

THE EVALUATION OF THE ELECTRONIC PRESCRIPTION SERVICE IN PRIMARY CARE

Interim Report on the Findings from the Evaluation in Early Implementer Sites

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EXECUTIVE SUMMARY

1. The Electronic Prescription Service's (EPS) role is a fundamentally simple one. It allows the transmission of prescription messages and digitally-signed prescriptions from primary care prescribers, via a central network and server infrastructure, the Spine, from where they can be downloaded by dispensing contractors including community pharmacists, dispensing appliance contractors and dispensing doctors. Prescriptions are then subsequently passed on electronically to NHS Prescription Services for reimbursement.
2. There have been two releases of EPS (EPS R1, EPS R2). EPS R1, in use since 2005, prints a barcode on the prescription form. This can be scanned by the pharmacy to initiate a download of data. In EPS R2 a digital prescription is sent to the spine, which a pharmacy can then download and dispense. The patient can nominate a specific pharmacy and the prescription will be directed there. Dispensing also initiates reimbursement to the pharmacy by NHS Prescription Services, the body responsible for calculating reimbursements and remunerations.
3. EPS R1 has operated for about seven years and has proved the core technical and network infrastructure. In EPS R1 the legal prescription remains the paper form. This report discusses findings related to EPS R2 in which a digitally signed electronic message is used as a legal prescription.
4. The Connecting for Health Evaluation Program called for research into the implementation and consequences of EPS R2 in June 2007. This evaluation project commenced later that year. The project is due to be finished at the end of 2012. This is an interim report reflecting the situation up to the end of 2011.
5. The study was constructed in four work packages. Work package 1 addressed safety, particularly in the study of dispensing error. Work package 2 studied the patient's perspective, Work package 3 the effects in the workplace (the community pharmacy and the general practice) and Work package 4 addresses the future.
6. In this interim report we summarise the learning so far. It does not represent all the work packages equally and some aspects of EPS R2 will not be evaluated until the end of the project. We have concentrated here on the findings from the early stages of implementation in which GP practices and community pharmacies were paired for initial pilot testing. At present larger scale rollout of EPS R2 is occurring across Primary Care Trusts and we will report on this in the final report. The work reported here therefore represents learning and experiences amongst early adopters. Subsequent development should be able to learn from this, and thus future experiences may be different.

7. Some patients liked the service and noted that it appeared to be quicker than the existing arrangements they had. For others, particularly those who currently have their repeat prescriptions collected for them, it made little difference. Some patients were annoyed when prescriptions were not ready when they arrived at the pharmacy. Sometimes this reflected early problems with the software and network and the way it was being used; however even when everything is working perfectly it is quite feasible that someone who receives an acute prescription and goes straight to the pharmacy will find it has not been received electronically by the time they arrive. Views on nomination split patients, with some feeling that it constrained choice whilst others felt that it would facilitate choice. Similarly, repeat dispensing was also felt by some to be beneficial given that this would reduce the number of urgent requests that had to be made and also mitigated against the need to register for on-line ordering from GP practice websites, which apparently can be cumbersome.
8. GP practice saw the main impact in the processing of repeat prescriptions. Based on data from a small number of practices it seemed to reduce the time administrative staff needed to spend on repeat prescriptions, and was maybe slightly faster for doctors to sign. There is however additional work to be done at the start of using the system, including training, and encouraging patients to nominate the pharmacy at which they will receive the medicine.
9. Pharmacists were often frustrated in the very early days as software and other operational problems were being addressed. However once the systems had become more stable they generally liked them and several felt that they helped smooth the workload through the day. With low volumes of EPS R2 prescriptions it is not possible to report on other administrative benefits for pharmacist in the work of claiming reimbursement. Some pharmacies, those which can fully embrace this technology, integrate it into their work practices and align it to their business goals, may see stronger benefits.
10. In the final chapter we address the future and factors which we think are critical to the wider rollout of the system. We address a number of false beliefs, which we term “canards”, and which lead people to have inappropriate expectations of EPS R2. When these canards exist it is likely that people will be disappointed with the system, and experience problems with implementation. We also note that the assumption that “the market” will drive up quality and usability has little foundation in the cases of general practice and pharmacy computer software systems.
11. The EPS R2 software has been adopted in a reasonably widespread manner among pharmacies, but this is not the case in general practice. Given that EPS R2 implementation on a regional and national scale is being undertaken at a time of major restructuring of primary care, and given that, at present, there seem few strong incentives for general practices to adopt EPS R2, we are hesitant in predicting swift and smooth achievement of uptake on a national scale.

12. The main beneficiaries of EPS R2, which is fundamentally an infrastructure project, are likely to be NHS and Department of Health as a whole, rather than local practitioners, or patients. Given the challenge of implementing EPS R2 in primary care at present, there may be a need for central intervention to sustain the momentum of this roll-out.

1

INTRODUCTION

Central to modern healthcare is the timely delivery to patients of appropriate medicines and appliances. Providing patients with regular and easy access to the medicines and appliances they need within the community can support improved health outcomes and quality of life. To achieve this good communication between patients, healthcare professionals (HCPs) and the pharmacies and other suppliers that provide medicines, equipment and devices is essential.

Communication in direct support of patient's access to the medicines and devices they need is traditionally first from prescriber to patient and then from patient to dispenser, using paper as the medium – the familiar green prescription form - the FP10. Other flows are also significant, for example if or when a prescriber sends a prescription directly to a dispenser rather than (or in addition to) passing it via the patient during the consultation. Other important communication links for the integrity of the overall system are from dispenser to reimbursement body to allow payment; from reimbursement body to prescriber for a retrospective prescribing review (e.g the. ePACT or ePFIP reports that describe prescribing trends); from dispenser to prescriber when a query is raised on a prescription; or patient to prescriber (or dispenser) to request reissue (repeat) or amendment of a prescription.

The scale of any undertaking to change this process is vast. According to data reported by the NHS Information Centre over 942 million prescription items were dispensed in primary care in the year to September 2011. The vast majority were dispensed at community pharmacy, with 5.8 million items dispensed by Dispensing Appliance contractors in the financial year ending 2011, and, we estimate from available figures, approximately 60 million items from dispensing doctors' practice in the calendar year 2010. Although the reporting periods for each of these dispensing contractors varies, making comparison difficult, these figures show the sheer volume of dispensing activity that occurs. What is more this is not static – the volume of dispensing has been increasing at an average of 5% over the last decade.

The Electronic Prescription Service (EPS), England's service for the Electronic Transmission of Prescriptions (ETP), is designed to support a change in this complex set of communications, moving from paper based transmission of many prescriptions in primary care to transmission

in a digital format including a digital signature. First announced in 2003, and established in 2005 as one part of the National Programme for IT (NPfIT), EPS has been managed through its establishment and development by Connecting for Health (CFH), an agency of the Department of Health (DH).

The role of the EPS is to support the generation, transmission and receipt of electronic prescriptions from a prescriber, mainly but not exclusively a General Practitioner – there are increasing numbers of nurse prescribers and various other health care professionals with limited prescribing rights - to a dispensing contractor such as a community pharmacy or dispensing appliance contractor. EPS also enables the dispenser to electronically sign and present the electronic prescription for reimbursement by NHS Prescription Services. In all this patients' interests are central, and EPS is intended to serve their easy and direct access to appropriate medicines, their adherence to the medicines prescribed and their convenience.

EPS is distinctive among the major programmes run within NPfIT in a number of ways. Two stand out. First it has a diverse and extensive set of stakeholders. To succeed it must rely upon the active contribution of a number of independent bodies and businesses including pharmacies, software suppliers, network providers and GP practices. Each of these has their own interests, available resources and time scales, and we cannot assume that any one of these are fundamentally committed to EPS as a core element of their strategy, nor are they for the most part under executive control of the NHS/DH. Second, just as the stakeholders are many and diverse, the benefits that accrue from EPS will in all probability be diffuse and multi-faceted, and are in general still conjectures or contingent upon some future vision of healthcare. Thus, at this time no stakeholder can confidently look forward to specific quantifiable returns from their engagement with EPS, and yet no stakeholder can ignore the potential it offers.

While ultimate benefits may be conjectures at present, we can be more confident that the arrival of EPS does change things for all stakeholders involved in the provision of health services in primary care in England. For example, based on the research reported here, changes can be anticipated and seen in how tasks are organised on business processes, in levels of performance including safety and quality measures, in means of regulation and management, and in the structure of markets and business supply chains. Specifically, as we argue in this report, EPS has potential to influence how medicines are used by patients, how activities are organised in health care institutions, what interactions between patient and HCP occur and how, and the way markets for medicines are structured.

The approach adopted in this study has been broadly based, including traditional research designs for quantitative outcome measures (e.g. error rates in dispensing), and more sociotechnically influenced qualitative work to understand the change experienced within specific locations, and the processes of change that EPS R2 conditions (see Box 1).

Box 1: A Sociotechnical View of Electronic Prescription Transmission

The sociotechnical approach to the Electronic Transmission of Prescriptions (ETP), as adopted in this study, is concerned with the combination of some new technology, various social groups, and diverse but interlinked organisational and work contexts. This is in contrast to approaches that privileged one aspect and ignore others, for example, privileging the technology (does it work in its own terms, is it reliable and maintainable) or narrow professional interests (do doctors need or like ETP?).

Sociotechnical ideas are traditionally associated with a particular style of systems design in which individual user groups' interests are represented through participative processes, and in which the final shape of a new technological system is able to be negotiated at the time of design in ways that accommodate human and social interests within technology's constraints. The primary focus in this tradition is on work teams and groups.^(14, 15)

In this study the sociotechnical perspective we adopt has a broader importance. It allows the policy maker, manager, engaged professional, or in this case independent evaluator, to balance a concern with technical functionality *per se* with the ways such functionality might be introduced to a work place, be adopted by user groups and work teams, and the cumulative and integrated consequences that emerge as new sociotechnical systems of work (practices) are established and achieve stability - for example the regular use of repeat dispensing.

In the extreme case technical functionality may be there (implemented, usable) but not ever used (adopted, integrated into practice), or more subtly be there but used in ways that the designer/sponsor did not foresee, with unexpected or unpredictable positive or negative organisational consequences.⁽³¹⁾ Thus, contemporary health care information systems such as EPS are not essentially or deterministically shaped in *ex ante* processes of analysis and design, or by careful selection of the 'right' software. Nor are their consequences clearly apparent at the time of initial implementation or tied principally to their technical functionality. Rather the sociotechnical 'working out' of a technology within the organisational setting continues over time, perhaps many years, and might be better seen as a set of improvisations or enactments that shape and reshape the technology and the work rather than as an ordered linear path to a pre-defined style of use.^(43, 44)

Thus it is not just or even principally the technology that is 'worked out', but aspects such as the work flow, job descriptions and team structures, pace of work and temporality, professional demarcations and the way that various organisations relate to each other. Hence ETP exhibits Coiera's first two rules for the reinvention of health care: 1. Technical systems have social consequences; 2. Social systems have technical consequences.⁽⁵²⁾

The evaluation project continues to the end of 2012, to allow the collection of data during the imminent next phase of PCT scale deployment. This is, or will be,

significant given that heretofore the use of EPS has been restricted to small scale implementations in carefully matched first of type sites.

This report presents interim findings of the Evaluation of the Electronic Prescribing Service in Primary Care, one of the projects commissioned under the Connecting for Health Evaluation Programme. The main focus in this report is on the history of electronic transmission of prescriptions and the lead up to EPS, the vision that the EPS encompasses, our preliminary accounts of its consequences for the ways in which medicines are supplied (prescribed and dispensed), and on the business processes of relevant health care and pharmacy institutions.

In the four chapters that follow we shall explore this emerging story of EPS R2. We begin our report by looking at prescription services in chapter 2. We look at the resources used to support prescription use as they stood prior to the introduction of EPS, and how ETP has been conceived in other nations. Following this, in chapter 3, we explore how EPS R2 operates and the manner in which it was expected to benefit prescribers, dispensers and other stakeholders in the service. In chapter 4, we explore the story of EPS R2 as it unfolded over the course of its initial implementation, with a focus on the experiences of patients, prescribers, and dispensers. Finally, in chapter 5, we close the report by discussing the possible futures for both the service and those who will use it.

2

SETTING THE SCENE

The EPS realises a long-held goal of the NHS to transfer digital prescriptions between GP practices, dispensing contractors and the reimbursement agency - NHS Prescription Services. Original policy suggested the delivery of a national electronic transmission of prescriptions service in England by 2004, and later, by 2007.⁽¹¹⁻¹³⁾ The assumptions upon which these estimates were based proved optimistic, but today in 2012 the service and its underlying infrastructure has come through a stage of intensive development and pilot use to a point where the move towards implementation on a national scale is beginning to gather pace.

2.1 Electronic Transmission of Prescriptions

The digital transmission of prescription data has come to be termed in the wider world ‘electronic transmission of prescriptions’ or ETP. This term is however not in universal use, and in the research literature such systems are often confused with or rolled up into more common but less appropriate terms such as ‘electronic prescribing’, Computerised Physician Order Entry (CPOE) or terms focused on the artefact ‘electronic prescriptions’ (e-prescriptions). This confusion has led to a proposal from within this project to establish a new MESH term aimed at distinguishing the generation and storing of the prescription via computers, from the transmission of the prescription (see <http://etpworld.wordpress.com/supporting-an-etp-mesh/>). Surescript, the largest provider of such services in the USA uses the term ‘Prescription routing services’ (see <http://www.surescripts.com/about-e-prescribing/e-prescribing-services/prescription-routing.aspx>). ETP is also often introduced and discussed as one part of the more general networking of health care – eHealth - and the potential for sharing health data across organisational and institutional borders.

Whatever name is used, and none is really adequate to capture this complex and intersecting set of medicines supply and use activities, the use of a digital network for a message implies that at least one party has a computer-based system to generate or receive the message. For example, a computerised prescriber can issue to a patient a paper prescription with a bar code printed on it. The patient does not need a computer but a

dispenser can read the bar code and locate the prescription details on some shared database. This approach was the basis for England's EPS Release 1 (EPS R1), which is described in chapter 3.

Thus the level of computerisation of the prescriber and the dispenser are the key prerequisite factors, as well as the presence of a reliable, secure and widely available network. These aspects of ETP are developed in this chapter as we set the scene for our evaluation of the consequences of the introduction of England's EPS as it moves from a small number of initial implementations to a wider deployment.

We go in search of the vision behind the design of the service, its antecedent technological basis, and the motivation for its development. The following chapter then presents the operational characteristics and the specific technology and services used and the potential benefits expected to arise from EPS for the four primary stakeholders in the service; patients, dispensing contractors, GP practices and NHS Prescription Services.

2.2 The Computerisation of Primary Care in England

Fundamental to the development of EPS has been the high level of computerisation of primary care in England. The history of informatics in primary care stretches back over forty years, beginning with the first experiments with GP practice computing in Whipton in 1970, and the first experiments with a wholly paperless GP practice taking place at Ottery St. Mary in 1975.⁽⁴²⁾ It was estimated by 1996 that over 96% of GP practices had been computerised,^(16, 53) a figure that has since been exceeded according to the figures on GP practice EPS deployments.⁽⁵⁵⁾

Community pharmacy in England has also demonstrated a high level of adoption of computers and seen increasing levels of functionality introduced over the past three decades. From the early 1980s onwards stock control systems provided by community pharmacy wholesalers to facilitate stock ordering processes have also provided functionality to support clinical use.⁽⁶⁰⁾ This functionality has emerged in response to requirements that labels on dispensed medicines should be computer printed and requirements that an electronic medication record be kept for a sub-set of the community pharmacy's vulnerable patients.⁽⁶⁰⁾

NHS Prescription Services, the body responsible for calculating reimbursements and remunerations for dispensing contractors and for settling accounts with these on behalf of the NHS also has a long history of computer use for operational purposes and to generate information on the use of medicines.⁽⁷¹⁾ NHS Prescription Services has for many years provided reports to support primary care prescribing with data presented at all levels from

prescriber level, to GP practice level, to regional level and to national level.⁽⁷⁸⁻⁸⁰⁾

The use of computers in the processing of prescription data at, what was to be eventually known as NHS Prescription Services, began in the 1970s. It was reported by Shepherd that this arose in response to difficulties in recruiting sufficient workers to effectively continue the manual processing that was then in place.⁽⁶⁰⁾ Further system development since then has included a capacity improvement programme (CIP) in 2007 which introduced automated management of the paper prescriptions submitted for reimbursement.^(83, 84)

EPS could be seen as an infrastructure to tie together these three mature domains of computerisation - with electronic prescriptions conveyed electronically between these three stakeholders, for fulfilment and for reimbursement purposes. However, despite, or because of their extensive and long-standing use of informatics, each of these three stakeholders has historically developed and maintained their own silos of electronic information. In the systems in use up to the establishment of EPS, transmission of information *between* these silos has relied upon human intermediaries and paper.

2.3 Issuing Prescriptions in English Primary Care

There are a range of prescriptions that are in use in England for the supply of devices and medicines to patients.⁽⁸⁶⁾ In this interim report we focus on the type of prescription that will be used for the dispensing of items that are currently within the scope of EPS, the FP10SS (see Figure 1).^(64, 86)

As can be noted, the FP10 form is currently a two part form, the left-hand side of which provides details of the patient for whom the prescription is written, the prescriber, and up to four prescription items. The right-hand side emerged as a result of technology change and was originally blank. This blank side of the prescription was required to ensure that the prescription was wide enough to fit the computer printers that were introduced in the early pilot programmes for informatics in GP practice. It was exploited by the early uses of GP practice computers to provide messages to patients about services. This role has been expanded, and this part of the prescription, which we refer to as the prescription counterfoil, will be discussed in relation to the management of repeat prescriptions.

MANAGEMENT OF ACUTE PRESCRIPTIONS

An FP10SS prescription could be issued either as an acute prescription, a repeat prescription or as a repeat dispensing prescription. Each of these prescriptions represents different assumptions about the course of the indicated problem that the prescriber is attempting to manage. The acute prescription will typically be issued to the patient following a consultation with the prescriber, to alleviate acute illness and with an

The diagram illustrates the layout of the FP10 Prescription Form, divided into two main sections: the Right Hand Side and the Left Hand Side.

Right Hand Side of Prescription:

- Pharmacy Stamp:** Located at the top left.
- Age:** NN (Newborn) or D.o.B (Date of Birth) DD/MM/YYYY.
- Title, Forename, Surname and Address:** TITLE INITIAL SURNAME, ADDRESS LINE 1-5, POSTCODE.
- Personal Details:** TITLE FORENAME SURNAME, ADDRESS LINE 1-4, D.O.B, Postcode, NHS NUMBER.
- Medication List:** Four rows for medication items, each with fields for MEDICATION ITEM DESCRIPTION, QUANTITY, and DOSAGE/FREQUENCY, followed by a checkbox.
- Signature of Prescriber:** Signature and Date fields.
- For dispenser:** DR INITIAL SURNAME, GP CODE, SURGERY ADDRESS LINE 1-3, POSTCODE, TELEPHONE NUMBER, PCT CODE, and FP10 SERIAL NUMBER.
- Endorsements:** A vertical box labeled "EPS R1 or R2 BARCODE".
- Messages for the Patient:** A section for additional patient instructions.
- Bottom Note:** "PATIENTS – please read the notes overleaf".

Left Hand Side of Prescription:

- Number of days treatment:** N.B. Ensure dose is stated.
- NHS Number:** NHS NUMBER.

Figure 1: Layout of the FP10 Prescription Form Used in English Primary Care Settings

expectation of not being repeated. However, we were also informed that acute prescriptions might also be used to identify which medications represent the most effective treatment for a diagnosed chronic condition. In all cases, the prescription would be conveyed to the community pharmacy directly from the GP practice by the patient or the patient’s representative, the clients of the healthcare service.

MANAGEMENT OF REPEAT PRESCRIPTIONS

In the case of patients who receive prescriptions for a chronic illness, the prescriber might suggest to the patient that he or she should be issued a repeat prescription. Where the patient agrees to this, the repeat prescription will be authorised by the prescriber for issue by the GP practice at regular intervals for a set number of issues without a consultation with the prescriber.⁽⁹⁵⁾ This process should include the opportunity for a

review of the continued need for the medication prescribed,⁽⁹⁵⁾ although there had been concern over the adequacy of control in this process.⁽⁹⁶⁾

Although there is local variation in the process of managing repeat prescriptions (see section 4.3), there are a number of generic steps that can be identified. In all cases, clients would receive an FP10, signed by the prescriber and including a prescription counterfoil that provides an order form for prescription items that the prescriber has authorised for issue as a repeat prescription. Depending on local practice, the patient might have a number of options for the re-order of prescriptions. The patient would typically have the option of submitting a paper request for her or his repeat medication to the GP practice, or might be able to telephone in a request, or possibly even the option of submitting a prescription request using a form on the GP practice website. At the GP practice, a number of administrative checks will be conducted to ensure that it is appropriate to issue the prescription, the key ones being to ensure that medicines are not being over-used by the patient, and that where a medication review is due it is conducted.

Although the repeat prescription removes the need for a consultation with the prescriber, as this type of prescription is managed outside of this process, the administration of the process can lead to the processing of the repeat prescription request taking up to two working days. The output of the process will either be a new signed prescription, or a note from the prescriber as to why a particular prescription request was not accepted. In either case the prescription would be collected from the reception of the GP practice.

In terms of management of the repeat prescription request this is distributed between administrative staff and a prescriber. The administrative staff will either create a new FP10 form that contains all the prescription items that were requested for a patient and distribute these to appropriate prescribers in the practice for review and signature, and/or prepare a note of any concerns about the prescription request.

This might include a review of the level of use by the patient which might provide an indication of potential problems in using the medication. The data for this decision would be based on the GP practice computer systems own estimate of patient adherence based on number of prescriptions created for particular items authorised for issue as repeat prescription items. The prescription forms and notes generated by the administrative staff are distributed to the appropriate prescribers within the GP practice, and signed as appropriate.

In a non-dispensing GP practice (the vast majority), signed FP10 forms, and where appropriate, notes for the patient, are returned to reception by prescribers for collection. This process might entail two to three journeys for the patient in order to have the repeat prescription filled (see Figure 2). These could include two journeys to the GP practice and

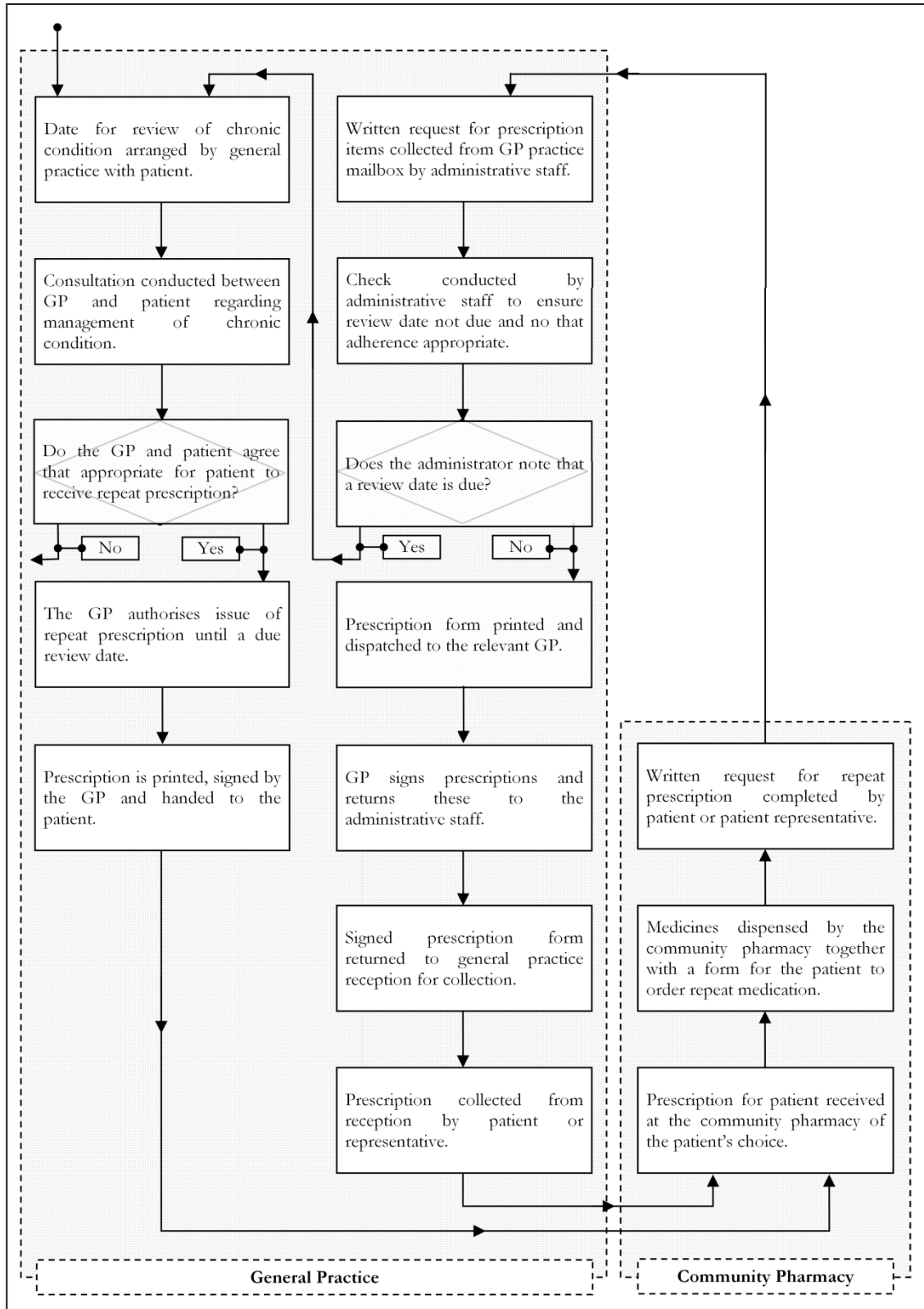


Figure 2: Management of Paper Repeat Prescriptions

then the community pharmacy. In cases where the community pharmacy does not have all the prescription items in stock, potentially another journey is needed to collect items that might not have been dispensed when the patient first submitted her or his prescription.

It should be noted that the process for managing repeat prescriptions might vary in the case of items that are dispensed by dispensing appliance contractors (DACs) and dispensing doctors. In the case of the former, the request for the prescription is handled using the postal service, and would not necessarily involve any activity on the part of the patient in the process of managing the prescription. In the case of the dispensing doctor, for those patients to whom the GP practice dispensary can provide medication, the prescription would not leave the GP practice.

MANAGEMENT OF PRESCRIPTIONS AT THE COMMUNITY PHARMACY

In this report, we have not yet described what happens to the prescription at the community pharmacy, and this appears to be the appropriate juncture at which to explore this, as described in Waterfield's description of an idealised dispensing process in community pharmacy.⁽¹⁰⁵⁾ This model describes a process in which there is careful control of the selection of medications for issue to the client which might employ up to four different groups of staff. This also illustrates the critical role of the paper prescription in the management of dispensing for patients, even though it is conceivable that a computer printed label could be used in place of this.

Waterfield's description of the dispensing process begins with the receipt of the prescription by the community pharmacist or medicines counter assistant. At this stage, the main concern is to establish that the prescription is printed on a form recognised as legal, that details are legible and that the details held by the community pharmacy dispensing system's patient medication record about the patient are accurate. It was also suggested at this point, the client should be informed of how long it might take for the prescription to be fulfilled.

If it has been agreed to dispense items against the prescription received, legal and clinical checks are conducted by the community pharmacist. This will include a check of the date on the prescription to ensure that it was issued within a six month period. At this point, the community pharmacist will use their clinical knowledge to ensure that patient receives the correct medication in an appropriate dose and formulation. The community pharmacist also has to interpret the prescriber's wishes at this point. This might include translation of instructions to patients that are written by the prescriber in Latin in an abbreviated form. Community pharmacies might also plan to add warnings and advice to the labels that are applied to items to be dispensed to patients.

Each item that is to be dispensed to the patient will feature a label that includes the

patient's details, the item dispensed, as well as to the instructions for the patient together with any advice and warnings for the patient. In the assembly of the prescription items for dispensing to the patient, and subsequent checking of these, a dispensing technician would be expected to refer to the paper prescription and not to any labels that had been printed from these. The final check of the content, strength and labelling of the item by either the community pharmacist or an accredited checking technician also relies on the presence of a paper prescription against which to check these details.

Prescription items would be assembled and labelled by dispensing technicians once it has been confirmed that the prescription is a legal document and the items are clinically appropriate for the patient. In this phase of the operation, the prescription could be used as a list against which to pick items for dispensing to patients, and also to check that the details on the patient medication record held in the dispensing computer system are accurate. The prescription provides an opportunity to ensure that all data pertinent to the production of accurate labelling are held on the system.

Waterfield's description also alluded to one of the potential problems with this system, that of managing out-of-stock items. In some cases, the community pharmacy would only be able to partially dispense the items on a prescription, leaving some items that need to be ordered to dispense the quantities stated on the prescription. In these cases, the client might wish to take the prescription to another community pharmacy and have nothing dispensed from the community pharmacy he or she initially presented the prescription at, or can take some of the dispensed items together with an owings note that can be presented when adequate stock is available to receive the rest of the required medication. Clearly, owings represent another potential source of inconvenience for the patient.

Once the prescription has been dispensed, the community pharmacy team will need to endorse the prescription to state precisely what had been dispensed to the client. These prescriptions are required for reimbursement and remuneration to the community pharmacy and are sent in a monthly bundle to one of NHS Prescription Services' processing centres.

In these batches, prescriptions are sorted by prescriber, and then by type of prescription. The community pharmacy has to declare the number of prescription items dispensed and the numbers of those that are exempt on a form, known as the FP34. This form is sent by post together with the prescriptions endorsed to NHS Prescription Services. The FP34 captures the number of prescription items that were handed to patients which the patient was exempt from paying a prescription charge for and those that were not.

IMPROVING PATIENT CONVENIENCE

Whilst the use of repeat prescriptions might be expected to improve patient's access to medicines, it does require effort on the part of clients to manage this process. Community pharmacies reduced some of this workload for clients by offering to submit orders to the GP practice on behalf of the patient, using prescription counterfoils left with the community pharmacy for this purpose, and then collecting new signed prescriptions from the GP practice. However, there was still an administrative burden placed on both the community pharmacy and GP practice by this process. An alternative means of managing prescriptions in those GP practices that did not provide a dispensary was the repeat dispensing prescription.

REPEAT DISPENSING PRESCRIPTIONS

Since 2005, prescribers in England have had the option of using repeat dispensing prescriptions as well as repeat prescriptions.^(119, 120) These were introduced as a potential mechanism to save both GP practice and community pharmacy time and to provide pharmacists greater opportunity to apply their professional knowledge. Again, the use of this form of prescription is agreed by prescriber, patient and also with the community pharmacy who undertake a greater role in the management of that prescription.

In the case of the two types of prescriptions discussed so far, the left-hand side of the prescription are the same, authorising a dispenser to provide specific products for the client. These prescriptions are used for a single dispensing of prescription items and then endorsed for items dispensed for the patient prior to their dispatch to the reimbursement agency. For those patients, whose prescriptions appear to be stable for and unlikely to change, the prescriber might chose to issue a repeat dispensing prescription, which can be used to dispense items to a prescription on a number of separate occasions.

The paper repeat dispensing prescription is composed of a repeatable prescription, an FP10 form signed by the prescriber that states the types of prescription items and how many times these can be issued to the patient, and a number of batch issues. The batch issues are FP10 forms that do not feature the prescriber signature that is required to make these legal prescriptions, but which do contain all the data on the repeatable prescription. Each of the batch issues is used for reimbursement purposes, and will be endorsed in the manner that other prescriptions are when dispensing takes place.

Repeat dispensing prescriptions can last up to a year and have been presented as a means of providing a safer and more convenient service to patients, as the process of

reordering prescriptions is eliminated during the period between authorisation of the prescription and the need for a clinical review of the patient's medication. Rather, the patient's interaction will be with the community pharmacy team who receive the repeatable prescription and who may also hold any of the batch issues that have not been dispensed for the client (see Figure 3).

Although a repeat dispensing prescription might feature a defined interval between issues set by the prescriber that indicates the number of days that have to elapse between dispensing against each batch, this does not have to be set. This means that unlike the repeat prescription process, the decision-making as to whether it is appropriate to dispense a particular item to the patient is a negotiation between the community pharmacist and the client in order to ensure there is an appropriate balance between patient convenience and the potential risk of over-supply of medication.⁽¹²⁰⁾ Should a patient's medication be required earlier than the interval that might be implied in the prescription, then a community pharmacist can use their clinical judgement to decide if this would be appropriate for the patient or not.

There are two other differences between repeat prescriptions and repeat dispensing prescriptions that should be noted. Firstly, the repeat dispensing prescription can only be dispensed by one community pharmacy for its duration, unlike repeat prescriptions which can move. Secondly, the need to order a new repeat dispensing prescription is indicated to the client when the last of the authorised issues has been dispensed, at which point a new clinical medication review by the prescriber would be required. It is immediately apparent that there are both potential benefits and vulnerabilities that emerge from these characteristics of the process.

2.4 Towards a Better Prescription Service

For patients, for whom it might be appropriate, the use of paper repeat dispensing prescriptions appeared to offer a mechanism that could improve patient convenience. The service was also viewed as a potential mechanism to save time for both GP practice and community pharmacy and to provide pharmacists with greater opportunity to apply their professional knowledge. This had been a stated desire of the 2003 DH paper, *A Vision for Pharmacy in the new NHS*,⁽⁶⁷⁾ as well as subsequent papers, including the DH paper *Pharmacy in England: Building on Strengths - Delivering the Future*.⁽⁶⁸⁾

Whilst it might be sensible for patients to move from repeat prescribing to repeat dispensing prescriptions, indeed this model for prescription management had been proposed as long ago as 1992,⁽¹³⁷⁾ limited evaluations have not been unequivocally positive about the model.^(141, 142) Repeat dispensing was expected to provide more effective monitoring of patient adherence than repeat prescription arrangements,

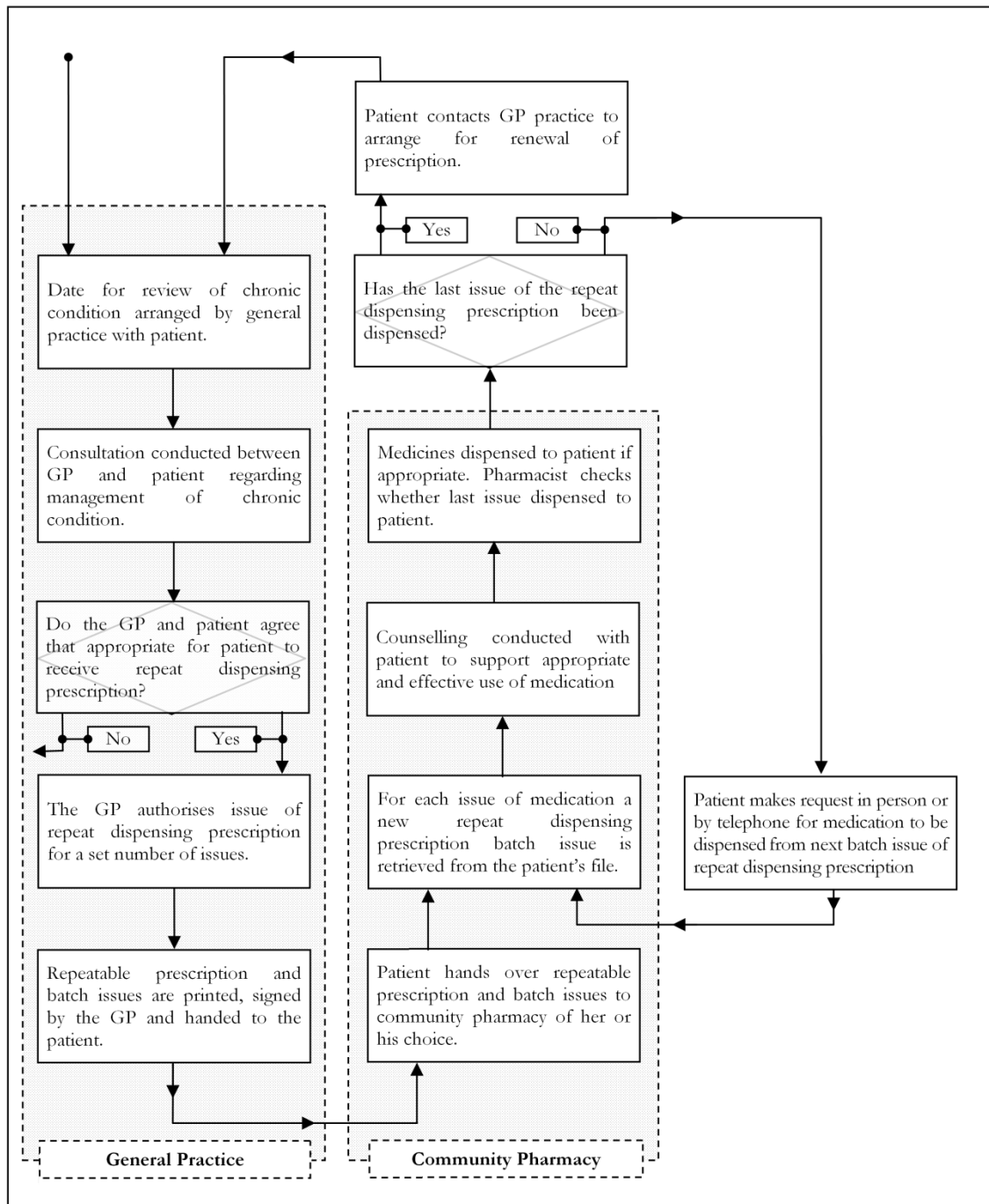


Figure 3: Management of Paper Repeat Dispensing Prescriptions

which had been criticised in a report of practice in 1996.⁽⁹⁶⁾ The introduction of repeat dispensing prescriptions, when coupled with the supplementary prescribing rights, provided a mechanism for community pharmacists to monitor and intervene where necessary at every dispensing event with this type of prescription.^(119, 145)

National evaluations of the initial implementation of the repeat dispensing service in 2006 suggested that whilst this service involved labour in gaining patient consent to use the service, it did allow for greater monitoring and opportunity for the conduct of medicines use reviews, and did reduce the level of contact between GP practice and patient, which we assume was taken to indicate that local management processes were effective.⁽¹⁴⁵⁾

Whilst there may be a strong administrative and clinical case for the use of repeat dispensing prescriptions in preference to repeat prescribing, in practice in the six years it has been available, the service has not reached the level of deployment expected. It has been estimated that over 80% of repeat prescriptions could be dispatched as repeat dispensing prescriptions.⁽¹⁴⁸⁾ However, in 2006, only 1% of prescriptions were issued as repeat dispensing prescriptions.⁽¹⁴⁹⁾ By 2010, this figure had increased to 4% in England as a whole, although in some Primary Care Trusts it was found that repeat dispensing prescriptions were issued to over 20% of patients.⁽¹⁵¹⁾ It is possible that the introduction of the EPS might support greater adoption of repeat dispensing prescriptions, as is noted in the following description of the history of the ETP service.

3

THE ELECTRONIC PRESCRIPTION SERVICE

The EPS represents one of a number of systems for computerising prescriptions and their transmission that have been explored in England over the course of the last two decades (see Box 2). The present programme emerged following the closure of a series of pilot ETP schemes that ran between 2002 and 2003.⁽³⁾ These schemes were replaced by a new commitment to ETP service as part of a new National Prescription Service,^(12, 13, 19) and become part of the nascent National Programme for IT (see Box 3).⁽¹²⁾ In this chapter, we begin by examining the rationale for the service, the development and functionality of EPS principally with reference to its operation in GP practice and community pharmacy, and the benefits expected from this service.

3.1 The Context of Operation

The development of EPS has arisen at a time when there are increasing demands being placed on dispensers by England's population of over 52 million.⁽³⁶⁾ Between 1999 and 2009, the number of prescription items dispensed in primary care has increased from over 529 million items to 886 million items,⁽⁴⁷⁾ and this trend has shown no signs of abating, with the latest available figures for the period October, 2010 to September, 2011 indicating the dispensing of over 942 million prescription items. Of these, the latest available figures show that only 11.4% of prescribed items in primary care will attract a prescription charge.⁽⁴⁷⁾ Over the course of 12 years, there has been a 78% increase in the number of prescribed items that have been dispensed in primary care settings.

Growth in prescription numbers has been seen in the case of both dispensing appliance contractors (DACs) and community pharmacies. In the case of DACs the number of prescription items handled has increased from 1.66 million in the financial year 2001-2002 to over 5.80 million ten years later.⁽⁵⁶⁾ This is despite a fall in the number of contractors from 179 in the year 2001-2002 to 125 a decade later.⁽⁵⁶⁾

Community pharmacy has also seen an increase in prescription volumes, in an era in which there has been a change in expectations about the role of the community pharmacist and greater emphasis on use of their clinical skills.^(67, 68) At the same time as this shift in expectations about the role of community pharmacy, there has also been a

Box 2: Ancestors of the Electronic Prescription Service

In the early 1990s, the NHS Care Card project trialled the use of a smartcard that would be held by the patient and which contained both a summary health record and any prescriptions that had yet to be dispensed to the patient.^(1, 5) Whilst this project was regarded as successful, it has been claimed that the programme never gained national adoption due to the costs implementation would have entailed.⁽¹⁶⁾

Following the experience of the NHS Care Card project, a further trial of ETP in England was announced by the Department of Health (DH) in 2000.⁽²³⁾ In this programme private consortia were invited to submit proposals for an ETP service and if accepted into this programme, to undertake development and deployment of this service at up to fifty general practices.⁽³²⁾ By March 2001, from the seventy expressions of interest in participating in the ETP three consortia had been selected to develop and deploy their solutions.^(45, 46)

In the three pilot schemes, there was electronic transmission of prescription data between either a community pharmacy selected in advance by the client, or to a central repository from which it could be downloaded by the community pharmacy at which the client presented herself or himself. In the case of the second model, paper was used to provide a barcode to the client which could be scanned at the community pharmacy attended so the community pharmacy could download the prescription for the client.⁽⁴⁵⁾

The pilot schemes were closed in 2003, with none of the options presented being developed for a national implementation.^(12, 13) These schemes had demonstrated the use of digitally signed electronic prescriptions and the transmission of prescription data accurately between general practice, community pharmacy and NHS Prescription Services, but were not deemed to be satisfactory by the independent evaluation that had been commissioned by DH.⁽⁶¹⁾ Indeed none of these schemes appeared to conform to the requirements laid out in a series of principles on the use of ETP first published by DH in 1997.⁽⁶⁹⁾

substantial increase in the number of prescription items being dispensed in community pharmacies. In the case of community pharmacy, volumes of prescription items dispensed have increased from over 432 million in the financial year 1994-1995,⁽⁷²⁾ to over 538 million in 2001-2002⁽⁷⁵⁾ and to over 850 million in 2010-2011.⁽⁵⁶⁾ In short in the course of 16 years, the volume of prescription items dispensed in community pharmacy has increased by over 96%. There has also been growth in the number of community pharmacies over the same period from 9,787 to 10,951.^(56, 72)

Unfortunately, we cannot comment on the change to the number of prescriptions issued by GP practice, given that these statistics have not been compiled until

Box 3: The National Programme for Information Technology

The programme that EPS was to form part of, NPfIT, officially began in October 2002 with the establishment of a unit to procure and deliver the new informatics systems. The formal opening of the agency for the delivery of this programme, Connecting for Health, taking place in April 2005.⁽⁴⁾ Connecting for Health was founded as an executive agency, with a limited life-span, its role ending at the very latest by 2010.⁽¹⁰⁾ NPfIT encompassed a number of programmes including EPS and a nationally available electronic summary care record (SCR) and the Secondary Uses Service (SUS).

NPfIT had followed previous efforts to instigate national informatics programmes in England in both 1992 and 1998.⁽¹⁸⁾ It had been suggested that whilst the 1992 programme failed due to an absence of interoperable solutions, the 1998 programme did provide interoperable solutions but failed to gain adoption due to concerns regarding functionality and funding of these systems. Further impetus for the instigation of the NPfIT also arose from Wanless' 2002 report into the future resource needs of the NHS which recommended protected budgets for informatics,⁽²⁹⁾ which was reinforced by the National Audit Office's assessment of local procurement of clinical systems which apparently precluded rather than promoted data sharing in the NHS.⁽⁴⁾

The technical architecture that would be delivered as part of NPfIT and which would support the services the programme encompassed was based around a set of applications which would enable the networking of computer systems in over 18,000 care locations in the NHS.⁽¹⁰⁾ These applications, and the associated hardware, which were known as the Spine, would be linked with the computer systems in the NHS via a National Network for the NHS (N3) delivered by the National Infrastructure and National Application Service Providers.⁽⁴⁹⁾ These would be complimented by a series of five Local Service Providers (LSPs) who would identify where new computer systems would be required, and where existing systems could be used to interact with The Spine.⁽⁴⁹⁾

The format of messages exchanged with The Spine was described in the confidential document, the Ten Page Specification. This document described the Electronic Business using eXtensible Markup Language (eXML) encoding that would embed Health Level 7 standard messaging, and would enable transmission of messages via The Spine. The format of the prescription messages that would be exchanged between primary care computer systems, N3 and the Spine's EPS functionality were defined separately, with the proviso that these must be expressed in an eXML format. The design of the EPS also exploited the Dictionary of Medicines and Devices (DM+D) which provided a standard format for the expression of both the identity of medicines and devices and set a standard format for setting quantities and expressing this.⁽⁶²⁻⁶⁴⁾

relatively recently. However, in the financial year 2010-2011, there were over 80 million prescription items issued by GP practices.⁽⁵⁶⁾ In the calendar year 2010, nearly 18 million prescription items were personally administered in GP practice, which suggests that there are approximately 60 million prescription items dispensed at dispensing doctor practices.⁽⁴⁷⁾

In their Impact Assessment for EPS, the Department of Health (DH) note the need for this new service as a means of reducing risk to patients, and also as a means of improving on a paper-based process that is both inefficient, and which was described as inconvenient for patients.⁽⁹¹⁾ The increase in prescription volumes has also led NHS Prescription Services to search for efficiencies in their operations, which has led to the introduction of their own programme of automation, the Capacity Improvement Programme (CIP). The CIP makes use of both intelligent optical character recognition to capture data from paper prescriptions, and also a 'rules engine' to apply the reimbursement rules to prescriptions.^(83, 84)

The introduction of CIP at NHS Prescription Services should have brought with it a more efficient service that benefitted dispensers and DH. This has not been borne out in practice, and there have been numerous articles written about its operation and NHS Prescription Services offering compensation for failures of the system. Whilst the system should have reduced workload for staff within NHS Prescription Services, this also might not be the case as community pharmacies have to invest more effort in preparing prescriptions for reimbursement. At present, in order to ensure scanning proceeds smoothly, community pharmacies should remove any notes attached to the prescription.⁽⁹³⁾ Given the problems inherent within CIP, a case could be made for an alternative approach to prescription processing, an alternative that could be provided by EPS.

3.2 The Electronic Prescription Service

The goal of EPS is to replace the paper prescription with an electronic document that will stand as a legal entity against which dispensing contractors can dispense. This stands in contrast to the national health services of Northern Ireland, Scotland and Wales, where paper is retained as the legal entity but on which machine readable information is added (see Box 4).

In the case of EPS, given the decision to move from paper to electronic prescriptions, it was planned to deliver the service over two releases, which would differ in the functionality offered. In EPS Release 1 (EPS R1), the focus was on establishing a messaging infrastructure, whilst with EPS Release 2 (EPS R2) the focus shifts to deployment of functionality that would be of clinical benefit as

Box 4: Approaches to Electronic Exchange of Prescription Data

In the United Kingdom, there have been four main approaches used to the electronic exchange of prescription information, as each of the four national bodies responsible for healthcare have adopted their own approaches. In Northern Ireland and Wales, they have looked at the use of bar-coded paper prescriptions as a means of transferring information between general practice and community pharmacy computer systems.^(8, 9) Both services use two-dimensional barcodes to encode all of the data on the prescription in a machine-readable form. When scanned at the community pharmacy all the data from the prescription would be added to the community pharmacy dispensing computer system. This obviously saves the re-keying of information at the community pharmacy which mitigates against a potential source of human error.⁽²⁰⁾

A different approach was taken in NHS Scotland, with the prescriptions being issued with an electronic prescription message that would be electronically transmitted to a dispenser. In Scotland, a barcode is also printed on the prescription.⁽³⁰⁾ However, rather than representing the content of the prescription, the barcode actually contains an identifier for the prescription, which allows the community pharmacy computer system to pull down from a central repository the electronic prescription message. The system in Scotland has been designed to support both acute and repeat prescriptions through the Acute Medication Service, and also repeat dispensing prescriptions through the Chronic Medication Service.^(30, 39) In this system, the opportunity to electronically cancel and amend prescriptions is available to prescribers, which is not available in either of the systems used in Northern Ireland or Wales.

The solution adopted in England is the most radical of the four nations in terms of its technical ambition. As with Scotland, an electronic message is generated and sent via a central repository, with all the advantages this provides including electronic cancellation and the ability to easily issue and amend repeat dispensing prescriptions. However, in the English system, the electronic message becomes the legal entity and as such means that there is the option of transmitting the prescription to any dispenser within England in advance of the patient attending that dispenser.⁽⁵¹⁾

outlined below (see Table 1). In the next section we shall look at the operation of the service and the implications of this for the management of prescriptions.

THE INFRASTRUCTURE AND FUNCTIONALITY OF THE SERVICE

It might be argued that the EPS was conservative in its design. The design of the service appeared to follow the processes used for processing paper prescriptions, and indeed each prescription is composed of a maximum of four prescription items under both EPS R1 and EPS R2 even though technically there should be no limit to the number of items that can be placed on an electronic prescription. The EPS was designed to make use of the

Table 1: Functionality of the Electronic Prescription Service⁽⁵¹⁾

FUNCTIONALITY	SYSTEM	
	EPS Release 1	EPS Release 2
Prescribing authority (GP or other prescriber) able to generate an electronic prescription message that can be received by a suitably equipped computer at a dispensing contractor.	YES	YES
The dispenser or prescriber can create a prescription token which is used to capture a declaration from the client that he or she has paid a prescription charge or to record a claim from this co-payment for a reason over than an age related exemption.	Not Applicable as Paper Prescription Remains the Legal Entity	YES When Required
Prescribing authority can generate an electronic prescription message that replicates the structure of the repeat dispensing prescription.	NO	YES
Upload of electronic prescription messages can be undertaken by prescribing authorities, and of annotated electronic prescription messages by dispensing contractors, which can be downloaded by dispensing contractors and NHS Prescription Services.	YES	YES
Cancellation of electronic prescription messages by an authorised person within the prescribing authority	NO	YES
The prescribing authority is able to add a secure advanced digital signature to the electronic prescription message which will make give this message the legal status of a prescription that can be dispensed against and endorsed to allow for reimbursement to the dispensing contractor.	NO	YES
Client nomination of a preferred community pharmacy, dispensing appliance contractor and a dispensing doctor to whom electronic prescription messages can be sent automatically where this is appropriate	NO	YES
Dispensing contractor can annotate the electronic prescription message and upload this to the Spine so that it can be transmitted to NHS Prescription Services to claim for reimbursement.	NO	YES

existing infrastructure and software architecture that was available or under development. Electronic prescription messages would be transmitted between prescribers, dispensing contractors and NHS Prescription Services using the National Network for the NHS (N3) and the Spine. It was expected that EPS functionality has been added to the prescribing

and dispensing computer systems in use within the GP practices and dispensing contractors in England.

In order to manage the transmission of the electronic prescription message, there were three services added to The Spine to support EPS. These were the Transactional Message System which would route messages between the users of the service, the Personal Demographics Service (PDS) which would capture basic demographic data about patients including their unique national identifier, their NHS number, and the Identity Agent, which was designed to provide endpoint authentication. The spine also provided EPS with a temporary store of data as prescriptions were issued and awaited collection or routing to a dispensing contractor.⁽¹⁰⁰⁾

These components provide essential functionality to meet the agreed specification of the service, and the needs of service users. The Identity Agent (IA) software was introduced in response to the need to address perceptions of poor data confidentiality prior to the introduction of NPfIT.⁽⁴⁾ This software was designed to support the obligations of the NHS with regard to the protection of patient data.⁽¹⁰⁷⁻¹⁰⁹⁾ This software only allows access to the PDS through the use of a Smartcard and personal identity number based system. In addition, the IA also records which sites patients are nominating as their preferred dispenser. The nomination sets where it is that the prescription would be sent. These nominations, recorded on the PDS, can be audited to check for potential direction of prescriptions against patient preference. Again this would contravene the principles underlying EPS use,⁽⁶⁹⁾ a concern of community pharmacy.⁽¹¹²⁻¹¹⁴⁾

This new infrastructure introduced new requirements that developers of community pharmacy and GP practice computer systems had to meet. These requirements defined new standards for connection to and information exchange with the national applications and infrastructure. Suppliers were expected to demonstrate their ability to achieve this through a new accreditation programme, the Common Assurance Process (CAP).⁽²⁾ In line with perceived best practice at the time, developers of prescribing and dispensing systems worked to an output-based specification which described the format of messages that should be exchanged between the different components of EPS.^(4, 62, 63)

THE OPERATION OF EPS RELEASE ONE

As already noted, it was proposed that EPS would be developed and deployed over two releases. These would be deployed in a four phase roll-out, over which the functionality described previously (see Table 1) would be integrated into the prescription service. Although EPS R1 was only expected to provide a test of the communications infrastructure of the service, benefits have emerged from this early phase of the deployment as the following description of the client's experience of community

pharmacy services during the four phases of implementation illustrates.

In the case of EPS R1 use (see Figure 4), for an electronic prescription message to be generated, the prescription items included had to be represented by a standard dictionary, the Dictionary of Medicines and Devices (DM+D) and were within scope for EPS R1. The scope of EPS at the time of writing specifically excluded controlled drugs.

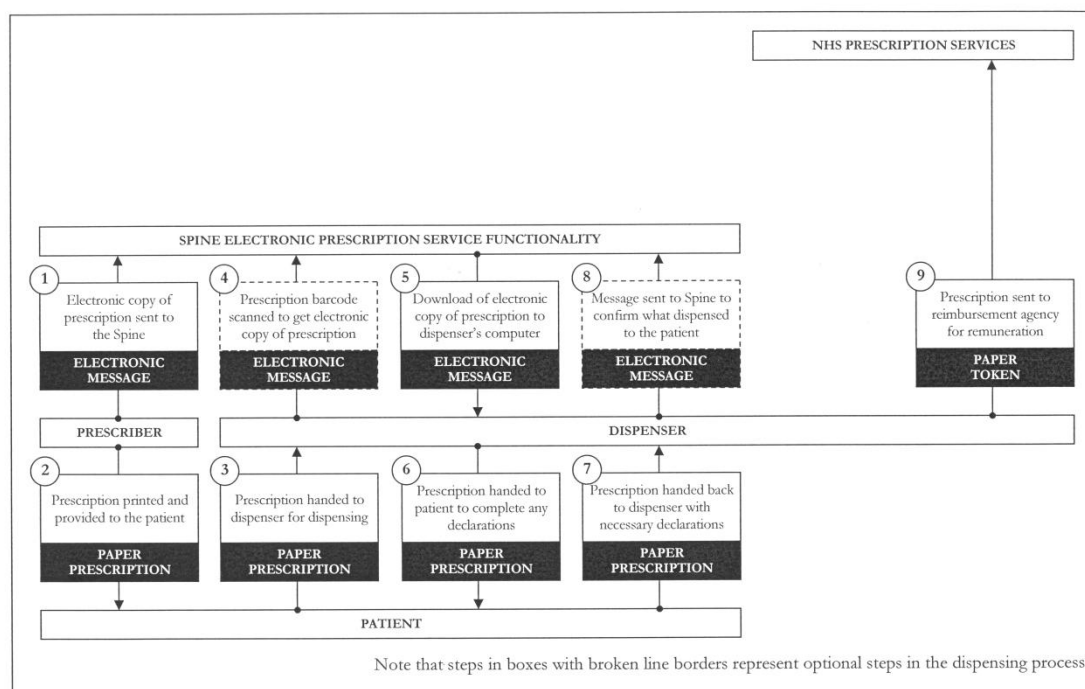


Figure 4: Electronic Prescription Service Phase One and Two Operation

Where these conditions were met, EPS R1 was designed to produce an electronic prescription message, to assign a Universal Unique Identified (UUID) to this and to upload this message to The Spine. When these conditions were met, the system was designed to print the prescription onto an FP10 form together with a barcode which contained the UUID. The bar-coded UUID would provide the unique identifier for a dispensing contractor to retrieve the electronic prescription message from the Spine.⁽⁶²⁾

In the case of EPS R1, the legal entity remained the paper prescription, and this could be handled by the dispensing contractor in the same way as any other prescription presented on an FP10 form. At the community pharmacy, if a site has an EPS R1 compliant system, the barcode on the prescription could be scanned. This action would lead to the dispatch of the prescriptions UUID electronically to The Spine and the dispatch

from The Spine of the electronic prescription message to the community pharmacy dispensing system.

The data received could be used to populate the dispensing computer system's Patient Medication Record with the data required to produce the labels that would need to be added to those items dispensed items without the need to re-key data. In addition, this functionality was exploited to add prescription data to the Patient Medication Record. As prescriptions contain the unique identifier associated with each patient, the NHS Number, stored in the PDS, this allows dispensing contractors to reconcile any locally-held records on the dispensing computer system with a single unique identifier.

The introduction of EPS R1 was also expected to provide community pharmacy with an opportunity to test another part of the EPS infrastructure, the transmission of prescription data from the dispensing contractor to NHS Prescription Service, via the Spine, which would form the communication channel for reimbursement to dispensing contractors for electronic prescriptions issued with EPS R2. However, this activity had no practical benefit for dispensing contractors, but was used by CFH to gain an estimate on the usage on the numbers of electronic prescription messages processed by community pharmacy.

Although no clinical benefit was expected from EPS R1, the creation of prescription messages containing the standard unique patient identifier for the NHS, the NHS Number provided a mechanism to reconcile their current records and to ensure that they have only one patient record for each patient. It also appeared to us that this system could be used to reduce the potential for fraud within the service, by making visible discrepancies between the paper and electronic prescription. However, whilst there is clearly some clinical benefit from EPS R1, contrary to one very prominent report on healthcare informatics in the NHS,⁽¹²⁴⁾ the main clinical benefits were expected to arise from EPS R2 and the adoption of electronic repeat dispensing.

THE OPERATION OF EPS RELEASE TWO

The delivery of EPS R2 itself was planned as a two phase roll-out, phases three and four of EPS programme deployment. Phase three covered the period from the testing of EPS R2 compliant dispensing and prescribing systems in a small number of paired prescribing sites and dispensing contractors where electronic prescriptions would be exchanged under tightly controlled test conditions (see Figure 5), whilst phase four describes the business as usual operation when EPS R2 is adopted as a national service (see Figure 6).

With the deployment of EPS R2, new functionality began to gain usage. In this

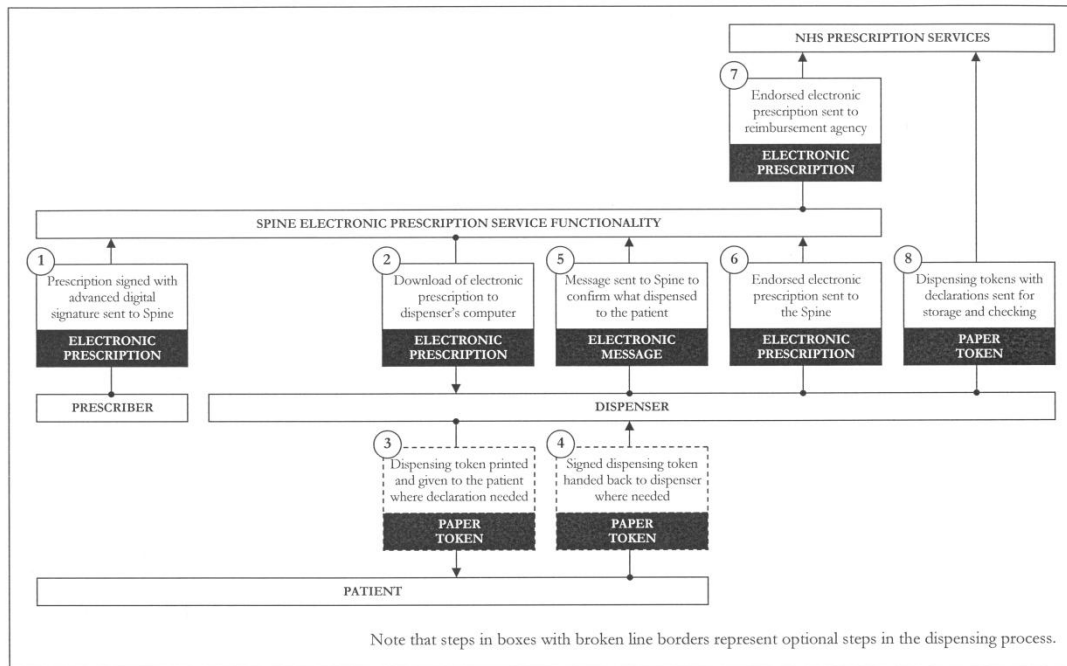


Figure 5: Electronic Prescription Service Phase Three Operation

release, the prescription was no longer a physically artefact but an electronic prescription message that was signed with what was called an advanced electronic digital signature. The service would allow for the introduction of electronic repeat dispensing prescriptions. These, like the other forms of electronic prescription had the advantage that these could be cancelled by an authorised member of staff at the prescribing authority up to the point at which dispensing occurred at the dispensing contractor. It had been expected that the introduction of electronic repeat dispensing would generate greater use of repeat dispensing.

The third phase of EPS operation marked the transition between the use of paper prescriptions and electronic prescriptions in a limited number of dispensing sites. In order to use EPS R2 during the third phase of implementation, the client was required to nominate the dispensing contractor that he or she wished to use. For those sites participating in the live testing of prescription and dispensing system functionality, this choice would be limited to one or two dispensing contractors within the close vicinity of the GP practice, and with to which a large proportion of prescriptions from the GP practice would typically be sent. The client would be able to set their nomination at either the GP practice or dispensing contractor, and change this at any time, or choose to halt their use of EPS should he or she wish.

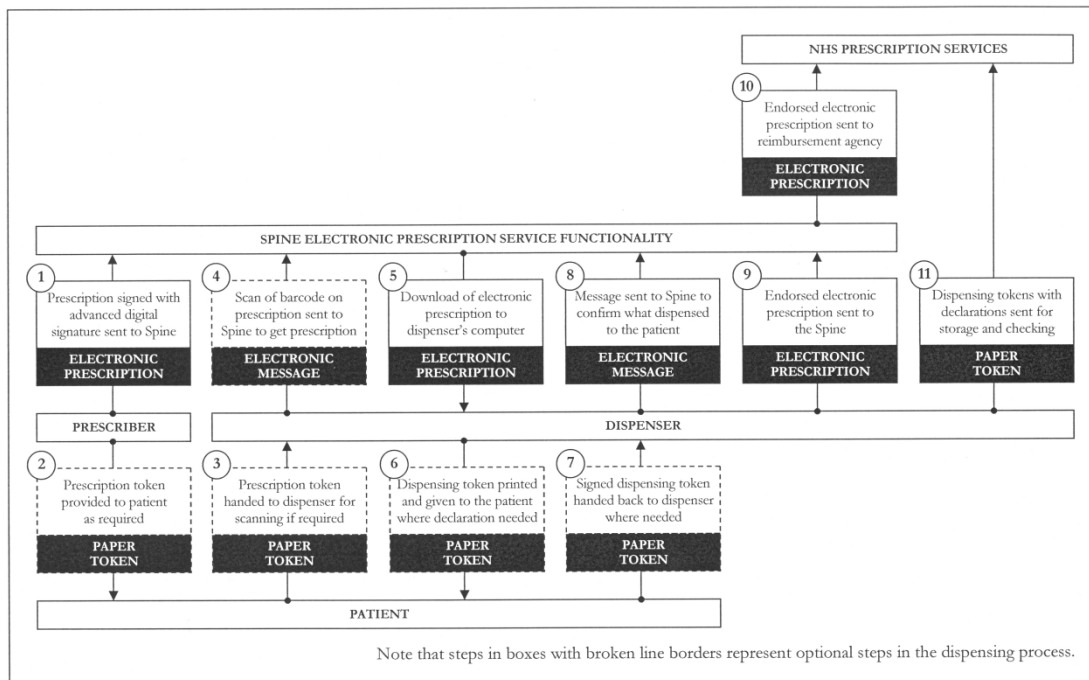


Figure 6: Electronic Prescription Service Phase Four Operation

At the time at which the client makes the nomination, he or she should be briefed on the operation of EPS. Publicity materials have been prepared by CFH to introduce the service to patients, although the GP practice or dispensing contractor might wish to produce their own. For the patient, the experience of using EPS R2 should not differ markedly from their present experience of the service. If a prescription is issued during a consultation, the client's prescription would be sent directly to the dispensing contractor. The client might be handed what was termed a prescription token, an unsigned piece of paper that looks like an FP10 form and contains all the details on the prescription and the UUID for the electronic prescription on a barcode but which does not have any legal value.

At the community pharmacy, the prescription might have already been downloaded in advance of the patient, or the prescription token might be scanned to retrieve the prescription from the Spine. Typically, the community pharmacies would be expected to make intermittent requests to the Spine from their dispensing computer system for any prescriptions that should be sent to them immediately.

In order to assemble and dispense the prescription to the client the community pharmacy might use the prescription token if there was one, or alternatively the community pharmacy had the option to print a copy of the prescription, known as a

dispensing token. This would also be required if the client needed to complete a declaration that he or she had paid the prescription charge or to claim exemption from this co-payment for a reason other than as an age-exempt patient.

Similarly, where a client received a repeat prescription, there would be little difference in their experience of the service with regard to ordering the prescription. As with paper prescriptions, the client would have the same mechanisms for ordering as before, which might include asking the community pharmacy to submit a request to the GP practice, submitting a paper or electronic request to the GP practice, or possibly making a telephone call to the GP practice where allowed.

The most noticeable difference for the patient using EPS R2 would be the removal of the need to collect paper prescriptions from the GP practice, although some patients might request a prescribing token, which provides a paper copy of the information on the electronic prescription. At the community pharmacy, the patient also has the option of receiving a dispensing token, which again would provide a paper copy of the electronic prescription information.

As with a prescription issued during a consultation, the client might be asked to sign a declaration, and a dispensing or prescribing token could be made available. In those cases, where the client required an order form for their repeat prescription items, a dispensing token would be made available on request to the client, which would contain a copy of the prescription counterfoil that the client could use to re-order their medication.

The main change in client experience of the prescription service was expected to be with repeat dispensing prescriptions. As noted already, it is possible for prescribers to issue a paper repeat dispensing prescription, which allows the client to present the prescribing authorities authorisation to dispense for a patient without the need to order a new prescription each month from the prescriber. In the case of electronic repeat dispensing, the batch issues for the prescription are held on the Spine, and can be downloaded by the nominated dispensing contractor as they are required. If the prescriber has not set an interval, a default dispensing interval of twenty-eight days would be set. In order to allow the dispensing contractor sufficient time to prepare the prescription, each batch issue would be downloaded twenty-one days after the previous batch issue had been dispensed against, although, the next batch issue could be downloaded earlier if the previous batch issue had been dispensed.

Although there would appear from this partial description that patients would benefit from EPS R2, CFH have not recommended the use of this service for all patients,⁽⁹⁰⁾ even though it was expected that EPS R2 would become the default

means of issuing prescriptions.⁽⁵¹⁾ In their guidance, CFH suggested that the service should be used for those patients who received regular medicines and who typically used the same community pharmacy.⁽⁹⁰⁾ However, with the national deployment of the service, during phase four, it was expected that it would be the norm for patients to use this service.

In phase four, in order for those clients who do not have a nomination to receive a prescription, a prescribing token would be issued (see Figure 6). This prescribing token would feature a barcode containing the UUID for the prescription. When this barcode is scanned at the community pharmacy this would enable the download of the electronic prescription from The Spine, and allow for it to be dispensed.

Repeat dispensing and repeat prescribing using EPS R2 was expected to provide a more convenient service for the patient. In the case of both, the digitally signed electronic prescription would be automatically sent overnight to the community pharmacy dispensing computer. If a mistake is made in the prescription, or there are changes required, a prescription could be cancelled and re-issued before it was received by the community pharmacy, or dispensed against.

For community pharmacy, the service might provide the opportunity to receive a prescription in advance of the patient. This might provide sufficient time for the community pharmacy to ensure that all the stock required to fulfil the prescription was at the pharmacy, reducing the need for owing notes, although it was possible for a prescription to be partially dispensed if the community pharmacy had to owe the client some of their medication.

However, the design of the process for managing electronic prescriptions was different to that for paper prescriptions. To begin, repeat dispensing prescriptions would now be mobile, following the patient nomination. Under paper, as each batch issue could only be used for dispensing if the community pharmacist had the repeatable prescription. This limited the patient to use one community pharmacy for the life of the repeatable prescription. In EPS R2 there was no such restriction, with each batch issue representing a prescription in its own right. Whether this was perceived to be at odds with the expectation of an extended clinical role for community pharmacists is not explored in this report, but did differ from the approach taken by NHS Scotland in its management of their own electronic repeat dispensing prescription service, the Chronic Medication Service.

The other change that was introduced into EPS R2 was in the manner in which dispensing contractors would claim reimbursement for prescription items dispensed, which could have an effect on the patient's experience of electronic repeat dispensing.

With EPS R2, as the prescription is transmitted from GP practice to community pharmacy and to the reimbursement agency (NHS Prescription Services) data is appended to the electronic prescription to capture what action has been taken. At the community pharmacy, an endorsement message would be added to the electronic prescription to indicate which prescription items the community pharmacy intended to supply to the patient.

When all the prescription items that the community pharmacy had intended to supply to the client had been supplied, a dispense message would be added to the electronic prescription, and the electronic prescription would be sent to the Spine and then to NHS Prescription Services. This process appeared to be designed on the assumption that the dispense message would be sent immediately after a dispensing event had occurred, in order to ensure that the repeat dispensing cycle is maintained and that prescriptions would be available in a timely manner for clients. Where this assumption is not met, we understand that delays might arise in the receipt of the next issue of the electronic repeat dispensing prescription at the nominated community pharmacy.

A mention should also be made at this point with regard to the collection of declarations from clients on dispensing tokens or prescribing tokens. The patient declaration is sent electronically as part of the prescription sent to NHS Prescription Services for reimbursement. However, at present NHS Prescription Services have also requested that dispensing tokens and prescribing tokens with completed declarations on them should be returned with paper prescriptions, although it is not clear as to how these would be used.

THE OPERATION OF THE EPS FOR OTHER DISPENSING CONTRACTORS

So far, we have focused on the experience of GP practices and community pharmacies. However, EPS was intended to cover two other constituencies, DACs and dispensing doctors. In the case of these two constituencies, the patients' experience would not be expected to vary to the same degree as would be expected for GP practice or community pharmacy.

In the case of DACs, items are requested by clients from the DAC, and the prescription is requested by the DAC from the prescribing authority and sent directly to them. For the prescribing authority the prescription would be like any other electronic document, and for the DAC, we would expect that this would be managed in the same manner as any other dispensing contractor, although we have yet to observe the business process at a DAC that was processing electronic prescriptions.

In the case of dispensing doctors, we would expect a similar case, with the client not coming into contact with a prescription either when paper or electronic prescriptions

are used. We would expect that the experience of the client at the GP practice dispensary would be similar to that at the community pharmacy, with declarations captured from the client in the same manner. The only difference would be noticed is that in the case of the dispensing doctor, the client would not have access to repeat dispensing prescriptions, but would have access to repeat prescriptions.

BENEFITS EXPECTED FROM THE ELECTRONIC PRESCRIPTION SERVICE

Over the course of its history a changing constellation of benefits has been ascribed to EPS. At the outset of the project we were told these were largely associated with efficiency gains at the national level and in particular in the processing of reimbursement. These claims were also made in the 2005 All Party Pharmacy Group (APPG) report on informatics and changes to the community pharmacy contract. This report claimed that there would be savings for NHS Prescription Services with regard to both staff and resources. The APPG also believed that the introduction of ETP would lead to more accurate prescription processing and faster remuneration.⁽¹¹⁴⁾ However, these claims regarding faster remuneration and more accurate prescription processing have never been presented by CFH as an actual benefit of EPS.

There were two documents that we found in the public domain^(91, 152) that documented the potential benefits arising from the implementation of EPS R2 for the core stakeholders of patients, general practitioners and dispensing contractors. For example, EPS R2 provided functionality that would allow the prescriber to cancel items from a prescription prior to that prescription being received by the dispensing contractor. Indeed, whilst the prescription might be composed of four prescription items, in EPS R2 the cancellation operation acted at the level of the prescription item. This would not simply provide a means of removing prescriptions from the Spine, or identifying to which dispensing contractor the prescription had been sent, this functionality could provide the prescriber with an automatically generated medico-legal record of decisions made with regard to the prescription issued.

Our own review of the history of EPS in England suggested that the benefits associated with the service have continued to shift and develop. Parties other than CFH have formed their own views with regard to the potential positive effect of EPS implementation. For example, it has been claimed that data collected using EPS could be used to provide an indication of patient adherence to medication.⁽⁴⁹⁾ However, this would require either the population of data on dispensing in the Summary Care Record or that data on dispensing was sent back to GP practice systems and integrated in their patient record, which as far as we know has never been anticipated in the technical architecture or in the work flow.

The introduction of EPS was expected to improve patient safety, most directly

through the transmission of full digital prescription data from prescriber to dispenser, which can then be used to populate the labels as prescription items are assembled. This obviously removed the need to rekey data at the community pharmacy and was recognised as a safety feature in the ETP pilot schemes run in England in 2003. The requirement upon the prescribing authority to use electronic prescribing, which was integral to all prescribing systems would ensure that only complete prescriptions can be sent, which would be expected to include all the information the patient required to make the best use of the dispensed item.

However, whilst the DM+D sets a common standard for describing most prescription items prescribed at the time of this study, there was no standard set for the transmission of the instructions to the patient. Rather dispensing contractors rely upon prescribers to adhere to the British National Formulary (BNF) good practice guidance, and to adopt the features available in the GP practice computer system.^(62, 63) We have noted from our own observations that prescribers still issue ambiguous instructions or make use of Latin abbreviations. In both cases, the dispensing contractor has to act to ensure that these instructions are in a form that can be understood and acted upon by the patient.

Other benefits that have been proposed are based on broader quality of care or safety considerations seen within the overall medicines use process. Thus, increased confidence in and use of repeat dispensing prescriptions by GP practice could potentially lead to beneficial consequences for community pharmacy and in particular an enhanced clinical role for pharmacists. This might allow a greater contribution from community pharmacy to the management of chronic conditions, which may support improved monitoring of patient adherence and ensure that patients are using their medicines appropriately as Ashcroft and colleagues noted.⁽¹⁴⁵⁾

The EPS has also often been presented as a system for supporting the administration of prescriptions (process efficiency),⁽¹²⁴⁾ but this too is often linked to benefits in respect of patient safety and the timely provision of appropriate medicines (outcome effectiveness). As noted above, prescribed medicines can be withdrawn or cancelled in EPS, and a new prescription raised in the interim between the patient consultation attendance at the community pharmacy. This ability could potentially foster greater communication and integration between community pharmacy and GP practice staff.⁽¹⁵²⁾ The use of electronic repeat dispensing prescriptions also potentially provides an opportunity for prescriptions to be received in advance of the patient at the community pharmacy which may alleviate potential stock-shortages and ensure that all prescription items can be issued to patients without the community pharmacy having to owe the patient an item.^(152, 162)

Potential administrative benefits were also suggested with regard to GP practice and community pharmacy business processes. With EPS GP practices would have expected to

no longer have to sort and store repeat prescriptions for return to patients,⁽¹⁶²⁾ and should not have to search for paper prescriptions when they could not be located in the workflow. Similarly arguments apply for community pharmacies which often maintain a paper based system for management of prescription collection services. The introduction of EPS should also reduce some of the burdens associated with the batching-up and sorting of prescriptions prior to submitting these for reimbursement to NHS Prescription Services.⁽¹¹⁹⁾ At present, whilst dispensing tokens currently have to be returned to NHS Prescription Services but these do not have to be sorted according to the identity of the prescriber or prescription type.

For patients, the core stakeholder in this service, the main benefits, aside from improved safety, are in the realm of convenience and potentially in providing greater access to their own information through integration of EPS with the Summary Care Record and potentially to an electronic health record such as HealthSpace.

As already noted, whilst the prescription is principally a message designed for the management of the issue of medicines to patients and the reimbursement of prescription costs to pharmacies, it has two, potentially three, other functions. Firstly, the prescription allows the prescriber to describe to the pharmacy what the indication is, allowing them to decide how to counsel the patient if this is deemed necessary. Secondly, the prescription counterfoil might also contain information of use to the patient, such as the review date for her or his prescription, notices of services available at the GP practice, as well as serving as a form for the selective re-order of prescriptions.

When a repeat dispensing prescription reaches the end of its life and is in need of re-authorisation or re-issue, this information needs to be communicated to the patient. In guidance, it has been noted that where there is no flow of paper, as is the case with EPS R2, this information should be communicated to patients by dispensing contractor staff. However, it was also noted that the prescription counterfoil might also contain non-clinical information, which dispensing contractors were not obliged to pass on.⁽¹⁶⁶⁾

The review of the various benefits of EPS above is intended to suggest that this is revealed in a quite complex picture, with many potential advantages that may be seen by a number of stakeholders. No one benefit alone offers the 'killer punch', and each remains today as more a conjecture than a proven fact. Indeed a substantial part of this project has been devoted to exploring these conjectures – for example in the process benefits of electronic repeat prescribing at the GP practice level.

What our research has shown, and as suggested in Box 7 where benefits issues are considered from an international perspective, benefits of ETP can be conceptually divided into a number of categories based on the fundamental understanding of the

Box 7: Benefits from Electronic Transmission of Prescription Messages

In England, a range of approaches to electronic transmission of prescriptions have been tested. These have included the use of smart cards to carry prescriptions,⁽¹⁾ to the use of paper tokens to carry prescription data in an encrypted machine-readable form,⁽³⁾ to the use of servers to transmit prescriptions as an email,⁽³⁾ to the current EPS R1 and EPS R2 services, where a server is used to route prescriptions and prescription messages to dispensers of the patient's choice.

The question arises as to why there has been such persistence in attempting to adopt electronic prescription transmission. England is not alone in this regard, as all three UK nations have implemented systems for electronic exchange of prescription data in primary care, as have Australia,⁽²⁵⁾ Canada,^(26, 27) the United States⁽³³⁾ and also many European nations^(34, 35) including Denmark,⁽⁴⁰⁾ Estonia,⁽⁴⁸⁾ Finland,⁽⁴⁰⁾ The Netherlands,⁽³⁵⁾ Sweden⁽⁵⁸⁾ and Spain,⁽³⁵⁾ although this has not been unproblematic.⁽⁷⁰⁾ It appears from a review of the literature on these international programmes, that there have been a number of drivers for ETP, which to a large extent have determined the architectures of these programmes.

Underlying the electronic transfer of prescriptions is the basic notion that data can be transmitted more accurately, and that this data can be subject to more reliable additional processing than is presently the case. For example, in the United States electronic transmission appears to have an advantage over the current mechanisms of sending prescriptions, which included hand-written orders, as well as faxed and verbal orders to community pharmacists over the telephone.⁽⁷⁴⁾

There are clearly problems with these traditional approaches. Receipt of orders via the telephone can be inefficient.⁽⁷⁷⁾ From research in other domains we also know that there is an opportunity for transcription and transposition errors to arise which could affect patient safety. Similarly, in the case of written prescriptions, the interpretation and keying in of data can also bring with it risk.

Other potential benefits identified include improved efficiency and safety in the prescribing and dispensing process.⁽³³⁾ These services have been associated with the potential creation of a complete medication history for patients,^(33, 58) which could include non-prescribed medications,⁽⁸²⁾ and could potentially be shared between care providers.⁽⁵⁸⁾ In the case of Northern Ireland, a system for the electronic transfer of prescription information was introduced to counter patient-initiated fraud.⁽⁸⁵⁾

The nature of the benefits desired defines the nature of the architecture used. For example, in the case of NHS Wales' system, a system for the electronic transfer of prescriptions, the paper prescription is retained but includes a barcode that contains all the prescription information. This reduces the need for rekeying of data and should promote improved accuracy in the transfer of data between the prescribing authority and the dispensing contractor. In the case of Northern Ireland's system where the emphasis was initially on counter-fraud measures, a bar-coded paper prescription is used, but the data from this was captured and sent via a network for checking against the claimant database in Northern Ireland to ensure the patient did not have to pay prescription charges.⁽⁸⁾

mechanisms it invokes.

We identify here six assumptions that these benefits statement are built upon. Each of these is founded in two domains – that of the generic digital technology, and that of the medicines use process.

- Digital data is transmitted more accurately and speedily than data on other media
- Transcription of data leads to errors
- Digital data is the basis for improved efficiency in organisational processes
- Improved quality of care is associated with fuller data (e.g. complete medication history)
- Digital data is sharable and supports coordinated inter and intra-team work
- Digital data allows value-adding additional processing

3.3 The Deployment of the Electronic Prescription

The delivery of these benefits is dependent upon the widespread adoption of EPS. At the time data collection ended for this interim report, the service was moving towards national implementation and in community pharmacy this expansion appeared to have been rapid. Unfortunately, the extent of deployment appeared to have been limited by GP practice deployment. Even though there were GP practice prescribing and community pharmacy dispensing systems available for national deployment, the service was still in phase three of operation, with most research activity limited to pairings of community pharmacies and GP practices. These pairings were typically first of type sites, pairs of GP practices and community pharmacies which were collecting data as part of the in-vivo testing for the CAP.

COMMUNITY PHARMACY AND GENERAL PRACTICE DEPLOYMENT

The numbers of community pharmacies and GP practices adopting EPS R2 have increased since the close of our first phase of data collection. At the time when our first phase of data collection ended there were ten GP practices that were sending electronic prescriptions via EPS R2, and a similar number of community pharmacies. Many of the sites at which we were working were identified by informed NHS liaison as the earliest users of EPS, but did not begin use of EPS R2 due to delays in the delivery of EPS R2 compliant dispensing and prescribing software.

DEPLOYMENT TO OTHER CONSITUENCIES

Deployment over the period covered by this report was limited to GP practices and community pharmacies. There was no deployment to DACs or dispensing doctors during this period. However, whilst DACs were in a position to begin adoption of EPS R2 from

June 2012 onwards, the same could not be said for Dispensing Doctors.

Deployment to the DACs differed from that of community pharmacy. In community pharmacy, a number of suppliers providing dispensing computer systems with a number of suppliers signalling their intent to offer EPS R2 functionality. In the case of DACs the case was different. Amongst independent DACs there was widespread use of a DAC specific dispensing computer system in this constituency, called MEDOP. Initial attempts to integrate MEDOP with the EPS were abandoned as it became apparent that this was a challenging and potentially expensive endeavour.

This approach was abandoned in favour of the adoption of a dispensing computer system developed for community pharmacy, which would be linked with the MEDOP solution in place. The MEDOP system was retained for management of prescriptions within each DAC, whilst the other dispensing computer system would provide an interface with EPS and be able to provide access to EPS R2 electronic prescriptions.

Whilst the problem of access to EPS R2 was solved for DACs, the integration of EPS R2 with the practice of dispensing doctors has proved more problematic. In the case of dispensing doctors, there is a dispensary in the GP practice, for which GP practice software suppliers have designed dispensing modules. These modules allow the GP practice to add the endorsements required for the reimbursement of prescription items dispensed, and to also update GP practice records. Implementation of EPS at these sites requires either the introduction of new functionality to the dispensing software that forms part of the GP practice systems in use, or the purchase of a dispensing computer system, of the type that community pharmacy currently uses.⁽¹⁵⁹⁾

At the time of writing, there had been no dispensing modules completed for EPS R2, despite the fact that the first example of a dispensing module was due to begin testing in November, 2009, but had not been delivered a year later.^(171, 172) One organisation claimed that this problem had arisen because the original specification had not taken into account the manner in which dispensing doctors would work.⁽¹⁷⁴⁾ Advice from CFH suggested that dispensing doctors could chose to adopt a dispensing system or wait for their prescribing system supplier to provide a dispensing module.⁽¹⁵⁹⁾ This latter approach potentially poses the problem of managing the identity of the dispensing practice, which would need to be identified by two site, or ODS codes, one as prescriber and one as dispenser.

3.4 The Deployment of the Electronic Prescription

The description of the EPS which we have given, guided by the available literature on the service, appears to have focussed on the transmission of data between GP practice and community pharmacy. Whilst we expect to see other constituencies use this service, including dispensing appliance contractors and dispensing doctors, the focus of the initial

implementations described in this study appear to reflect this. For GP practice and community pharmacy, the introduction of EPS appears to have been predicated on the possibility that new clinical relationships could be supported through this service, which could improve both process efficiency and patient outcomes. In the case of EPS R2, improvements in outcomes would be expected to follow from both reduction in time spent managing transcription errors, and also through increased monitoring of medication use by community pharmacies. In the next chapter we explore the actual experience of the service at initial implementer sites and whether there is evidence to support these outcomes.

4

FINDINGS TO DATE

The findings so far reflect our learnings from the early stages of development, testing and rollout of EPS Release 2 (EPS R2) and the software supporting it. In many cases we can only report on the baseline measures before introduction of the system, however in other cases we can account for the early stages of rollout in which there were pairings of GP practices and community pharmacies.

This chapter is structured predominantly around two of the four work packages that constitute the evaluation, these being the patients' perspective and the effects on the working of community pharmacies and GP practices. We have not included information about the safety work package as this is predominantly one large study which is still underway. We have examined over 10,000 prescribed items, however we will not reveal any findings here as it may change behaviour in the last stages of the evaluation. The final work package, which looks to the future, constitutes the chapter following this.

4.1 Patients' Views of the Service

This study explored to look at patients' and representatives' (hereafter clients) experiences of EPS, as well as the perceptions of clients who have chosen not to use the service. A complex picture emerged, of service adoption and potential consequences of service use.

BACKGROUND

Prior to the conduct of this evaluation, little was known as to how patients might experience the ETP service. Some surveys had been done in the UK of the potential consequences of adoption of ETP,^(21, 22) and latterly EPS.⁽²⁸⁾ Outside of the UK there were three limited evaluations that looked at patient experiences, a study of geriatric clients' experiences of ETP in the United States,⁽⁴¹⁾ and a series of Swedish studies on their e-Receipt service that focussed on non-collection of electronic prescriptions⁽⁵⁰⁾ and client experiences.⁽⁵⁴⁾ Interesting the last study seemed to indicate that clients were unaware of how their prescriptions were being sent to the community pharmacy, and using the service despite concerns over its potential benefits.

METHOD

Clients were interviewed either face-to-face or over the telephone following an introduction to the researcher by community pharmacy or GP practice staff. Face-to-face interviews were held at these location and notes made at the time and immediately afterwards. Interview data was analysed using content analysis. Observation of the process of managing electronic and paper prescriptions was also conducted at community pharmacy and GP practice sites.

Data obtained from interaction with patients included basic demographic data, their use of email and the internet, information about the type of prescription raised, the process used to order and obtain medicines, the frequency of contact with healthcare providers, and the clients' views of the EPS.

PARTICIPANTS

In total, 58 clients participated in the study (20 male and 38 female), of whom 32 had received an EPS R2 prescription. The ages of participants ranged from over 25 years to over 65 years, with the largest group of participants falling in the latter age group. The vast majority of prescriptions collected were from repeat prescribing.

A COMPLEX PICTURE

The qualitative analysis presents a complex picture of clients' responses to the service, which appear to be contrary to the business case for the study. For example, we can note that not all clients value a more convenient service where convenience is associated with a reduction in travel to community pharmacy and GP practice sites for prescriptions. Rather, clients might prefer to submit the prescription request in person and to take this in person to the community pharmacy. There appeared to be three main reasons for this. Firstly, as might be expected, clients might prefer the contact with GP practice and community pharmacy staff. Although for other clients the increased convenience of the service was expected to draw them to the use of EPS R2.

Secondly, the client might wish to present the image of someone who meets her or his obligations with the GP practice by adopting the role of the good client. This was an unexpected finding for us.

Thirdly, clients might not be comfortable with the thought of using computers to transfer prescriptions, even though EPS R2 does not involve any direct interaction with the computer on the clients' part. Indeed, it is conceivable that the client might expect to have to use computers to be able to make use of electronic prescriptions.

Finally, some clients also appeared to recognise that their prescriptions would not be suitable for transmission via EPS R2 as their prescriptions frequently changed. It was noted by three of these four clients that they attended the GP practice on a monthly basis anyway to have their prescriptions checked, so there appeared to be no advantage to using EPS R2.

Nomination

A complex picture emerges because of clients' perceptions of the flexibility of the process. The majority of clients who expressed an opinion on nomination, eight, were generally happy with nomination as they did not foresee an occasion on which they would use an alternative community pharmacy. This was either because the pharmacy was the most convenient for the patient, or because the client already used a co-located GP practice on a regular basis. In one case it encouraged a client to nominate a pharmacy closer to her workplace.

In contrast, in the case of three clients it was felt that EPS R2 would fix the location to which the prescription could be sent, apparently reducing the flexibility of the service. In the case of one of these, the client worked across the region so would want to drop in the prescription wherever he could. Another client liked that he could choose a pharmacy based on which were open at the time he finished work.

Finally, two clients had concerns about nomination as their community pharmacy might not be able to meet their request in a timely manner. One client preferred the option of taking the prescription to another pharmacy if her nominated pharmacy was too busy. Another client expressed concern about having her prescription sent to a nominated pharmacy when she was not sure if they had the stock to fulfil it.

Paperless Prescriptions

The introduction of EPS R2 brings with it the opportunity to send prescriptions in a wholly paper-less manner. This will mean that some clients who EPS R2 would have to ask their community pharmacy for a dispensing token in order to obtain a copy of the prescription counterfoil. However, whilst it might be expected that a prescription counterfoil might be of use to clients, this was not a view that was universally held.

One client stated that the prescription counterfoil had no relevance whilst another criticised the prescription collection service for not providing him with a copy of the counterfoil, which was viewed as reducing the level of control he had over the prescription ordering process. Two clients commented on the use of the prescription counterfoil as an aide-memoire for the client and as a means of transferring information on their prescriptions between care-settings.

Although there was limited use of repeat dispensing prescriptions at the time of this study, when told about the service, four clients identified potential advantages in the use of these. In the case of two clients, repeat dispensing provided a means of mitigating against the need to place urgent requests into the GP practice when they had forgotten to drop in their prescription order. It should be noted that GP practices might prefer written requests for prescriptions whether sent on paper or electronically. In the case of one client, she noted that there was an internet portal to allow her to submit electronic prescription requests but that she did not wish to use this.

Service Reliability

Concern was raised by some of the clients over the reliability of the service. Firstly, one client who had chosen not to use the service was concerned as to whether the service was quick enough to manage acute prescriptions. At one site, we did witness delay in the receipt of electronic acute prescriptions for two patients. Two other clients had reported problems they experienced with the transmission of repeat prescribing and repeat dispensing prescriptions.

Problems have also emerged when some of the items on a prescription are sent electronically and other items on a prescription are printed on a paper prescription. The creation of a split prescription can arise for a number of reasons, for example when an item on a prescription is a controlled drug or when an item on a prescription is not mapped to the DM+D. This splitting of prescription items can prove inconvenient for the client, and led to one client abandoning the service.

The response to these problems from two clients who used the service was to telephone the community pharmacy to check that the prescription had been received at the community pharmacy. Whilst this would appear to be a reasonable strategy for clients to use, changes to community pharmacy workload might be expected to emerge should this strategy gain broader use.

It was also noted by one client that he had not been provided with information by the community pharmacy that the repeat dispensing prescription had come to an end. Apparently, the first that the client knew of this was when he attended the community pharmacy and the issue he was expecting was not there.

Service Security

In response to questions on perceived disadvantages to the transmission of prescriptions electronically, there were four clients who commented on the perceived security of the service. In the case of two clients, there was little concern over confidentiality of the service as it was expected that there would be safeguards in the community pharmacy, and also within the system. Interestingly in the latter case, the

provenance of the service as a national NHS service was viewed as indicating the service would be secure. Another client did not express any concern about security as the prescription was not felt to contain any confidential data. There was one client who did express concerns over the security of the service. However, this appeared to arise not because of his experiences with EPS, but from his experiences of a secure internet payment system.

Speed and Convenience of the Service

Notwithstanding delays to electronic prescriptions en-route from GP practice to community pharmacy, eight clients who used EPS noted that the delivery of prescriptions had become faster. Two clients noted that prescription items were ready to be dispensed when they attended the community pharmacy, which was within the same period that it had previously taken to collect prescriptions. Similarly, another two clients noted that the problems that they had experienced with regard to the supply of medicines had been reduced. We should also note that there were two clients who were prepared to recommend the service on the basis of the convenience that repeat dispensing brought with it for the patient.

THE SUITABLE PATIENT

The question arises as to what these findings tell us about how the service should be managed and for which patients the service would be most beneficial. Whilst it was claimed that the norm for prescriptions would be to be sent via EPS,⁽⁵¹⁾ the original publicity for the service for patients suggested that the service would be suitable for some patients but not all.⁽⁹⁰⁾ The advice provided suggested that the process of nomination should be introduced to those patients who receive regular repeat prescriptions, or for those patients who tend to use the same dispensing contractor. It is interesting to note that this information was not included in the main reference for prescribers and dispensers, the Business Process Guidance issued to initial implementers.⁽⁶⁴⁾ Our preliminary analysis suggests that there are three main factors that we need to examine in identifying who would be a suitable patient for this service.

The Motivations of the Clients

The work to date has identified two potential factors influencing whether or not the client adopts electronic prescriptions. These were social in nature, the process of raising the prescription and acquiring prescription medicines providing the opportunity for social interaction, and others that were presentational in nature, the opportunity for the patient to demonstrate her or his investment in the service. Clearly, where the patient feels the need to fulfil these needs then it would be inappropriate to ask the client to adopt electronic prescriptions.

The Client and the Prescription

The EPS offers the opportunity to raise acute, repeat dispensing and repeat prescribing prescriptions. However, in the initial patient guidance the suggestion was made that raising acute prescriptions would not have any benefit for the patient, where this was issued in the consultation. As the guidance noted, there would be no savings in terms of travel for the patient, who is at the GP practice anyway.⁽⁹⁰⁾

From our own observations, we believe that the issue of an acute prescription as an electronic document might in fact be disadvantageous to some patients, as the design of dispensing systems explicitly required that the downloading of urgent prescriptions, including acute prescriptions, had to be initiated by the dispenser manually. Note that in the case of the EPS, repeat dispensing and repeat prescribing prescriptions are sent as routine prescriptions, which means that these will be processed by the EPS overnight and sent automatically to the appropriate dispenser for the start of work the next morning.

A consequence of adopting this architecture is that there will be cases where the patient attends the community pharmacy, expecting to have her or his prescription dispensed, but waiting for the prescription to be delivered. Indeed, we noted that this happened on at least one occasion, which would be expected. It should also be noted that as there is no mechanism for identifying where a prescription is between transmission from the GP practice and its receipt at the community pharmacy, should there be any problem encountered in the transmission of the prescription, it is difficult to locate where this problem has arisen.

It was also noted by some clients that some of the prescriptions that had been issued had been split between paper and electronic prescriptions. Clearly, this is a source of potential inconvenience for the patient, and whilst not a concern in the initial implementer sites where the community pharmacy and GP practice are usually located close to each other, this will not be the case in later implementation. This splitting of prescriptions will arise because the patient either receives prescriptions that contain controlled drugs or have items on the prescription which are not coded to DM+D.

This suggests a need for GP practices, in selecting clients who might wish to adopt electronic prescriptions, that there is some screening done in advance to ensure congruence between the content of the patient's prescription and the ability to send the prescription as an electronic document. Whether or not there is any need for medications to be stable for patients represents a dilemma, given the ability of the prescriber to cancel and reissue prescriptions relatively easily. Obviously, if neither of these conditions are met, there will be a need to identify a new process for that

particular patient's prescription.

It is also worth noting at this point, that in the business process guidance,⁽⁶⁴⁾ dispensers are not informed of when a client changes their nomination from that site. This means that the community pharmacy has no means of knowing if they should be expecting a repeat dispensing prescription for a patient or not. For clients, this might mean that should technical problems arise, the dispenser only becomes aware that a repeat dispensing prescription is missing when informed of this by the client, potentially degrading the client's experience of the prescription service.

The Clients, their Medicines and the General Practice

The degree to which sending an electronic prescription to the dispenser is an advantage for the patient, depends on the prescription ordering arrangements in place. Whilst CFH's guidance for patients suggests that electronic prescriptions are appropriate for patients who receive a regular prescription, for those whose prescriptions regularly change, there is clearly no advantage in raising a prescription electronically where changes are made at the consultation with the patient. However, in the case of one patient, it was reported that change to her prescription items was made over the telephone. In this case, the use of electronic prescriptions might be deemed appropriate given that this would save the patient time and effort with regard to collecting her prescription.

The Clients, their Medicines and the Community Pharmacy

One of the main themes to emerge from the work with patients was on the manner in which nominations should be managed. Concern was raised as to whether the electronic prescription would be flexible enough to allow them to take into account the need to visit an alternative community pharmacy, should stock not be available, or waiting time appeared unacceptable, or when the client's usual pharmacy is closed. Whilst the patient can change her or his nomination at any time, where a nomination has been made, the original guidance to patients stated that the client should attend the dispenser that had been nominated.⁽⁹⁰⁾ In these cases, the current phase of EPS deployment would not be suitable, although this might change when it becomes possible to issue an electronic prescription without a nomination.

The Future Electronic Prescription Service

Currently, the EPS is emerging from its initial implementation phase, and much of the functionality associated with the service has yet to be used in a manner that represents a realistic model of a service as usual operation. It was expected that with wider implementation that electronic prescriptions could be issued to those patients without a

nomination, the prescription token providing the means to download the prescription to the community pharmacy of choice for the patient.⁽⁹⁰⁾

The wider implementation was also expected to provide the opportunity for clients to set nominations more flexibly. Originally, it was proposed that clients would be able to set their own nominations via the NHS website HealthSpace.⁽⁶⁴⁾ However, there is no further news of development of HealthSpace at this time. This would provide another channel by which the client could amend their nomination in addition to the GP practice and the dispensers.

The introduction of EPS also potentially brings with it wider adoption of repeat dispensing in the community. Although there are no electronic mechanisms by which the GP practice can reconcile directly what has been prescribed and what has been dispensed to the patient, repeat dispensing potentially could. Those participating in repeat dispensing arrangements consent to the exchange of information between community pharmacy and GP practice, which is especially important given the potential role the community pharmacist has in ensuring that patients are able to make effective use of their medication.

Whilst patients might express concern over the potential surveillance over their adherence that repeat dispensing might bring with it, repeat dispensing might provide a more convenient service to clients provided the local nomination processes are effective. Repeat dispensing removes the need for the client to raise a new issue, which might be rejected by the GP practice as being ordered too early or potentially indicating over-use. Rather, the timing of dispensing events is negotiated with the community pharmacy.

4.2 Pharmacy work practices

Surprisingly little work exists on the work practices of community pharmacists in England (or elsewhere). Our plan was to explore the effects of EPS R2 on work practice in two ways - qualitatively and quantitatively.

THE SOCIO-TECHNICAL ORGANISATION OF COMMUNITY PHARMACIES

We have very little formal knowledge of how social and technical processes are used in dispensing and community pharmacy, and how core technical artifacts are adapted into the work practice. We have studied 15 pharmacies ethnographically, which involves a researcher spending half day periods in the pharmacy observing activity and chatting with staff. A total of 2 to 3 days observation was conducted at each site and the field notes were converted into case studies for each site. The sample included a wide range of locations, from villages to inner-city areas and shopping centres. They were also a mixture of large chains, local chains and independent pharmacies. Most had delivery

drivers, and the total number of staff in the pharmacies during the observation period was typically between 2 and 5. The observations and case studies followed a number of themes, such as the physicality of the pharmacy (its location, size, layout), the workflow, the workload, the resources available, engagement with electronic aspects of dispensing, and the social elements of dispensing. The analysis suggested there were 3 models of community pharmacies in their approaches to work.

Technically oriented approach: In pharmacies illustrating this approach dispensing was driven by technical elements rather than social ones. High-technology artifacts such as advanced software, problem-solving software, system remote control tools and (in one case) a robot, were used to propel work. They were usually associated with a range of supporting protocols such as prioritising work through dispensing baskets, structured communication systems between staff and between staff and customers, highly structured physical space and regimented transport arrangements. These staff looked forward to EPS R2 as a novel artefact.

Socially oriented approach: Here the social elements drove matters more than the technical elements. Dispensing depended on interaction between staff. These staff were indifferent to EPS R2 and showed little knowledge about it.

Improvising approach: These pharmacies did not appear to have a particular approach or organisation to work. They tended to use every resource available to aid work, although in an apparently unsystematic way. These pharmacies were often trying to achieve high work output with limited resources. These staff were eager for EPS R2 and were hoping that it would help them achieve work targets.

This analysis would suggest that the culture and established work practices of these pharmacies may affect their willingness and ability to take on EPS R2. Technically orientated pharmacies are likely to look forward to its introduction, and implement it in a systematic way. Those with an improvising approach may be willing to take it on, but disappointed if it does not quickly deliver benefits, and may be less able or motivated to work through problems. The socially orientated pharmacies, all other things being equal, are less likely to be early adopters, but may be more likely to adopt EPS R2 when it becomes more of a social norm amongst their peers.

INITIAL OBSERVATIONS AFTER EPS R2 IMPLEMENTATION IN PILOT SITES

Eight of the sites which had been observed in the pre-implementation phase were visited after implementation, the pharmacists and staff were interviewed. At these sites it was estimated that between 10% and 40% of prescriptions were dispensed by EPS R2. They had generally positive attitudes about EPS and wanted to retain it. They felt it helped reduce omissions and improved the workflow and workload. In general it was not

being delivered in a paper free manner. Pharmacists would print tokens as a physical object to be used to help compile the medicines for dispensing, and for someone to check the dispense medicines against. Given that some patients who had their prescriptions sent by EPS R2 also received a token from their doctor, the consequence was that more paper was being used with this system, rather than less. Smartcards were also seen as troublesome, given the rapid multitasking that goes on within a pharmacy. The pharmacist would tend to insert their own personal card at the start of the day and leave it there for all staff to use. Generally their views were that patients were accepting the system, however some patients had bad experiences, for example when they arrived before their prescription, or in cases in which the prescription had apparently gone missing, and so a few patients had chosen to take away their nomination. It would appear some, but not all, of these cases were related to teething problems with software or its use. On the other hand pharmacists felt that patients had fewer items which were owed to them, and hence did not have to return to the pharmacy as often.

The problems that were recorded, which may well reflect the fact that these pharmacists were the pilot sites for the new technologies, related to missing prescriptions, problems with the downloads and problems with the system as a whole being down. This last point could be particularly frustrating as pharmacists did not appear to have access to parts of the NHS web in which problems with the spine were posted, together with updates on when they were resolved. Some pharmacists expressed concern that their income would be affected, either because patients spent less time in the pharmacy, and hence there was a fall in associated sales, or because the reimbursement for printing costs was a flat fee, irrespective of the number of items dispensed.

How community pharmacists spend their time

The quantitative study presented substantial challenges as it became clear that during our study period EPS R2 mediated dispensing remained a minority of the dispensing work. Hence, attempts to show significant differences after EPS R2 were thwarted and we have instead described normal practices so future studies can make comparisons. There are several methods of assessing the proportion of time workers spend on different activities. We decided against observational methods in the pharmacies adopting EPS as the researchers would have to be in the centre of the dispensary for days to identify activities and get a sufficient sample size and this would be too disruptive to be acceptable. In addition it does not allow the capture of cognitive activities (if a pharmacist is staring at a prescription are they checking it clinically? Legally?). We decided that self report at random time intervals was the optimum method as it did not involve a lot of researcher time, captured cognitive activity, could be used on multiple staff, and the frequency of the time intervals could be adjusted to be acceptable to staff.

We developed a novel form of data capture in which staff are given mobile phones which are texted automatically at random intervals, the person then texts back a code representing their activity at that time. This data collection is still underway, however as the use of EPS R2 has been relative small, we think this will provide little more than support to the qualitative findings. So far we have collected, but not analysed, data from three pharmacies 'pre' EPS and four 'post' implementation.

In order to get some baseline information we took a sample of 10 pharmacies in the London area and placed trained observers in each to study the pharmacists at various times of day over a two week period. 12,306 observations were recorded. Opening hours were a mean of 61h per week (range 49-100). Assembling and labelling products took 25% of the time and clinical monitoring of prescriptions 12%; counselling took 11% of the time. The full analysis is still being conducted.

4.3 General Practice work practices

BACKGROUND

England is one of the most advanced nations in the world in its deployment of informatics in primary care. Informatics are typically introduced into GP practice on the presumption that these will accelerate work, and that this will save time.⁽¹²⁹⁾ This assumption also appears to underlie the delivery of current informatics systems in the NHS.⁽¹³⁵⁾ In this part of the study we addressed three main research questions. Firstly, how does EPS R2 influence GP practice work practices? Secondly, what potential does EPS R2 have for reducing workload on prescribers, here represented as time in activity? Thirdly, how do prescribers and other GP practice staff perceive and understand EPS R2? These appear to be pertinent given concerns over GP practice workload,⁽¹³⁸⁾ and the new informatics services being introduced into primary care such as Choose and Book, GP2GP and the Summary Care Record.

METHODS

For this part of the evaluation, a multi-method approach was adopted to examine the management of all prescriptions that were issued outside of the consultation. This study looked at the management of repeat prescribing prescriptions, repeat dispensing prescriptions, and also any acute prescription items requested by patients outside of a consultation that were recorded as having been prescribed to the patient previously. This part of the evaluation also attempted to characterise the manner in which work is organised within different GP practices, the time spent in processing prescriptions, and also the flow of the prescription through to the community pharmacy.

A range of methods were used to conduct this study. These included interviews and observations which were used to understand the processes used in prescription

management, potential disruptions to these, and the manner in which such disruption was managed. Timing was conducted of both the prescription processing tasks conducted by prescription clerks or receptionists, and where possible of the time a GP spent in signing prescriptions outside of the consultation. GPs were also asked to complete a prescribing diary form to record the amount of time spent in signing electronic and paper prescriptions. In order to capture how long it took for electronic and paper prescriptions to navigate the prescription process, a tracking sheet was attached to a sample of prescription requests.

The methodologies that we used were also extended on the basis of advice received from the independent steering committee advising this project. It was felt that the loss of paper prescriptions in GP practice over the course of the processing of these posed a possibly infrequent but time-consuming problem that needed to be solved. Following the recommendations of the steering committee, we created a 'missing prescription' log to try and capture the time spent in searching in the GP practice for prescriptions that had not been received by clients or community pharmacies.

PARTICIPATING SITES

Due to the nature of the first of type testing and the delays to the roll-out of the service, we could only feasibly collect data from four of the sites that were using EPS R2 by the end of our data collection in September, 2011. The practices varied with regard to size of their patient lists, with one site having 4,000 patients, another with 8,500 patients and the remaining two with 12,000 patients. Although the number of sites we had access to was limited, we captured data from GP practices on the use of electronic prescriptions with the three prescribing systems that were then undergoing testing, EMIS Web, INPS Vision and TPP SystemOne. EMIS Web was in use in two of the sites that we studied.

FINDINGS

For the purposes of the study, the repeat prescription process was deconstructed into five main stages, with a sixth stage that was enacted when a prescription was reported as missing by the patient or the patient's representative (Table 3). However, this generic model disguises considerable variation between sites with regard to the manner in which prescriptions were managed. For example, one site favoured the receipt of prescription requests over the telephone, whilst the other three preferred written requests but were willing to except housebound patients from this requirement and receive their requests by telephone.

Sites also varied in the personnel involved in the process. In one site, any queried prescriptions had to be reviewed by the practice nurse who would then pass these onto a GP, whilst at another site, a medicines management technician would receive any prescription requests which were due for review. Only two of the sites were regularly

Table 3: Generic Stages of the Prescription Process for the Issue of Prescriptions for Medications

Stage in Process		Description of Stage
1	Prescription Requests processed on General Practice Prescribing Computer System	Once the prescription request has been received at the general practice, it is processed by administrative staff. This stage in the process includes: [1] The search for the correct patient record, [2] Selecting which items to add to the prescription, [3] Printing the paper prescription for signing or sending the electronic prescription to the prescriber to be digitally signed.
2	Processing of Prescription Requests for Distribution to Prescribers	Prescription requests might be annotated with messages to the prescriber flagging any problem with adherence identified, or whether the prescription request is for an acute item issued previously, or whether a medication review is due. Paper prescriptions might be stapled to the original request submitted by the patient. The paper prescriptions will be distributed via prescriber pigeonholes or prescription trays taken to prescribers. Electronic prescriptions are sent automatically to the GP workflow screen on their computer system. In those cases where an annotation needs to be made to the prescription request the prescription to be signed might be accompanied with an electronic message for the prescriber to act on.
3	Processing of Prescriptions Requiring Action by Prescribers	The GP receives the new prescription with the request and decides whether the prescription should be signed. Signed electronic prescriptions will be sent to the Spine, from where they can be downloaded by the nominated community pharmacy. Signed paper prescriptions will be passed to the reception staff for filing. Note that in some cases a prescription might not be printed, and a request for a prescription sent to the patient's GP. In these cases the GP might also return the request with a note to the receptionist to either raise a prescription to be signed, with a note as to why the prescription cannot be issued, or print the prescription herself or himself.
4	Filing of Paper Prescriptions and Rejected Requests for Collection	Reception staff file newly signed paper prescriptions into filing tray at the reception desk for patients and also, where applicable, for each community pharmacy with whom a prescription collection service operates.
5	Collection of Paper Prescriptions	Patient or representative collects the paper prescription from reception and takes this to the community pharmacy.
6	Search for Lost Prescriptions	If a prescription is not available for collection within the expected time limits for processing, a search process might take place in the general practice. When a prescription cannot be found a new one might be issued.

issuing electronic repeat dispensing prescriptions. In most cases, a request for a prescription would lead to the printing of the FP10 prescription form, or the creation of an electronic prescription form for signing. However, this would not always be the case if a medication review was due, items are requested too soon, if there is a request for a change in dosage written by the patient, or if the patient has requested an item that is not listed amongst the list of medicines that the GP is authorised to prescribe on a repeat prescription for the patient.

Observation of repeat prescription processing suggested that there were a number of factors that affected the time taken to produce new prescriptions. This included time-lags in the prescribing systems themselves and whether staff were able to multi-task in the production of a prescription. It was also noted that time spent in processing prescriptions might also be affected by the ordering of items on prescription counterfoils and patient records. There is no specification of the manner in which repeat prescription lists should be printed on prescribing tokens or dispensing tokens. In the case of paper prescriptions, the order of items on the paper prescription counterfoil would match those on the prescribing system generating a paper prescription. In the case of dispensing tokens, these will be printed using a community pharmacy dispensing system, and consequently the order of items on the dispensing token might not match that of those on the prescribing system. The manner in which time is used in the GP practice also changed. Paper prescription forms are typically processed and distributed to a set cycle, with distribution to prescribers occurring at set times during the day outside of surgery. In the case of electronic prescriptions these could be sent to the prescriber or practice nurse at any time, and addressed promptly in between patients. However, there is a question as to how sustainable this is. In two practices, the time taken for GPs to sign electronic prescriptions was quicker than for paper, whilst in other two it appeared to take longer.

Unfortunately, only limited data was available on missing prescriptions, two of the four sites failing to return data. At one site, over the course of 55 days, only two prescriptions were reported as missing, whilst in another, a prescription was lost every two days. The time spent in searching on average was between five and seven minutes per prescription.

TIME SAVINGS AND LOCAL PRACTICES

Our timings of administrative staff to print-off or send prescriptions to general practitioners appear to support the view that electronic prescriptions are quicker to process overall (see Table 4), and were generally quicker to sign. Based on data from diaries filled in by the GPs, at three of the GP practices electronic prescriptions were faster to sign, with paper prescriptions taken an average of 39 seconds, 29 seconds and 22 seconds to sign, and for EPS R2, an average of 7 seconds, 20 seconds and 13

seconds in the respective sites. However, in the fourth site, the trend was reversed with the paper prescription taking on average 13 seconds to sign per item, and the electronic prescription 24 seconds.

Table 4: Overview of Time Spent at Reception Producing Prescriptions from Prescription Requests Received

		Number of Prescriptions	Number of Items	Total Time Spent	Average per Item	Average per Prescription
Prescription Type	Electronic	40	124	00:35:22	00:00:17	00:00:53
	Paper	94	314	01:49:16	00:00:21	00:01:10

Although the data we present here is suggestive of an advantage for the processing of electronic EPS R2 prescriptions over paper, we need to note these are preliminary findings. We need to be mindful that the data is limited with regard to the number of prescriptions we have seen processed. The results found might also be an artefact of differences between the patients who have been invited to make use of electronic prescriptions, and the relative number of queries these prescriptions generated. Larger scale use of the prescribing diaries might reveal a stronger effect of EPS R2 on signing times. However, there are a number of other potential confounds that need to be taken into account in understanding these findings.

Over the course of this study, we found that it was difficult to get a reliable estimate of the time taken in the administration of prescription requests, given the limited numbers of electronic prescriptions managed at sites and also that some of the activities related to the management of prescriptions are interspersed with other activities. For example, at two sites there were prescription clerks dedicated to the printing and sending of prescription forms to be signed, but the receptionists were responsible for filing these amongst their other duties. At another site we visited, there were no dedicated prescription clerks, so the processing of prescriptions was undertaken whilst the staff were also managing other telephone queries from patients.

Another potential confounder is that there is also multitasking at the computer systems used. On one of the systems there was a delay between the request for a patient record, the first step in processing a prescription, and the return of this by the computer. This provided the prescription clerk with an opportunity to put together the prescription and the original request, and to place this in the appropriate pile in her workspace. There appeared to be a few seconds between the record being displayed and the process of compilation being completed.

Despite this there might be potential benefits with regard to processing of requests electronically. At one practice that was studied in which there were dedicated prescribing staff, it was estimated that the time saved by EPS R2 could be around 20 minutes per batch, in what was a serial process at this site. At this site, prescriptions were printed and then compiled together with the original requests after all requests had been dealt with either by printing or sending a prescription or raising a query.

On the basis of results obtained, we suggest that there are potential time savings to be made through EPS R2, as shown below (see Table 5). However, this needs to be placed in the context of other potential changes in the workplace which might mean these savings are not realised. For example, as already mentioned, the introduction of EPS R2 might affect who is able to work on a particular prescription, as the electronic data flows in the GP practice are defined by the system supplier rather than the GP practice. Although the specification of EPS R2 does not cover this, it is inevitable that the management of any electronic document will bring with it potential changes to workflow.

4.4 An Emerging Service

Our findings to date reflect the initial implementation of the service. As such these represent the experiences of GP practices and community pharmacies that are advocates of this new technology. This advocacy also has to be viewed in context of the nature of these deployments and the fact that adoption of this service has involved labour for GP practices and community pharmacies with regard to publicising the service locally, gaining patient nominations as well as changing their business processes. Some sites have also had to ensure that for those patients who would benefit from EPS that the prescriptions items in their records are compliant with the Dictionary of Medicines and Devices (DM+D). As prescriptions change and older items might be removed from prescriptions and replaced by alternatives we would expect a natural migration towards DM+D use. However, the need to ensure that prescriptions are compliant with DM+D will still involve some labour from sites.”

At present, repeat dispensing is still not widespread. Most GP practice sites we visited are still not making use of electronic repeat dispensing. This is to be expected given that some GP practices were having to migrate to a new system for EPS R2, then having to migrate to EPS R2 itself. With increased implementation of the service, we might expect wider adoption of repeat dispensing prescriptions, which may be the main step-change following the adoption of this service.

Questions have also been posed as to the possible effects of the introduction of Smartcards as a mechanism for securing access to the Personal Demographics Service (PDS) on the Spine. In community pharmacy, where there is shared access to one or

Table 5: Potential Time Savings from Electronic Prescription Use in the Process of Supplying Medications to Patients

Stage in Process		Description of Stage
1	Prescription Requests processed on General Practice Prescribing Computer System	No major difference in the process for issue of paper or electronic prescriptions. There is no difference in the ways requests are received for electronic prescription or paper prescriptions.
2	Processing of Paper Prescriptions for Distribution to Prescribers	Potential time-saving through use of electronic prescriptions as removes the need for compiling prescriptions and the prescription requests received. However, these savings might be mitigated by work-arounds required to ensure that prescribers are aware that there are electronic prescriptions waiting to be signed and/or queries to be checked.
3	Processing of Prescriptions for Signing by Prescribers	The potential time saving from electronic prescriptions depends on a number of factors including interface design and the degree to which prescribers effectively use the embedded electronic workflow management system (where available).
4	Filing of Paper Prescriptions and Rejected Requests for Collection	There is a potential time-saving here from electronic prescription use.
5	Collection of Paper Prescriptions	Again, there is a potential here for time-saving from the use of electronic prescriptions.
6	Search for Lost Prescriptions	There should again be a potential time-saving from the use of electronic prescriptions.

two terminals in the dispensary this could potentially require change in the dispensing process to manage access in a manner that ensure that staff behave in a manner that is consistent with Smartcard terms and conditions. These currently require the issue of personal Smartcards which the holder should only use for their own access to the PDS. Smartcard rules might need to change to fit with community pharmacy work practice.

There is clearly momentum to the deployment of EPS R2 at present. Whether these deployments of the software are translated into adoption of the service remains to be seen. Our continuing work on the evaluation will investigate the emergence of the business processes that follow deployment, and the consequences of these. In the next and final chapter of this report we explore what this emerging future might look like.

5

THE FUTURE OF THE SERVICE

In this final section, we examine what we believe the future holds for EPS Release 2 (EPS R2), focusing on the factors that could drive or limit deployment and adoption of the service and the consequences.

On the surface the electronic prescription service is a simple, familiar model of electronic ordering being applied to medicines. Peoples' familiarity with other forms of online ordering,, may lead them to under estimate the significant complexities and challenges in making a system work at a national level and across multiple organisational and institutional boundaries. So far a lot has been learned about the complexities that occur as operations start and individual organisations adopt EPS R2.

There has been useful development of software, clinical assurance processes, snagging, upgrades, and support for those trying to change their work practices as a consequence of the introduction of this technology. However, to achieve a large scale uptake of EPS R2 requires that some internal momentum is generated, some critical mass achieved, which will encourage others to take the same route - remembering always that the core stakeholders have a fair degree of choice as to their commitment to adoption of EPS R2.

5.1 Forces for Adoption

The current rate of adoption reflects the drive over a few years by the implementation team and local PCTs to set up pilot sites. They are now scaling rollouts in PCTs such that a whole geographical area is introduced to EPS R2, moving beyond the initial steps of limited pairings of GP practices with a local pharmacy. However we need to ask what will drive adoption among the central stakeholders, once the central driving force of the implementation team withdraw?

It was originally assumed that "the market" would drive adoption in community pharmacy. Pharmacists would adopt EPS R2 to secure the regular trade delivered as a result of the nomination process. This has, to a fair degree (and helped by a payment to each pharmacy towards the cost of upgrade) worked. In addition, a significant proportion of pharmacists who have used the system so far like the way that, with sufficient throughput, it smoothes out workload.

The forces for GPs to adopt the service, or for patients to press for it, are however weaker. Our results suggest, in a small sample of GP practices, that adopting EPS R2 may speed up repeat prescribing for practices as a whole, but it also implies some new time-consuming activities associated with the early stages of adoption, such as nominating patients, and adjusting repeat dates, quantities etc to allow repeat dispensing. More fundamentally EPS R2 challenges the current work practices around repeat prescribing, and GP practices need to engage with the work flow and the policies it reflects. In GP practices that have problems with lost prescriptions EPS R2 may have benefits, reducing the time spent searching for them. For some patients there are benefits to EPS, however these seem to be relatively weak, and counterbalanced by some patients who have experienced problems. In policy terms, EPS may be part of a broader vision of the role of patients in healthcare, for example contributing to personal or summary health/care records, but this perspective is not very apparent today in the patient population.

Finally we note that there is an appetite centrally to have EPS rolled out, not just for 'back office' functions such as managing reimbursement and fraud detection, but also because of the potential that a live stream of prescribing and dispensing data offers: the ability to monitor, influence, control and conduct research into the commonest form of treatment in the NHS and its second most expensive resource. If the NHS wishes to realise these possibilities it will have to overcome some significant challenges.

5.2 Challenges to Widespread Adoption

We identify here several challenges that, to a greater or lesser extent, could limit the widespread adoption of EPS. We have split these into two. First we present a number of beliefs or understandings which we have encountered which can potentially adversely affect adoption, then we discuss some broader institutional factors that may work against EPS R2 adoption.

BELIEFS ABOUT THE ELECTRONIC PRESCRIPTION SERVICE

There are a number of beliefs and assumptions about EPS R2 which we have found to be widely held, but which, in our view, are not always true. If people inappropriately hold these beliefs then they will plan inadequately, be frustrated at implementation and be disappointed in the service. We call these beliefs 'canards' and have assimilated them in Box 5 with a brief explanation beneath each as to why they may not always be true.

INSTITUTIONAL FACTORS THAT MAY LIMIT ADOPTION

In addition to the canards discussed above there are other structural and contextual issues that present challenges and which may limit the wider adoption of EPS R2. The restructuring of the NHS and the (at the time of writing) uncertainty about the

Box 5: Canards of the Electronic Prescription Service

With EPS all the information required on the label is already input by the GP, so will be transmitted directly to the pharmacist's label and thus save time and errors of transcription.

GPs may use abbreviation when writing the prescription, these will appear unchanged on the label, or they may omit information. Consequently the texts need editing to create an acceptable label.

An electronic message will get to the pharmacy faster than a paper prescription.

Patients in GP practices very close to the pharmacy may find they arrive at the pharmacy before the prescription has been downloaded, because of delays in uploading, or because pharmacists are not allowed to frequently access the Spine to see if prescriptions are waiting.

EPS R2 supports repeat dispensing which will now take off rapidly because it saves time for GPs.

There appear to be several barriers to repeat dispensing working effectively, and a minority of GP practices seem committed to this. In any case it is a functionality that will probably be taken up after initial EPS R2 experience.

All prescribing will be through EPS R2.

Controlled drugs and other products, prescriptions written by hand at home visits, etc will continue to be paper based for at least the near future. Some people suggest that EPS R2 is not suitable for acute prescriptions if the patient wishes to go directly to the pharmacy. If GP practices must retain paper prescribing capacity they have weaker incentives to adopt EPS R2.

With EPS, pharmacists have less need to communicate directly with doctors about prescriptions.

Pharmacists have an important role in screening and checking prescription. There will always be problems that need to be resolved, such as 'lost' prescriptions, potentially inappropriate prescribing etc.

EPS is a communication system between GP practice and pharmacy.

Apart from the transmission of prescriptions in one direction, EPS does not act as a conduit for communication. All other queries, orders etc need to be communicated as they are at present.

Pharmacists will benefit from EPS, which can deliver itemised billing against which to reconcile their dispensed items.

They still get a lump sum and no detailed breakdown.

DM+D is a comprehensive basis for EPS.

DM+D is not fully inclusive of all products that are dispensed and most GP and pharmacy software systems have an internal mapping of their codes to DM+D, which has potential for error.

Box 5: Canards of the Electronic Prescription Service

GP computer packages are mature software and ready for EPS R2 to be added as a ‘plug in and play’ module.

GP software systems continue to develop (eg EMIS Web is a new product), expand to cloud computing, offer new patient interfaces etc, as well as integrating other CFH initiatives, which makes them dynamic products. The addition or upgrade of EPS R2 capability takes time and requires training of several members of the GP practice.

EPS starts after the point that a prescription is written: thus it does not have consequence for doctors’ work practices in particular their prescribing.

EPS substantially affects the work practices of doctors and their staff.

EPS R2 is paperless.

If anything, at present it seems to increase paper usage. A single sheet the green FP10 can be replicated two or three times when using EPS R2.

structures and roles of Informatics within it will lead to hesitation and uncertainty. Whatever the long term benefits of these national changes, they are likely to impact on the short to medium term implementation of EPS as the new structures are set in place. These will inevitably have significant priorities of their own, and EPS is unlikely to be among them.

EPS cannot just be delivered, ‘switched on’ and work. Its implementation within a local health economy requires specialist labour, time, resource, training, and changes in GP practices and community pharmacies. When introduced to the system all sites must to some extent work out how to get the best of the system in their own context. In other words, it requires time and care to set up EPS R2 and integrate it into the work flow in ways that promote efficiency and good practice. EPS will be competing for time and resource with other initiatives within the new clinical commissioning groups (CCGs), within GP practices, within pharmacies and within the software and service suppliers' development priorities. If the benefits of EPS to the local health economy are perceived to be weak, it will be at risk of becoming a low priority in what will be a very challenging period of change in primary care.

The culture of “benefits realisation” in primary care may also work against EPS, which is primarily an infrastructure. It offers the potential for savings and improved information management nationally, although some of these benefits will not be delivered until there is a ‘critical mass’ of use. Those within CCGs charged with finding

benefits and driving them forward may well anticipate that few will be found in any local study, and may sideline EPS because of this.

Any assumptions that “the market” will drive EPS R2, or more generally a process of improvement and innovation in the software used, needs to be examined carefully in primary care. For any particular organisation, the disruption of changing GP or pharmacy software system is so great that there is little mobility in the marketplace. The policy of some PCT’s in the past to have all GPs using the same software further distorts the market. Finally, pharmacies seem to have little if any formal presence as influential user groups, which may be detrimental to improved usability. Note that usability was not part of the original specification for EPS, it was felt that the market would drive this.

We see, for example, that one of the leading system suppliers for GP practices only offers EPS support as part of its new system. The rate of EPS adoption will therefore, at its fastest, match the migration of users from the old system to a significantly different new one. This in turn will be limited by factors such as the company’s capacity to provide and install new equipment and train staff. Uptake of EPS in GP practices may thus be slower than expected, and coming as part of a major upgrade, the EPS functionality may be ignored for a period while other more central functionalities are assimilated.

The development of the service is an on-going activity that involves a number of stakeholders, for example, new functionality is currently being proposed for the next-generation Spine. These discussions have focussed on a set of requirements that emerged from the experiences of conducting first of type testing at sites. These are currently being consulted on with stakeholder groups and could potentially provide the means to include greater levels of feedback as to the location and status of prescriptions within the EPS systems. This kind of improved usability or new functionality may in time help promote adoption and use. We can also see procurement models changing with time. For example the current contracts for GP System of Choice (GPSOC) will conclude in March 2013. Such change could reinvigorate and promote EPS R2, equally, they could limit its attractiveness.

Finally, and perhaps significantly for EPS R2 future, we see that the impetus for EPS R2 that comes from the centre may be declining. This is in part a reflection of wider policy shifts (e.g. from monumentalism to localism). Thus the use of EPS was previously mandated in the NHS Operating Framework.⁽⁵⁹⁾ This is no longer the case,⁽⁶⁵⁾ so at the time of writing EPS appears not to be mandated for primary care in the NHS, though we are assured that this is not the direct implication. This may in any case be of no concern. People will find their way to use a well-designed, reliable and useful service that fits into their business or professional practice – if we build it (well) they will come.

However, in the case of such a networked infrastructure, achieving a critical mass and the needed momentum probably requires a carefully presented message and some incentives. Given the relative importance of GPs in the adoption process, as noted above, the QOF may be one place to locate such incentives.

5.3 The Future

To be a success EPS R2 should be able to deliver real benefits to the NHS. But what would success look like? Large IT projects inevitably mean different things to different stakeholders. Success to a patient might mean easier access to medicines while having confidence in the system; to a pharmacy it may be smoothed workflow and safer dispensing; to a GP practice it might be reduced workload and time savings for GPs and practice staff. To the NHS it reduces the costs and improves the accuracy of the processing of approaching a billion prescribed items a year. Secondary to this, and if the system is widely used, may be the potential to monitor, influence and research prescribing in real time. Whereas local benefits can be delivered through local implementation, the DH ones require a critical mass before they can be achieved. Thus, as with any data-centric infrastructure such as EPS there is a need to ‘feed the beast’ before it can deliver. The DH should reflect on what they would consider a successful (and realistic) extent of uptake (say, by the end of 2014, 30% of prescription items sent electronically? 60%?, 90%?; levels of repeat dispensing? improved reimbursement practices?). On this basis they could establish appropriate levers, which would probably most often need to be originated at the national level, to encourage the target uptake.

From the challenges listed in section 5.2 the critical factor for successful rollout seems to be adoption and use by GP practices. If the preliminary findings in this study are confirmed and EPS R2 saves time for practices this will improve uptake, which in turn, if well implemented, should improve the success of local implementation. However, patchy implementation may take a very long time to deliver the benefits for DH.

5.4 In Summary

The translation of the EPS specifications into a nationally adopted system has proved to be far, far more complex than was anticipated. The programme is therefore some way behind its original timetable; however the implementation team, the software suppliers and the early adopting health professionals have learned and developed, in the ways that should happen with IT implementation. In effect we now have an EPS that “works”, although there are still a number of issues to be resolved. It needs to be recognised that this current success has been developed and achieved at sites who were willing to pilot the system, and is currently only working in early adopter PCT/CCGs. The challenge now is to drive widespread adoption during a period of enormous organisational change within primary care in the NHS. In our view it is likely that some form of national

support and local incentive structures will need to be in place if EPS is to overcome these challenges and deliver the benefits to the NHS as a whole which can be expected to result from widespread rollout.

Ethical Review

The Evaluation of the Electronic Prescription Service in Primary Care was submitted to the Cambridgeshire I Research Ethics Committee (REC) under REC Reference Number 08/H0304/58. This project was classed as a service evaluation by the REC. Conduct of the study was undertaken following consultation with local Research Governance offices in each of the PCTs where we planned to do work, and with the permission of the sites and consent of staff, patients and representatives at each of these sites.

Disclaimer

This report is independent research commissioned by the National Institute of Health Research. The views expressed in this publication are those of the authors and not necessarily those of the NHS, the National Institute for Health Research or the Department of Health.

APPENDIX

A HISTORY OF SERVICE DEPLOYMENT

In this part of the report, we shall briefly examine the history of deployment of the Electronic Prescription Service (EPS) and the state of deployment at the close of this first period of data collection. We shall begin with the key stakeholders in the process of deployment, before examining how general practice and community pharmacy systems have been procured, and the local processes that must be engaged in to provide EPS functionality to a region.

Governance and Oversight of the Programme

Overall oversight of the EPS programme is provided by an EPS Programme Board, which provides a forum for both policy makers in the form of England's Chief Pharmacist, representatives from the Department of Health's Medicines, Pharmacy and Industry Group, as well as representatives from the agency responsible for delivery of the service, Connecting for Health (CFH).

The description of Connecting for Health that was given in August 2011 was that of an agency responsible for the development of a national infrastructure for NHS health informatics, which included both national services and national applications, including the EPS, the National Network for the NHS (N3) and the Spine.⁽⁷⁾ This rather simple statement obscured the more complex role that CFH actually has to fulfil. The delivery of EPS requires the introduction of a central system for the transfer of data, the definition of a structured message set, the management of system releases by system suppliers using an accreditation framework, known as the Common Assurance Process (CAP), as well as the delivery of a set of products to support guidance, communications and implementation. Oversight of the programme is also provided by a series of user groups, established and convened by CFH, that represent community pharmacy, general practice, and patients.

Organisations represented on user groups include the BMA, CCA, DDA, INDAC NPA, PSNC, RCGP amongst others. Between them, these organisations provide a professional view from the perspectives of trade-bodies, regulatory associations, as well as contractual organisations. The user groups provides an opportunity for representatives of the two professions, and professional representatives of patients and service users to comment on the design of the service, and to review its implementation and potential change to business practices.

Over the course of this programme, further consultative groups have been created in order to support implementation and development of the service. This includes the EPS Implementation Board, which is populated by representatives from Primary Care Trusts (PCTs) and the umbrella Strategic Health Authorities (SHAs). This board provides an opportunity to learn about other PCTs experiences of implementation and to respond to these, as well as share resources which are regarded as being of use or benefit to sites. The Implementation Forum represents one incarnation of a board that was previously known as the First of Type Implementation Board, which provided a communication channel between PCTs and CFH, its SHA equivalent, the SHA Implementation Forum, and an earlier EPS Implementation Board.

Delivery of the service to primary care providers requires the expertise and resources of CFH, PCTs, software suppliers as well as the engagement and participation of prescribers and dispensing of contractors themselves. It appeared to be the case that the deployment would be managed by PCTs, although with the First of Type sites which contributed to the testing of systems as part of the CAP process, additional technical and business change support came from CFH. Support was in place at these sites until systems gained full roll-out approval.

Underlying this model was the view of the CFH mission as a time-limited one with regard to EPS. The remit of the organisation was to deliver systems to the start of having full roll-out approval for EPS, although it is not clear what arrangements will be in place in the future to support EPS in business as usual operation. Over the course of the programme, CFH have increasingly emphasised the need to capture lessons learned from implementation with regard to business change and the need for engagement with all stakeholders implicated in the process of system delivery.⁽³⁸⁾ Recently, CFH have changed their approach to deployment with the instigation of an exemplar PCT programme. In this programme, PCTs are given support in the rapid deployment of EPS to a large proportion of their estate. Whilst, this like all other deployments aside from First of Type deployments is led by the PCT, CFH promised to provide business process change guidance and support, additional support on the ground, and support with regard to both engagement with primary care providers and in the deployment of the service.

Procurement of Systems for the Electronic Prescription Service

The evolution in the management of the implementation of the programme has also been mirrored by change in the procurement process for ensuring the delivery of EPS compliant systems. In the original plan for NPfIT, it was proposed that in addition to a national application and infrastructure provider responsible for delivery of N3 and

the Spine, there would be five Local Service Providers (LSPs) which would cover a cluster of SHAs.⁽⁴⁹⁾ The 28 SHAs in England were founded in 2002 with the remit of developing local services within a region.⁽¹⁰⁾ Within the SHA there would be a number of PCTs, as well as acute, ambulance and mental health trusts.⁽⁵⁷⁾ There were also a number of foundation trusts which resided outside of SHA control. The PCTs, which were founded in 1997, gained responsibility for commissioning local services in 2002.⁽¹⁰⁾ Over the course of the EPS programme, they have also acquired responsibility for the procurement of general practice systems.

With regard to the development of general practice systems, a number of initiatives have been used to encourage the use of computers in general practices, including government-led initiatives⁽⁶⁶⁾ and commercial initiatives that involved the provision of computer systems in return for post-marketing data.⁽¹⁶⁾ More recently there have been a range of initiatives for funding of general practice computer systems by the government which have focussed on procurement of systems that meet specific requirements, firstly through the Requirements for Accreditation (RFA) programme,⁽⁷³⁾ and more recently through the General Practice Systems of Choice (GPSoC) programme.⁽⁷⁶⁾

The procurement strategy that has emerged illustrates the conflicts that emerge between policy amongst the partner institutions. Attempts to implement a single supplier policy under NPfIT with systems supplied by the National Local Ownership Programme gave way to a programme where an alternative supplier would be provided, before this gave way to the current GPSoC programme.^(4, 76, 81) Primary Care Trusts whilst financially the clients of system suppliers were obliged through the GPSoC programme to meet clauses in the General Medical Services and Primary Medical Services Contracts that covered general practice computing. These clauses allowed general practices free choice of accredited systems, provided these technical and functional requirements set by CFH even though call-off agreements are agreed between the PCT and system supplier.⁽⁸⁷⁻⁸⁹⁾

These developments placed two constraints upon general practice computer system suppliers. Firstly, as previously, suppliers were obliged to meet a set of stringent functional requirements set out in the GPSoC maturity model (Table 6),⁽⁷⁶⁾ compliance with which would be assessed using the Common Assurance Process (Box 6). The introduction of the RFA programme had previously led to a reduction in the number of systems and companies operating in the general practice space,⁽⁷³⁾ and this outcome was replicated with the development of the new functionality (Table 7).

Secondly, software suppliers were obliged to provide a set of systems that included functionalities that were defined for them rather than through collaboration. This

Table 6: Levels of the General Practice Systems of Choice Maturity Model

Maturity Level	Description of Required Functionality
0	Functionality of the general practice computer system must provide the core set of functionalities described in the RFA99 requirements.
1	Addition of both Choose and Book and Personal Demographics Service functionality to Level 0 functionality.
2	Addition of Electronic Prescription Service functionality to Level 1 functionality.
3	Addition of GP2GP electronic record transfer functionality to Level 2 functionality.
4	Addition of data hosting to Connecting for Health standards to Level 3 functionality.
5	Level 4 functionality with future services.
6	General practice system integrated with Local Service Provider detailed care record system.

stands in contrast to the approach used by NHS Scotland where there was a dialogue with suppliers to define e-Pharmacy applications that they were confident that they could meet. It is unclear as to whether this was an intentional artefact of the development process in England or not, but could potentially be seen as a barrier to the development of timely EPS solutions.

In the case of EPS, whilst the N3 and Spine, delivered under a centrally procured contract with BT were ready for EPS R2 in August 2006,⁽⁹²⁾ with Prescription Services announcing they were ready in September 2007,⁽⁹⁴⁾ the same cannot be said of general practice and community pharmacy systems. The original aspiration to deliver EPS by the close of 2007 was not met, although rapid progress has been made over the last two years.

For general practice computer system suppliers the development of EPS would be necessary for continued access to the general practice market. Upon entering an agreement to supply general practice systems under this contract, the supplier was obliged to ensure that certain functionality would be available within 12 months of the contract being signed.^(97, 98) Meeting these requirements provide to be an obstacle to two of the system suppliers who left the GPSoC programme and consequently NHS primary care contracts.^(101, 102)

Box 6: The Common Assurance Process

All computer systems that wish to be connected to N3 and The Spine, either to use Spine functions or to exchange information with other systems via the Spine,⁽²⁾ have to undergo a process of assurance testing, called the Common Assurance Process (CAP). In fact this should be more accurately referred to as Common Assurance Processes, as each programme has their own process tailored to the needs of that programme,⁽⁶⁾ as is the case with EPS.⁽¹⁷⁾ The CAPs replaced both the NHS CFH Compliance scheme from 2004, and also the Requirements for Accreditation programme used to assure the functionality of general practice systems.⁽²⁴⁾ This process is supported by an NHS CFH Release Manager and is overseen by an overarching governance body, the Clinical Safety Group.⁽⁶⁾

These processes were designed to provide what CFH term a clear and transparent approach to the development of high quality and clinically safe systems.⁽³⁷⁾ For each system this process is concluded when a system gains Full Roll Out Approval, at which point a system can be connected to the Spine at all locations in England wishing to use that system and associated services.⁽⁶⁾ System providers wishing to develop for the Spine need to be nominated for inclusion in the CAP programme by sponsoring NHS organisations such as the Department of Health and PCTs.⁽²⁾

The CAP itself involves a review of the safety case for the proposed functionality in the system, followed by witness testing in a test environment, known as the sandpit or more formally, The National Integration Centre, witness testing using synthetic prescriptions in a real-life community pharmacy and general practice, followed by witness testing with real prescriptions in a real-life community pharmacy and general practice environment.

Although the focus is on meeting the requirements defined in the messaging standards for EPS R2, the CAP scope also encompasses system acceptability and usability for system users, although no usability standards were set to check the systems against. We understand that the philosophy taken was one that the system suppliers were the experts in delivering usable systems for their clients. It should also be that the programme to develop usability guidelines for NPfIT programme, the Common User Interface (CUI) programme was not completed until after the specifications for EPS R2 had been completed and development was well under way.

The principal concern with regard to the CAP is to ensure that the messaging standards are met. In the final stage of testing with real prescriptions, the Deployment Verification Phase, 2,500 prescriptions have to be transmitted seamlessly between each system. Once a pack of 2,500 prescriptions has been sent and received correctly, provided these represent a diverse enough sample, the Clinical Safety Group at CFH might issue the system with a Deployment Verification Certificate to enable national roll-out, although in the past some of these have had caveats attached that restricts their deployment to specific numbers of sites, as happened in the case of Cegedim and their Pharmacy Manager community pharmacy system.

Box 6: The Common Assurance Process

Although the process might appear to be a purely technical exercise, there are two points at which the Clinical Safety Group and the service users exercise their judgement with regard to suitability of the service for Full Roll-out Approval. The Clinical Safety Group reviews the items that have been sent and received to ensure that it contains a sufficiently diverse range of items to represent its typical operation, including items sent as acute, repeat prescribing and repeat dispensing prescriptions.

This process does not discount the potential concerns about usability or clinical safety that system users might have. Over the course of the Deployment Verification Phase, the users of the system will hold regular teleconferences with the system suppliers and CFH to identify any problems in operation that might affect clinical safety and to resolve these. The process aims to identify those usability problems which would be shared by other sites rather than issues that simply relate to personal preferences of prescribing or dispensing staff. To attain the Deployment Verification Certificate, the first of type site needs to complete a Deployment Verification Report. This stage in the process indicates that the site is satisfied with the operation of the system that they have received, although there might be enhancements made, which are not critical to clinical safety which might be expected to be completed following deployment.

The significance of aspiring to gain EPS R1 and EPS R2 accreditation for software suppliers becomes apparent if we look at the procurement model. This has led to the development of a complex environment in which there remain multiple system suppliers. This diversity would be expected in the case of community pharmacy, where there are no restrictions on procurement by contractors, but not necessarily in the case of general practice. However, attempts to restrict the choice of general practice computer systems met with resistance creating the current, complex deployment model for EPS.

For community pharmacy suppliers, there was also incentive to supply systems through a model of indirect reimbursement to suppliers for each deployment of a community pharmacy dispensing system with CAP accredited EPS R1 and EPS R2 functionality.⁽¹⁰³⁾ Again, the requirements placed upon system suppliers has led to a pruning of systems available to community pharmacies (Table 8).

The need for new functionality and the introduction of remote hosting of medical records has also required the re-design of some general practice systems. For example, EMIS abandoned further development of its existing LV and PCS solutions in favour of a new internet based system, EMIS Web. It was explained that there had been such a gap between the original coding of and the specifications requiring the re-design of these to meet GPSoC requirements that it was not possible to upgrade these systems

Table 7: General Practice Systems Adopted and Currently Available

Supplier	System	EPS Release 1 Compliance	EPS Release 2 Compliance	
			Reference Stage Testing Begins	Full Roll Out Approval
CSC o TPP	SystemOne	Yes	Jul. 2009	Pending
EMIS	LV	Yes	Discontinued	Discontinued
	PCS	Yes	Discontinued	Discontinued
	EMIS Web	Yes	Jun. 2010	Jul. 2011
In Practice Systems	Vision	Yes	Apr. 2011	Sep. 2011
iSoft	Premier	Yes	Pending	Pending
	Synergy	Yes	Pending	Pending
Microtest	Evolution	Yes	Pending	Pending
	Practice Manager	Yes	Pending	Pending
Healthy	Crosscare	Yes	Pending	Pending
SeeTec	GP Enterprise	Yes	Discontinued	Discontinued

to meet these requirements.

Implementation within Primary Care Trusts

Aside from the capability of community pharmacy and general practice system suppliers to introduce appropriate new functionality, the implementation of the service is also dependent upon the ability of Primary Care Trusts to support the introduction of the service.

In order to effectively deploy the service, a number of measures have to be put in place to ensure that deployment of the service is coordinated locally, can be achieved within the resources available to community pharmacy and general practice system suppliers, and meets all necessary infrastructure requirements, as outlined below. The main mechanism for ensuring that PCTs have in place appropriate infrastructure to support the service is the issue of Secretary of State Directions (SSDs). These represent the necessary first stop for the deployment of the service, and make legal

Table 8: Community Pharmacy Systems Adopted and Currently Available

Supplier	System	EPS Release 1 Compliance	EPS Release 2 Compliance Discontinued	
			Reference Stage Testing Begins	Full Roll Out Approval
AAH	Link Evolution	Yes	Discontinued	Discontinued
	Proscript Link	Yes	Nov. 2010	Mar. 2011
Ascribe	Park Systems Ascribe	Yes	Discontinued	Discontinued
Boots the Chemist	Smartsript	Yes	Discontinued	Discontinued
Cegedim	MediPhase	Yes	Discontinued	Discontinued
	NexPhase	Yes	Jun. 2010	Sep. 2011
	Pharmacy Manager	Yes	Jul. 2009	Aug. 2010
Helix Health	QicScript	Yes	Pending	Pending
Lloyds Pharmacy	COMPASS	Yes	Jun. 2010	Jul. 2011
Pharmacy Plus	CAPA	Yes	Pending	Pending
Positive Solutions	Analyst PMR	Yes	Feb. 2011	Aug. 2011
Rx Systems	Proscript	Yes	Nov. 2010	Mar. 2011
Swebtec	Pharmasys	Yes	Pending	Pending

within the PCT to whom these are granted the issue of prescriptions that feature digital signatures.

FIRST OF TYPE SITES

The first set of SSDs were issued to a set of initial implementer PCTs who were expected to host the first of type testing that would form part of the CAP, and would be the first sites to demonstrate roll-out of the service. These first of type tests, conducted between pairs of community pharmacies and general practices provided in-vivo evidence that the systems under test could accurately send and receive electronic prescriptions. As a consequence, the requirements for SSDs were more stringent than would be the case for those sites that would follow.

In the case of the initial implementer PCT applications, the PCTs had to show sufficient capacity for undertaking the project including a named EPS Lead, a Registration Authority function, as well as a local helpdesk, training and business-change support. The PCTs also had to show in their application that there was an effective partnership between the PCT and local professional representatives from the Local Medical and Local Pharmacy committees, as well as patient representatives and primary care computer system suppliers.⁽¹¹¹⁾

These applications also had to include details of the community pharmacies and general practices that might participate, with emphasis placed on sites that could demonstrate that they had appropriate data quality in the case of general practice, business continuity and disaster recovery plans, and also some evidence that the site had experience of repeat dispensing.⁽¹¹¹⁾

SUPPORTING THE SERVICE IN PRIMARY CARE TRUSTS

The deployment of EPS in any PCT requires that there are a number of infrastructures in place, which must be in the process of planning and development for SSDs to be issued. The PCTs need to demonstrate that they have plans to put in place appropriate infrastructures for the delivery of the EPS service. These include the development of a policy governing how nominations will be captured and who from, a policy for the management of business process change in both community pharmacy and general practice, communication plans, business continuity and disaster recovery plans, as well as policies for the issue of Smartcards and the distribution of stationery for community pharmacy and general practice.⁽¹¹¹⁾

The delivery of the service in primary care trusts relies upon a number of functions, including a National Service Helpdesk, system suppliers' helpdesks, local Registration Authorities, which are responsible for the issue of Smartcards for access to EPS R2, as well as any local support for informatics. In addition, as the programme has progressed a number of resources have emerged to assist PCTs in their deployment of EPS including an implementation toolkit and a catalogue of lessons learned from earlier implementations. For the participating community pharmacies and general practices, the other consideration that needs to be taken into account is meeting the Information Governance requirements, and which need to be met in order to use EPS R2.

The above suggests a need to reach agreement locally as to the approach to be taken towards the local implementation of EPS R2. Indeed, there have been local ETP implementation boards created within PCTs to manage this process. As might be expected there is representation from both the Local Pharmaceutical Committee and the Local Medical Committee, which are concerned with professional representation for their respective communities. In addition, representation might also include community

pharmacy and general practice users, as well as representatives from the PCT's informatics departments, the local Registration Authority and also the PCT's medicines management functions.

THE EXEMPLAR PRIMARY CARE TRUST PROGRAMME

In a recent development, Connecting for Health has undertaken a range of wider installations of EPS R2, beginning with the Isle of Wight PCT in late 2011, and moving on to Bexley PCT in 2012. In these deployments, the aim is to have a full roll-out of EPS across the community pharmacies and general practices in the estate. Additional support for these programmes is provided by CFH through additional training resources at individual sites and also through local webinars that provide opportunities for sites to raise concerns and learn from others in the region about particular aspects of the service.

The Exemplar PCT deployment in the Isle of Wight was completed in a matter of a month, with all sites being ready to send and receive prescriptions in the PCT. Consequently, this represents the first opportunity for patients to test the process of nomination change. This deployment also provides an opportunity to audit the performance of the service. In January, 2012, a CFH business process management team visited the Isle of Wight to conduct a baseline audit, which involved an assessment of the time spent in the management of prescription queries by both dispensers and prescribers.

The Current Level of Deployment

With regard to deployment, despite two of the general practice systems gaining Full Roll-out Approval prior to the close of this early part of the evaluation, only a few sites have installed general practice systems (Figure 7). Deployment has been much higher in the case of community pharmacy systems mainly it appears as a consequence of community pharmacy multiples adopting the service and being able to rapidly deploy the software to their estate (Figure 8).

The difference in the degree of roll-out is only to be expected, given that for community pharmacy, the main process changes are associated with the receipt of prescriptions and the collection of exemptions, and the recording of prescriptions as dispensed and sending the appropriate claim message when a prescription has been dispensed. In short, the business process change requirements might be more limited in the case of community pharmacy than in the case of general practice.

However, deployment does not necessarily represent use of the system in a clinically meaningful manner. Given the discrepancy between community pharmacy and general practice roll-out it might be the case that community pharmacies might wait many months before receiving an electronic prescription.

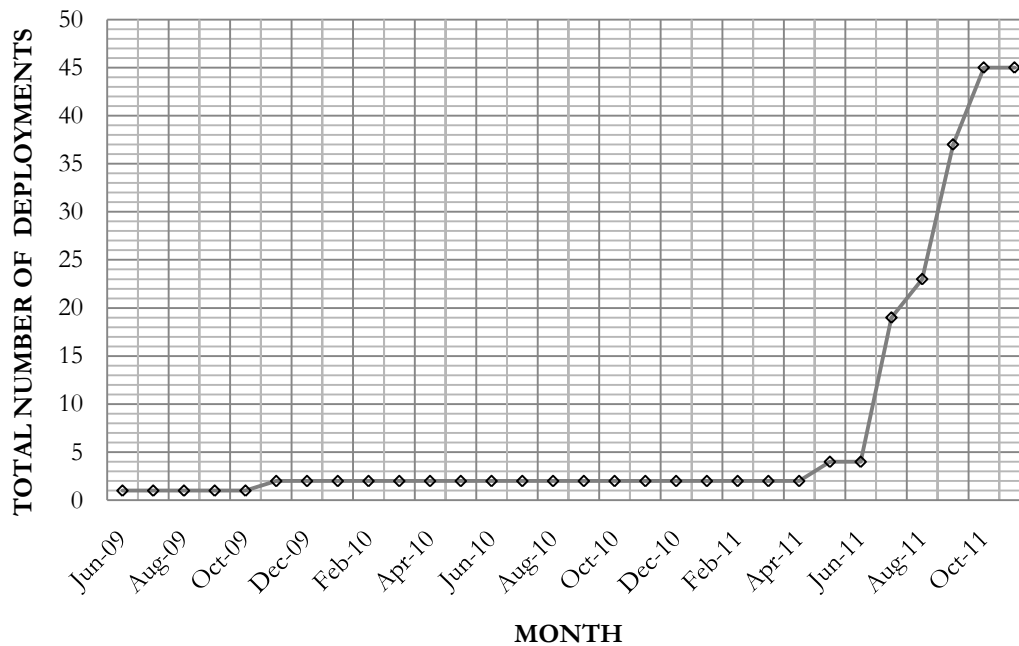


Figure 7: General Practice Deployment of the Electronic Prescription Service Release 2 from June 2008 to November 2011

Indeed, in the case of community pharmacy it has been suggested that there is a two phase approach to training which is determined by whether or not the site expects to receive electronic prescriptions from nearby general practices. In the first phase of training, sites are given training in managing electronic prescriptions received, whilst in the second phase, the site is provided with training to support the management of nominations.

Determinants of Level of Service Deployment

There are three main factors which determine the level of roll-out of EPS, which have historically been separate but with the move from PCTs to Clinical Commissioning Groups might become less so. These were the readiness of PCTs to adopt EPS, the availability of SSDs and the level of resource available for implementation from community pharmacy and general practice system suppliers.

One of the purposes of the Secretary of State Directions was to support community pharmacy software suppliers by indicating in which areas they should concentrate their resources with regard to deployment and training. However, with the delays experienced in general practice system delivery, it became apparent that this mechanism no longer had much benefit for software suppliers, as they could no longer effectively predict where resource should be invested. This led to the suspension of further issues of Secretary of State Directions in May 2011.⁽¹²⁸⁾

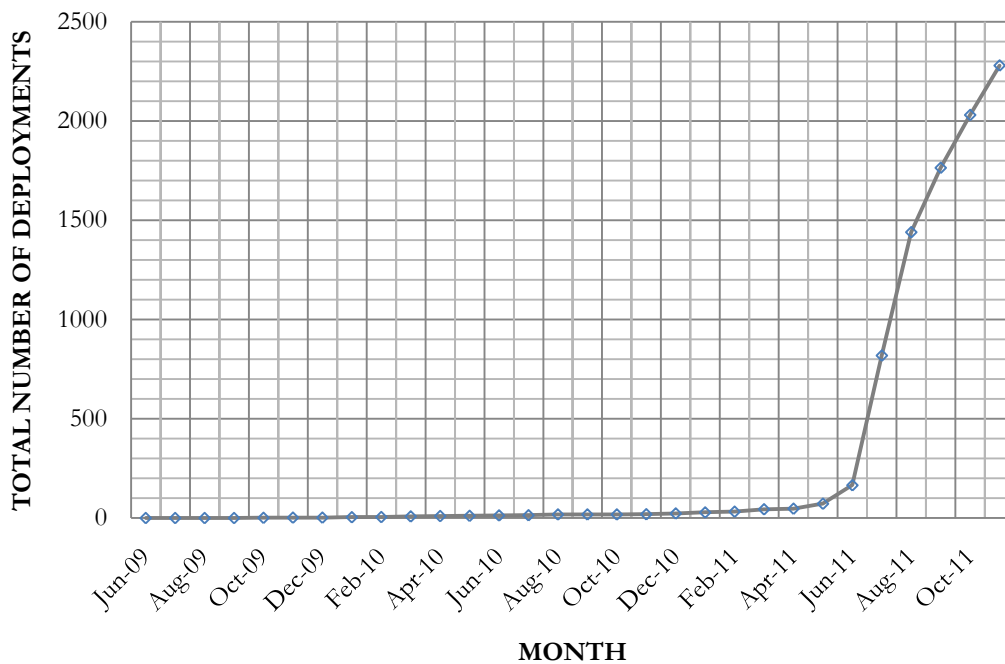


Figure 8: Community Pharmacy Deployment of the Electronic Prescription Service Release 2 from June 2008 to November 2011

To date, there have been four issues of Secretary of State Directions, between November, 2008 and May, 2011. The first issue of Secretary of State Directions was in response to a call from the Department of Health for PCTs willing to participate in the first of type testing of EPS R2, which covered seventeen PCTs.⁽¹³⁰⁾ Three further calls for PCTs to apply for Secretary of State Directions yielded a total of 82 PCTs who could deploy EPS R2.⁽¹³¹⁻¹³³⁾

Future Deployment of the Electronic Prescription Service

In review, the history of the implementation has seen the successful delivery of EPS R1 and EPS R2 functionality to the delivery of general practice and community pharmacy computer systems. Similarly, the number of sites able to send and receive electronic prescriptions has steadily risen, although the deployment to general practice has been at a slower pace than in community pharmacy.

In short, the model adopted by CFH has seen successful deployment of the service, but deployment does not necessarily equate to meaningful clinical use. This problem has also been recognised with regard to deployment of new informatics solutions in

the United States and has led to the suggestion of meaningful use criteria in the HITECH Act.^(139, 140)

Notwithstanding the promotion of meaningful use of the services questions also arise as to the ability of PCTs to develop the service within the context of changes to the structure of the NHS. We expect that the effects of these changes will emerge over the course of the final year of the evaluation.

GLOSSARY

AMS Acute Medication Service

The AMS is the electronic service used by NHS Scotland for the transmission of prescription data on acute prescriptions in primary care. The focus of the AMS is on pharmaceutical care and on any counselling or advice associated with acute prescriptions in primary care.

APMS Alternative Provider Medical Services Contract

Under the GMS and PMS contracts, general practices could opt-out of providing some additional services in return for a reduction in the funding received.⁽⁹⁹⁾ Services were commissioned from additional providers by PCTs. These providers can include commercial providers, voluntary sector providers, mutual sector providers, social enterprises, public sector bodies, NHS Foundation Trusts and NHS Trusts.

ATD Authority to Deploy

The term ATD has been used on some documents by Connecting for Health as a synonym for Full Roll Out Approval.⁽⁶⁾

ATP Authority to Proceed

This is also known as the Development Milestone Achievement Certificate and forms part of the Common Assurance Process. As part of the test of the dispensing and prescribing systems, the systems are tested in situ in real-life general practices and dispensing contractors premises. This testing process involves the pairing of sites deploying dispensing and prescribing computer systems and allows for the test of the accuracy of message transmission between prescribing site, dispensing site and the reimbursement agency, NHS Prescription Services.

APPG All Party Pharmacy Group

The APPG is a parliamentary group that aims to both raise awareness of the pharmacy as well as promote current and future contributions that pharmacists could make to the nation's health.⁽¹⁰⁴⁾ The officers of the APPG are drawn from both the membership of the House of Commons and the House of Lords, with funding received from a number of bodies including the CCA, NPA, PSNC, and the Royal Pharmaceutical Society. The meetings of this group take place in public, according to the structures of select committees, and call upon government officials, health professionals, industry groups, patient groups, representatives of PCTs, as well as representatives of SHAs.

BMA British Medical Association

Doctors and medical students can choose to be represented by the BMA, an organisation that was established to look after the professional and personal needs of the profession.⁽¹⁰⁶⁾ The BMA claims to be in constant contact with the Governments and administrations of the UK nations. The organisation emphasises its aim of promoting high quality healthcare and the promotion of both medical and allied sciences. To support these aims, the BMA produces policies covering areas of interest such as public health, ethics and NHS inter-alia.

BNF **British National Formulary**

The BNF is a reference for those prescribing, dispensing and administering medications that are generally prescribed in the UK.⁽¹¹⁰⁾

BT **British Telecommunications PLC**

BT were awarded contracts to deliver the N3 in 2004⁽¹¹⁵⁾ and the Spine in 2003.⁽¹¹⁶⁾ The company has delivered both of these service infrastructures. The contracts for both of these services are due to end in 2013,^(117, 118) with a re-procurement of N3 already announced.⁽¹¹⁷⁾

CAP **Common Assurance Process**

CAP provides a generic end to end process for all not provided by LSPs, which covered at least 80 different clinical systems that were not delivered by LSPs.⁽¹²¹⁾ The CAP provides an end-to-end process for checking that systems are of sufficient quality and are clinically safe.⁽⁶⁾ This process included requirements for the basic level functionality related to connectivity with the Spine, and also functional and clinical requirements.⁽¹²¹⁾

CCA **Company Chemists' Association**

The CCA represents the large companies that operate in community pharmacy, with the current membership composed of nine large multiple community pharmacy chains, representing over 50% of the UK market. The stated aim of this organisation is to create an environment in which pharmacy can flourish through fair and equitable competition.⁽¹²²⁾

CCG **Clinical Commissioning Group**

The CCGs were introduced in the 2010 White Paper Equity and Excellence: Liberating the NHS.⁽¹²³⁾ These consortia of general practices and other clinicians would take responsibility for commissioning NHS services for their local populations, with oversight of these by a national level NHS Commissioning Board.⁽¹²⁵⁻¹²⁷⁾ These organisations would provide local level commissioning in place of PCTs which were to be disbanded by 2013, and SCRs, which were to be disbanded in 2012.⁽¹²³⁾

Cegedim Rx

A subsidiary of the Cegedim Group SA,⁽¹³⁴⁾ Cegedim Rx supplies two dispensing computer pharmacy systems in the UK, Nexphase and Pharmacy Manager.⁽¹³⁶⁾ It is claimed that the company supplies computer systems to over 6,500 community pharmacies in the UK, which represents over 50% of the market.⁽¹³⁴⁾

CFH **NHS Connecting for Health**

CFH was founded as the executive agency for the delivery of NPfIT in April 2005,⁽⁴⁾ with the expectation that the agency's role concluded in 2010 by the very latest.⁽¹⁰⁾ At the time of writing, CFH forms part of the Department of Health's Information Directorate, with no formal announcement yet made over its end-date. Over the course of its history, the agency has had to change from one responsible for the centralised delivery of informatics to one in which the strategy is to connect existing informatics solutions into the national infrastructures of N3 and Spine to support national applications including Choose and Book, EPS, GP2GP, and SCR inter-

alia.⁽¹⁴³⁾ The agency is presently responsible for maintaining and developing the national infrastructure in support of these programmes.⁽¹⁴⁴⁾

CFHEP Connecting for Health Evaluation Programme:

The CFHEP was established in 2006, with the goal of informing the deployment of the products from NPfIT through a series of evaluations of particular components of the programme. It was hoped that CFHEP would deliver high quality, objective, third party insights into the lessons learned from the implementation of the NPfIT programmes.⁽¹⁴⁶⁾ This programme concluded in 2012.⁽¹⁴⁷⁾

CIP Capacity Improvement Programme

CIP involved the introduction into NHS Prescription Services of automation to capture and interpret data from paper prescriptions. The CIP, which was expected to go live by February, 2007, would use intelligent OCR to read data from paper prescriptions, and a computerised rules-engine to calculate reimbursement for prescription items on the basis of item dispensed, quantity, strength and other factors that affect reimbursement as described in the Drug Tariff.⁽⁹³⁾ However, it was recognised that prescription processing could not be fully automated and that there would be items that could not be read by the OCR, or items that required checking, such as where the patient or representative has signed a declaration indicating exemption from prescription charges.⁽¹⁵⁰⁾ The CIP was part of a plan to reduce the number of prescription processing sites from nine to three, with a reduction in staff from 2,800 to 2,580. This was expected to generate savings of £20 million that could be put into patient care.⁽⁹³⁾

CMS Chronic Medication Service

NHS Scotland's CMS is akin in structure to electronic repeat dispensing used in England. This service allows for the pre-authorisation of prescriptions lasting for a period of up to 48 weeks, to be dispensed at regular intervals to the patient.^(30, 39) The patient can only use the service if they give both explicit consent to the sharing of information and has a twelve week dispensing history with the community pharmacy they wish to use, although this can be changed over the life of a CMS prescription.^(30, 39)

CPOE Computerized Physician/Provider Order Entry:

CPOE has been deployed in acute care settings in the United States and other nations as a means of supporting accurate medication ordering for patients by physicians. Such systems can support the process of ordering prescriptions through the provision of menus of possible medications, default dosage levels, and be ensuring that the medication order is complete by specifying that all fields on the prescription order are completed.⁽¹⁵³⁾

CSC Computer Sciences Corporation

CSC took over the LSP contract for the North, Midlands and East Cluster for the NPfIT in 2007.⁽¹⁵⁴⁾ They subsequently bought their main contractor for the programme, iSoft in August, 2011.⁽¹⁵⁵⁾

CUI Common User Interface

The CUI programme, which began in December, 2005, was a programme to define a series of standards and guidance for the design of healthcare computer systems' user interfaces deployed in England.⁽¹⁵⁶⁾ The user interface guidelines cover standards for the display and entry of data, standards for the safe display and interaction with medication, and the management of use of technology. It is expected that interface guidelines for the display and entry of data have been mandated by the ISB for use by 2015.⁽¹⁵⁷⁾ This project has been described as platform agnostic, meaning that the guidance and standards should apply to all systems used in the NHS.

DAC Dispensing Appliance Contractor

DACS are organisations that are able to dispense appliances for patients against NHS contracts. In order to operate as a DAC, an appropriate licence needs to be obtained from the Primary Care Trust, although the numbers of these are limited.

DDA Dispensing Doctors Association

The DDA provides dispensing doctors with advice on dispensary management, access to discounted training for dispensary staff, and also represents the interests of the profession through interaction with DH, General Practice Council, and the PSNC.⁽¹⁵⁸⁾

Dispensing Doctor

Dispensing doctors are usually general practices based in rural areas who will dispense medicines to patients.⁽¹⁵⁹⁾ In order to become a dispensing patient, a patient must both live in an area which is rural in nature, and also at a distance of more than one mile from the nearest community pharmacy.⁽¹⁶⁰⁾ As of 2008, it was estimated that there were 1,170 dispensing doctor practices in England.⁽⁶⁸⁾

DM+D Dictionary of Medicines and Devices

The DM+D is designed for use throughout NHS care settings as a common format for the identifying and describing medicines and devices.⁽¹⁶¹⁾ The DM+D emerged from previous work to develop an electronic drug dictionary for primary care by NHS Prescription Services in order to support primary care prescribing and ETP and the United Kingdom Clinical Products Reference Source (UKCPRS) programme of the NHS Information Authority.⁽¹⁶³⁾ The latter project had been established as part of an initiative to standardise descriptions of appliances, devices and medicines and to link this knowledge in order to provide decision-support.⁽¹⁶⁴⁾ Prior to the introduction of DM+D there was no common data standard used throughout the NHS for the transmission of information about devices and medicines.⁽¹⁶¹⁾ The DM+D was also expected to support the development of both electronic prescribing systems and automated dispensing systems.⁽¹⁶⁵⁾

DVP Deployment Verification Period

In order to assure the quality of dispensing and prescribing systems, the CAP involves in-situ testing of systems between pairs of community pharmacy and general practice systems. Up to five

pairs of community pharmacy and general practice sites can participate in this process. This process follows a period of laboratory based testing, and marks the start of testing of the full journey of the message from prescriber to dispenser and on to NHS Prescription Services. In this phase of testing, test electronic prescription messages are generated from a test-pack of 600 scenarios.⁽¹⁷⁾ If the systems successfully exchange messages accurately, then the CAP can move on to the next phase, known as initial implementation.

DVR Deployment Verification Report

At the conclusion of the DVP of the CAP, the general practices and community pharmacies participating in the first of type testing programme need to complete a DVR to indicate that they are satisfied with the system and to allow it to progress to the next Clinical Safety Review prior to receiving FRA status.⁽¹⁷⁾

ebXML Electronic Business using Extensible Mark-up Language

The ebXML standards were developed to enable enterprises of any size to conduct business using the internet.⁽¹⁶⁷⁾ This standard is an open XML standard that enables data transfer as well as provides tools for definition and registration of business processes.

Electronic Transfer of Prescriptions

Rather than produce an electronic message that is transmitted over a network from the general practice to a community pharmacy, some systems encode prescription data as machine readable data on to a paper prescription. This type of system has been deployed by NHS Wales⁽⁹⁾ and the Department of Health, Social Services and Public Safety in Northern Ireland.⁽⁸⁾

EMIS Egton Medical Information Services Limited

EMIS have focused on the supply of general practice computer systems since the 1980s, with three current product lines, the command-line based EMIS LV,⁽¹⁶⁸⁾ the windows based EMIS PCS,⁽¹⁶⁹⁾ and more recently, their cloud-based solution EMIS Web.⁽¹⁷⁰⁾ The company claims to have deployed their systems to 53.1% of general practices in the UK.⁽¹⁷³⁾ According to information from CFH, only EMIS Web will be developed to meet the demands of GPSoC.⁽¹⁷⁵⁾ The EMIS Web system received FRA for EPS Release 1 in September, 2010, and for EPS Release 2 in March, 2011.^(176, 177)

e-PACT Electronic Prescription Cost Analysis

NHS Prescription Services offers e-PACT reporting for pharmaceutical and prescribing advisors. This is an on-line service that allows generation of reports of prescribing at general practice of PCT level from the last sixty months of dispensing data.⁽¹⁷⁸⁾

e-PFIP Electronic Prescribing and Financial Information for Practices

The e-PFIP reports are provided on a periodic basis by NHS Prescription Services to general practices, and provide a comparison of individual prescriber and practice performance against comparators at the intra-general practice, and at the inter-general practice level through PCT and national comparisons.⁽¹⁷⁹⁾ These reports also provide a comparison of prescribing costs against general practice budgets. Note that these reports are derived from the dispensing data collated by NHS Prescription Services.

EPS R1 Electronic Prescription Service Release 1

The first release of the EPS, involved the modification of general practice prescribing computer systems and dispensing contractor dispensing computer systems to include the ability to generate and receive an electronic copy of prescription issued. Data was transmitted via N3 and the Spine. The service also provided the ability to send copies of prescription message from dispensing contractors to NHS Prescription Services. This service provided the opportunity to test the infrastructure that would allow the transmission of electronic prescriptions from prescriber to dispenser to remuneration and reimbursement agency.

EPS R2 Electronic Prescription Service Release 2

The second release of EPS saw the electronic prescription message become the legal entity authorising dispensers to supply devices and medications to the patient with the option of creating a paper copy of the prescription using a prescribing or dispensing computer system. This release of the service, which used the same infrastructure as its predecessor, EPS R1, provided new functionality including electronic repeat dispensing prescriptions, and the ability to cancel prescriptions at any point up to their receipt by the dispenser.

e-Receipt

e-Receipt is Sweden's ETP solution, which began operation in its present form in 2000.⁽⁵⁸⁾ In this system a prescription is sent from the electronic prescribing system used by a physician to the community pharmacy via a secure national network, Sjunet.⁽⁵⁸⁾ By 2004, the system had been designed to include a mailbox configuration which allowed prescriptions to be sent directly to the community pharmacy selected in advance by the patient, or to a mailbox from which these could be downloaded by the community pharmacy the patient attends.^(58, 180) The service has been presented as a successful implementation of ETP. Between August 2000 and September 2005, monthly electronic prescription volumes rose from 100,000 to 1,200,000.⁽⁵⁸⁾ By 2008, over 75% of prescriptions were sent from a doctor's office to a community pharmacy electronically.⁽¹⁸¹⁾ Use of the service were expected to be the removal of illegible prescriptions, time saved through use of e-prescribing, reduction in fraud risk, improved patient drug information and the avoidance of duplicate prescriptions.⁽¹⁸⁰⁾

ETP Electronic Transmission of Prescriptions

ETP is used to refer to any prescription or prescription message sent electronically via a computer network from a general practice to a dispensary in the community. In the case of England, this can include a community pharmacy, a dispensing appliance contract, or a dispensary within a dispensing doctors' practice.

Exemplar Primary Care Trust

In August 2011, a new approach was adopted in the implementation of EPS R2.⁽¹⁸²⁾ Prior to this date, implementation had either been as part of first of type testing for the CAP or had been on a general practice by general practice basis, with support provided by the Primary Care Trust, with local community pharmacies being supported by their system suppliers and provided with information by PCTs as to when general practice sites in the vicinity would be expected to use EPS R2. The Exemplar PCT programme focussed on deployment at the level of the PCT, with PCTs invited to participate in a programme in which there would be deployment to a significant

number of prescribing and dispensing sites in an accelerated manner. The process was expected to allow for a more overt demonstration of the benefits of EPS. In return for ensuring that sufficient resource and support was in place locally to support this process, CFH would offer direct support for PCTs with regard to engagement with clinical teams, business process change and faster resolution of issues during the implementation.

FOT First of Type

As part of the Common Assurance Process (CAP) that assures quality of the systems, an in-situ test of the ability of each dispensing and prescribing system must be conducted.⁽¹⁷⁾ This involves the exchange of test prescriptions, and later real electronic prescriptions prior to the system receiving Full Roll-out Approval if all conditions of the CAP are met.

FRA Full Roll-out Approval

FRA represents the last phase in the compliance testing process of the dispensing and prescribing systems in use, the Common Assurance Process. This is also known Full Roll-out Approval. This gives authority for the dispensing or prescribing system to be deployed at sites outside of the First of Type sites. However, there might be temporary caveats that limit the number of systems that can be deployed.^(183, 184)

GMS General Medical Services Contract

GMS is a contract for the provision of general practice services to the NHS, and is one of three procurement contracts that were in place at the time of this report, the others being APMS, and PMS.⁽⁸⁷⁾ The GMS provided a number of funding streams for general practice. This included essential services which all general practices were expected to provide and covered the management of patients who might be ill or who were ill with acute, chronic or terminal illnesses, additional services and enhanced services which were commissioned by PCTs in response to local health needs. Additional services included provision of immunisation, child health services amongst others. General practices did not have to provide additional services but would be expected to provide a portion of the monies available for commission of these services from other providers. There are a variety of funding streams for general practices including premises fees, a dispensing payment for general practices with a dispensary, payments for senior staff, a global sum based on patient population, and the Quality and Outcomes Framework (QOF). The QOF was introduced as a voluntary scheme in which general practices would be paid against their achievement on evidence-based clinical indicators.

GPSoC General Practice Systems of Choice

GPSoC represents the latest of three procurement strategies for computer systems in general practice. Previous approaches in which general practices would be offered by the NPfIT LSP, and a successor programme which offered an alternative system in which LSP area were abandoned, as these did not meet the requirements of the GMS Contract.^(4, 88, 89) GPSoC instead offered general practices access to any system, paid for through PCT contracts, provided the system supplier met RFA99 and was willing to implement specific functionalities defined by NPfIT including EPS, and SCR.^(66, 76)

HealthSpace

HealthSpace was designed to allow patients to access their SCR from home, and whilst the service did not allow patients to amend information, it did allow patients to add comments to their records.⁽¹⁸⁵⁾ It was also reported that the service would provide online communication with general practices.⁽¹⁸⁶⁾

Helix Healthcare

Irish company that supplies dispensing computer systems. This company supplies the dispensing computer systems that are used by the internet-based community pharmacy, Pharmacy2U.

HL7 Health Level 7

HL7 is an organisation that was working on the development of a framework and standards for the storage, retrieval, integration and exchange of data in healthcare.⁽¹⁸⁷⁾

iSoft

iSoft was a subcontractor to CSC as part of NPfIT, but by the time this report was produced, had become a wholly-owned subsidiary of CSC. Renamed Healthcare Group of CSC, the company had previously supplied informatics solutions for primary care and acute care as part of NPfIT.⁽¹⁵⁵⁾

INDAC Independent Dispensing Appliance Contractors

Representative body for dispensing appliance contractors, who have held roles in the EPS User Groups. and the EPS Forum.

INPS In Practice Systems Limited

Supplier of prescribing computer systems that is part of Cegecim, which also supplies dispensing computer systems.

Initial Implementer

This term has been used in two ways in CFH documentation. It has been used to refer to the community pharmacies and general practices that represented the earliest adopters of EPS R1 and EPS R2.^(64, 162) However, in the case of EPS R2 this term has been used to refer to the seventeen PCTs which were expected to host the FOT testing that would form part of the CAP, and which would be the earliest sites to deploy the service.⁽¹⁸⁸⁾

Initial Implementation

As part of the first of type testing conducted for the Common Assurance Process that Connecting for Health instigate, real electronic prescriptions will be exchanged between up to five community pharmacy and general practice sites using particular dispensing computer or prescribing computer systems.⁽¹⁷⁾ In order for the dispensing or prescribing computer system to gain national deployment, 2,500 electronic prescriptions need to be flawlessly transferred between the general practice, community pharmacy and NHS Prescription Services. This phase of testing involves a period of witness testing in which there is a comparison of the prescription as prescribed and the prescription as received following processing at the dispensing contractor. At the close of this testing period, a DVR is completed by the prescribers or dispensers involved in the programme.

The initial implementation phase follows from the successful completion of the Deployment Verification Period.⁽¹⁷⁾

Meaningful Use

In order to incentivise the appropriate use of healthcare systems in the United States, a programme has emerged under the HITECH Act to encourage adoption and use of these services.⁽¹³⁹⁾ A three stage process has been developed, each stage being associated with incentive payments for clinicians. Stage one incentive payments were associated with recording of appropriate data, stage two incentive payments with the use of data in the improvement of processes of care, and stage three incentive payments with the changes in the outcomes of care.⁽¹⁴⁰⁾

MESH The Medical Subject Headings Classification

MESH represents the United States National Library of Medicines' hierarchically ordered controlled vocabulary thesaurus. This is used for the indexing of articles from bio-medical articles and is used to enable searching of the MEDLINE and PubMed databases.

Microtest

Supplier of prescribing computer systems to both dispensing and non-dispensing general practices based in Cornwall.

N3 National Network for the NHS

The N3 provides a network infrastructure for the sharing of information between healthcare sites within both the NHS and Scottish NHS.⁽¹¹⁵⁾ N3 represents the network infrastructure that provides the broadband networking capacity to enable the transfer of data for services including Choose and Book, the EPS, SCR and the Picture Archiving and Communications System.⁽¹⁸⁹⁾

NLOP National Local Ownership Programme:

In response to criticism of a procurement model in which all contracts for NPfIT were managed nationally, in 2006, there was a devolution of responsibility for local systems implementation and management of LSP contracts to the SHAs.

NPA National Pharmacy Association

Trade association for community pharmacy which aims to support professional activity as well as providing a representative voice for the sector. The organisation also provides products and services to community pharmacy, including advice on standard operating procedures.

NPfIT National Programme for Information Technology

NPfIT was instigated in 2002 as a ten year programme.⁽¹⁸⁵⁾ The initial focus of the programme was on the delivery of the Summary Care Record and Detailed Care Record (collectively referred to as the National Care Records Service), Choose and Book, the Electronic Prescription Service, the Secondary Uses Service and the supporting infrastructure of the National Network for the NHS (N3) and the Spine. The programme later included the GP records transfer, the Picture Archiving and Communications System, and the Quality Management Analysis Systems to audit GP performance against targets.⁽¹⁸⁵⁾ This approach was introduced as it was viewed as the most

efficient mechanism for promoting inter-operability and consistent development of informatics in the NHS. In 2005, responsibility for delivery of NPfIT was moved from DH to CFH.⁽¹⁸⁵⁾

NHS Care Card Project

The Exmouth Care Card Project was a pilot project instigated in 1989 which investigated use of a patient-held smartcard as a mechanism for transfer of patient information between primary care and acute care providers.⁽⁵⁾ The smartcard contained prescriptions and a summary medical record. The pilot scheme involved general practices, pharmacies, diabetes and emergency care departments in local hospitals, and a dental practice.

LSP Local Service Provider

A series of five LSPs were awarded contracts for provision of regional informatics services as part of NPfIT in 2003. These would provide the patient administration and prescribing systems required to meet the needs of the Care Records Service.⁽¹⁸⁵⁾ They were also originally asked to provide a solution for general practice informatics. This approach was later replaced by GPSoC.⁽⁷⁶⁾ Each LSP was contracted to look after a particular geographical region, which spanned a number of SHAs.⁽¹⁸⁵⁾

OCR Optical Character Recognition

OCR is the process of using computer systems to scan, recognise and encode data that takes the form of alphanumeric characters.⁽¹⁹⁰⁾

ODS Organisational Data Services:

The ODS code identifies organisations within the NHS, including community pharmacies, general practices and other NHS Trusts.⁽¹⁹¹⁾ This code is used to provide endpoint authentication of sites that wish to connect to the Spine via N3.⁽¹⁹²⁾ The Smartcards used to access the PDS include a set of roles associated with the ODS.⁽¹⁹³⁾ Spine Directory Services allows sites to obtain organisational data on another from any site that is connected to the Spine. The ODS code is used to identify the source and destination sites for electronic messages, including electronic prescriptions.⁽¹⁹¹⁾

PCA Prescription Cost Analysis

The PCA is produced by NHS Prescription Services and provides data on the number of items and net ingredient costs for all prescriptions dispensed in the community in England. This data includes prescriptions that are raised in primary care settings such as general practices, as well as those hospital and prison prescriptions that are dispensed in community settings.⁽¹⁷⁹⁾

PCT Primary Care Trust

PCTs have been responsible for the commissioning of local services since 2002, and are responsible for ensuring that the requirements of the NHS Operating Framework and the Informatics Planning Document are met.^(10, 59, 135) The PCTs were founded in 1997, but are expected to be abolished from April, 2013 onwards.^(10, 123)

PDS Personal Demographics Service

The PDS provides a centralised record of basic demographic details for patients including name, address, date of birth, current GP, and the unique identifier for patients adopted throughout the NHS, the NHS number.⁽¹⁸⁵⁾

PMS Personal Medical Services Contract

PMS is one of three contracts for the commissioning of general practice services in operation at the time this report was written. This contract allows for the commissioning of services from general practices by PCTs.⁽⁸⁷⁾ The same funding mechanisms are in place as for GMS aside from these sites not receiving a global sum, but rather a contract payment.⁽¹⁹⁴⁾

Positive Solutions Limited

Supplier of integrated electronic point of sale and patient medication record systems to community pharmacy. At the time the report was written the company was owned by Mawdsley, a pharmaceutical distribution and wholesaling company.

PSNC Pharmaceutical Services Negotiating Committee:

The PSNC negotiates the terms for the provision of NHS community pharmacy services through liaison with DH and other representative bodies for the NHS. The organisation's goal at the time of writing this report was to enable community pharmacy to offer an increased range of high quality and fully funded services.

Public Key Encryption

A form of cryptography where messages are encrypted according to a private and public encryption keys held by the person requesting data.⁽¹⁹⁰⁾ The public key is sent from the requester to the sender of data in order to enable the sender to encrypt data. The data returned is decrypted using the private key that is held by the person requesting information. Security of the service relies upon the private key not being shared beyond the system receiving the data.

QOF Quality and Outcomes Framework

The Quality and Outcomes Framework was introduced in 2004 as a voluntary incentive scheme.⁽¹⁹⁵⁾ A portion of the remuneration for the GP practice would be made on the basis of reported performance against indicators of patient care. The system was designed to provide an indication of the GP practice achievement against a number of indicators for clinical care, health improvement, patient experience and practice management.⁽¹⁹⁶⁾ Incentive payments are made to GP practices on the basis of performance weighted according to the size and demographic characteristics of the GP practice list.⁽¹⁹⁵⁾

Quicksilva

Supplier of electronic message brokering systems that enable community pharmacy systems to link to N3 and the Spine.^(197, 198)

RA Registration Authority:

The RA is the organisation responsible for the administration of the issue of smartcards within a particular health community. This organisation, which might be part of a PCT, a local community service or a shared service, is responsible for verifying the identity of NHS staff wishing to access Spine systems, the registration of these members of staff and their roles, and the issue of smartcards.^(199, 200)

RCGP Royal College of General Practice

The RCGP represents general practitioners in both DH and Government committees. The organisation aims to support both general practitioners and to improve patient care.

RFA Requirements for Accreditation:

RFA introduced to ensure the quality of informatics systems introduced into general practice.⁽⁷³⁾ The RFA standards were introduced in 1992, covered messaging from general practice to laboratory and to health authorities, data standards and prescribing criteria.⁽¹⁶⁾ General practices would only receive reimbursement for computer systems from the NHS if they met these standards and hence this provided a commercial incentive to suppliers to meet these standards. In order to enter into a GPSoC contract, it was expected that the computer system offered would meet the last of the RFA standards, the RFA99 standard from 1997.⁽⁷⁶⁾ It was claimed that the introduction of RFA and changes to arrangements for funding of general practice prescribing systems had led to a reduction in the number of system suppliers in the market.⁽⁷³⁾

RHINO Routine Health Information Network

RHINO is a non-governmental organisation⁽²⁰¹⁾ that aims to promote the better health in those nations described as resource poor through the use of high quality, productive and sustainable routine health information systems, which will support local decision-making.⁽²⁰²⁾ The routine health information system provides ongoing data collection of health status, health information and health resources. Data collected might include administrative data and epidemiological surveillance data.

Repeatable Prescription

This term is used as a synonym for Repeat Dispensing Prescription, but can also be used to refer to part of the repeat dispensing prescription itself.

Repeat Dispensing Prescription

A repeat dispensing prescription is a prescription that allows patients to obtain regular medications for up to twelve months without the need to order a prescription from their general practices. This system operates slightly differently for paper and electronic systems. In the case of the paper repeat dispensing system, the patient would be issued with both a repeatable prescription and a number of batch issues. The repeatable prescription is the document signed by the prescriber which identifies the items that the community pharmacist can dispense to the patient, and the number of occasions on which this action can arise. The first batch must be issued within six months of the date on which the repeat dispensing prescription is signed and the last batch issue can be dispensed against up to twelve months after the first dispensing event. Each batch issue is an unsigned copy of the repeatable prescription and is used to capture the endorsements made by

the community pharmacist to indicate what was dispensed to the patient. In the paper system, as the repeatable prescription is the legal authorisation to the community pharmacist to dispense medications to the patient, dispensing can only take place at one dispenser. In the case of electronic prescriptions, a similar system is in operation, but each batch issue represents a digitally signed electronic prescription, which means that each batch issue could be dispensed at a different community pharmacy.

Repeat Prescription

A repeat prescription allows patients to obtain regular repeat medication without the need for a consultation with a healthcare professional on each occasion that he or she requires medication. The prescription would be authorised for a set period of time until a medication review is due for the patient, which might be for a period of up to a year. The authorisation of the prescription for issue means that administrative staff and prescribers can provide the patient with a new prescription for a set of regular medications on each occasion an order is placed for the patient.

Rx Systems

Supplier of community pharmacy dispensing computer systems,⁽²⁰³⁾ which is co-owned by EMIS as majority share-holder with a 78.9% stake in the company, and Phoenix Medical Supplies, a pharmacy wholesaler, as a minority shareholder holding the remaining 21.1% of the company.⁽²⁰⁴⁾

SHA Strategic Health Authority

The SHAs are regional organisations within the NHS, which were founded in 2002 in order to develop local services within that region.⁽¹⁰⁾ Within the area covered by the SHA there would be a number of PCTs, as well as acute, ambulance and mental health trusts, over which the SHA would have strategic oversight.⁽⁵⁷⁾ It was expected that SHAs would be abolished at the latest by 2013.⁽¹²³⁾

Spine

The Spine contains a series of national applications which underpin the five main informatics services for care provides in the NHS including Choose and Book, EPS, GP2GP, Summary Care Record and the Secondary Uses Service. At present, the Spine provides services in support of 60 million patients and links over 20,000 healthcare sites.⁽²⁰⁵⁾ The current contract for The Spine is due to end in 2013.⁽¹¹⁸⁾

Surescripts

Surescripts provide a private national network for ETP in the United States.⁽³³⁾ The service is built from two networks provided by RxHub and Surescripts, which began operation in 2002 and 2003 respectively. It is estimated that at present approximately 25% of prescriptions in primary care are transmitted through this network, with 98% of multiple community pharmacies and 73% of independent community pharmacies being linked to the Surescripts network. The Surescripts network provides both prescription routing to any community pharmacy linked to the network and also a medication history for each of the patient using the service.

SUS Secondary Uses Service

The proposed SUS would collect data from the new National Care Records Service applications and aggregate data in support of management, commissioning, clinical audit and research.⁽¹⁸⁵⁾

Swebtec

This company designs and supplies a web-based dispensing computer system for community pharmacy. The company is unique in that it entered the market to supply dispensing computer systems after the announcement of the EPS programme.

TPP The Phoenix Partnership

TPP was founded in 1999 and presently produces SystemOne, a general practice computer system, which has been delivered as a wider vision of a system that would provide a single electronic record across healthcare providers.

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