- Increasing difficulty in evidencing workload and outcomes to commissioners.
- 'Hidden' impact on patient wellbeing of inefficient medicines management.
- Inability of pharmacy staff to redeploy their effort into more worthwhile priorities.
- Loss of building brick towards achieving better electronic communication with GPs.
- Lack of a flexible platform for responding to new requirements in future.
- Loss of a major building brick towards EPR.

8.3 Recommendations

8.3.1 Therefore the Trust is asked to:

- Approve this OBC.
- Authorise the issue of an OJEU Advert.

- Note that this EPMA system will be compatible with any future EPR which the Trust may wish to procure, provided that the OJEU Advert is carefully worded.

- Make a provisional allocation in the Capital Programme of £1,399,758 in FY 2013/14 and £247,016 in FY 2014/15.

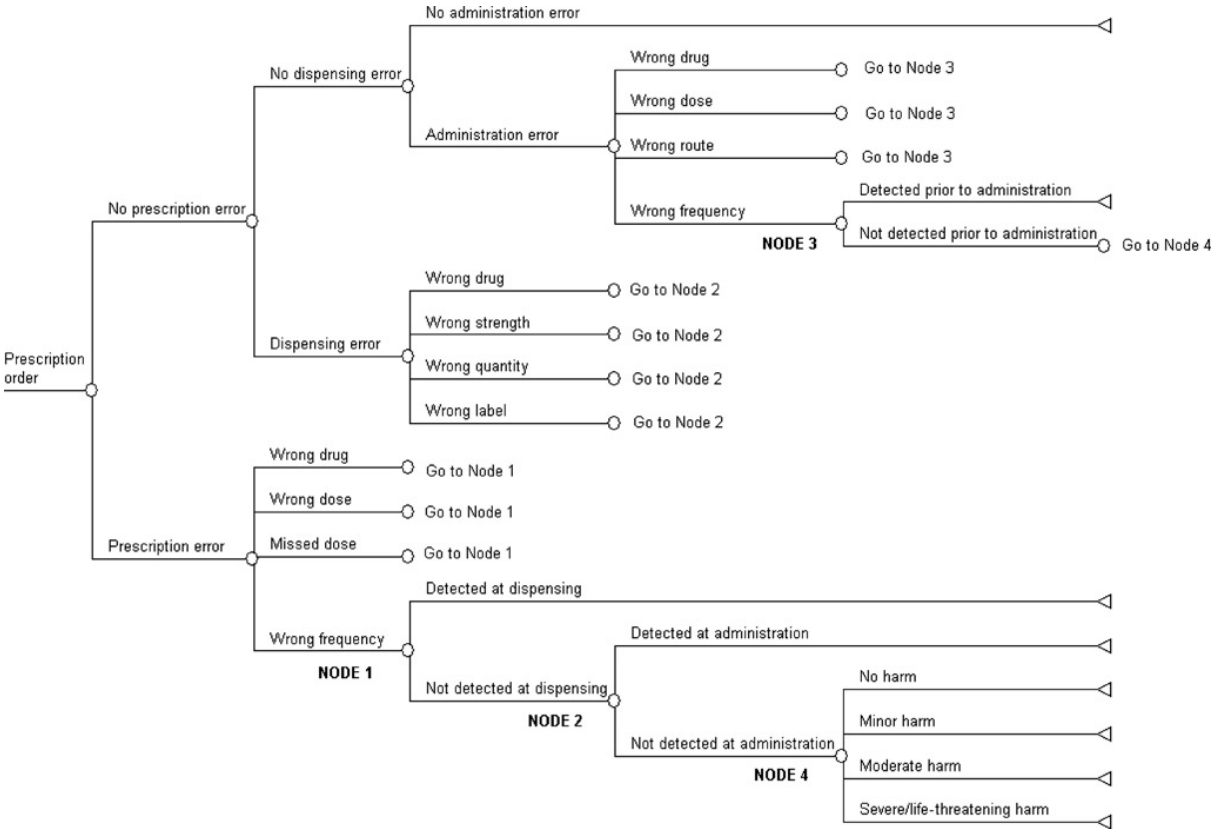
- Advise on the preferred accounting mechanism for capturing the Trust-wide financial benefits and using them to fund the non-recurrent and recurrent revenue costs (because this potentially impacts on numerous directorate and departmental budgets).

- Note that effective project management arrangements must be in place before this scheme begins, in order to ensure that the financial benefits are delivered on schedule.

Appendix A – Causes of Medication Errors

The decision tree below shows a series of error points in pathways through the medication process in a generic secondary care setting, such as STH. These error points are not exhaustive but represent the most frequently observed ones. They show how easy it is for such errors to occur, and – by implication – how strong EPMA error detection methods could make an effective and powerful difference if used at Nodes 1, 2, 3 and 4.

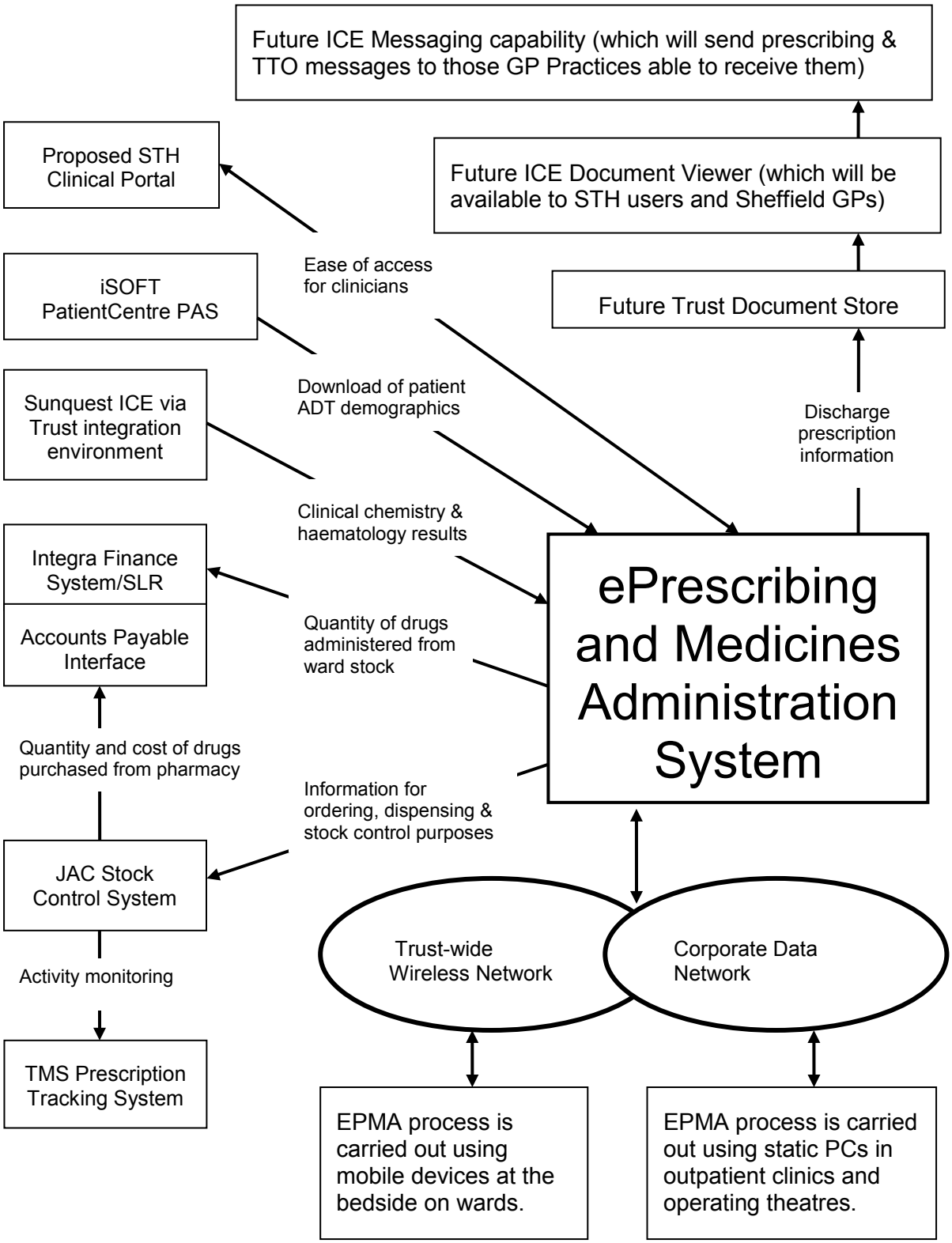
The top line indicates the most desirable route.



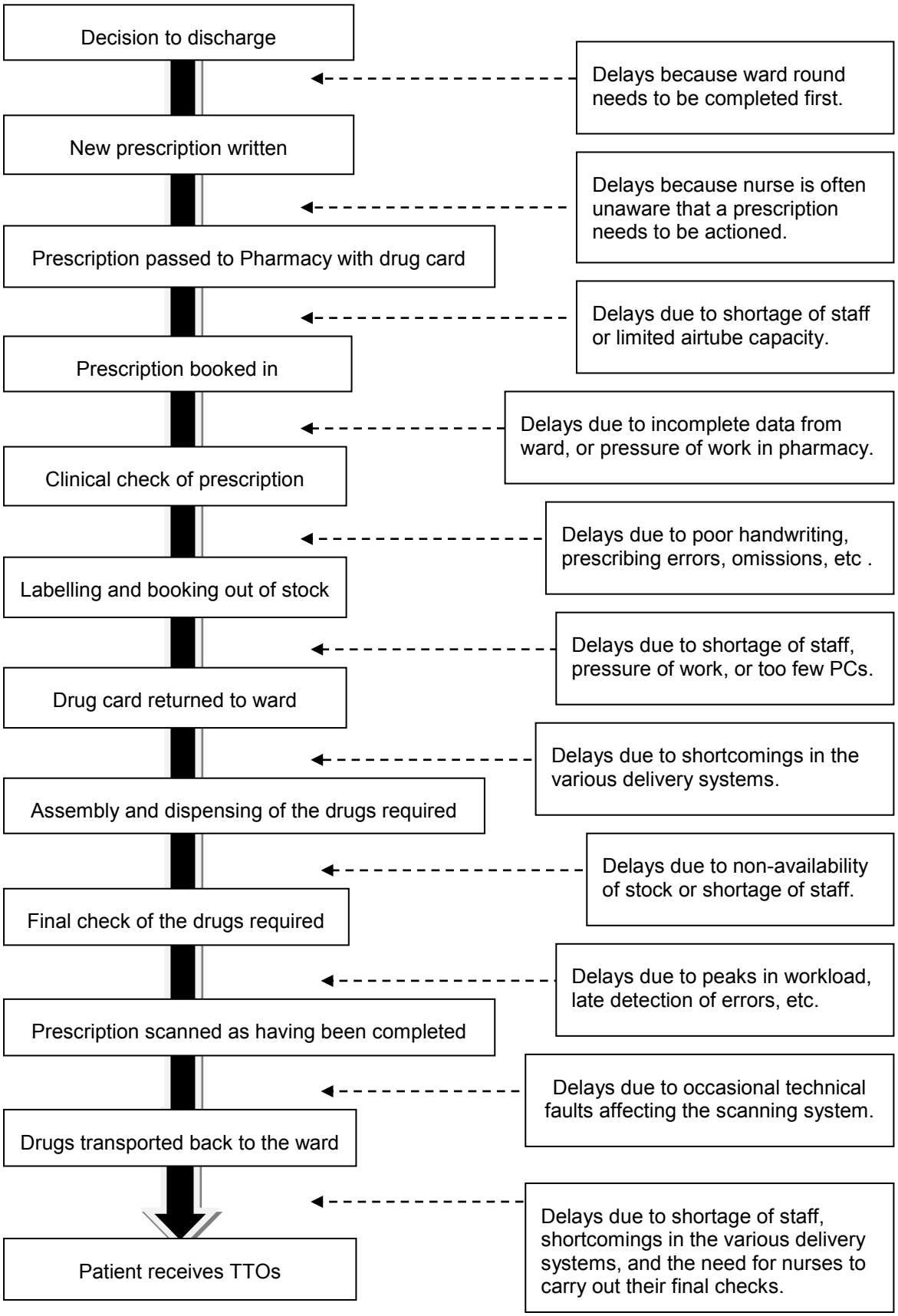
The bottom line indicates the least desirable route.

Acknowledgement: The Trust is grateful to the Journal of Health Services Research and Policy for permission to use this diagram.

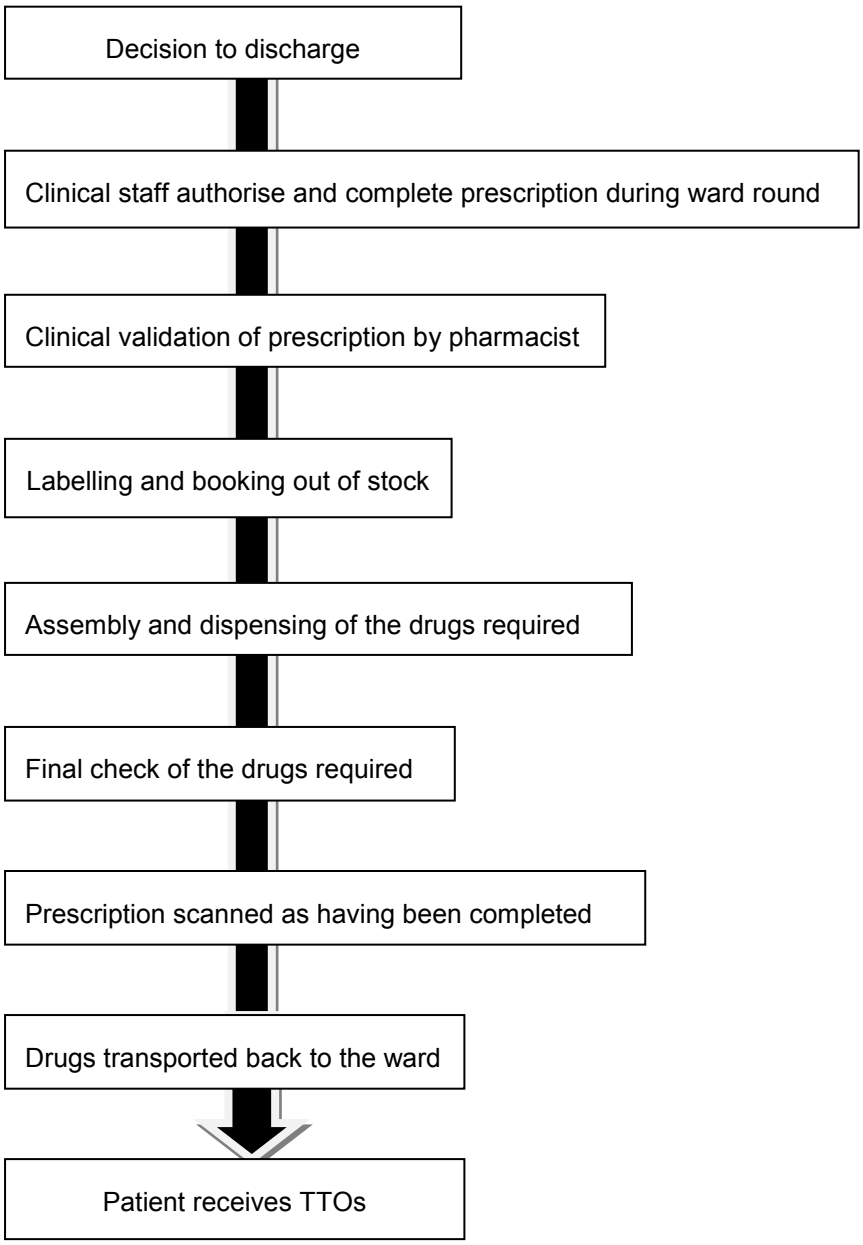
Appendix B – Simplified Diagram of Proposed Scope



Appendix C – Simplified Diagram of Current Inpatient Workflow (eg for TTOs)

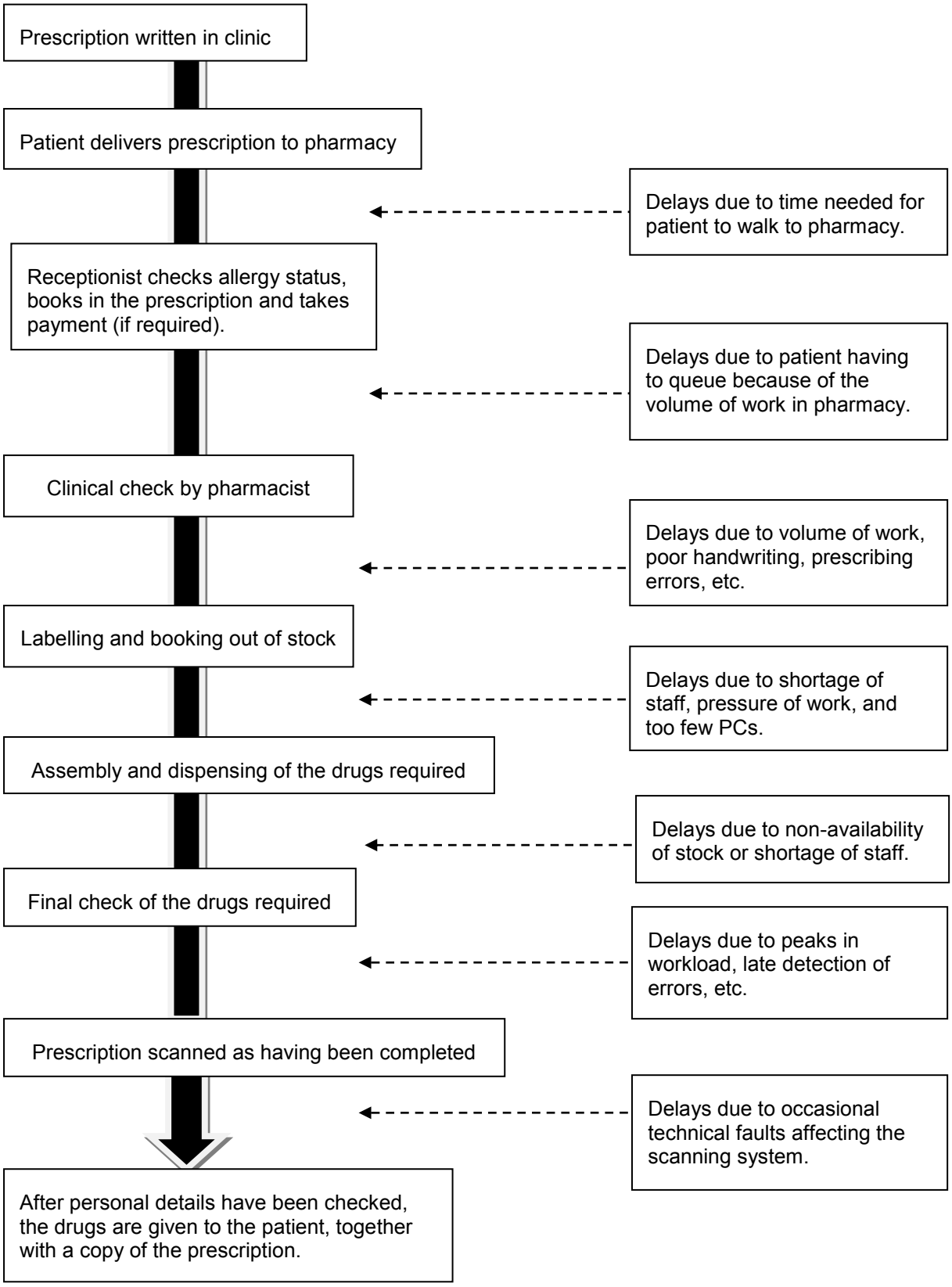


Appendix D – Simplified Diagram of Future Inpatient Workflow (eg for TTOs)

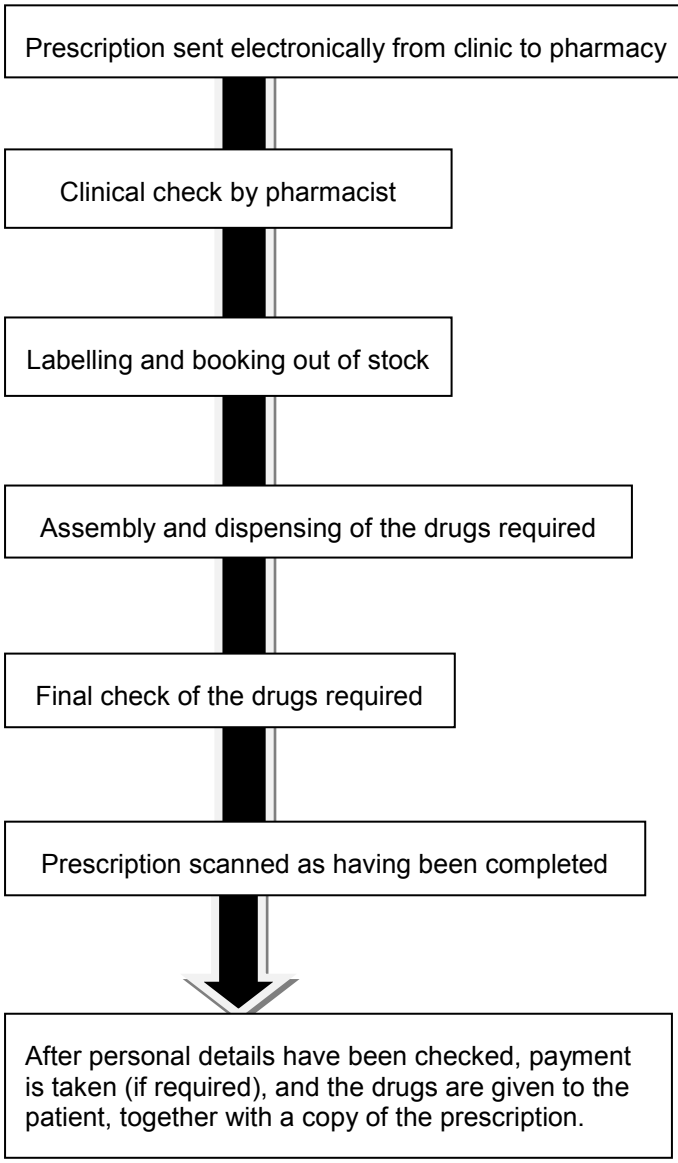


Benefits: Whilst some of the reasons for the present delays will still remain, there will be considerable improvements in inpatient workflow. The number of prescribing steps will be reduced. Queries arising from errors and omissions will be greatly reduced. The present peaks and troughs will be smoothed out. Access to the drug card will no longer be the limiting factor in the TTO process. Pharmacy and ward processes will often be able to run in parallel, rather than sequentially, thus speeding up the entire discharge procedure.

Appendix E – Simplified Diagram of Current Outpatient Workflow



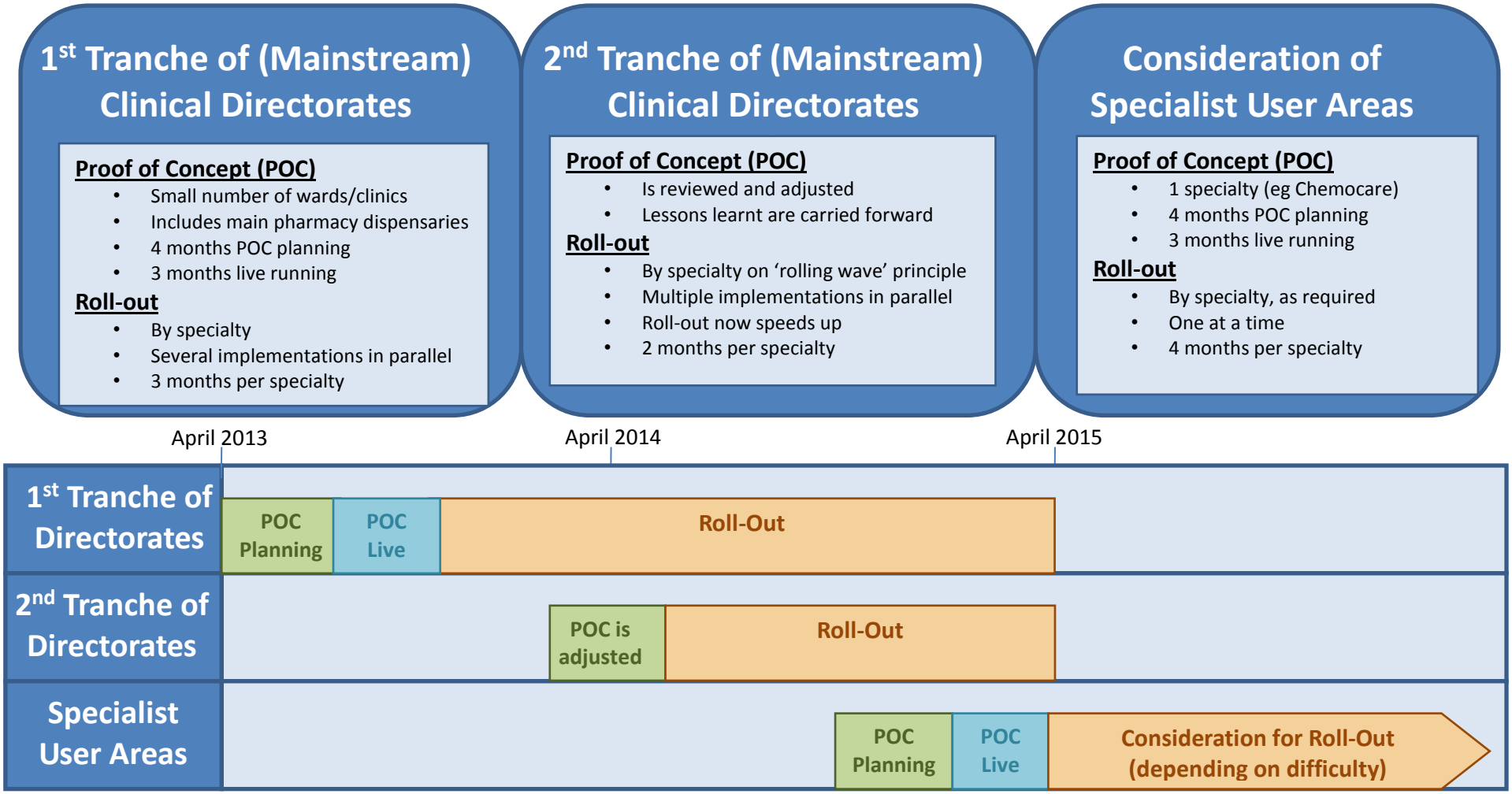
Appendix F – Simplified Diagram of Future Outpatient Workflow



Benefits: Some of the reasons for the present delays will still remain. However, there will be considerable improvements in outpatient workflow. These will probably be noticed by patients more than clinicians. For example, the various steps currently associated with the patient having to physically deliver the prescription to the pharmacy will be removed. Instead, the prescription will be sent electronically, thus enabling pharmacy to start the dispensing process whilst the patient is walking to the pharmacy to collect their drugs. As a further benefit, the patient will not have to repeat their personal details so often (although final checks will still remain). This will smooth out some of the present peaks and troughs of workload and reduce the time spent by patients waiting to collect drugs. Overall, EPMA should greatly improve the patient experience in OPD and clinics.

Appendix G – Outline Implementation Plan

All suppliers tend to begin their implementation with some form of study, which may be called a Gap Analysis, Benefits Analysis, Implementation Planning Study (IPS), or Proof of Concept (POC). Whatever the term used, this study is usually intended to map current working practices and identify how to achieve the desired future state. It is then followed by a pilot on a small number of wards/clinics - plus pharmacy - in order to establish a reproducible plan for roll-out on a wider scale. Thereafter the supplier usually assumes that the Trust will organise the roll-out on its own, ie with only limited second-line external help, and so the resourcing implications of this approach for STH should not be underestimated.



Appendix H – Hardware Specification for Data Entry Devices and Peripherals

Potential suppliers have indicated that the Trust will need to deploy data entry devices and peripherals which conform to the following typical specification.

However this specification is only a guide, and some suppliers may have other requirements. Please also note that hand-held palmtops are not recommended by some EPMA suppliers.

Thick Client PCs	**Requirements**
System software	Windows XP(SP3) or Windows 7
CPU	Dual Core 2.4GHz, or preferably 3GHz
RAM	2 GB or higher
Hard drive	80 GB, preferable 7200 rpm
Network card	100 Mbit or higher
Screen resolution	1280 x 1024 16 Bit colour depth or higher
Additional software	MDAC version 2.8 or higher Net framework installed (1, 2, 3 and 3.5 or higher). MS Office 2003 Suite or higher (generating reports/discharge medication)
Laptops	**Requirements**
System software	Windows XP or 7
CPU	Dual Core, 2.1GHz, 3MB
RAM	3GB
Hard drive	250GB, preferably 7200 rpm
Network card	100 Mbit
Screen resolution	14.0 HD (1366 x 768)
Additional Software	MS Office 2003 Suite or higher (generating reports/discharge medication)
Printers	**Requirements**
Printers are needed for most EPMA modules.	Almost every laser printer is supported for report printing.
Barcode scanners	**Requirements**
Barcode scanners are needed for most EPMA modules, and especially for medicines administration.	Almost every general cabled USB scanner is supported, as long as prefix and suffix can be configured and the most common barcodes can be read, such as Symbol. Wireless barcode scanners can be used as well. But in that case the workplace setup must be validated in terms of its processes, bearing in mind the distance of the scanner to the screen, any interference from other devices, and so on.

Label Printers	Requirements
Label printers are probably only needed for certain pharmacy functions.	For preparation workstations or pharmacy documentation workstations, it is possible to use any printer with a minimum label size of 50x60 mm (recommended 54x70 mm) which can be accessed through a Windows printer driver. Recommended products are: Direct Thermal - or Thermal Transfer-Printer, e.g. Zebra LP2844, Zebra TLP2844.

Appendix I – Site Survey Locations for Data Entry Devices and Peripherals

A key assumption underlying this OBC is that all data entry devices and peripherals necessary to carry out EPMA on wards and clinics will be in place by the time that this project begins, see Notes 12 and 13 of Figure 5 (Capital Costs). This assumption is based on the fact that:

- Most wards and some clinics are already equipped with static PCs, and that over the coming years these will progressively be upgraded to support Windows 7.
- The Trust-wide Wireless Network Project will provide two mobile cart-mounted laptops (or similar) for every inpatient ward as roll-out of that scheme progresses.
- The possibility of clinical staff using their own personal (ie privately funded) mobile data entry devices is still under discussion within the Trust.

At the time of writing, however, it is unclear how far this assumption will hold true by FY 2013/14 and 2014/15. This is a very dynamic and fast-moving area, and almost certainly the reality will be different to today's thinking.

Therefore it will be essential to validate this assumption by conducting a detailed site survey of the Trust's requirements at FBC stage in order to confirm that (1) the correct provision exists, and (2) whether any extra capital cost will be incurred in order to fill gaps.

To this end, a Table is provided below showing which locations may need to be visited in order to validate that such hardware is in place. It is not an exhaustive list, as ward moves are constantly taking place. In summary, it is a snapshot as a starting point.

Potential List of Locations to be Surveyed
RHH
Cardiothoracic Services
Echocardiography Dept
ECG Department
Communicable Diseases
GUM Department
Ward E1
Ward E2
Ward E3 (OPD, including OHPAT & Day Cases)
CC, Anaesthesia & Operating Services
ICU/HDU
Theatre 1
Theatre 2
Theatre 3
Theatre 4
Theatre 5

Theatre 6
Theatre 7
Theatre 8
Theatre 9
Theatre 10
Theatre 11
Theatre 12
Recovery/PACU
Post Operative Surgical Unit (POSU)
Theatre Admissions Unit (TAU)
Ward J1 – Centralised Pre-Op Assessment Unit
Surgical Services
Ward F1 (Elective Orthopaedics) – opening Jan 2012
Ward F2 (Endocrine/Plastics & Breast Surgery)
Day Surgery Unit
Pre Assessment
Theatre 1
Theatre 2
Theatre 3
Theatre 4b
Theatre 5b
First Stage Recovery
Second Stage Recovery
Seminar Room
Diabetes/Endocrine
John Ward Centre
Ward Q1
Endocrine Investigation Unit
Head and Neck Services
Ophthalmology Centre
Ward I1 (ENT)
ENT Outpatients
General Medicine - Acute & Elderly
Ward O1 (Stroke rehab)
Ward O2 (Haem Day Cases)
Ward P1 (Clinical Investigations Unit)
Ward P2 (Haem/Gastro)
Ward P3/4 (Haem)
P3 Day Ward
Ward Q3 (Elderly)
Ward Q4 (Rehab)
Medical Outpatients
General Surgery
Ward J1

Ward J2
Neurology
Ward L1
Ward L2
Clinic rooms in Neuro Outpatients (M1)
Clinic rooms in Medical Outpatients (A Floor)
Neuro Day Care Unit (on Ward I2)
NITU (N1)
Neurosurgery
Ward N1
Ward N2
Clinic rooms in Neuro Outpatients (M1)
Clinic rooms in Medical Outpatients (A Floor)
Neuro Day Care Unit (on Ward I2)
NITU (N1)
Neurosciences Consultants Offices
Pulmonary Vascular Unit
Ward M2
Stereotactic Radiosurgery
Offices on C Floor
Consulting Room on C Floor
Planning Room on C Floor
Ward N1 patient side rooms
SR suite on A Floor
Radiographers office on C Floor
Obstetrics & Gynaecology
Ward G1, incl.day cases
Ward G2
Ophthalmology Centre
Ophthalmic Outpatients Department
Rheumatology
Rheumatology Outpatients Department
Ward O2
Urology
Urology Outpatients Department
Lithotripsy Suite
Ward H1
Ward H2
Dermatology
Dermatology Outpatients Department

Jessop Wing
Level One
Obstetric Outpatient Dept, Level One
Ante-Natal Clinic
Consulting Rooms
Ultrasound
Sonographers Office
Ultrasound Manager
Scan Room F
Foetal Maternal Unit
Monitoring Room 1
Monitoring Room 2
Scan Room A
Scan Room B
Monitoring Room
Foetal Maternal Records
Gynae Outpatient Dept, Level One
Consulting Rooms
Colposcopy
Colposcopy Rooms
Assisted Conception Unit
Consulting Rooms
Level Two
Theatre 1
Theatre 2
Theatre 3
Theatre 4
Labour Ward, incl.transitional care & HDU
Special Care (SCBU)
Neonatal High Dependency Unit (ITU)
Neonatal Follow Up Unit, incl.OP
Pre-Op Assessment Clinic
Room 1
Room 2
Room 3
Room 4
Level Three
Whirlow Ward
Rivelin Ward
Concord Ward

Norfolk Ward
Level Four
Andrology Unit
WPH
Inpatients
Day Care Unit
Ward 1
Ward 2
Ward 3, incl.teenage cancer unit
Ward 4
Outpatients
Main OPD
Radiotherapy
Clinical Trials Centre, incl.day cases
CCDH
Ground Floor
Paediatric Dentistry
Special Care Clinic
Oral & Max Surgery, aka consultants clinic
Radiology
First Floor
Outpatient Theatre
Assessment & Casualty
Minor Oral Surgery & Local Anaesthetics
Orthodontics
Oral Medicine
Second Floor
Periodontology
Restorative Dentistry – Left (RD2L) – 16 chairs
Restorative Dentistry – Right (RD2R) – 16 chairs
Surgery 1
Surgery 2
Surgery 3
Third Floor
Restorative Dentistry – Left (RD3L) - 16 chairs
Restorative Dentistry – Right (RD3L) - 16 chairs
Surgery 1
Surgery 2
Surgery 3
Surgery 4
Surgery 5

Surgery 6
Surgery 7
Surgery 8
Surgery 9
Surgery 10
Surgery 11
Surgery 12
Surgery 13
DENTAL PRACTICE UNIT, 19 NORTHUMBERLAND ROAD
Surgery 1
Surgery 2
Surgery 3
Surgery 4
Surgery 5
Surgery 6
Surgery 7
Surgery 8
Surgery 9
Surgery 10
NGH
Accident & Emergency
Minor Injuries Room
Resuscitation Room
Moderates Area
Triage Room
X-Ray Rooms
Clinical Decision Unit
GP Assessment Unit
Blue Team
Red Team
Cardiothoracic Services
Coronary Care Unit
Cardiac Intensive Care Unit (CICU)
Chesterman 1
Chesterman 2
Chesterman 3
Chesterman 4
Firth 7
Theatre 1
Theatre 2
Theatre 3
Theatre 4
Cath Lab 1
Cath Lab 2
Cath Lab 3
Cath Lab 4

Cath Lab 5
Echocardiography Dept
ECG Dept
Cardiology Consultancy Rooms
Clinical Immunology
Clinical Immunology & Allergy Unit (CIAU)
Immunology Dept & Laboratory
UK NEQAS
CC, Anaesthesia & Operating Services
Intensive Care Unit,incl.ITU and HDU
Theatre Admissions Unit (TAU) – Vickers1
Theatre 1
Theatre 2
Theatre 3
Theatre 4
Theatre 5
Theatre 6
Theatre 7
Theatre 8
Theatre 9
Theatre 10
Theatre 11
Theatre 12
Theatre 14
Theatre 15
Theatre 17
Theatre 18
Recovery Unit
Post Operative Surgical Unit (POSU)
Chronic Pain Service
Day Surgery Unit
Pre Admission Consulting Rooms
Theatre 1
Theatre 2
Recovery
Diabetes
Diabetes Centre
Endocrinology
Endoscopy
Endoscopy Room 1
Endoscopy Room 2
Endoscopy Room 3
Endoscopy Room 4
Endoscopy Recovery Area

General Medicine - Acute
Hadfield 1
Hadfield 2
Hadfield 3
Hadfield 4
Hadfield 5
Hadfield 6
Medical Admissions Unit 1 (MAU 1) – Huntsman 1
Medical Admissions Unit 2 (MAU 2) – Firth 5
Medical Admissions Unit 3 (MAU 3) – Firth 6
Brearley 1 (Day Unit)
Brearley 2
Brearley 3
Brearley 4
Brearley 5
Brearley 6
Brearley 7
Medical Outpatients Department 1 (OPD 1)
Medical Outpatients Department 2 (OPD 2)
Chest Clinic
Cystic Fibrosis Unit
Cystic Fibrosis OPD
General Surgery
Surgical Admissions Unit
Surgical Assessment Unit – Firth 1
Firth 3
Firth 4
Firth 9
Huntsman 2
Metabolic Bone Unit, Sorby Wing, incl. Bone Densitometry
Consulting Rooms
Phlebotomy Rooms
Orthopaedics
Huntsman 5
Huntsman 6, incl.orthopaedic assessment unit
Huntsman 7
Vickers 1
Post Operative Surgical Unit (POSU)
Orthapaedic Pre-Assessment Rooms
Orthopaedic Outpatient Rooms
Fracture Clinic
Plastic Surgery & Burns
Burns Unit
Burns Theatre
Huntsman 4
Hand Unit – Vickers 2, and also Vickers 3 (OPD)

Palliative Care
Sheffield Macmillan Unit (MPCU)
Hospital Support (18 beds)
Spinal Injuries
Osborn 1
Osborn 2
Osborn 3
Theatre
Recovery
Spinal Outpatients
Osborn X-Ray
Rehabilitation
Mobility & Specialised Rehabilitation Centre (MSRC)
Osborn 4
Renal
Sheffield Kidney Institute
Sorby Renal Outpatients Department
Vickers 2
Vickers 3
Peter Moorhead Dialysis Unit (two wards)
Vascular Surgery
Sheffield Vascular Institute
Vascular Cath Lab
Angio Day Ward
Firth 3
Firth 4
Outpatient Local Anaesthetic (OPLA)
Post Operative Surgical Unit (POSU)

Appendix J – Whole Life Costs

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Capital Costs	£1,399,758 (See Note 1)	£247,016 (See Note 2)								
Non-Recurrent Revenue Costs	£206,466 (See Note 3)	£188,466 (See Note 4)								
Supplier Recurrent Revenue Costs	£150,000 (See Note 5)	£300,000	£300,000	£300,000	£300,000	£300,000	£300,000	£300,000	£300,000	£300,000
Trust Recurrent Revenue Costs, excl.Capital Charges		£145,290 (See Note 6)	£290,581	£290,581	£290,581	£290,581	£290,581	£290,581	£290,581	£290,581
Capital Charges		£116,081 (See Note 7)	£228,943	£222,507	£216,071	£209,635	£203,198	£196,762	£190,326	£93,554
Cost Savings		-£762,500 (See Note 8)	-£1,525,000	-£3,050,000	-£3,050,000	-£1,525,000	-£762,500	-£762,500	-£762,500	-£762,500
Add'l Income		-£150,000 (See Note 9)	-£300,000	-£300,000	-£300,000	-£300,000	-£300,000	-£300,000	-£300,000	-£300,000
Total	£1,756,224	£84,353	-£1,005,476	-£2,536,912	-£2,543,348	-£1,024,784	-£268,721	-£275,157	-£281,593	-£378,365

Notes:

1. Is 85% of the total capital costs.
2. Is 15% of the total capital costs.
3. Is 50% of the Trust's non-recurrent revenue costs, plus all of the supplier's non-recurrent revenue costs (£18k).
4. Is 50% of the Trust non-recurrent revenue costs.
5. Is worst case, ie that annual support and maintenance charges become payable with effect from Initial Go Live on (say) 1 October 2013, ie half-year initially.
6. Is 50% of the Trust's recurrent revenue costs, which may be a slightly crude estimate, because much depends on exactly how the implementation progresses.
7. Because implementation is phased over two years, capital charges will be staggered, ie with much lower figures at both the start (FY 2014/15) and the end (FY 2022/23).
8. Is 25% of the total value in FY 2014/15, rising to 50% in FY 2015/16, followed by two years at 100%, then one year at 50%, before declining to 25%.
9. Is 50% of total value in FY 2014/15, thereafter 100%.

Appendix K – Project Organisational Structure

Project Board

Please note that:

- In addition to those named below, the General Manager, Therapeutic and Diagnostic Services (Ray Ward) will also be entitled to attend Project Board meetings, whenever he wishes.
- It is very likely that the Assistant Capital Supplies Manager (Louise Verity, Ext 65847) will join the Project Board for Phase 2 (Procurement).
- It is very likely that once a Preferred Supplier has been appointed, a representative of that company (often the Account Manager) will join the Project Board for Phase 3 (implementation).

Role	Appointee	Ext	Responsibility
Chair and Executive Representative			To act as Senior Responsible Owner (SRO) with ultimate responsibility for achieving the project's goals and ensuring VFM, whilst balancing the demands of the business, users, and those who will supply and implement the chosen solution.
Senior User Representative			To represent user requirements, co-ordinate user resources, and (if necessary) resolve any user conflicts.
Capital Budgetholder and Senior Supplier Representative			To represent the interests of both internal and external suppliers, ensure the commercial viability of the project, and process supplier invoices as required.
Senior Clinical Representative			To represent the requirements of clinicians.
Deputy Clinical Representative			To represent the project on the Health Informatics Programme Board (HIPB) and assist xxx as required.
Senior Nursing Representative			To represent the requirements of nurses.
Pharmacy Representative			To advise on pharmacy matters, and especially pharmacy information services.
Capital Finance Representative			To advise on capital planning matters.
Senior IT Representative			To advise on IT architecture and interfacing requirements.
Clinical Informatics Representative			To advise on change management and benefits realisation.
User Training Representative			To advise on how best to organise large-scale user training for clinical and other staff, as well as organisational development and practice development matters.
Enterprise Team Representative			To advise on the relationship between ePrescribing and the PatientCentre & ICE projects.

Project Manager/Implementation Manager

A Trust Project Manager will be appointed in due course with a view to working closely with the Preferred Supplier's Project Manager.

Project Team

Please note that the exact composition of the Project Team will vary according to the nature of the work being undertaken at the time but is likely to include the following (or their representatives):

Name	Area of Expertise	Ext No
Clinical Lead (SHO or above)	Design of working practices, as well as F1 rotation, locums, and related medical matters	TBC
Nursing Lead (Ward Manager/Sister)	Nursing matters, especially risk	TBC
Pharmacy Lead	EPMA confiuration and acceptance testing	TBC
Training Lead	User training	TBC
IT Lead	Detailed installation and interfacing matters	TBC
Infection Control Lead	Infection control and related matters	TBC
	Lead Renal Pharmacist	
	Pharmacy Healthcare Governance Manager	
	Operations Manager	
	System Manager, Chemotherapy ePrescribing System	
	Group Finance Manager	
	IM&T Pharmacist	
	Clinical Pharmacist, General Surgery, NGH	
	Consultant Pharmacist (Critical Care)	
	IT Services	
	Information Governance	

Appendix L – Outline Change Management Plan

This scheme will impact on many areas of the Trust, not just Pharmacy. Therefore the Change Management Plan is not meant to be comprehensive, but rather an indicator of the breadth and complexity of the change required in order to achieve the anticipated benefits identified in this OBC.

#	Event
Preparatory Actions	
CM1	Conduct Full Stakeholder Analysis to ensure no-one is missed by the briefing process
CM2	Brief TEG
CM3	Brief CMB
CM4	Brief General Managers and Service Managers (Op Board)
CM5	Brief Nurse Directors
CM6	Brief the Deanery
CM7	Brief Primary Care, including GPs and community pharmacies
CM8	Brief Patient Representatives
CM9	Develop High-Level Communications Plan for all STH staff
CM10	Initiate vacancy control process (or its successor) for the new posts required to resource the EPMA implementation. The process will need to start in October 2012 or earlier, especially for recruitment of the Trainers, in order to anticipate the long lead time of six months or more which occurs before new staff actually arrive in post.
CM11	Ensure business change management is properly represented on Project Board and Team
CM12	Arrange for EPMA to be added to Doctors Induction Programme
CM13	Arrange for EPMA to be added to Nurses Induction Programme
CM14	Create Benefits Realisation Plan to identify widest possible scope for achieving benefits
CM15	Establish close links with LOS workstream to co-ordinate improved discharge process
CM16	Ensure that clear criteria are developed for which types of prescribing and medicines administration will be included in the scope of the EPMA system, and which will be excluded (examples of the latter might be the prescribing of diet supplements, blood transfusions, etc)
CM17	Liaise with non-Pharmacy directorates who act on prescriptions (eg WPH Radiotherapy) in order to agree process for prescribing, dispensing and administering
CM18	Liaise over Information Governance (IG) requirements

#	Event
CM19	Liaise over Positive Patient Identification (PPI) requirements
CM20	Liaise over Infection Control (IC) requirements
CM21	Liaise with the Nursing Directorate about how the new EPMA accountability processes and audit trails will apply to nurses in practice, so that the latter know what to expect, and so that there is consistency in HR matters across wards
CM22	Liaise with the Finance Directorate about adding items to the Asset Register at the right time and determining exactly when capital charges will begin
CM23	Ensure that IT support is correctly scheduled and resourced to achieve the implementation timetable
CM24	Liaise with the sponsors of those systems with whom it is intended to interface EPMA, so that all potential benefits and concerns are fully explored in advance
Implementation Actions	
CM25	Conduct Implementation Planning Study
CM26	Conduct Proof of Concept or Pilot(s)
CM27	Develop user training package(s), including for bank & agency staff
CM28	Make plan to provide user training for new starters, locums, and F1 rotations in future
CM29	Develop reproducible implementation plan for each Clinical Directorate
CM30	Make special provision for those Directorates which are likely to have complex needs
CM31	Develop roll-out order
CM32	Develop Local Communications Plan for each Clinical Directorate (based on roll-out order)
CM33	Take Baseline Measurements across STH, so that benefits can be judged at a later date
CM34	Make plan for parallel running of manual and electronic systems until cutover is complete
CM35	Undertake Clinical Safety Review (of both the system and processes) before Go live, involving risk managers, information governance, and other key stakeholders
CM36	Liaise with Medical Records over any issues raised by Kardex no longer being used
CM37	Consider how to ensure that patients still go to the dispensary when no paper script exists, eg by issuing them with a laminated ‘reminder’ card to be taken to the dispensary
CM38	Hold formal meeting to hand the EPMA system over to IT Services for long-term support
CM39	Adjust Change Management Plan in response to feedback.