



Research article

The biggest computer programme in the world ever! How's it going?

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Abstract

Early in 2004, the British Government announced the award of eight enormous IT contracts with a combined value of more than £6 billion. The companies selected would introduce new IT systems and processes to Europe's largest public sector organisation, the National Health Service (NHS) in England. The contracts were due to run for 7 years, until December 2010. At the end of June this year, the contracts will be exactly halfway through. But all is not well with the National Programme for IT (NPFIT), and both the programme and the agency NHS Connecting for Health (NHS CfH) set up to deliver the programme, have received considerable, and sustained criticism from many sources since their inception. Is this criticism justified or are some critics simply jumping onto a bandwagon? This paper attempts to provide an unbiased (if such a thing is possible) commentary on the programme so far.

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Introduction

If a week is a long time in politics, as Harold Wilson famously said, then 2 years is a very, very, long time in this NHS computer programme. This paper builds on the author's book – 'The NHS IT Project: The Biggest Computer Programme in the World Ever!' (Brennan, 2005). Because of the rapid pace of change within the National Programme, there have been changes that were not mentioned or even considered in the original book. For example, NHS CfH was not even a twinkle in the old dog's eye when the manuscript was submitted in December 2004.

It has become increasingly obvious to the NHS and to other observers that the scale of the NHS NPFIT is far greater than anything the UK public sector has ever seen. But is the programme too ambitious? Plans published by NHS CfH in January 2005 indicated that by April 2007, 151 acute hospital trusts would have implemented patient administration systems of varying degrees of sophistication. But as of 18 April this year, only 18 had been deployed, and as we have already seen, feedback on the programme has been often less than positive.

To make matters worse (for the programme); the structure of the NHS has changed too since 2002. That is nothing new to those readers who work inside the

ever-changing NHS. Re-organisation always follows re-organisation and it often seems as if a number of complete re-organisation cycles are completed in every employee's lifetime. Strategic Health Authority (SHA) boundaries have been re-drawn, Foundation Trusts have become commonplace, and the NHS Information Authority was scrapped and replaced by a new agency charged with delivering this ambitious and hugely difficult programme. The name of this new agency is 'NHS Connecting for Health (NHS CfH)'. No mention of IT or 'information' in that title. Quite right. The new name recognised that this programme is more about change and integration than it is about simple (or even complex) IT.

These organisational changes were only the beginning. As the months passed, the programme seemed to struggle to keep up with this pace of constant change. There were key personnel changes at the top of the programme, the Quality and Outcomes Framework was introduced, practice-based commissioning and payment by results had magically appeared out of the fog, a key software provider (IDX) was replaced, another (iSOFT) had to face up to delays in its solution and suffered a worrying period of stock market jitters (iSOFT was in the process of being bought by Australian software vendor IBA at the time of

Box 1

The Department of Health has announced that the digital Picture Archiving and Communications System (PACS), a key part of the NHS National Programme for IT, has gone live in every hospital trust in London and will be available across England by 2008 (*The Register*, 23rd May 2007).

writing this paper), there were calls in the press for a widespread review of the whole programme, and every day seemed to bring news of project delays. And as the programme was coming to terms with all these changes, the NHS experienced record overspending. Trusts all over England began to announce job-cuts to balance their books and the new Health Secretary Patricia Hewitt was compelled to declare that despite local difficulties the NHS had had its 'best year ever'.

There were some concerns in the NHS in 2004 with the speed with which the National Programme contracts were awarded, and the apparent lack of clarity in the contracts themselves. The critics had obviously not seen the (nearly) 700-page specification for the National Care Record Service (NCRS) alone! But despite this, the breathtaking change of positive attitude to NHS IT in these initial phases was generally warmly welcomed. And to be fair, it all started out so well. Richard Granger and his team answered the critics and delivered what they set out to deliver – a series of robustly negotiated contracts which, when delivered, had the potential to radically change the face of NHS IT and, in the process, drastically reduce the cost of IT to the NHS. This would have the effect of moving the clinical IT agenda away from the committed few to everyone in the NHS. While there were concerns over what would eventually be delivered (would it be ready in time, and what would the total cost be to the NHS?), we should not lose sight of how great an achievement this was. For the first time, health IT had risen right to the top of the political agenda, with significant commitment from the very top of the office – Number 10.

Prior to NPfIT and for the last 20 years, there have been successive attempts to raise the profile of NHS IT and although these successive initiatives regularly extolled the value of effective IT to good healthcare management, the adoption of clinical IT in the NHS has been patchy at best.

So now, at last it would happen. It was not before time. There had been consistent calls for significant increases in funding to enable comprehensive change to happen. So why are some commentators now saying that money is being wasted? What are the actual objections to this programme? Is not CfH delivering exactly what was asked for in the 1998 White Paper 'Information for Health'? Is it the *delays* that concern us? Or is the architecture? Or is it simply too ambitious?

Let us review the issues.

Issues

A single national record

It did not all begin with NPfIT. The years before the programme had seen a succession of more modest IT

initiatives aimed at encouraging better use of IT in the NHS. Some (like the NHS Electronic Patient Record programme (EPR), and the Electronic Record Development & Implementation Programme (ERDIP) projects which followed) suggested a pragmatic way of delivering electronic health records as a by-product of deploying systems to support clinical care. These integrated systems would be based in the local community where more than 95% of clinical care is delivered (and where, of that care, 90% is delivered in a primary care or community setting). It made sense to build systems based on that local clinical community and that was the model proposed by the EPR Programme and in some of the ERDIP projects that followed. A clear distinction between the EPR (that might be the record of your care from a single NHS institution – like a hospital or a GP practice) and the national EHR (the lifetime Electronic Health Record) was articulated in 'Information for Health'. This somehow became confused during some of the later ERDIP projects, losing the distinction between the two components and resulting in an amalgamation of both EPR and EHR into what has now become the NCRS.

So great has been the focus in the National Programme on the need for a single patient record accessible by any clinician anywhere, that it is easy to forget that the original objective was *not* a single national electronic record. This may be a very desirable objective, but it was originally secondary, and not until NPfIT was it seen as the main driver. As Frank Burns, author of *Information for Health* and one of the original architects of the NHS IT programme explained in 2002, 'There was never a business case made for a national EHR. The real benefits of clinical IT is in the use of computerised decision support and local shared records'. Burns argued that the programme should be seen more as a local than a national record. 'There has always been a degree of re-conceptualising especially at the academic end', said Burns, 'but we shouldn't lose sight of the difficulties that have to be overcome for this to be a success. We need basic clinical systems in place – at the GP end of the service and in our hospitals and these local implementations will support local agendas. Let us not focus on [centralised] standalone projects but rather let's put more effort into ensuring the basic building blocks are in place such as the local community EHR. These will then feed these national projects' (Brennan, 2002a).

It was, in hindsight, a very clear vision: put *local* community clinical systems in place, and export the data into a local clinical record. Worry about networking these together later. It was a view that has become directly opposed to the direction of travel selected by the NPfIT that originally envisaged everything being stored on a national electronic database.

The approach in Wales (Kable, 2007) looks like a very different one to that adopted by England. Their vision, although criticised by some for being too slow in implementation, is to create a national record through the *organic* growth of successful local projects. Scotland too has approached the national electronic record from a different angle. The Scottish Emergency Care Record is an extract from all GP systems of a reduced clinical data set. It does not try to be all things to all people. It is a starter for 10. The English 'data spine' on the other hand is *not* seen as a peripheral module. It is absolutely central to *all*

components of the programme. It is not only intended to store clinical and administrative data, it will also manage access and security. As such, it is a potential bottle-neck and obviously key to the successful delivery of local systems.

So, one of the main issues is the lack of clarity about what this important programme will be delivering and thereby the public perception of it.

The delivery model: Did we need an LSP? Would a catalogue of accredited interoperable systems been a better model?

In 2002, the author interviewed Sir John Pattison, the man who first accepted responsibility for designing the National Programme (Brennan, 2002b). One of the issues discussed was the delivery model planned for the programme. Sir John envisaged the appointment of local service providers (LSPs) who would have responsibility for identifying the right IT solutions and delivering them to NHS organisations within a geographical area (later to become the five 'clusters'). But was this the most effective model for delivery, Sir John was asked. Could not the existing process be improved simply by developing national business cases, providing ring-fenced monies, and accrediting solutions?

Sir John was forthright in his response. 'There is an issue of capability', he told me. 'What we are proposing is extraordinary in scale and it is precisely the scale of the programme that requires this additional layer. It is needed to ensure not only that the technology solutions are available and accredited, but to underpin those implementations with comprehensive change management. We know that some enthusiasts will forge ahead whatever model is adopted, but it is the generality that require more support and facilitation. The traditional procurement model is not designed to do this and the scale of what we are proposing needs this extra change management facilitation layer'.

The view, then, of those running the programme was that the NHS and the solution suppliers did not have enough IT expertise or staff resources to implement the complex clinical IT required of the programme. In addition, the acknowledgement that this was not just an IT project also highlighted the need for organisational-change skills that were not readily available in the NHS. The introduction of the LSP layer was expected to deliver this support. Has it been successful? To varying degrees yes, but it has been a very long and shallow learning curve for the LSPs and those approaching this project with a measure of arrogance have had to reassess those attitudes. Take as a measure, the number of acute Patient Administration Systems (PAS) systems that the LSPs have installed to date, 18, as we have seen, in three and a half years. This compares to an annual deployment of around 10–15 a *year* in the years before the programme. In those days the deployments were done by the software suppliers themselves, each of whom had about 20–40 staff on the payroll dedicated to the task. So somewhere around two or three hundred people were deploying more than twice as many PAS systems a year as the LSPs would eventually manage with several thousand people focussed on the task. It was a difficult lesson for the LSPs to learn.

But while the National Programme has not delivered many PAS implementations (relatively), it has been successful in other areas, often with (low-profile) infra-

structure projects. For example, it has finally grasped the nettle of security; access control and confidentiality although these issues have yet to be 'put to bed'. It has also been extremely successful with the widespread implementation of digital imaging (X-rays) through Picture Archiving and Communications System (PACS). This was achieved at a pace not possible pre-NPfit. Exciting development of the clinician computer interface have been achieved in a project called the Common User Interface (in partnership with Microsoft) – developments that will have international significance and ultimately improve the take-up of clinical IT by clinicians.

There was also a false expectation about the attitude of these eventual users of these systems – the clinicians. LSPs seemed to believe that clinicians would welcome the provision of exciting new systems aimed at supporting them in their work. As it happens, they were not pushing at an open door, and these critically important users of the system had yet to be convinced that this programme was what they wanted.

The jury is still out then on the LSP model, although it is generally acknowledged that this comprehensive programme could not have been delivered with the existing IT support structure in the NHS. Some of the frustrating delays have been lack of a proven product and in those areas where such a thing actually existed (e.g. some of the PACS products), good numbers of successful implementations have indeed been achieved.

Why did we need to change? What were the problems with the old (procurement) system?

Even the greatest critics of the NPfit would not advocate going back to the old ways of buying computer systems for the NHS, would they?

The old procurement system was time consuming and costly – for both the NHS and their suppliers. Considerable effort went into identifying the local user requirement, and into getting local clinical and management buy-in. This requirement would then be advertised in the European journal and a lengthy and costly beauty parade started.

At best, a short list of half-a-dozen suppliers would be invited to undertake demonstrations on site. These would be followed up with visits to user sites. In order to ensure appropriate buy-in from key Trust personnel, teams of users would be involved in this entire process. In the end, one of the supplier products would be selected. That supplier (usually a software company) would be awarded a contract not just for software, but for hardware, installation, configuration and training. This process did not come cheaply or quickly. Each supplier (or vendor) involved in such a selection process would be expected to give up considerable time effort and resources in order to participate. A rough estimate is that each supplier involved in the beauty parade would have to invest £250,000 each. In the event that their current selection process failed, they would have to re-coup this expense from the next NHS contract where they were successful. The bottom line is, the NHS paid for this bureaucracy eventually.

Critics of NPfit, of course, often point to the lack of clinical engagement in the current programme. It is

Box 2

As the DoH is 'unlikely to complete the programme anywhere near its original schedule', providers should be able to 'select from a wider range' of PAS systems, it concluded
(*Health Service Journal*, 19th April 2007).

interesting to note, therefore, that even in the old procurement model, it was rare for all the users to come to a consensus, and equally rare for many clinicians to get involved in the decision-making process. An NHS Trust employing hundreds of doctors might typically find that two or three doctors would have the time or the interest to get embroiled in a computer procurement, one nurse, and if they were really lucky someone to represent the views of the allied healthcare professions (e.g. the physiotherapists). Nonetheless, the rest presumably felt that they had some 'skin in the game' as at least some of their colleagues had been involved.

Another problem was that these procurements were very 'organisation' based. The Trust would buy a system for the hospital and at best expect it to link to the GPs, but often such integration was not a part of the procurement and primary care would generally buy their own systems too. In other words, the procurements did not support the total patient journey.

Following Information for Health in 1998, the approach to procurements did evolve. A number of combined communities initiated collaborative purchases of integrated solutions across many different organisations and focussed on a local clinical community including primary and secondary care. These were managed through the Local Implementation Plans delivered through Local Implementation Teams.

The frustration currently being felt by some in the NHS is that progress *was* actually being made with the delivery of clinical IT, which has now had to be put on hold for the National Programme. (It is also worth noting too, at this point, that these delays in delivering CfH products have caused some Trusts and clinical communities to go and buy products *outside* the National Programme – an understandable reaction by the NHS to the delays but an action that muddies the strategic vision still further.)

Even these local community-focussed projects required considerable effort to manage the procurements and could probably never have delivered what all the parties wanted anyway. Compromise is always necessary in these processes, and it is difficult to reach total agreement on a single system. In the event, none of the big collaborative procurements ever made it through to completion. The National Programme intervened.

So now the pressure of commercial competition has virtually disappeared from the NHS in England. The rigid landscape of solutions offered by CfH has effectively prohibited local NHS Trusts from selecting their own systems. By adopting a Service Orientated Architecture (SOA), the programme may have hoped it was building a plug-and-play environment, and this would have been fine, but the exclusivity of current LSP contracts would mean your choice of things to plug and play with is restricted to products in the LSP portfolio. And while it could be argued

that once an LSP-preferred supplier fails to deliver to contract, then alternative products could be considered, this is an option that requires failure, and hardly qualifies as user choice.

Nick Harte, Product Director of iSOFT, one of the software suppliers at the centre of the programme, said at a recent workshop event that the introduction of new national systems based on Service Oriented Architecture had brought fundamental changes (E-Health Insider, 2007). He argued that an SOA was the only way to deliver the ambitions and scale required by the programme. 'A Service Orientated Architecture recognises that no one company has the solution'. However, because of the nature of the contract letting within NPfIT, a reducing number of companies now seem to have the solution.

'Interoperability is the key', said Harte. 'All the elements of the solution being put in are interchangeable'.

Did ministers really know what they were funding?

Those of us steeped in the history of clinical IT and health informatics, have had years to learn the language (and its acronyms) and appreciate the peculiarities of the NHS and those who sail in her. Someone so equipped would look at the prospect of changing clinical practice by adopting (appropriately evidence-based) clinical care pathways as challenging at best. That is not because these in the know have 'gone native' – it is simply that unless you appreciate and work around these NHS idiosyncratic ways, you will not get anything done. The assumption then, that a 'one-size-fits-all' approach will work clearly demonstrates a lack of understanding of the clinical family. Assuming that care will be delivered through standardised clinical pathways, without any fuss, belittles the efforts of the many who have been trying for decades to achieve a degree of clinical standardisation.

Lack of understanding as to what is actually in the programme (by those at a senior level in the programme and in government) has not helped either. An example of this confusion can be seen in one element of the programme – ETP (electronic transmission of prescriptions). The ETP is a key part of NPfIT and was initially heralded by some within the programme as a great way of reducing clinical risk through decision-support-aided prescribing. But the transmission of prescriptions and the process of prescribing are very different bedfellows. The NPfIT Board eventually (and formally) acknowledged their misunderstanding in March 2004, and minuted that 'The Board noted the difference between electronic prescribing and ETP and confirmed that ETP would not deliver electronic prescribing'.

There was also a considerable misunderstanding about the actual detail of the programme, with 'NPfIT' becoming short-hand for a 'national electronic record'. On many occasions and in many different settings, references to the programme are made in such a way, as if the *only* deliverable from it was a national electronic record. 'This electronic record programme is a complete waste of money' 'Who says we need a national record. Spend the money elsewhere'. Yet, as we have seen, the genuine business case for clinical IT is for the delivery of intelligent decision support, and IT for clinical care in the local community,



and for these systems to generate a passive record locally as a by-product of the local care process. No one has ever published a compelling business case for a *national* electronic record alone. The justification for this expenditure lies more locally with the local NCRS systems. In addition, the other elements of the programme have their own justification. For example, the ETP element of the programme discussed above might be justified by the potential cost savings from preventing prescription fraud, for example, partial completion of the prescription or substitution of scripts. Or it might be justified by removal of the need for duplicate data entry at the Prescription Pricing Authority in Newcastle. These potential savings are considered to be significant.

Was there enough diligence into the solutions being offered or did it come down to price?

The speed with which the contracts were negotiated and awarded was breathtaking. To undertake such a complex and comprehensive process in such a shortened timescale was remarkable, particularly since the contracts were unique for the NHS, and also because the NHS would not pay the suppliers unless they delivered their products successfully.

It seemed, at the time, to be a foolproof process. The intention was to award contracts only when the solution offered by the LSP could be proven to work and so what was known as 'sand-pit' testing was introduced as a pre-requisite to contract award. The days of the NHS buying 'vapourware' were over. CfH would eventually argue that this was not actually possible as, while what was required of the programme already existed in pockets, the complete integrated solution did not exist anywhere and proof of existence of a complete final working product was not possible. However, as the suppliers do *not* get paid unless they deliver the product then it could still be argued that the NHS still does not buy vapourware. The focus shifted subtly – from requiring proof of a validated product being currently available to requiring evidence of a working product before a penny would be paid; a statement that was contradicted in the special Private Eye report on NPfIT (Brooks, 2007). The sand-pit testing however did enable those negotiating the procurement to assess the LSP's and their software partners working together to demonstrate integrated solutions. The contract payment restrictions they put in place was 'the next best thing' to seeing the finished product prior to contract signing. There have been many winners in this part of the programme with lawyers and management consultants being kept particularly busy.

Smaller companies with a record of delivering were pushed out. Did we need large contracts to make the savings? Have these contracts saved money (if they deliver) or could we have done the same thing with local procurements (from a catalogue of accredited products)

Whenever the National Programme is accused of wasting public money, one defence usually emerges. The contracts, we are told, will only be paid for when the contractors deliver the goods. Suppliers to the National Programme are paid when they deliver completed products and services that are fully accepted by the NHS to be safe, reliable, and

fully functional. All completion risk lies with the contractors. They are liable for any costs that arise. Deliver the programme efficiently and on time and they will (possibly) earn big profits. Deliver wastefully, or late (or not at all) and they stand to make thumping losses. Witness Accenture, originally LSP for two clusters, who exited the programme in 2006 after setting aside \$450 million to cover losses on the programme. Prime contractors are also responsible for managing their own subcontractors' performances – particularly the software suppliers; and so the responsibilities and risks flow down. The NHS, it was argued, could not lose.

But there is also another way that the NHS is set to benefit financially from the programme. A major tactic in NHS CfH's aim to secure best value has been the enterprise wide arrangements (EWA) negotiated with suppliers involved in multiple prime contracts across the NHS. Estimated savings of more than £70 million have already been made through the EWA process. In total, central purchasing of core systems and services by NHS CfH will save the NHS in England an estimated £3.8 billion over 10 years. Independent analysts Ovum have estimated that £4.4 billion is being saved through central procurement of IT systems by NHS CFH compared with what could have been achieved by individual NHS organisations purchasing the same systems separately.

This is the first time the NHS has been able to exercise its full weight to drive down prices and benefit from economies of scale for IT products in this way. This approach has the knock-on effect of putting money for patient care into the pockets of NHS organisations across the country.

Unless the NHS starts to pick up the bills of the LSPs, I doubt that the complaint that the National Programme is wasting public money can really be justified. Money is being wasted, that is for certain. But it is the share capital of the big consultancy companies that won the right to deliver the programme that is being hit. Yes, there have been considerable costs to the NHS too, with its own armies of management consultants and lawyers, but so far the cold equations of the contract have applied. Where solutions have not been delivered, contractors have not been paid.

The other cost to the NHS, if the programme fails, is time. The NHS, as has previously been stated, has been demanding clinical IT for decades. Were the Programme to fail, the NHS would be put back years.

So why could not local communities simply buy their EPR provider products from a catalogue? This approach had been successful in Primary Care computing with GP systems being subjected to a rigorous accreditation process. Why could not this approach have been adopted for secondary care? Allowing local choice of the major clinical systems may well have ensured more commitment from the local clinicians as they would have felt less that the system was being imposed on them.

As we will see later, the five cluster model almost precluded this approach. A model based on local communities could well have been more successful with their implementations if more local choice had been possible, but then again the NHS would not have benefited from the bulk-buying discounts.

The sad fact of life is that myriad small suppliers have been pushed out of the picture. Perversely, it was often

these smaller suppliers who generally had a good record of delivering clinical IT to the NHS.

How much will the National Programme cost?

This question was asked of Parliament, and according to the Parliamentary answer of 12 December 2006 we now know what the costs will be. The data spine will cost £620 million over the life of the programme. The New National Network (N3) will cost £530 million, and Choose and Book £64 million. The LSPs NCRS offerings are London – £996 million, the North East – £1399 million, the West Midlands/North West – £973 million, the East and East Midlands – £934 million, and finally the South – £986 million. It comes to a total of £6.5 billion. Well we knew that already. Actually, it will be considerably more than that when implementation costs and training are included. As Sir John Pattison himself acknowledged, the cost of the contracts is only a part of the overall costs of the programme.

But £6 billion – possibly £12 billion when all costs are added. Is this a lot of money? Well yes – in anyone's book it is. However, consider it in the wider context of the NHS spending. Over the same period (let us take the programme life as 10 years rather than the seven immediate years of the initial contracts) the NHS will spend £3.3 billion on electricity and gas. It will spend £20 billion on drugs, £14 billion on X-rays, £6.6 billion on transport, and £42 billion on agency staff. And consider this spend against the amount that other industries spend on IT. It will still amount to less than 3% of overall NHS spending. Local Government already spends 4–5% of revenues on IT. Banking spending considerably more at 6–7% of total income. Derek Wanless (2002), who was asked to review IT spending in the NHS hinted at a target figure of 4%. That would amount to around £34 billion over 10 years.

And the NHS is an expensive business. In every day, our NHS will spend:

- £170 million (i.e. £2000 every second),
- £10 million settling litigation claims,
- £2.8 million on treating patients who have MRSA,
- £1.3 million on treating patients who have had an adverse drug event.

Implementing IT in the NHS to underpin the delivery of clinical care is done to reduce risk and improve patient safety. If used appropriately to re-engineer service delivery where appropriate, it has the potential to reduce these costs significantly. The Programme is not just about the national record – the benefits are far far greater than that.

Rip and replace

Many would argue that the policy of replacing PAS systems with new PAS systems was a waste of perfectly good working applications. Sitting a clinical module on top of these legacy systems and integrating to specialist clinical modules may have been a workable alternative model.

This approach, often referred to as 'Best of Breed', uses existing 'legacy' applications like the PAS or specialist modules, and simply adds an integrated generic clinical application on top. Before we examine this aspect of the programme in a bit more detail, let us remind ourselves of

Box 3

... The project is costing more than £12 billion, enough to pay for 60,000 nurses for 10 years or for Britain's participation in Iraq and Afghanistan twice over (*The Telegraph*, 17th April 2007).

the objectives of this multi-faceted programme. These were to:

- Deliver a Broadband network service.
- Deliver the transmission of prescriptions from GP practices to pharmacies.
- Support on-line appointment booking through Choose & Book.
- Create a national EPR or spine (NCRS).
- Provide local integrated clinical systems (Local NCRS).

The first two components are virtually 'stand alone' and while their delivery is an important part of the programme, they can be considered in relative isolation. Choose & Book is also managed as a separate programme although its development requires its functionality to be embedded within the PAS and GP system, which makes Choose & Book interdependent on any of the wider changes to the NCRS element of the Programme. But while we consider the 'rip and replace' approach, let us consider, and appreciate, the NCRS element of the programme.

NCRS consists of the national data spine (and all its functional components) and those NCRS elements that will be delivered locally. The local elements are those sometimes referred to as the 'doing' systems, including local GP systems with their array of clinical functionality, and those in hospitals and other community settings including electronic requesting of radiology examinations/ordering of laboratory investigations/electronic laboratory reporting and electronic prescribing and medicines administration. These local systems also have integrated care pathways to support the patient journey as a key component.

Now if this programme was simply about producing an electronic record of care, this could have been achieved with any set of integrated clinical systems and PAS's. The programme would have simply standardised the output from these systems regardless of the product or supplier, and the record elements could have been extracted and stored either locally or nationally. But one programme objective is to support the entire patient journey with intelligent clinical IT. A patient in the GP surgery is put on a pathway of care. That pathway is then used as the vehicle for the delivery of evidence-based medicine by *all* agents whether primary care, secondary care, social services, etc. Supporting the delivery of care in different organisations by different groups of clinical and non-clinical users becomes very difficult, if not impossible, if the systems in each of these organisations are from different suppliers and are not integrated. The simplest option is that all sectors use systems that are at least integrated and preferably part of the same integrated suite of clinical systems and managed by a single vendor. And so the model emerged where the primary and secondary care clinicians had to have, and use, the same system and thereby be capable of all contributing to the same clinical pathway.

Was there a better way? Could we not have used these legacy systems (such as the existing work-horse patient administration systems) and layer on a generic clinical 'doing' system? Would it have been possible to leave a degree of local choice of clinical systems, which had to be compliant to some accreditation/standardisation scheme while developing some pathway layer that would have been a national product? The answer may well have been 'no'. But the lack of a transparent discussion of these options contributed to the festering criticism we continue to see today. Perhaps it was considered. Perhaps it was concluded that contractually, it would have been too difficult to agree contracts where every site runs different combination of systems and perhaps, this would have meant that the 'bulk-buying' discounts would not have been so generous. Who knows?

What is it in the programme that the critics are objecting to?

It is all too easy to jump on the bandwagon and complain about the lack of progress with the programme. That can be unfair. The Programme has made significant progress with some elements. One unfortunate consequence of the misperception that the NPfIT is just about producing the national EPR is that progress with other parts of the programme (like PACS or the Common User Interface) are ignored and any delays with the complex electronic record development suggests the widespread failure of the whole NPfIT. However, these delays in delivering the contracted software are still hard to defend. It was always going to be a difficult programme. The naivety of some who thought this hugely complex programme of work could be delivered in 2 or 3 years simply demonstrates their lack of understanding of the complexity of healthcare let alone the potential risk of implementing IT into that complex environment. What is less understandable is the suggestion from some on the bandwagon that this programme *itself* is totally inappropriate. In what way?

Information for Health, in 1998, identified a sensible and pragmatic strategy for health IT. The same people who criticise NPfIT would probably have applauded sites like Wirral NHS Trust and Queen's Hospital, Burton. Both sites had invested massively in integrated trust-wide IT systems. Both are working examples of the benefits that effective systems can deliver to a busy NHS Trust. Is not this what NPfIT is trying to do? Is not the Wirral and Burton functionality exactly what has been bought? The fact that it has not yet been delivered (or even built) does not mean the *requirement* is wrong. NPfIT has simply taken that vision and contracted it out to suppliers through a new delivery model – the LSP's.

You may argue that the decision to split England into just five clusters was a mistake. While it enabled maximum bulk-buying discounts to be achieved, in hindsight it may be considered that these clusters were too far removed from the real clinical communities. At the time of contract award, there were 28 Strategic Health Authorities. It may have been a better model had there been 28 LSPs. Who knows?

Another potential contributor to the problems the Programme now faces is the relationship between these LSP's and their customer.

'Who is their customer?' you might ask. 'The NHS?' you may propose. Unfortunately, to the LSP's, CfH was the

customer. This may explain some of the problems experienced in these early days. With NLOP (NPfIT Local Ownership of the Programme), we may see a closer relationship between the LSPs and their users (and ultimate customers) – the NHS.

Architecture

The architecture for the NCRS revolves around the central Data Spine. This is not simply a national repository of clinical information. It is a far more 'active' component than that. 'The Spine' or 'The Data Spine' is the name commonly given to the combined national databases and applications, working on key information about a patient's health and care, that forms the core of the NHS Care Records Service (NHS CRS). While some in the Programme object to the word 'spine', the name nonetheless seems to have stuck, partly perhaps because it casts the spine as the 'backbone' service, the piece of the central system that does no real work on its own, but is essential in communicating messages between the other operational components.

Common sense appears to be prevailing with the data spine. At the start of the Programme, it was envisaged that the Spine would contain most of the patient record, so that nearly all your medical record and mine would be held in a huge central database. This overambitious expectation has now been watered down considerably. Detailed information about all of a patient's contact with the NHS will now be held only at the local level, where most healthcare is administered. The spine will now only hold significant summary items from the record. However, it will also manage a set of key functions of those local systems including access control.

Why have a Spine?

Once the NHS CRS is fully implemented, having each patient's summary record stored on the Spine will mean that wherever and whenever a patient seeks care from the NHS in England, those treating them will have secure access to summary information to assist with diagnosis and care. The summary record will also point clinicians to where full local records are held. This should provide safer, more joined up care.

What will the Spine do?

The Spine will store personal characteristics of patients, such as demographic information. It will also store summarised clinical information, which may be important for the patient's future treatment and care, such as allergies, visits to A&E, and adverse reactions to drugs. It will ensure the security of systems required to restrict access to the national and local systems, and will provide a secondary uses service, using anonymous data for business reports and statistics for research and planning purposes. Finally, it will interface with all the local IT systems within the National Programme.

The National Programme had wanted a very aggressive timetable and there are some who believe that despite the initial pain, the NHS NPfIT had taken the right route in mandating tough standards and adopting a SOA, the benefits of which were now being seen.

Part of this approach to the architecture of the elements of the programme has been to define and adopt an SOA for healthcare, comprising centrally provided national services – the spine ‘business services’. These include patient ID, security, and authentication, which can then be utilised by interoperable administrative and clinical applications. In August 2006, the first implementation of the Summary Care Record within the NHS CRS (termed rather snappily 2006(b)) was activated. In line with the policy of the Clinical Leads for a phased introduction to gain professional and public confidence, this release will contain only one key clinical record deliverable – the GP part of the Summary Care Record.

The GP Summary Record will be derived from practices, which have a National Programme-compliant clinical computer system and with data that meets defined quality criteria. The data quality will have to be assessed and approved before a practice can upload its patient data. When a practice meets these two criteria, a local public information campaign will precede the upload explaining precisely which practices are about to have patient data uploaded to the spine. However, even though the aims of the data spine are now considerably less than they once were, this is still a fundamentally different approach to that advocated by people like Frank Burns who said that the real and genuine benefits (and therefore savings) should be at a local clinical community level – building from the bottom up. Was there a better way?

Engaging the clinicians

When the first edition of the author’s book was being printed in 2005, there was already an increasing concern that a lack of clinician engagement, (understandable during the confidential contract negotiations), would result in a feeling of apathy among the clinical staff – at best. At worst, it might mean downright hostility (Brennan, 2005). However, a survey by doctors.net found overwhelming support for the NPfIT. The survey of 2200 doctors found that a large majority believe the medical profession should support the National Programme to modernise NHS IT systems. This does not necessarily endorse the way in which the implementation has been managed, but it does lend weight to the aims. It also confirms the views of a number of Medix surveys, and NHS CfH’s own MORI survey, that the majority of doctors agree that the National Programme is a priority for the NHS. However, it is apparent that the support is waning. As reported in the latest Medix survey November 2006 ‘When NPfIT was launched, doctors, recognising the critical need for greater investment in IT systems for the NHS and in particular in the benefit to patients of an integrated clinical record, were pleased that the Government had decided to allocate substantial funds to a radical update of NHS IT systems. They were enthusiastic supporters of the initiative. Today, four years later, half of doctors know little or nothing about it, hardly any say they have had adequate consultation and most think the project is being poorly implemented. Because of this, and despite their continuing belief in its potential benefits, doctors’ confidence that NPfIT will deliver those benefits is undermined and their enthusiasm is waning’.

Box 4

Far from being a waste of money, it is actually producing savings for the NHS. The procurement process undertaken by the National Programme for it set new standards for the public sector and it has already achieved major savings for the NHS on hardware and software (Connecting for Health’s Myth Buster, accessed 13th May 2007).

In February 2007, it was reported in ‘The Register’ that NHS doctors have given the controversial new £12billion IT system their backing, but say that no more money should be spent on it. In a survey of 3000 doctors, 66% said they think the new system would make a positive change to the NHS (Pinsent Masons (Out-Law.Com), 2007). In a survey carried out by website Doctors.net.uk for *The Times* newspaper, 86% of the doctors surveyed said they thought the scheme should *not* be abandoned. Doctors were asked whether they were optimistic that the CfH IT system would change the way the NHS is run and 91% said yes. When asked if they were sceptical that it will make a positive change, 66% said they were not sceptical.

Surveys like this have demonstrated a very positive measure of support and commitment from coal-face clinicians that is essential if the programme is to succeed. But this general support appears to have been eroded as the programme continues to attract bad publicity. What has not helped has been the constant change of clinical champions. Personnel changes since 2002 include the departures of Aidan Halligan and Sir John Pattison, Dr. Anthony Nolan, Prof Peter Hutton, Lord Warner, and Lord Hunt (who has since returned). The nursing champions have also changed with John Badham and then Heather Tierney-Moore leaving their roles as nurse champions. It is difficult enough to stimulate and maintain the interest of busy clinicians and especially so if their ‘champions’ do not hang around long enough to deliver the programme.

An interim solution

The delivery of the NCRS will consist of a rolling programme of projects which will, in principle, deploy new applications into Trusts as their existing systems reach the ends of their support contracts, or as they are ‘ready’ to move to the deployment of new applications. Under the original planned phases, no Trust could proceed with the deployment of clinical applications unless that Trust had already implemented the PAS. This effectively delays the clinical phase for Trusts that have an acceptable existing PAS.

Consider the three clusters that are set to deploy the iSOFT applications with CSC Alliance as the LSP. The principle architecture components were originally planned to be:

1. *i.Patient Manager (iPM)* – Formerly the iSOFT PiMS system. This is the PAS application. Most sites were expected to deploy this first.
2. *i.Clinical Manager (iCM)* – This is the application derived from the original Eclipsys Sunrise Clinical

Manager system. In the clinical stage, iCM will handle ordering.

3. **LORENZO:** LORENZO was the new application promised by iSOFT. It should act as a common point of entry to the system for all users, handling Single Sign On (SSO), as well as linking to the 'spine' for Role Based Access Control (RBAC) and for Legitimate Relationships (LRS). In use, LORENZO will present clinicians upon log-on with a patient list, and it will include results viewing.

The two principal applications would be linked using iSOFT's own i.Integration Engine (iIE). This in turn should link to external integration engines and to external laboratory and radiology systems. Well, that was the plan and it seemed straightforward. Trusts would start by replacing their old PAS systems, and then they would deploy orders and results. But apparent delays in the development of LORENZO led to a reconsideration of the deployment plan. The sticking point is the ability of the whole architecture to work *without* replacing the legacy PAS. In principle it can. iCM has successfully been deployed with non-iSOFT PAS systems in sites like Salford, Southmead, Guy's Hospital, Durham, and St Helier hospitals. The difficulty for the Programme is related to the iSOFT LORENZO development. Confident that LORENZO would be ready on time, the versions of iCM built for the Programme would not work without the complete LORENZO architecture. That meant that sites with modern functional PAS systems could not leapfrog the PAS deployment stage and go straight to the clinical stage, as they were able to do before the Programme began. The brave new world of interoperable 'best-of-breed' applications that was sold to the NHS begins to look like the old monolithic system that so many NHS solution-architects were trying to avoid.

One size fits all may not deliver what is needed

As Frank Burns said in the BJHC interview 2002, 'I do get nervous that there are people far away from the reality of implementing the strategy and very far away from the culture in the NHS who have this notion that they can simply contract at a national level, for a national solution. I am sure there are still people who think that. I personally think it would be a disaster if ever such an approach were attempted. Integrating healthcare records over the lifetime of an individual, through a whole series of ill-health events, involving a combination of agencies and dozens of different professionals is complex and requires excellent technical solutions and vast degrees of cultural and organisational change. To suggest you can build that and roll it out in the same way that you would roll out a supermarket check-out system displays to me, incredible naivety that would make you seriously concerned about their understanding of the complexity of healthcare'.

That is the dilemma. One size will not necessarily fit all. Every healthcare organisation is different. Maybe they should not be as different as they are – but changing the nature of our healthcare institutions may be a bigger challenge than making the IT systems flexible enough to support the different ways they choose to work. Forcing a single solution with no local tailoring onto these busy

clinicians will not work and this aspect itself is a potential risk to the programme.

Conclusions

Brooks (2007) suggested that, 'those running the programme talk only about the specifics of what is going well and what can be delivered'. It is equally selective for the critics to only talk about the parts of the programme that are failing and what cannot be delivered on time. A reasoned commentary lies somewhere between these two extremes.

In essence, the National Programme's content was agreed over the last 20 years of health IT with successive programme and projects agreeing a blueprint for the future development programme. This blueprint culminated in a clearly defined strategy for electronic records as articulated as the outcome of the national EPR Programme and the follow-up programme ERDIP.

The Six Level EPR model was a reasoned pragmatic solution that was well received by both the NHS and Suppliers alike. The interactive CD Rom used to promote the model soon became a Health IT icon of its time. But its time may well come again. This comprehensive and complex programme cannot be delivered overnight and will not be delivered through a big bang. There needs to be an incremental plan and the old EPR model could be dusted off and tweaked. (The author still has copies of the original interactive CD Rom for those interested in reviewing it! For further information, visit www.eprarms.com)

This model ensured the way to do it was simple and well understood. EPR would be built at a local clinical community level. It would consist of integrated clinical and administrative systems. These would produce a passive record, held locally. A national summary record (the EHR) would be fed from these local systems. 'Would be' implying that this is some future functionality and not a pre-requisite from day one.

In my view, the NPfIT turned that simple approach on its head. NPfIT decided that the main objective of their programme was a single national electronic record. Most of the problems with the Programme can be traced to that fundamental re-interpretation of what the NHS needed. It might have been workable if this was allowed to evolve over time, so long as the programme's primary objective was left untouched – to put in place effective, workable local systems that support the way that healthcare professionals work in local organisations.

Halfway into the programme, the LSPs have yet to convince the NHS that they really can deliver solutions and change effectively. Perhaps the scale of the challenge is just too big for them. There was a stage, in 2003, before the NHS in England was divided into five arbitrary clusters, when we all expected the delivery model to be much more local. As discussed previously, we had 28 SHAs back then, and we expected a process where 28 service providers would be appointed – one for each SHA. It is hard to escape the view that, if this had been the model, we would be looking at a Programme much closer to completion. Each local contractor would be dealing with less than half a dozen Trusts; work would have started much sooner; the relationships between Trusts and contractors would have been closer.

Smaller contractors could have been lighter on their feet dealing with software delays. But multiply that up to the huge clusters that we have today, and the model becomes huge and unwieldy. Trusts who are in no hurry to move can bide their time. No one is in the spotlight. Maybe NLOP (NPfIT Local Ownership of the Programme) – due to come into force in September 2007, will change that. But even so, SHAs are much bigger now. It would not be easy to regenerate the enthusiasm for change that was so prevalent back in 2004. And will NLOP really mean a shift in decision making down to these re-defined SHAs or will the major decisions continue to be made behind closed doors and then the NHS expected to act on them?

There is a need for an electronic record. The static, paper-based record has been a significant barrier to any new ways of working. The NCRS data spine will enable considerable re-design of the NHS with patient choice the major driver for change. But in the early days, patients will tend to choose what they know and it may have been more sensible to deliver local solutions and a local record first before worrying about the national electronic record that appears to be driven by political need and desire rather than a clinical or public one.

So while the national record is a pre-requisite for this changing care-delivery model, with the existing organisational model we have at the moment, there currently is only a weak business case for the investment in the comprehensive national electronic record. There is however a considerable clinical business case *now* for the implementation of local systems to support the clinicians in what they do and in these systems producing a local electronic record. It may have been more pragmatic to implement these local clinical systems first and in time pull their outputs together in a large single national database.

Consider two approaches to this national record problem. If you wanted to create the ability for a fit and healthy cyclist to ride across England, North to South and East to West, you could sit down and create a national cycle way. This could be then imposed as a national cycle way and rigidly enforced. An alternative model may be to create local cycle routes based on say a 50-mile area, enabling the majority of cyclists to engage in their hobby at a local level. In time, these local routes could be linked into a national cycle network – like the Scottish National Cycle Network.

So, in developing a national electronic record there are two choices: Adopt the big bang centralised psychopathic route or the locally focussed eventually networked local route. The choice is yours: Psychopath or Cycle Path.

More seriously though, back to our £30 billion question once again. Will NPfIT work? Yes, it will deliver new technology to the NHS. The Programme has many elements, some will be successfully implemented and others not. But for the NHS to grab the opportunity that this programme offers for the NHS, the clinicians need considerable encouragement, a clearer idea of what will be delivered and evidence of benefit.

Will the programme survive a change in Prime Minister or even in Government?

We should also be very clear what the programme is all about. The view that NPfIT is simply about delivering a national electronic health record must be exorcised.

Finally, to date the public debate about NPfIT has been confrontational on both sides. This is not a climate in which criticism can genuinely be seen to be taken or given as constructive. Healthy debate and constructive criticism should be welcomed and indeed invited. Jumping on a critical bandwagon for the sake of it is not helpful.

We all want this Programme to succeed.

It is *our* NHS, it is *our* Programme, and it is *our* money. It is in no one's interest for it to fail.

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About the author

Sean Brennan had a long career in the NHS initially in Pathology then as a general manager and information manager responsible for the Resource Management, Medical Audit, and IT staff. In 1993, he was seconded to the Department of Health as a Clinical Audit Advisor and in 1996 he was appointed as Project Manager for the national Electronic Patient Record Project in England a position he held till 1999 when he had a dual role – split between the Health Department of the Scottish Office and the NHS Information Policy Unit in England. In July 2000, he joined Northgate Information Solutions (formerly MDIS) as Head of Healthcare Strategy, experiencing life in the commercial sector. In 2002, he launched Clinical Matrix Limited, a network of consultants engaged in strategy development; business cases; clinical change-management; and general informatics projects for the NHS and commercial customers. His book 'The NHS IT Project. The Biggest Computer Programme in the World Ever!' was published in April 2005 by Radcliffe Publishing and it considers the National Programme for IT (NPfIT) as being delivered by Connecting for Health in the context of the last 20 years of health IT. He has been project manager for the 'IT Implications of the New Ways of Waiting' project for Scotland since 2005.