

COMPLEXITY AND CONTRADICTION IN IT POLICY: THE CASE OF THE NHS NATIONAL PROGRAMME FOR IT

Justin Keen

Editors' Introduction

This chapter looks at the unintended consequences of a huge technology-based modernization project; the NHS National Programme for Information Technology in England. The project was envisaged by policy-makers in the Department of Health as a major rationalization of the NHS, gathering together all patient information in a single record for every citizen, accessible to health practitioners from across a range of services. But the NHS is a collection of organizations with a troubled history of failed information technology projects and a complex legacy of multiple systems for specific tasks, operating in parallel. There are also successes in some areas, where important links between systems have been developed and fostered over many years. Modernization plans introduced in the 1990s ignored these previous on-the-ground efforts, with policy-makers taking a fatalist view of the ad-hoc untidy nature of existing arrangements and the lack of integration between systems. Policies were aimed at 'tying down the future' with a new 'gold standard' of a centralised, integrated system which would radically simplify the organization of health information. Yet seven years after its conception, and a huge outlay of resources, the project remains only partially implemented and appears to have introduced additional complexity and uncertainty to the NHS information environment. A national 'spine' of basic information about citizens exists, but none of the stakeholders seem to know what kinds of patient information should be attached to it. The future is more uncertain than ever, as policy-makers continue to devote resources to the project, seemingly playing for time as they wait for an appropriate problem to fit the technological solution they have bought into.

Introduction

None of us is surprised when we hear that a major project is running late. We tend to assume that it will be completed eventually, or abandoned if problems

prove to be insuperable. But what are we to make of a project which is costing billions of pounds, but has no clear end date, and yet there is no sign of it being abandoned? That, in essence, is the fate of the NHS National Programme for IT in England.

In order to understand how the NHS National Programme has arrived at this point, we need to go back in time and re-trace the steps taken by the key parties involved. It turns out that there are two distinct tracks, which only really merged when the NHS National Programme was announced in 2002. One track leads us through developments in computing in NHS organizations. The NHS can claim a creditable track record in implementing IT systems for general practitioners (GPs), though a more patchy one in hospitals, and many nurses and other clinical professionals still make limited use of IT even today.

The other track is the one trodden by policy makers down the years. While there are clear and unsurprising differences between the earliest IT policies in 1990 and those of today, there are also important continuities. For example, it is possible to trace a growing commitment to the belief that it is possible and desirable to integrate all of a patient's personal data in single electronic health records. Similarly, it has always been assumed that doctors and other clinicians will collect data for their own use, but that key data will also be passed to and used by central government. The NHS is funded mainly through general taxation, so it is reasonable for governments to monitor the use of public resources. As we shall see, though, fundamental disagreements about the nature of that monitoring have cast a shadow over NHS IT policy making for the last 15 years.

The two tracks lead us to the central paradox in the NHS National Programme, and indeed in the aspirations of health policy makers in many other countries. Modern IT systems are viewed, by their proponents, as technologies which *reduce* complexity. This was certainly the view of the cheerleaders for the National Programme at the start, who spoke about 'ruthless standardization' of behaviour through the use of integrated IT systems (Department of Health 2002), and rapid - unproblematic - procurement and deployment (Brennan 2005). It was as if they

believed that they could see into the future, to a world where large scale integration had been achieved. Yet one of the most distinctive features of the Internet and other large scale electronic networks is that they *increase* complexity. That is, the more one tries to integrate services the greater the challenges of dealing with heterogeneity and scale. In the NHS, integration requires co-ordination across professional and organizational boundaries, and across large geographical distances. Yet it has always been difficult to achieve effective co-ordination. Services are inherently uncertain - health care is not a uniform process, akin to a car production line. Professional boundaries are jealously guarded. The realization that this was an important consideration in the NHS came late in the day (Nicholson 2008). The integration promised by IT networks has run into severe co-ordination problems, in part because organizational and professional boundaries are deeply entrenched and stoutly defended.

The next section sets out the political contours and administrative context of the NHS and other health care systems, as it is not possible to understand IT developments without some understanding of the landscape. This is followed by the brief accounts of the development of selected IT systems, and then a re-tracing of the tracks laid down by policy makers. The final section sets out the central paradox, and argues that it rests on deeply held beliefs about the potential of IT networks to enable policy makers to impose tight control over the behaviour of doctors and other clinicians.

The Political Landscape

Three general characteristics of the NHS are relevant to this account. First, all health care systems in developed countries are based on long-term political settlements between the most powerful interests. Moran (1999) argues that the state, clinicians (particularly doctors) and technology suppliers are locked into a long-term triangular relationship with one another. The arrangement has been stable over long periods because each party derives benefits from the relationship. For example, pharmaceutical firms have access to markets to sell their products, doctors can use those products to provide high quality care, and governments

benefit by being perceived to have supported a valued service. By comparison with GlaxoSmithKline and other pharmaceutical firms, IT suppliers in England have historically been minor players, but the amounts of money now committed to the NHS National Programme for IT suggests that they now have a place at the top table.

It is important to stress that the triangular relationship has not always resulted in services that serve the wider public interest, however that term is defined. For example, there is clear evidence that doctors - who control the majority of resource allocation decisions in practice - are reluctant to work in more deprived areas (Acheson 1998). Given that health problems increase with decreasing household incomes, the result is that service provision is inversely related to need. There is also good evidence of unjustified variations in both the content and quality of care across the country (Dixon et al 2007).

Second, the NHS is a bureaucracy, but one with some peculiar characteristics. In the early 1990's the NHS was subjected to a New Public Management makeover. A number of structural innovations were made, including the introduction of an 'internal market' wherein the purchasing and provision of services were separated from one another. The story of the rise and fall of the internal market has been told elsewhere (Klein 1998, Moran 1999), but the essential point here is that it kick-started a drive to increase the amount and quality of detailed information collected about services being provided. The NHS has been subjected to successive rounds of reforms - upheavals might be a better term - ever since, and at present it is in the grip of overt moves to contract out health service provision to private firms. As with the internal market these policies have been both controversial and at best partially successful. Indeed, far from devolving authority the 1990's reform programme led to centralization (Hacker 2004). The reforms greatly strengthened the hierarchical relationships from hospitals and other provider organizations upwards through district and regional general management tiers. One important result is that the government has been able to introduce strong top-down performance management.

Third, the NHS has always been riven with inter-professional problems, with increasing professionalization over the last twenty years contributing to co-ordination problems on the ground. Throughout this account, it is important to bear in mind that the state may have a legitimate interest in monitoring and evaluating the work of doctors and other professionals.

Information Technologies On The Ground

Throughout the last 20 years, most IT investment decisions have been made by individual NHS organizations. For straightforward reasons, relating to the scale and complexity of health care, IT solutions developed along functional lines. Discrete systems have been developed for GPs, for out-patient clinics, operating theatres and so on. At least until recently, NHS managers and clinical staff have not had to wait for national initiatives, so that these various systems have diffused across the NHS or faded away without central intervention. This section sets out a number of thumbnail sketches. The accounts show that there have been some important successes, as well as the inevitable false starts and failures. Crucially for this chapter, the successes highlight the ways in which initiatives on the ground have grown up in a piecemeal way, with few links between them. Looked at as a whole these local arrangements form an important legacy and a major co-ordination challenge for the new centralised plans laid out in the National Programme for IT.

GP and pathology systems: two successes

Around 90 per cent of all contacts with the NHS are in primary care, and the great majority of these are with general practitioners (GPs) and practice-based nurses. Twenty years ago, there was little in the way of IT in primary care. But developments were afoot. The Department of Health paid for the development of a system for remunerating GPs, who are independent contractors and who have always been paid through a complicated mix of flat fees and tariffs for specific activities (such as providing health screening services or minor surgical procedures). In the late 1980's a number of small specialist IT firms worked closely with GPs, and developed early commercial systems, which in the early days

were useful for automating the complicated 'back office' administration of GPs' incomes, and resulted eventually in GPs being able to submit claims electronically.

From the start, the firms and the GPs envisaged that their systems should also be integral to clinical work, and so hold all of the data that GPs would need to diagnose and treat their patients. During the 1990's, more and more GPs purchased systems, so that by the end of the decade the great majority of GPs had them on their desks. Today, it would be a rare event to see a GP without the computer system playing a role in the consultation. However, as we shall see these systems do not link with one another, and there are still only limited direct links between GP practices and hospitals.

A similar story can be told about pathology systems. Hospital doctors and GPs are both heavily dependent on pathology services to help them with diagnosis and treatment. A typical hospital pathology department undertakes millions of tests each year for its own doctors and for local GPs. In the 1980's, a number of pathologists who had active interests in IT began to develop systems and communications standards that would allow their colleagues to make electronic requests for pathology tests, and for them to receive the test results once they were available. Pathology department systems - the machines that analysed samples - were becoming progressively more automated, but were producing paper printouts which had to be sent out in hospital internal mail or by post to GPs.

It seemed a natural, if big, step to link the analysers to IT systems in order to capture results and send them to the people who had ordered them electronically. Pathologists and interested GPs worked with small specialist IT firms, initially to develop electronic links within hospitals and to small numbers of practices. As with the development of GP computing, pathology test reporting became more popular over time, so that pathology departments have gone a long way to removing paper from their reporting processes. This said, and echoing the situation with GP systems, the links are still one way: in most places GPs cannot make electronic requests for tests (Lord Carter of Coles 2008).

In both GP and pathology computing, it is striking that developments have been professionally led, and have diffused across the NHS steadily over a period of 20 or so years. Over time, more and more GP practices have received pathology test results electronically, with the results being entered automatically into GPs' patient records. In the last five years the development of electronic communication of pathology data has been supported by the NHS National Programme, an example of a quiet development away from the limelight.

A Mixed Picture

There are further successes to note. Twenty years of NPM-inspired reforms have resulted in a Service with solid finance systems, which have developed in parallel with increasing demands on the quality of financial information. Similarly, the basic administrative systems in hospitals - called patient administration systems - were first implemented in the 1970's. These systems support mundane, but vital, functions such as booking of out-patient appointments and admissions. However, many patient administration systems are still based on 1970's technology, have not kept up with wider technological developments, and yet in many hospitals have not been replaced, and have to be continuously patched up.

This brings us to the strange case of parallel information systems in health care, and to structural problems of the kind that generate paradoxes of modernisation. While there have been successes in primary care and in 'back office' hospital systems, the fact is that hospitals and community health services - district nursing, health visiting and the like - are still awash with paper. Principal among these are the medical, nursing and other records that professionals use when they see patients, and the forms and letters that hospital doctors send to GPs. There are two consequences of reliance on paper-based systems. The first is that they do not aid the kind of co-ordination required for safe care. (This observation underpins all thoughtful arguments for electronic patient records: they may not turn out to be achievable, but the basic premise is perfectly reasonable.) The second is that the records are disconnected from the administrative and finance systems, which effectively work in parallel in most places. Upwards reporting to

the Department of Health is based mostly on the administrative and finance systems, so that central returns do not directly reflect the data in clinical records.

The problems involved in the operation and use of multiple parallel systems within and across specialist areas of the health sector are well illustrated by the case of radiology systems. Broadly speaking, radiology services are similar to pathology services. Radiology departments provide diagnostic services to both GPs and to hospital colleagues, though in their case the services are based on making and interpreting medical images including x-rays, CT scans and MRI scans. Yet the trajectory of technological development has been very different. Radiology information systems have been available and routinely used since the late 1980's. They were developed as local versions of patient administration systems, and used for booking and tracking patients through radiology services.

Then followed the move from film - including x-ray films, the films that are stuck up on light boxes in any self-respecting medical soap - to computerized imaging, and on to systems which hold all types of images in one place, called Picture Archiving and Communication Systems (PACS). PACS were first available in the early 1990's, but were expensive, costing several million pounds per hospital, and a lot of money for what are essentially storage devices. Images were typically only available within a radiology department, and possibly in the one or two specialities that were the heaviest users of imaging services such as orthopaedics and general surgery. In contrast with pathology services, the focus was on capturing and storing radiology images rather than on communicating results - radiologists' interpretations of images - to medical colleagues. The result is that, in many hospitals, radiologists' opinions were - and still are - dictated, transcribed and then posted to the doctors who have requested opinions. In other words, radiology departments have maintained the separation of clinical and administrative data.

In order to round out the picture, it is important to note that there were many calls for system integration in this earlier period. Papers setting out ideas for electronic patient records were first published in the 1960's. In the UK the Department of Health published a report - the Tunbridge Report - proposing

electronic medical records as long ago as 1965. Since that time there have been dozens of initiatives supporting the design and implementation of electronic records technologies. As we have seen the result is some successful stand-alone records systems. As the next section shows, though, *shared* electronic records have proved to be a graveyard for the ambitions of policy makers.

A similar situation prevails in telemedicine - this being an umbrella term for using electronic networks to allow remote consultations or advice giving. The first formal studies of telemedicine systems were reported in the 1970's (Moore et al 1975, Dunn et al 1977). There have been technological improvements over the years, and a progression from 'near-laboratory' applications, through early commercial systems using proprietary technology to solutions which use cheap and reliable mass market equipment over the Internet. In spite of the reduction in costs, the diffusion of telemedicine applications in clinical practice has been slow and take-up is still very patchy. The history is one of large numbers of initiatives, most of which have failed to diffuse beyond small numbers of enthusiastic users (Coiera 2006, Wootton 2001).

IT policies since 1990: from technicians to technocrats

This section covers the IT policies that prevailed in the NHS from the 1990s. It shows that there were two distinct phases of policy making. The first phase was characterised by central exhortation to design and implement new systems to support both administration and the delivery of services. In the second, the most recent plans have sought to impose reforms on the basis of central technology-focused objectives, rather than building on the best of the endeavours on the ground that were described in the last section,

As noted earlier the milestone 1989 White Paper, Working for Patients (Secretaries of State 1989), set out proposals for an 'internal' market' in the NHS. Policy makers in the Department of Health realised that the new arrangements would require detailed information about the health of local populations, so that purchasers could allocate resources to where they were most needed. Providers would need to collect data on the volume, cost and quality of services and use it

as the basis for negotiations with purchasers. They would have to show what they had done in order to persuade purchasers to pay for it. The view was taken that these new requirements could only be met by using IT systems. The drive came from politicians and civil servants who wanted the reforms to work, and so were motivated to produce their own plans. The first result was the Framework of Information Systems in 1990. This was followed by the more detailed Information Management and Technology (IM&T) Strategy in 1992.

The dominant theme was centralization. Both the 1990 and 1992 policies emphasised the importance of ensuring that the Department of Health would have the data it needed, which would be derived from local systems across the NHS. (So much for Working for Patients presaging a new era of NHS managers freed from central control.) What is more, the fact that important early IT development was already under way in the NHS was ignored: policy was not connected to realities on the ground. There were no detailed statements on the usual bedrock of IT policies, such as standards for inter-operability of systems. There were no convincing statements about the ways in which IT would support the key Working for Patients policies in practice. It is one thing to say that IT will support a policy, another to explain to NHS managers and clinicians which systems they should buy, and why. This was policy making of the vague exhortation variety.

Unsurprisingly, the consequence was that not much happened, at least in the arenas of interest to policy makers in London. In the event, everyone was let off the hook because the NHS internal market experiment was slowed down and then quietly dropped around 1995. (This era has been reviewed elsewhere, see Webster 2002). But the IT supporters at the Department of Health had secured a foothold in the policy firmament. One tangible result was that, in 1994, they were able to sign a contract with suppliers including BT and Cable and Wireless for an NHS network, NHSnet, which we would now recognise as an intranet.

NHSnet was little used initially but carried substantial volumes of email traffic - up to 1 million emails on a working day - by 2002. It was not used to exchange clinical information, though, partly due to a recommended boycott of NHSnet by

the medical profession (Anderson 1995), and partly due to the realisation by civil servants that data within NHSnet were - as doctors' representatives claimed - not secure. Both then and now, NHSnet is only accessible on NHS premises, so that staff cannot access it 'on the move' or in their own homes. (The Danish network, in contrast, carried both clinical and administrative data, so that by 2002 the majority of prescriptions, as well as hospital referrals, were handled electronically.)

During the period to 1998, as we have seen already, implementation continued on the ground in a gradual, unfussy way. We cannot mention this period, however, without also mentioning the list of NHS IT disasters. Four in particular hit the headlines, each of which further emphasises the top-down, technology-driven thinking that was prevalent at the time. The first was the Wessex region IT programme, started at the end of the 1980's, where the (then) Wessex Regional Health Authority signed a contract with IBM to implement region-wide finance, HR and hospital information systems. Major elements of the project never got out of the starting blocks, and millions of pounds were wasted. This was followed by the Department of Health-supported Hospital Information Support Systems (HISS) programme. The HISS programme was intended to provide hospitals with high quality communications infrastructure, so that pathology, radiology, prescribing and other data were all available at a single terminal. (The thinking here was broadly similar to that surrounding electronic health records, though with a stronger focus on communications than creating single databases of individual patient data.) A National Audit Office report concluded that the programme had spent £103M and achieved savings of £3M. (Arguably, allowing the £3M. claim was if anything generous.)

Next came the London Ambulance Service (LAS). The Service awarded a contract for a new IT system for routing ambulances following emergency calls. The contract was poorly specified and awarded to a company that had simply bid too low. When the system was introduced it quickly led to chaos, with stories quickly appearing in the media of patients dying while waiting for ambulances that never arrived. The system was quickly scrapped (though it is worth noting that a new

system was introduced with barely a ripple three years later). The scandal over the Read Codes was different in nature, but contributed to the general malaise. Dr James Read, a Loughborough GP, had developed a clinical coding system for use by GPs. Coding matters because counting, and identifying groups of people with particular problems, really do matter in health care. If you want to target people with diabetes in a new education campaign, you need to know who they are. It transpired that Dr Read had been paid substantial sums for a new version of his coding system which was not delivered, and had presided over irregular financial and HR practices. All of this was exposed in another NAO report.

These failures, combined with the observations about the fragmented nature of developments on the ground, help us to identify two points that are relevant in the next period, from 2002 onwards. First, the NHS has historically lacked project management skills, and has a poor track record in negotiating with large private firms. Combined with naivete in policy making, this has led to large, inflexible projects which are beyond the skills of the organizations involved to manage (Collingridge 1992, Collingridge and Margetts 1994) Second, the policies in this period tended to ignore the practical realities on the ground - the inherent complexity of health care delivery, and the IT successes and failures. This situation occurred in spite of the fact that some of the initiatives, including GP and pathology computing, were supported by some civil servants. There appears to have been a disconnection, within the Department of Health, between the civil servants who interacted with and supported NHS developments and those who wrote the policy documents.

Into the limelight

The change of government in 1997 did not lead to early change. The next policy, Information for Health (Department of Health 1998), was published in 1998. One noteworthy development was explicit support for integrated electronic patient records, presented as part of a move to more patient-centred care.

Documentation was, though, vague about the content of the records, or who would use them. Overall, though, the document represented a continuation of earlier policies, in both its focus on central requirements and in the absence of money for

purchasing new systems. A later policy (Department of Health 2001), intended to show how IT would support the NHS Plan, Labour's principal early policy statement, merely re-affirmed earlier policies, and there was still no money.

And then something happened. There was a marked change in IT policy making during 2001 and 2002. The period included a high profile meeting between Prime Minister Blair and Bill Gates. The Wanless (2002) report on the NHS for the Treasury concluded that the NHS had seriously under-invested in IT over many years (though it should be stressed that the report failed to offer any compelling evidence for this view). Management consultancy reports on NHS IT were prepared for the Prime Minister and others (Craig and Brooks 2006). It all culminated in a meeting at 10 Downing Street in May 2002, the result of which was a decision to provide funding for an ambitious IT infrastructure for the whole of the NHS, to cost around £2.3bn. and taking 2 years and 9 months. (Brooks 2007) These examples show that the Prime Minister and Chancellor dominated decision-making: accounts from senior Department of Health officials confirm this, with those officials travelling to Downing Street for key meetings (Brennan 2005).

What happened next puts all previous NHS IT disasters - indeed IT disasters anywhere - in the shade. In brief, a new Director General of IT was appointed, on a salary higher than both the Prime Minister and the Chief Executive of the NHS. He headed a new Agency, Connecting for Health. The Director General decided to strike long-term, and highly inflexible, contracts with large IT firms. The contracts were agreed between a new agency, Connecting for Health, and the contractors - the NHS had no direct input into the process. Initially there were five ten year contracts, each for a region of England, for electronic health records for every patient. A sixth contract was agreed for a national system called Choose and Book. This was intended to allow GPs, or patients, attending hospital for a first appointment to book that appointment themselves. This was viewed as a key technology underpinning the Labour Government's commitment to ensure that patients could exercise 'choice' between hospital services. A seventh contract was, in effect, an extension of the earlier NHSnet contract, designed to allow patient data to be available anywhere in the NHS. All data would be routed

through the network - now called The Spine - even if it was only being sent from a GP practice to a hospital a mile away. Later, contracts were awarded for a national system for the electronic transfer of prescriptions from GPs to pharmacies and for the implementation of PACS in radiology departments. All hospitals were expected to implement PACS by the end of 2007.

Accounts from key participants at the time show that the National Programme was based on three key ideas. The first acknowledged the historical lack of funding and weaknesses in procurement (Brennan 2005, Department of Health 2002). The second was that IT contractors would have the knowledge needed to deliver the Programme. The National Programme reflected the ideological belief, that originated under Mrs Thatcher's premiership, in the ability of large private firms to help to solve perceived problems in public services. The third idea was that the centre wanted more control of doctors and other clinicians. This played into the centralizing tendency under both Conservative and Labour governments, and has arguably been the principal driver of IT policy making over the last 20 years. As noted earlier this is a reasonable policy position - the question is whether top-down IT policies could ever help to achieve the desired control in practice.

Things have not gone well. The Choose and Book technology, strongly championed by ministers and civil servants, was perceived to be difficult to use in both GP surgeries and hospitals. There was considerable initial resistance from many GPs, but the system has been implemented in some areas, partly because clinicians and managers know that the technology is intimately related to a key government target, that no patient with an initial diagnosis should wait longer than 18 weeks from first GP referral to hospital treatment.. Work on the electronic prescribing service (EPS) started later than Choose and Book. The pattern looks similar to GP and pathology computing in earlier times, NAO reports and deployment statistics [<http://www.connectingforhealth.nhs.uk/newsroom/statistics/deployment>] show that there was a slow start, attributable to extensive negotiations with both GPs, pharmacies (from Boots to single shops) and pharmaceutical firms, and then increasing uptake. PACS have been successfully installed in all NHS hospitals, though as noted earlier these are stand-alone systems, and contribute little to

system integration. The main problem concerns the flagship of the programme; the five contracts for electronic health records, worth over £5bn. Five years in, systems had been implemented in a handful of hospitals in the south of England, and in single departments in two hospitals in the north.

The main bright spot, if you are a policy maker, is the N3 network, the Spine. N3 works, in the simple sense that GP computing systems can link to it, and pathology services now run over it. However, because of problems elsewhere, connections from hospitals are few and far between. As a result we are still a very long way from the avowed goal of accessing a patient's details anywhere, anytime via the Spine. Indeed, it is still not clear how patient data will be integrated.

Government policies flip-flop between proposals for creating summary records with just a few data items (a patient's current prescriptions, for example) and making full clinical details available to clinicians (Ministerial Taskforce 2006, Anderson et al 2009). Taking a detached view, the success with N3 is important because central agencies such as the Information Centre for Health and Social Care, and primary care trusts, now have access to detailed patient level data from primary care, where most care is provided, and which can be used for planning purposes.

The mystery is why anyone thought the National Programme would work. There was ample evidence of the risks from the start, and much critical commentary in the early days of the Programme. Some journalists deserve credit for identifying problems early on and for doggedly exposing problems in the first 2-3 years, when Connecting for Health was both secretive and aggressive in the face of the slightest criticism. Similarly, a number of academics and other commentators (Cross 2006, Guenier 2002) expressed concerns early on, and set out alternative strategies. Indeed, it is worth pointing out that the evidence base was very thin. In health care, new drugs and devices are routinely subjected to cost-effectiveness assessments, in the NHS and many other countries, and yet there is almost no evidence for IT investments. Systematic literature reviews of evidence about electronic patient records show that there is, at best, limited positive evidence for effects on the working practices of clinical or administrative staff (Delpierre et al

2004; Poissant et al 2005; Ross and Lin 2003). There is, similarly, little empirical evidence to support investments in communications technologies in health care (Whitten et al 2002).

Conversely, there has been a failure to learn positive lessons from some other countries. Arguably the most impressive example is in the Danish health service. Work began in the early 1990's on the development of communications standards. Sustained development and implementation effort has led to a situation where almost all communications are handled electronically across the country. It needs to be stressed that Denmark has pursued a policy of supporting communications through clearly defined and agreed standards, as opposed to pursuing the technology-driven policies preferred in England.

When it became clear that all was not well the NAO announced that it would investigate. Its first report in 2006 looked suspiciously like a whitewash, stating that the National Programme was experiencing problems but could still be successful. The report did, though, show that progress had been slower than had been claimed, that the lifetime costs of the Programme had risen to £12.4bn., and it stated that Connecting for Health had been unable to identify significant benefits, even in principle.

Rumours circulated of stormy meetings with Connecting for Health, and of deadlock over agreeing the text lasting several months. Politicians, including members of the Public Accounts Committee, were unhappy with the first report and quickly announced a second one. The second report, in 2008, was more forthright and appears to have led to the resignation of the Director General in advance of its publication. Progress was still very slow, and timescales for electronic health records were stretching out into the next decade. By 2009, the National Programme was little more than a source of easy soundbites for opposition politicians, and a continuing source of stories for journalists. There was always something going wrong, and there were persistent rumours about re-negotiating some of the contracts altogether.

This state of affairs raises obvious questions about the responses of Connecting for Health, the NHS and supplier firms. Connecting for Health is still in place. While there have been regular calls to scrap the National Programme, the fine print in ministerial speeches and policy documents points to the continuing belief that the NHS needs more IT investment. The NHS National Programme is properly viewed as the culmination of policies which have brought IT policy makers and suppliers to the top political table. It may be very uncomfortable to be there, given the endless criticism, but at least they are there.

NHS organizations waited for these systems initially, but many are now pursuing own plans outside the NHS National Programme. Having been promised new 'base' systems, such as patient administration systems - remember that many of these were ageing at the start of the Programme - many hospitals are now procuring their own systems, in the same way they would have done before the National Programme. In GP computing a new firm, TPP, has produced a system that is popular with GPs, particularly in the north of England. This system can pass data upwards to the NHS Spine, but connections to hospital departments are still few and far between. In short, local managers, informatics managers, doctors and others have concluded that it is no longer sensible to wait for the long-promised national solutions.

As for the National Programme suppliers, some firms walked away, arguably retaining some dignity (Accenture), while others had contracts terminated (IDX). One of the key firms became embroiled in internal governance problems (iSOFT), and these appear to have significantly affected its ability to deliver promised systems. With the exception of BT, who are responsible for the Spine, we can conclude that firms could not solve the technological and implementation challenges in the NHS, as the politicians and civil servants had hoped. In retrospect it seems that the firms had different motivations for participating in the National Programme, and to some extent this has influenced their subsequent behaviour. For example, Accenture seems to have taken a straightforward business decision to join and then to walk away: the National Programme looked like a good opportunity, but just wasn't in practice. Other firms such as Cerner

are more committed, commercially, to the health care IT market and have found it more difficult to walk away.

The Complexity Paradox

This story started with a number of professionally driven initiatives, where policy makers from were excluded from decision-making and implementation, at least in the early stages. The period before 2002 offers an important lesson, which is that the successes followed professional and organizational contours, notably in the cases of GPs and pathologists. If technologies did not fit these contours - telemedicine is one example - then they failed time after time. Yet in spite of the evidence of practical successes and failures, a stream of criticism and critical official reports, and the absence of cost-effectiveness evidence, policy makers have consistently pursued top-down solutions. Archetypal Modernists, they believed that they could see the future, or at least believed that people working in large IT firms and management consultancies could do so. They foresaw a world where large scale networks would guarantee two types of co-ordination. Health services would be co-ordinated through 'ruthless standardization'. Co-ordination of routine data collection would facilitate collection of data required by the Department of Health, which could use it to panoptically to monitor and evaluate NHS activity. In short, integration would be achieved through standardization, and lead to a reduction in the complexity of managing the NHS.

These beliefs led the Department to strike large, long term and tightly defined contracts with suppliers, and to employ large numbers of management consultants within Connecting for Health. The National Programme policies looked simple, but this was only because they omitted to address the complexities of the NHS. It was assumed that the contractors would deal with the complexities in the design and deployment of their new systems. As we now know, this belief was misplaced. The contractors could not see into the future after all. Even now it is unclear whether the contractors ever believed that they could replace existing systems. They may have been believers, or felt forced to suspend disbelief, because the commercial risks of being excluded from the Programme were too high.

The real task facing the contractors was to overlay their new systems on the existing patchwork. Indeed they faced three challenges - securing the commitment of all key groups of health professionals and managers, integrating new and existing systems, and integrating the new systems with one another, requiring co-ordination between the contractors. The result has been the opposite of the original intention, with the National Programme adding a new set of co-ordination problems. There has been an increase in complexity, reflected in continuing difficulties with implementation. The National Programme contained the seeds of this increased complexity from the start.

There is some evidence that this point is now - belatedly - understood. For example, in his evidence to the Public Accounts Committee in 2008, the Chief Executive of the NHS stated that the National Programme was more complex than anyone (in his milieu) had realised (Nicholson 2008). In addition, Connecting for Health has been considering opening up the market for electronic health records and other services to all comers, thus breaking the monopolies created in the initial contracts. Policy makers may now appreciate that they cannot see the future after all. Tightly drawn contracts cannot be used, and contracting parties will in future need to enter into long-term relationships with one another, and deal with the inevitable unexpected turns of events through negotiation.

The National Programme seems to be stuck in a sort of Never-Never Land. The belief in the potential of large scale networks within political elites seems unshakable. Shared electronic patient records even rated a mention in President Obama's (2009) inauguration address. While some policy makers have come to realise that IT increases complexity in health care, recent history shows us that it will be difficult to resist the desire to control the future, and the pouring of more money into IT investments in the hope of doing so.

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