



The Way Forward for NHS Health Informatics

**Where should NHS Connecting for Health (NHS CFH) go
from here?**

A report on behalf of the British Computer Society (BCS)
by the BCS Health Informatics Forum Strategic Panel

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Established in 1957, the British Computer Society (BCS) is the leading body for those working in IT.

With a worldwide membership now of more than 55,000 members in over 100 countries, BCS is the qualifying body for Chartered IT Professionals (CITP).

BCS was incorporated by [Royal Charter](#) in 1984. Its objectives are to promote the study and practice of computing and to advance knowledge of, and education in, IT for the benefit of the public. BCS is also a registered charity.

The BCS Health Informatics Forum (BCSHIF) is composed of volunteers who are experts in the field of IT in health. It brings together healthcare professionals of many kinds, ICT experts, informatics experts, academia, service personnel, users, suppliers and patients. Working within the learned society which is the BCS, BCSHIF has released several commentaries on the English National Programme for IT and the agency, NHS Connecting for Health, since 2002 - see www.bcshif.org

Foreword

The English NHS Connecting for Health Agency (NHS CFH) and its main programme, the National Programme for Information Technology (NPfIT), are now about half way through their planned lives. The NPfIT controls the lion's share of the NHS IT spend, but not all of it. Some of the things that the NPfIT planned to do have become, or are becoming, reality. Others are not, and some of these involve challenges that do not have easy answers.

This report is a summary, and certainly not a full review of its subject. It is based on the opinions of the health informaticians within the BCS who have, between them, hundreds of years experience of implementing ICT in health. It salutes NHS CFH's successes and explores the less successful elements and the related external issues. It starts with a summary of our recommendations, a brief examination of where the NHS is headed, and an assessment of NHS CFH now. We go on to list the strategic changes that are necessary, and the detail behind our proposals. Finally we suggest which proposals should be regarded as a priority. Appendix 1 contains a glossary of acronyms and terms used. Electronic copies of the report are at: <http://www.bcs.org/hif/cfhreport>.

Until very recently the sponsors of NHS CFH have seen information technology (IT) as a fix for the challenges faced by the NHS. This is a common mistake: IT enables change, is sometimes a catalyst for change, but it is not an end in itself. As Professor Jim Norton, board member of the Parliamentary Office of Science and Technology, said:

*'There is no such thing as an IT project, merely business change projects mediated by people and ICT.'*¹

This misconception has been a prime cause of large-scale IT project failure since computers first became commonplace². The problem has been heightened by NPfIT's top-down nature; the patchy reflection of NHS requirements in the procurements in 2002; and the subsequent changes in those requirements to meet the Government's NHS reform programme. We believe that this is one reason why so many NHS staff have yet to see NPfIT as a key enabler of business change and it has thus discouraged the local ownership of NPfIT implementations.

We want NPfIT to succeed – we believe that set in an appropriate and properly funded business context, informatics will make a massive contribution to safer and more appropriate patient care. We agree with Wanless³ that NHS should spend about 4 per cent of turnover on informatics – but this spend must be business led⁴, and that 4 per cent should be a guide, not a target.

We therefore consider that there is a pressing need to realign NHS CFH as a major enabler of business and service transformation. We acknowledge that NHS IT implementation had major gaps and problems before the advent of NPfIT. We appreciate that some of the issues it faces – information governance for example - are not of its own making and predate NHS CFH, although it has inevitably raised their importance. Others – for example: the need for significant local business change; the integration of social and healthcare; and the changes in clinical data recording, quality and management it relies on – must be recognized as major challenges in their own right.

The Government has committed very significant resources for NHS informatics, but relatively little has yet been spent and less still is visible in front-line informatics. We wish to see this commitment play its proper and vital role in the new NHS. Starting from where the NHS and NHS CFH are now, our report is intended to start a constructive, urgent and open dialogue to support this goal..



Dr Glyn Hayes, Vice President, British Computer Society; Chair, BCS Health Informatics Forum

¹ IOD Response of 2nd February 2006 to 'Transformational Government Command Paper (CM 6683)

² 'The Challenges of Complex IT Projects', Royal Academy of Engineering & the BCS, April 2003

³ 'Securing our future health. Taking a long term view' Final Report, Derek Wanless, April 2002

⁴ As we said in our evidence to the National Audit Office, <http://www.bcs.org/upload/pdf/auditofficejan05.pdf>

1 Summary of key recommendations

The acronyms in brackets refer to the bodies that we consider should respond to the recommendation, and the figures indicate the sections of the report that give more detail. As the acronyms show, only a minority of the recommendations are considered to be the sole responsibility of NHS CFH. The recommendations are not listed in priority order.

- 1.1 Provide a business⁵ context for NPfIT owned at national and local level (DH & NHS - 2.6 paras 3 & 4).
- 1.2 Focus on local implementations at Trust and provider unit level, e.g. hospitals, diagnostic and treatment centres, community and mental health Trusts, and practices. Providing specialty, service-specific and niche systems will encourage clinical involvement and give quicker benefits (NHS CFH, LSPs, NHS - 3.1, 4.2 & 5.1).
- 1.3 Persuade local NHS management that informatics is an essential part of business solutions and service transformation. Provide explicit additional funds for business change and service transformation. Embed informatics in Trust business targets with realistic target dates (DH, NHS, NHS CFH - 3.2).
- 1.4 Adopt a truly patient-centred approach at the local health community level (DH, NHS CFH, NHS - 4.3).
- 1.5 The strategy should be evolutionary, building on what presently works and encouraging convergence to standards over time, rather than revolutionary (DH, NHS CFH, LSPs - 3.3).
- 1.6 Given a heterogeneous set of systems, vide 1.2 and 1.5, there needs to be a greater emphasis on standards to enable systems to interoperate effectively, rather than focusing on relatively few monolithic systems (NHS CFH, NHS ISB - 4.1).
- 1.7 Establish basic informatics elements that are standard across the UK to enable coherent treatment of patients irrespective of their movement across home country borders. Ensure that other facets of the English strategy support this coherence (All home country health administrations & national IT programmes - 3.8).
- 1.8 As part of 1.5, fully implement GP system choice at practice level (DH, NHS CFH, LSPs - 4.2 (d)).
- 1.9 There also needs to be an accreditation process for all new and existing systems, both against the chosen standards and functionality requirements that does not stifle innovation (NHS CFH - 4.1 (p) & 5.2).
- 1.10 Revisit and reallocate roles and responsibilities of the NHS at each level, NHS CFH nationally and locally, and system suppliers. We understand this is now under way (DH, NHS, NHS CFH - 2.6 paras 5 & 3.7).
- 1.11 Transform NHS CFH into an open partnership with NHS management, users, the informatics community, suppliers, patients and their carers that is based on trust and respect (DH, NHS, NHS CFH - 3.9 & 5.8).
- 1.12 There are major issues about the sharing of electronic patient data which need to be resolved whatever the shape of future informatics in the NHS. These must not be hijacked by technical issues, and informed patient consent should be paramount (Patients, carers, healthcare professionals, DH, Information Commissioner - 3.5, 5.3 & 5.4).
- 1.13 Information sharing between care professionals should initially be by messaging using the Spine TMS service pending further work on information governance and the National Care Record Service (NHS CFH & LSPs - 5.4).
- 1.14 Clearly define what the NHS Care Record Service (NHS CRS) is. In line with 1.2 & 1.5, a virtual service offering views of the distributed records available for a patient would seem appropriate (DH, NHS CFH, NHS, healthcare professionals, other health informaticians - 3.4, 4.3, 4.4 & 4.5).

⁵ See Appendix 1 for a definition of what we mean by 'business'

- 1.15 Put implementation of the Personal Spine Information System (PSIS) on hold (DH, NHS CFH - 4.4).
- 1.16 Consider developing the equivalent of the Scottish Emergency Care Summary. General practice systems could provide this on demand, given implementation of 1.14 above (DH, NHS CFH - 5.5).
- 1.17 The clinical professions, NHS management and informaticians should collaborate to provide clear and comprehensive guidance for all sectors on good informatics practices, such as record keeping and information management – clinical and other – and embed this in undergraduate and post-graduate training. The NHS should facilitate the take-up of this guidance (Royal Colleges, DH, NHS management, NHS ISB, informaticians - 4.5).
- 1.18 More appropriately skilled / qualified staff are likely to be needed. The approximate volumes need to be agreed, and their supply enabled. The process of professionalising informatics staff should continue (NHS CFH, NHS, BCS HIF UK CHIP, NHS – 4.7).
- 1.19 Data quality is critical to reaping the benefits of the raised investment in IT. The improvement of general practice patient data across England has been the subject of work for some years. The same needs happen in all care sectors, including private and voluntary care providers, and to be extended to data other than patient data (NHS CFH, NHS - 4.8).
- 1.20 Continue with the New NHS Network (N3), the Transaction & Messaging Service (TMS), Personal Demographic Service (PDS), Spine Directory Services (SDS), Electronic Prescription Service (EPS), Choose & Book (C&B) and GP to GP electronic record transfer (GP2GP) but ensure an open maintenance and enhancement process (NHS CFH & NASPs - 4.9, 5.6 & 5.7).

2 Where are we going and where is NPfIT now?

2.1 Health informatics needs to be radically improved

Meeting the challenges of delivering healthcare in the 21st century requires much improved IT-enabled business systems based on a new IT infrastructure, irrespective of whether care is delivered through the NHS or otherwise, and irrespective of the method used to fund the healthcare system. These improvements need to build on what is already in place and to facilitate the sharing of knowledge, information and workflows across care communities and to include patients and their carers. Such an informatics infrastructure is critical to the successful implementation of Government healthcare policy, and in particular is fundamental to:

- the development of choice and contestability in the healthcare system, ensuring that money follows patients and where possible improves quality, efficiency and innovation within a framework of evidence-based commissioning;
- the engagement of patients, their carers, and the public in the prevention of disease and the management of their own health;
- applying managed care principles to improve the quality of treatment for chronic disease, to avoid expensive emergency interventions and to improve quality of life and economic productivity;
- enabling the use of new technologies to deliver care closer to patients, and to enable them to remain in their own community for as long as possible;
- restructuring of the healthcare workforce and other resources to cope with the impact of demographics on both the demand and supply side of healthcare.

This is not easy to do in a complex adaptive system such as the English NHS, and is bound to cause some disruption.

2.2 The NPfIT has delivered useful foundations and infrastructure

The N3 network and aspects of the Spine provide essential national infrastructure which are working and are probably capable of meeting future requirements. This would include the PDS, SDS, Access Control Services (ACS) and the Spine as messaging broker for the EPS, C&B and GP2GP services. It would exclude the more problematic services which have yet to go live – the Personal Spine Information Service (PSIS) and the NHS Care Records Service (NHS CRS) – see 3.4

The NPfIT has also done necessary work on the informatics foundations that will be required to support future IT and this would include its input into work on messaging and terminologies.

2.3 The NPfIT may have inhibited the implementation of operational systems

While the NPfIT has delivered a number of local operational systems including PACS, PAS, and some Community Health and departmental systems, it is possible that at least similar levels of delivery could have been achieved by the processes that were in place prior to the NPfIT. The NPfIT may have the potential to deliver these systems at a lower unit cost but this will require the NPfIT to continue to increase the number of systems installed.

In the area of acute electronic patient record (EPR), NPfIT has majored on PAS replacement and this has reduced the number of acute EPR systems that would have been implemented had the NPfIT not existed. There are obvious and proven benefits from the implementation of order communications and ePrescribing. In some cases these could have been delivered on existing PAS infrastructures, which could then have been incrementally absorbed by new systems from Local Service Providers (LSPs) or non-LSP sources.

Similarly, the deployment of departmental systems in hospital has been slowed down by the unsuccessful attempts of the NPfIT to meet this demand with fully integrated enterprise systems that have yet to be implemented (or in some cases produced). Hospital trusts have continued to manage and replace departmental systems largely as they did before.

General practice was to all intents and purposes completely computerized prior to the NPfIT, and the systems were – and are - generally an integral and essential part of the way that practices function. There was general agreement prior to NPfIT that additional functionality was required to increase interoperability between GP systems and GP systems and other care sectors, and the suppliers were

planning concerted action to provide some of these facilities. The LSPs initial 'Rip & Replace' policy led to the undermining of this and other work that was already planned to shift primary care informatics from a GP-centric to a broader primary/community care focus. as the primary care community felt obliged to divert its effort into fighting to protect the systems it already had. The GPSoC will go a long way towards resolving this problem if it is fully funded, and the NPfIT initiatives are making good progress in some areas towards the integration of general practice and other community care sectors.

2.4 The NPfIT is delivering useful services

The EPT and C&B are delivering services now. There are issues, but we believe that these will be resolved. There is a good prospect that GP2GP will also deliver. NPfIT has successfully delivered the GP Quality Management and Analysis system (QMAS) which was a mission critical requirement for the NHS. The PACS procurement and implementation is proceeding, with many implementations now live, albeit going somewhat slower than originally planned. In this context it is worth noting that NPfIT changed the PACS supplier for the West Midlands & North West Cluster in response to user representations.

C&B has been plagued by political issues around choice but some elements of it (electronic referrals for GPs and electronic booking for patients) are long recognized requirements. It does not suit all the relevant business requirements (see 5.6), but there is little doubt that both C&B and the EPS will be widely implemented in the medium term. GP2GP has identified some informatics challenges with serious clinical safety implications which have slowed it down and which are unrelated to NPfIT, but with acceptable compromises a useful GP2GP service seems like a reasonable medium-term expectation (see 3.4 & 4.5).

2.5 Has the NPfIT demonstrated value for money?

Overall, the net deliverables of the NPfIT have been limited considering the scale of what was planned. The NPfIT has been successful in limiting payment for non-delivery, but having under spent because of not delivering is hardly a success and the central costs incurred by NHS CFH are such that, so far, the value for money from services deployed is poor.

2.6 The NPfIT is changing in the right direction

NPfIT's experience to date and external pressures have caused shifts in its strategy which are in the right direction. However, such shifts are restrained by contractual commitments and priorities. The ultimate users are only now being properly brought into the loop, and patients have never been effectively involved. Political pressure also constrains NPfIT to deny problems and to defend the indefensible.

However, all parties face failure unless the Department of Health takes the opportunity to realign the NPfIT with a more realistic business-based informatics strategy. NHS CFH and LSPs seem to be moving towards recognizing that future IT services will have to be built by creating a framework in which a wider range of heterogeneous systems can share information and workflows and in which existing systems and existing system suppliers will play a greater part.

Arguably the major weakness of NHS CFH is that it currently lacks a business context: we have rapid policy implementation without the associated informatics planning. The output-based specification (OBS) used in the NPfIT tendering process is not – and never was – a substitute for business requirements, and to make matters worse, these have changed greatly since it was produced. Without the relevant informatics in place, the planned reforms – Choice, Payment by Results (PBR), Practice-based Commissioning (PBC), independent sector providers and direct payments – will not succeed. There is therefore an urgent requirement to align NHS CFH implementation schedules with the timetable for NHS reform: the poor line-up between between the 18 week wait target implementation and its IT support is a case in point. Business objectives should drive information objectives which in turn should drive IT solutions. Viewing NPfIT as just an IT project as its name implies has led to implementation plans that have all too frequently ranged from the optimistic to the unreal. The process should be as shown below in figure 1.

This raises a more fundamental question: if the NHS is to realize its potential benefits where is the integrated business process change that must accompany NPfIT at all levels? The NHS CFH Do-Once-&-Share Projects are a step in the right direction, but their coverage is patchy, and their types of output too variable: the task now is to extract and effectively share the generic elements of care

delivery that they have identified. Local business process change must be performed by local organizations, but it needs further generic central support. Experience also tells us that implementation costs are several times more than procurement and that the benefits are not realized immediately. Where are the funds for local business change? We are aware of some financial support from NHS CFH to the NHS but this was typically limited to two years and, in some cases, the funding stopped in March 2006. This creates real problems for a cash-strapped and target-led NHS, and this needs acknowledging and addressing by the DH and NHS Management Board.

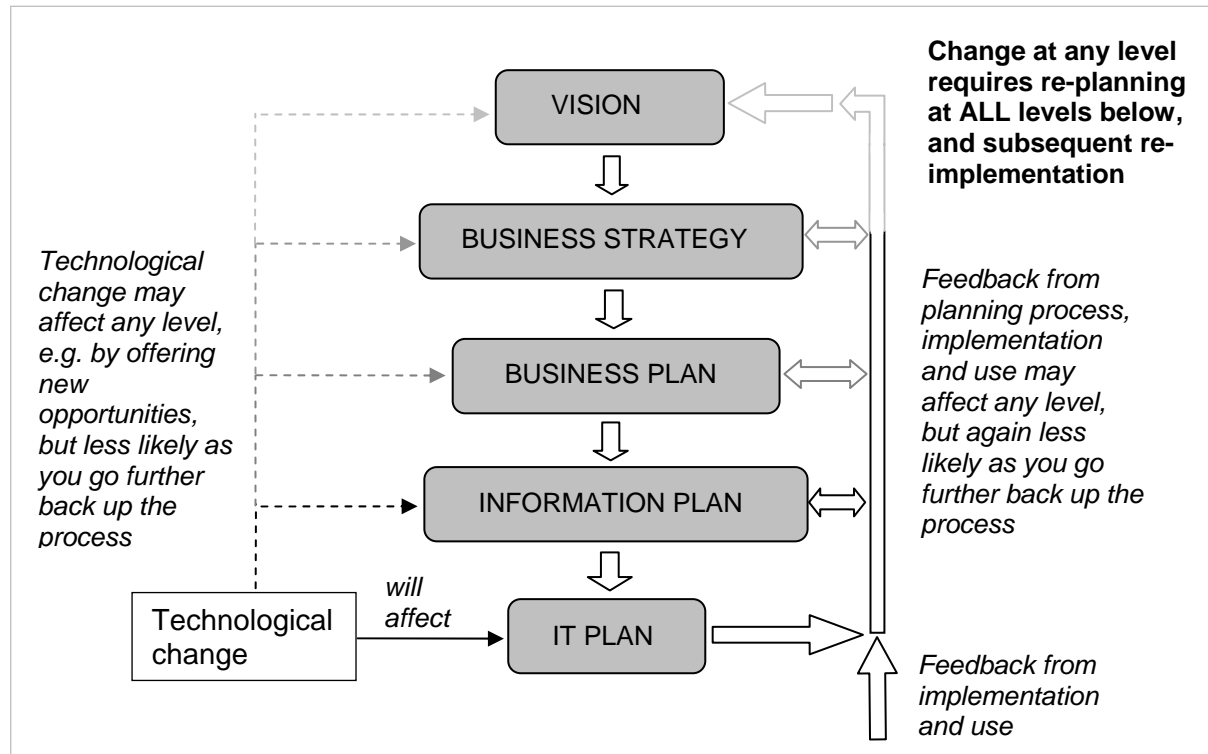


Figure 1 Informatics planning in context

We welcome the project recently started by the NHS chief executive to address another major cause for concern - the governance arrangements between the NHS, NHS CFH nationally, NHS CFH at cluster level and suppliers. The project includes a new piece of work – the NPfIT Local Ownership Programme. This will review roles and responsibilities at all levels, LSP contracts, configuration and processes. At the same time, it is important that functions which should properly be done once for the NHS are not fragmented, and that central coordination for other activities is maintained where appropriate. The steady release of information about this project is encouraging. This, and more information about the scope and work of other reviews of NPfIT known to be in progress, would help to create an image of the programme that NHS staff could identify with.

It is to be hoped that the NHS Management Board takes up the challenge to make the changes required. Criticism that results in the NPfIT being perceived as a total disaster in the eyes of the public and politicians will achieve nothing.

3 The changes in direction required

The fundamental goal is to support diverse business processes that recognize local constraints and individual patients' health beliefs and values. This should take advantage of the opportunities to promote best practice and interoperability and exploit the generic elements of many care processes. Instead of the current monolithic systems intended to meet most of the needs of users in a local health community, we need a range and choice of more innovative and agile solutions. These should contribute to a common purpose, encouraged within national standards to deliver functionality in whatever way suits the users and suppliers. This should not be interpreted as ruling out adoption of LSP products where they fit the business requirements. There is evidence that some clusters are already moving in this direction.

3.1 Focus on local implementations. Implement at Trust level and below, where most sharing of information is required and where most of the gains are to be had. Get local ownership by local deployment that takes account of local readiness and business objectives, conforms to national standards and more clinical buy-in (and management/administration understanding). Good, widespread local implementations are a prerequisite for any National Care Record Service, whether this involves some kind of single national EPR or not.

3.2 Get local buy-in. To achieve local implementation, it is necessary to persuade local NHS staff (including management) at Trust level and below that informatics is part of the answer to their problems and not an expensive irritation and preserve of the specialist. Management's willingness to accept this is weakened by having to meet other more pressing performance targets. Demonstrate to them that IT has a vital place to play in improving the efficiency and quality of care provision. It is fundamental to service delivery, service reform and thriving in a competitive environment.

Encourage a local approach that is business-driven rather than IT-led, through a nationally supported senior management education programme and exemplars. Local business priorities, capabilities and readiness may not match the functionality or schedules that come with nationally procured software solutions. LSPs and the NPfIT need to pay much more attention to this issue. Only local management can set in train the business changes needed to unlock the benefits of IT. As a general principle, it can take about a year for the implementation of a non-trivial system to run as smoothly as the system(s) it replaces. Any benefits often only start to materialise from year two onwards. Funding for local implementation (including business process change) with payback from potential later benefits would greatly boost local management enthusiasm. Embed informatics – whether LSP-sourced or not – within Trust business targets, but with target timescales that are both challenging **and** feasible.

3.3 Evolution not revolution. While acknowledging that some existing systems are no longer fit for purpose and need replacing, the approach should be to build on what presently works and to encourage convergence. This is particularly apt in general practice (2.3 last para). Revolution is a high risk strategy for both the customer and their suppliers. Besides the initial disruption to working practices and the resources needed to change them, system replacement commonly runs headlong into the issue of data migration. This difficult migration process is a necessary evil that can sometimes adversely affect patient safety. We need to evolve towards a common platform which will allow heterogeneous legacy, contemporary and future systems to interoperate appropriately, provided that the integration risk is accepted by the NHS as an informed choice. The history of general practice computing shows what can be achieved by an accreditation process and cooperation between suppliers.

3.4 What is the NHS CRS?⁶ NPfIT needs to decide what the National Care Record Service is and to communicate this clearly to the NHS. Is it (a) a physical IT concept – a comprehensive patient record held in its entirety in one or more national databases; or (b) an information concept – pulled together ephemerally (on demand in real time or by regular extraction processes) from disparate patient record databases and presented for a single instant for a specific user, or (c) a mixture of

⁶ For the BMA view of the NHS CRS – including patient data confidentiality issues – see 'Connecting for Health – the NHS Care Records Service in England': <http://www.bma.org.uk/ap.nsf/Content/ncrsguidance>

both? Does it include records not provided by LSPs and the NASP? Are patient records in one cluster to be accessed by users in others, and if so how? What is the basis for propagating corrections to patient data that may have been copied to several other locations (including the Spine)⁷? How is duplication of information on the Spine to be detected/avoided?⁸ The standards for content structure, including those enabling navigation of the record, are critical but they should follow agreement on the record elements required and their sources (4.1 (a) & (b)). That in turn depends on what patient information needs to be shared, when and how. It is our belief that a distributed, virtual record approach is the most sensible way forward. It makes the use of a heterogeneous record set feasible, including those from social care, and offers the best basis for both information privacy and confidentiality, and interacting with the different informatics solutions being installed by the other UK home countries. It is a sensible starting point for converging record architectures and semantics. The approach seems more in keeping with the web-enabled 21st century than a central record, and could ultimately do away with the need to exchange GP records between practices, q.v. the GP2GP project.

3.5 Tackle information governance. We need to be clear about both data custodianship and data responsibility, which are separate issues. The Data Protection Act and Caldicott need to be balanced against patient safety and the 'greater public good' in terms of cost and efficiency. Some pragmatism is required urgently to enable existing and future LSP systems to live side-by-side. Commendable though it is, Caldicott reporting of patient record accesses that appear to be unjustified is of limited value because it comes after the event. Any arrangements must support the trust that lies at the heart of the clinician-patient relationship. If patients do not feel comfortable with the confidentiality of their data, they will not allow significant information to be recorded or will withhold it, so informed patient consent is paramount. In either case, their care will suffer as a result. On the other hand, care that is appropriate and safe can only be provided if certain types of patient information are shared. The information governance issue was not created by the NPfIT, but is made more urgent by its changing of the patient information sharing paradigm to include substantial amounts of remote patient record sharing (a 'pull' approach) on top of the current need-to-know ('push') method based on messaging. It also means that increasingly substantial amounts of patient-identifiable data will be in the custody of organizations other than those that collected it and that are not clinical in nature. To cater for record access by people other than their authors, a three-level confidentiality ladder would meet the concerns expressed by patients to date. An item or assemblage of patient data would fall into one of three confidentiality categories:

- a) available to the original author only;
- b) available to all clinicians caring for the patient within the author's provider organization;
- c) available wherever required by those providing personal care;

This approach does not avoid all the challenges, but research shows that the vast majority of patient data would fall into the last category. Such a ladder would be in addition to any patient consent given at or prior to the time of use, e.g. for unscheduled care.

3.6 Secondary uses of personal data. The NPfIT is ultimately intended to provide vastly increased amounts of patient data for secondary purposes, including NHS management, planning and research. So although the associated confidentiality issues have been with us as long as electronic patient data has been available in significant quantities, the requirement to tackle them is now more urgent than ever. People using patient data for secondary purposes should obtain patient consent to use personally identifiable data or should only be able to use anonymised/pseudo-anonymized data. As a last resort the would-be secondary user can seek an order under the Health & Social Care Act 2001, although given the techniques available today for anonymization/pseudo-anonymization this

⁷ For current NPfIT plans for the Spine Summary Care Record, see 'The initial generation and continuing refreshment of the GP summary care record - the way forward' in SCR Briefing14.pdf via reference 5

⁸ For example, a heart attack in GP could also be reported in a laboratory cardiac enzyme test, and the hospital discharge letter, both of which are likely to be reported back to the GP, put into the patient record, and then subsequently copied to the Spine. Multiple heart attacks are not uncommon: how many heart attacks did the patient concerned have?

should not be necessary for new applications. Secondary uses should be made clear to patients and care providers⁹.

3.7 Facilitating implementation. Cost-efficient procurement is necessary but not sufficient. Issues remain with NHS and supplier capacity, capability and affordability (which may be exacerbated by NHS CFH cost-shifting driven by DH central budget cuts). The roles and responsibilities of the NHS, LSPs and national application providers need clarification. This is under way (see 2.6, penultimate paragraph), but there needs to be more detailed work on the relationship between capability and capacity of NHS organizations and the factors that make for successful implementation projects and successfully running operational services. Additional funding for implementation, including protected NHS staff time for system training and business change, are required. Generic, central expertise and resources need to be made available to the local teams carrying out business process change. Peripatetic local implementation resources that move from Trust to Trust are one way to retain and transfer the lessons learnt from individual implementations.

3.8 Cross-border treatments. Many thousands of patients move between the UK home countries for, or during, treatment every year, and some at least of their patient information needs to accompany them. Any strategy adopted by NHS CFH must be capable of supporting these cross-border treatments. To do this, certain basic informatics elements should be standard across the UK. These elements need to be identified as soon as possible. Related issues apply to patients moving between NHS and private care.

3.9 Creating a partnership. To flourish, NHS CFH and its suppliers must be open to, and acknowledge, the challenges and problems they face. In reality, failure is only complete when we do not learn from it. Health informatics experts appreciate that the NPfIT's ambitions involve tackling issues that do not have answers 'on the shelf', especially taking into account the scale of the project. It needs a partnership with the NHS management and users, the system suppliers, informaticians and patients that is based on trust and respect. So far this has singularly failed to happen. NHS CFH's communication strategy is improving but is still failing to engage its target audiences as it should. Its literature is perceived to be of limited value to them, and is regarded by many as patronising rather than informative.

⁹ This is also a top-level recommendation of the report 'Toward a National Framework for the Secondary Use of Health Data', published by the American Medical Informatics Association in September 2006

4 More detailed proposals

4.1 Need for standards. NPfIT has done considerable work in the standards arena, and the work with the NHS Information Standards to set up an international standards development organisation for SnomedCT is a good example of this. However much more needs to be done to ensure that systems - whether from NASPs, LSPs or elsewhere – ultimately achieve semantic interoperability. More effort should be put into selecting / developing the standards needed, especially those relating to the electronic patient record. This requires two-way engagement with the British, European and international standards organisations (e.g. ISO and HL7: the latter is already happening). At least some of the effort must come from NPfIT, but some could be provided by an augmented NHS Information Standards Board. Implementing standards takes time, so a pragmatic stance is necessary: the perfect easily becoming the enemy of the good enough (for now). Producing selective implementation guides for existing standards is relatively cheap and would enable quicker wins. Among the key additional tasks in the area are:

- a) an electronic health record/electronic patient record (EHR/EPR) architecture that suppliers can converge towards. The ENV13606/CDA v2 standards would be sensible starting points¹⁰.
- b) representation of content, especially clinical content. Particularly important are items most relevant to patient safety, such as allergies, adverse drug reactions and medication statements of all sorts. Again ENV13606/OpenEHR archetypes would be a sound starting point, and the National Clinical Dataset Development Programme in Scotland has done significant work in this area. One of the first projects to come up against this requirement has been GP2GP.
- c) generic patient-safety critical display elements, e.g. adverse reactions, allergies, medication items, intervention interaction warnings, e.g. drug to drug. There is a strong relationship between this and 4.1 (b). This means revisiting the NHS CFH Common User Interface (CUI) project. We applaud NHS CFH's work to ensure that all the intellectual property rights of the CUI are retained by the NHS, and this should be continued.
- d) standards for generic workflow data. This is essential for electronic care planning and management when tasks are passed from one carer to another carer or from one organization to another, for example when a GP refers a patient to an acute Trust, which may in turn ask another unit to perform certain investigations or treatments. The work concerned will therefore appear on more than one computer system as it is progressed. To enable its overall monitoring, management and communication, the work, its state, e.g. requested, scheduled, completed, and its properties – who will do it, where, when etc – needs to be represented in a mappable way, ideally in the same way, on all systems dealing with it.
- e) standards for generic care protocol/guideline/pathway representation. This is a mirror image of the generic workflow presentation requirement but at the knowledge level. It is needed to enable the electronic use of care protocols/guidelines/pathways that span multiple organizations, and therefore computer systems. Common display formats are necessary but not sufficient.
- f) representation of knowledge in general, and the clinical knowledge associated with drugs and prescribing in particular, i.e. indications, cautions, contraindications, side-effects, drug to drug interactions and so on. The latter needs to be accessible via the NHS Dictionary of Medicines & Devices (DM+D).
- g) standards for electronic decision support. For algorithmic reasoning with patient data, there has to be a formal relationship between data categorised by its place in a patient record structure, any formal terminology used within it, the representation of the knowledge on which reasoning is based and the reasoning methods employed. For example, data contained in composite patient record structures needs 'flattening' in order to reason with it. Delivering such standards depends on the delivery of 4.1 (a), (b), (d), (e), (f) and (o).
- h) unique identification of care issues and therefore episodes of care (also known as patient pathways in the current cancer and 18 week wait target documentation). This is needed to enable coherent care provision, planning and reporting across organizational boundaries. Whether activities and other record items need to be uniquely identified should be explored.

¹⁰ ENV 13606 is a European pre-standard for exchanging electronic patient records. It is due to become a full European and ISO standard in 2007. CDA (clinical document architecture) version 2 is an HL7 v3 generic standard for messaging clinical documents. Like ENV13606, it comprises a recursive hierarchy of components

- i) the ability of the DM+D to support acute prescribing has been questioned. This should be checked.
- j) application programme interfaces (APIs) for common services, such as those for terminology, workflow management, drug information provision (DM+D).
- k) an API for EPR/EHR services to enable the decoupling of applications that use patient data from applications providing that data to them – typically those supporting patient data servers – other than via the API. This means that patient data storage may be handled in the best way, and be changed over time, without requiring changes to the applications using the data. For example, it could be designed to enable distributed and/or virtual patient record approaches to be used.
- l) a generic NHS Data Model that provides logical and physical business information views of the NHS business architecture, covering personal care delivery, service delivery and other processes. It should be based on a reinvigorated NHS Data Dictionary and its metamodel. This will help to future-proof new informatics solutions. Without it we shall simply design archaic ways of working into any new systems. The revitalised Dictionary must interrelate appropriately with other related standard elements.
- m) continuing the work NHS CFH is already engaged in with others to make the HL7v3 messaging standard easier (and safer) to use, which is timely and important. The claims made for HL7 v3 to be a basis for standards other than messaging should however be investigated thoroughly when considering their adoption.
- n) a need to openly pilot SnomedCT, the terminology adopted as standard by the NPfIT, disseminate the outcomes and to publicize current plans to cope with and tackle long-term challenges, such as equivalence and negation. There will inevitably be significant generic issues in the introduction of compositional terminology as novel as SnomedCT, especially in real-time use, and it would be sensible to explore these centrally on behalf of all future users.
- o) a need to check that the set of standards chosen form a coherent whole – given the variety of standards that exist and their overlapping scopes, e.g. HL7 v3 / SnomedCT & record architectures – and decide the deployment scope of each. The expression of negation in clinical records is a case in point.
- p) an appraisal by the NHS of the work of the Integrating the Healthcare Enterprise (IHE) group using existing standards, ebXML & XDS, given that formal standards development and implementation is slow. IHE's Connectathon events both demonstrate success and improve confidence.
- q) a process for the implementation of these standards, which is a sine qua non. It should encourage the convergence of applications – new and old – over time, with critical standards being mandated for implementation by given (but realistic) dates. This requires an accreditation process for all new and existing applications from whatever source. It will be necessary to look at accreditation anew in the light of the increasing impact of software on clinical care, and therefore on patient safety.

4.2 Local implementation. Focus on local implementations, as suggested in section 3.1. Use existing and LSP systems where appropriate, but procure systems from other sources as well if this would result in sound implementations of interoperable solutions sooner and/or systems that are more appropriate to local business needs. In all cases the systems procured should be NHS-accredited, a major ongoing activity for NPfIT.

- a) Many current PASs in acute care are obsolete. They do not reflect the complex supply chains involved in delivering healthcare, and need to be geared to contestability, choice, pathway booking and scheduling and information linkage across organizational boundaries (primary, community, acute, tertiary, private sector, mental health, social care, etc). They need replacing with more comprehensive level 3 EPR systems as defined in Information for Health¹¹, with Trust patient data integrated, physically or logically, into a single record. Order communications (including physician order entry, electronic prescribing and imaging) and the capability to monitor the 18-week referral-to-treatment target (RTT) are current priorities. ePrescribing and RTT are currently not well supported by vendors, if at all.
- b) Sub-enterprise systems – supporting service departments, specialties and specific pan-enterprise activities such as PACS – are a good way of giving clinicians 'quick wins', as are niche

¹¹ 'Information for Health', Frank Burns, DH, September 1998

applications: the NPfIT PACS programme demonstrates this well. The emphasis should be on encouraging innovation, diversity and adaptability and with multiple system suppliers, given that they pass NHS accreditation and agree to converge their products over time by implementing common standards (see above). The patient information they accumulate needs to be linked (by messaging and/or as part of a logical record for the super-ordinate organization), especially in a world of patient-centered pathway management. There also needs to be an overarching strategy for niche and departmental systems – the current DH approach seems very ad hoc, e.g. cancer prescribing, and blood tracking. This requires a real focus on the relevant standards – see 4.1.

- c) In primary and community care, the main task is to extend the coverage of community-wide systems that truly cater for multi-disciplinary team working, the mental health Care Programme Approach, the single assessment process and complex scheduling. Pay especial attention to supporting managed care and integration with social care, although this is unlikely to happen overnight. Social services staff exhibit a very different working culture to healthcare: they use a different language to describe clients, have a very different record keeping style based as much on the case as the client, and have a much more intimate, everyday relationship with the police and legal system. Their relatively unstructured and text-based records would be difficult to import into healthcare systems, and vice-versa for healthcare records. A virtual record approach – see 3.4 - would at least make using the two alongside each other possible.
- d) Stop current attempts to have a standard GP system per Primary Care Trust and above, and fully enable GP system choice at practice level. This means obtaining Treasury approval for the funding, and making sure it is ring-fenced for this purpose only. This could be funded from the current NHS CFH underspend.

4.3 Put the patient at the centre. Adopt a truly patient-centred approach at the local health community level, including a patient portal providing – amongst other things – access to their records (including the ability to add to them and initiate corrections) and to clinical knowledge in a patient-digestible form. The successful exploitation of such a portal will require extensive education of both patients and healthcare professionals, and will support – and require – reengineering of the care process. This is the cornerstone of making patients & carers the primus inter pares of their care teams, and encouraging them to assume responsibility for their health. If we expect patients to take control of their health, there is a case for giving patients custodianship of their records (possibly on a smartcard). This hasn't yet been adequately explored.

4.4 Put PSIS on the back burner. Put implementation of the PSIS element of NHS CRS on the back burner. The first tasks must be to agree the purpose of the NHS CRS, and then to decide what role (if any) a Spine patient record should play (see 3.4 and 5.3-5.5). Any successful nationwide implementation will ultimately only be possible when 4.2 has been achieved (unless it only involves GP patient data).

4.5 Consider a national patient record directory. Consider what role a Spine electronic directory of all patient records could play in providing better patient care. Such a facility would be necessary (but is not sufficient) for virtual (possibly life-long) logical patient records to be constructed from a set of distributed patient records (see 3.4). Patient data governance issues will be a major consideration to take into account. Such a facility could be another step towards superseding GP2GP record exchange, although it would not bypass all the issues that GP2GP has encountered.

4.6 Facilitating reengineering of the care process. The introduction of informatics that truly supports the patient journey during a spell of care and their entire health career will – and is intended to – have a significant impact on the way care is delivered and the way clinical practice develops. There is currently no coordinated work to identify these changes, and prepare clinicians for them. Better provision, use and management of patient data, including record keeping, is a key part of this impact. So in parallel with IT implementation, the clinical professions working with informaticians should provide clear and comprehensive guidance on good clinical record keeping and data management in all care sectors, and embed this in the undergraduate and post-graduate clinical curricula. These requirements have been recently endorsed by the Royal College of Physicians¹². For instance, the use of a clinical terminology as part of everyday record keeping is routine in general

¹² 'Engaging clinicians in improving data quality in the NHS', Royal College of Physicians, September 2006
<http://hiu.rcplondon.ac.uk/iLab>

practice, but novel to most other care providers. The Royal College of General Practitioners' Good Practice Guidelines version 3 would be a useful starting point. There will also be a need to introduce practitioners and managers to the revised informatics context provided by NPfIT, such as the PDS, SDS and TMS. Mechanisms will be needed to facilitate their introduction in everyday practice, and the PRIMIS + model should be considered as a basis for roll-out to health sectors other than primary care. Development of new and augmented secondary data sources based upon data collected by NPfIT's Secondary Uses Service (SUS) and made available by the NHS Information Centre for Health and Social Care (NHS IC) will mean that NHS management and administrative staff will also require augmented data management skills, and therefore will need training from the NHS IC to provide them.

4.7 Ensuring the availability of sufficient staff of the right quality. Even allowing for the implementation of 4.6, with significant increases in informatics demand across the NHS, the capacity and capability of the Health Informatics workforce needs to be enhanced if the National Programme for IT is to be delivered, at the same time as all the other NHS priorities. Agenda for Change has resulted in the downgrading of some informatics posts and a loss of morale; this has not helped. Formal workforce planning is urgently needed for the informatics specialism. This should be supported by continuing the work of UKCHIP to establish health Informatics of the formal profession. The BCS Health Informatics Forum – and its Member Group ASSIST - would welcome the opportunity to work together with NHS CFH and other national bodies on these complex issues of workforce planning, building capacity and capability, and UKCHIP.

4.8 Data quality is critical to reaping the benefits of the investment in IT. This means that electronic data has to be timely, comprehensive, accessible and accurate, whatever form it is recorded in (text, as codes, structured text, etc). Algorithmic use of the data, e.g. for decision support or secondary purposes, relies on data having these properties. The PRIMIS project and its predecessor have been at work on improving patient data quality in general practice since the mid-'90s, and it has moved under NPfIT to become PRIMIS+. There is comparatively little work on this topic in other care sectors, such as community and acute care, although the NHS Data Standards unit of the NHS Information Authority (IA) had a programme running for several years to improve the quality of administrative data in the acute sector. A nationally facilitated effort is necessary in all care sectors, primarily focussing on patient data but covering additional data as well. For instance if the data in the Spine Directory Service is not up-to-date, comprehensive and accurate, the role-based access & legitimate role control of access to patient data will not function properly. NPfIT has had to oversee major work on data quality improvement to enable national applications such as the PDS to function, but this has in some cases caused problems for users.

4.9 Carry on with what works. NHS CFH should continue with N3, TMS, PDS, SDS, ETP, security services, C&B (but see 5.6) and GP2GP as these are delivering – and will deliver – significant benefits. Ensure that feedback from users is collated, made visible to the NHS as a whole, and followed up (see 5.7). For instance, the current NHS CFH User smart card sign-in times are causing considerable difficulties in some locations, and the issue needs to be addressed.

5 What should be the current priorities?

Some of these priorities described below are quicker to achieve than others. The more difficult ones therefore need to be started as soon as possible. The emphasis should be on doing what IT does well and humans do badly, but not necessarily perfection; some goals adopted by NPfIT were seen by external observers as ambitious from the outset. The 80/20 rule is the best guide. For instance, sharing patient data is essential, and where a person is the recipient any format that they can assimilate is a sensible starting point. So while coded data is needed for algorithmic decision support, secondary uses et al, and these will in turn bring significant extra benefits, such data must be complete, accurate and up-to-date to support it properly (safely in the case of patient care). This will take time to achieve. Not to share data because it is only text or document images and not coded is to deny the user access to potentially valuable information.

5.1 Provide informatics support to every care setting. The first priority should be to ensure good enough systems in individual care settings as outlined in 3.1-3.3 & 4.2.

5.2 Putting standards to work. There has to be an immediate, larger and more coordinated effort to select, profile and deploy the standards listed in 4.1, and to ensure that the results of this activity generates a coherent set of standards. Accreditation will form a major part of this work.

5.3 Establish information sharing requirements. Key to dealing with the information governance issues is establishing the generic requirements for information sharing for improving both the quality of individual patient care, and the efficiency with which that care is provided at the aggregate level. Particular care is needed not to let technical issues unduly skew the picture. The work goes beyond the boundaries of NHS CFH, and the results will form the foundation for revisiting the National Care Records Service.

5.4 Share information by messaging. Information sharing between care providers should initially be by explicit messaging, e.g. discharge and encounter messages, recording encounters and summaries of the provision of care in all sectors – acute, community, mental health and unscheduled care. An exception to this is given in section 4.2 (a) and (b), and there is a need to examine cases of implicit transfer of patient data between systems, i.e. transfers that the user does not explicitly initiate. Majoring on messages rather than record merging/browsing/transfer controlled solely by RBAC and legitimate relationships will obviate possible technical problems with NPfIT's proposed approach and some of the current information governance issues. The 'sealed envelope' mechanism is unlikely to be seen as an addition that enables patients' confidentiality requirements to be met, as (a) it will not be available when Summary records are first uploaded to the Spine, and (b) sealed envelopes can be opened subject to RBAC & legitimate relationship checks and algorithms, i.e. are not truly sealed. The proposed NHS CRS Summary Care Record appears to behave like the 'sealed envelope', as it goes to the Spine even if the patient has explicitly declined sharing it, and, once there, can be accessed by anyone with the appropriate legitimate relationship and role¹³. Using messaging will provide a breathing space during which governance issues and the nature of the National Care Records Service can be explored further. Personal selection/generation of message content helps to avoid potential information overload by ensuring – within provider guidelines – that only relevant information is sent to the recipient. The messaging approach will also make it easier to interact with the rather different informatics strategies adopted by the other UK home countries.

5.5 A summary record for unscheduled care. An English equivalent of the Scottish Emergency Care Summary – probably derived at first from the GP record – would be of value to those providing unscheduled care, even if it could not always be guaranteed to be complete or absolutely up-to-date. Given 24/7/365 access to them over the web, it could be provided by the GP systems themselves. Access must be restricted to those providing unscheduled care, and require patient consent before use. If consent is not obtainable, the clinician can access the record if he/she considers that to do so would be in the patient's best interest, and the patient is informed of the access as soon as possible afterwards.

5.6 Enhance Choose & Book. Choose and Book is working well for the simpler clinical services, but at present does not support national and local referral protocols and complex cases that require case prioritization by the recipient. There are concerns about the staff time it takes up in both primary and acute care, and the identification of the relevant bookable services available from providers: one acute Trust reports a 30 per cent error rate in C&B bookings. Better guidance on the preparation and use of service directories and exemplars would help with the latter, but implementation of a more sophisticated ontology of the services available to book may also be needed.

5.7 Provide an open inclusive system enhancement process. Maintain and enhance the existing applications and services – e.g. N3, TMS, ETP, C&B, PDS, SDS, etc – in an open manner, including lists of issues raised, responses and schedules of enhancements. This includes both business and performance issues. Ensure that users play a major part in scheduling business-related enhancements, possibly through independent user groups.

5.8 Make the most of informatics expertise. Engage in an open dialogue with NHS management, users, informaticians and system suppliers – make the maximum use of the expertise and knowledge that exists outside NHS CFH in the NHS, BCS Health Informatics Forum (including

¹³ 'The initial generation and continuing refreshment of the GP summary care record: the way forward', version 14, NHS CFH, May 2006 – it is best found via the reference in footnote 6.

ASSIST¹⁴), Intellect¹⁵ and academia. The first tasks of a consortium of personnel drawn from these organizations should be to discuss this document, and to re-evaluate the risks for the current NHS CFH programmes. These should be started immediately.

5.9 Make the most of the opportunities offered by comprehensive informatics support for the care delivery process. Set in motion production of the resources to support the process to improve data quality, management and use described in 4.6 and 4.8. Explore the broader generic requirements/opportunities for change in care delivery and the clinical process described in 4.6, for example changes to the format of the clinician-patient consultation, and assess the resources, training and facilitation required for their implementation.

¹⁴ ASSIST is the largest group of the set that make up the BCS Health Informatics Forum., and consists chiefly of IT staff within the NHS.

¹⁵ INTELLECT is the trade association representing UK IT companies.

Appendix 1 Glossary of terms and acronyms

Text in italics come from the NHS CFH Jargon Buster:

<http://www.connectingforhealth.nhs.uk/jargonbuster>

API	Application Programme Interface. The interface that a computer system, library or application provides in order to allow requests for services to be made of it by other computer programs, and/or to allow data to be exchanged between them.
business	In this report 'business' means the core activity of the organization named, not just the financial aspects of it. For the NHS and its Trusts this is provision of healthcare to patients and populations (including helping people to stay healthy), and responsibility for the services that are required to do this.
C&B	Choose and Book. <i>Will allow patients, in partnership with health and care professionals, to book first outpatient appointments at the most appropriate date, time and place for the patient.</i>
Caldicott	... Report. On the issues of controlling access to patient data. ... guardians. Senior staff in the NHS and social services appointed to protect patient information.
cluster	One of the five regions of England set up by NPfIT for IT procurement and implementation purposes. They are Eastern, London, North East, North Western & West Midlands, and Southern.
contestability	The ability to be able to compare bids for providing NHS services, typically from commercial suppliers and NHS units. To do this it is necessary to compare the unit costs, contents and quality of the competing services.
CUI	Common User Interface. An NPfIT project intended to provide designs for a common look and feel to patient data displayed or printed by computer applications for human consumption, particularly patient-safety critical elements such as allergies, adverse reactions and medication activity.
DH	UK Government's Department of Health. The acronym used to be DoH.
DM+D	Dictionary of Medicines and Devices. <i>The source of terminology and a common health language for medicines and devices used in healthcare.</i>
ebXML	Electronic business XML. A variant of the web eXtended Markup Language specifically designed for conducting business electronically.
EHR	Electronic Health Record. Sometimes used as synonym for EPR, sometimes used more specifically to indicate an electronic record of patient data that spans several organizations, possibly all organizations, providing care to the patient.
EPR	Electronic Patient Record. Sometimes used as synonym for EHR, sometimes used more specifically to indicate an electronic record of patient data specific to a particular organization such as a GP practice.
EPS	Electronic Prescription Service. A service intended to provide total electronic handling of prescriptions. ETP is the only element of EPS which is currently in train.
ETP	Electronic Transmission of Prescriptions. <i>Enables GPs/prescribers to send prescriptions electronically to pharmacies.</i>
GP	General Practice/General Practitioner as indicated by the context.
GPSoC	GP System of Choice project. This will enable PCTs to seek bids from GP system suppliers.
GP2GP	General Practice to General Practice (record exchange). An NPfIT application that permits the electronic movement of electronic patient records from one practice to another, for example when a patient changes GP. The service is currently under development.

HL7	Health Level 7. An American-based organization with an international reach that develops standards for interoperability between health-related computer applications, particularly by for electronic messaging.
informatics	The knowledge, skills and tools that enable information to be collected, managed, used and shared (and for health informatics) to support the delivery of healthcare and to promote health and wellbeing. Source UKCHIP 2003.
LSP	Local Service Provider. <i>Responsible for making sure the new systems and services delivered through the NPfIT meet local requirements and are implemented efficiently.</i>
N3	New NHS Network. <i>The new fast, broadband communications network for the NHS. N3 is delivered by BT and replaces the existing private NHS network, NHSnet.</i>
NASPs	National Application Service Providers. <i>Groups of commercial suppliers who are contracted to deliver national services such as Choose and Book and the Electronic Transmission of Prescriptions.</i>
NHS	UK National Health Service. Though it is a truly national service. It has some features which are unique to each of the UK home countries.
NHS CFH	NHS Connecting for Health. The Department of Health agency set up to deliver the National Programme for Information Technology (NPfIT) and associated programmes.
NHS CRS	National Care Record Service. <i>Currently under development. This will be an electronic store of over 50 million health and care records which can be accessed by health professionals where and when they are needed. It will also give patients secure internet access to their own health record.</i>
NHS ISB	NHS Information Standards Board. An independent advisory board reporting to the NHS National Programme for IT Board. It appraises informatics standards and decides whether they are suitable for adoption by the NHS.
NPfIT	the National Programme for Information Technology. <i>Responsible for procurement and delivery of [much of] the multi-billion pound investment in new information and technology systems to improve the NHS.</i>
OBS	Output Based Specification. <i>Each prospective supplier to the National Programme must meet rigorous technical requirements. These are set out in an output-based specification.</i>
PACS	Picture Archiving & Communication System. <i>A system enabling images such as X-rays and scans to be stored and sent electronically so that doctors and other health professionals can access the information with the touch of a button.</i>
PAS	Patient Administration System. A system used in hospitals to keep track of their patients by recording admissions, discharges, intra-unit transfers, etc. It may or may not cater for outpatient appointments.
PBC	Practice-based commissioning. The purchasing of patient care services not provided by GP practices. This includes acute care and may include anything such as services from GPs with special interests, physiotherapy, counselling, and sports injuries services.
PBR	Payment by Results. Payments to healthcare providers based on a fee per patient case handled, including recognition of the resources required by the case.
PCT	Primary Care Trust.
PDS	Personal Demographic Service. The NPfIT Spine service which holds demographic details of all NHS patients.
PSIS	Personal Spine Information Service. This is currently a store of patient-related messages transferred using the Transaction and Messaging Service data that are persisted on the Spine, of which some from next year onwards are intended to contain patient summaries derived from the patients' GP records.

QMAS	Quality Management and Analysis System. <i>To support the Quality and Outcomes Framework, NPfIT has commissioned British Telecom to develop and implement a new IT system called the Quality Management and Analysis Subsystem. It will provide reporting, forecasting and payment information for improving services within the Quality and Outcomes Framework.</i>
RBAC	Role Based Access Control. A technique for limiting access to computer system functionality and data depending on the role currently assumed by the would-be accessor.
RTT	Referral to treatment time. This is the period elapsing between the receipt of a referral by the unit/person referred to, and the first definitive treatment received by the patient. From 2007 there will be a target RTT duration of 18 weeks.
SDS	Spine Directory Services. The directories of NHS staff and their roles, NHS organizations, NHS computer systems, etc, provided as part of the NPfIT Spine.
SnomedCT	Snomed Clinical Terms. A terminology built up from material from the College of American Pathologists and (all) the Read terms. It will replace Read as the new standard terminology to be used in English electronic patient records.
Spine	<i>The Spine is the name given to the national database of key information about a patient's health and care and forms the core of the NHS Care Records Service. It will include patient information such as NHS number, date of birth, name and address, and clinical information such as allergies, adverse drug reactions and major treatments.</i>
SSOS	Single sign on service. NPfIT's technique which allows the person signing on to use one or more NPfIT services in an online session without having to sign on again.
TMS	Transaction & Messaging Services. NPfIT's message handling service, which forms part of the NPfIT Spine services.
UK CHIP	UK Council for Health Informatics Professions
XDS	EXchange Directory Service. A web-based directory service.