LOCAL PRACTICE

Annexe:

Major challenges confronting the NHS today and what reforms are needed to provide long-term sustainability in a challenging funding environment

a report by Dr Geoffrey Boxer and Linda Boxer

About the authors

The authors have significant experience of a wide range of NHS specialties spanning more than thirty years, and across the full spectrum of healthcare delivery.

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- PhD in Health Sciences – Oncology (Development of targeted antibody and anti-vascular therapeutics for colorectal cancer)
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1998 – 2014 Operational Manager (Accident & Emergency, Womens' Health, all medical specialties, pathology services) – Royal Free Hampstead NHS Foundation Trust

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- Clinical Pathology Accreditation (CPA) UK Ltd inspector (now UKAS)
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Executive Summary

This report sets out a list of 10 key areas for NHS and reform and will argue that, in the current NHS climate, there should be two main areas of focus, at least in the short term to ensure that the current burden on the system is reduced and outcomes are improved for individuals.

It will suggest that the time and effort of the majority of reform work should be concentrated on locally delivered healthcare systems that are truly integrated. It will argue that the system needs:

- More local healthcare systems, that take into account the needs of individual communities
- Changes to the way services are commissioned, bringing them back to a local setting wherever possible
- True integration of healthcare functions around the individual

The report also lists a number of other key areas for NHS reform which, it will argue, all have a part to play in improving the current healthcare system but in the most basic of terms will suggest that a locally delivered, integrated healthcare economy must be a forefront of NHS reform in the short term on the basis that it will:

- Be relatively[1] low cost to implement
- Be relatively straight forward to implement
- Have a large scale impact on the population
- Take a relatively short time to feel that impact

Dealing with problems or finding new opportunities

Currently, the NHS is celebrating the 70th anniversary of its inception and the promise of an additional £20 billion on the annual budget by 2023 has been warmly welcomed by Sir Simon Stevens, the Chief Executive of NHS England. But there is a real danger that the stark reality of an under-performing, poorly resourced, anachronistic National Health Service becomes overshadowed by an outpouring of nostalgia with emotive stories from a bygone era of how Britain changed the world. Whilst the creation of the NHS was unquestionably of huge significance and value in 1948 and has maintained its commitment to the noblest of principles over the intervening years, no successful organisation has ever maintained its pre-eminent position globally as a world-leading influence without change, innovation, and realising opportunities to create improved results and better outcomes.

Clearly, the public and political perceptions of the NHS today are often very different. One of the major obstacles to winning the argument for reforming the health service and embracing commercial opportunities is the view that is held by many, particularly in older age groups, that the NHS must be treated like a protected species and not criticised. In general, the public

[1] Relative, in this context is in comparison to the other areas of focus listed in the report.

has an emotional attachment to the NHS that makes any changes appear as threats. This in turn leads to politicians chasing votes by damping down their enthusiasm for truly radical reform. In addition, internally, response to change in the NHS amongst many employees is reactionary and that culture is directly correlated with age and length of service.

Localis report an 'A New Public Sector Ethos' based on a survey of >1000 public sector employees, established that PPPs (Public-Private Partnerships) are much more likely to be looked upon favourably by younger members of the population and that there are any other factors influencing how PPPs are viewed.

There needs to be a clear message to both the public and to NHS employees that government reforms are being implemented to improve outcomes for all, and not mistaken for vehicles to either force longer or more unsocial working hours or to pave the way for a privately-funded health scheme. Such was the case in 2016 when many junior doctors took part in strike action following the government's decision to alter their working practice to cover a 24/7 service - a situation which the government failed to realise had to be fully underpinned by increased numbers of all support staff.

In its current format the NHS is no longer capable of giving the initially promised and now expected level of performance. Working within current financial constraints changes in process will not provide the capacity required. Changes to practice in many circumstances must apply 24/7 - working smarter, not harder. There is a perception by the public and some NHS employees that the spectre of privatisation of the National Health Service is looming. In reality, the contribution of the private sector and commercial companies, to NHS working is extant. The core business of the NHS is to provide healthcare, but where industry can provide critical support and develop new systems that must be embraced.

Whether it's a successful burgeoning business, a solid and reliable public sector service, or a not-for-profit third sector organisation, getting the balance right between fixing the hole in the roof whilst it's raining and researching and developing along new and relevant lines of innovation, is critical. Occasionally, as the ex-Chancellor George Osborne liked to remind us from the despatch box, there might be times when it is possible to fix the roof whilst the sun is shining – the NHS will never encounter such a brilliant time unless there is radical forward-thinking plan by a bold and courageous government. There is obvious justification for a radical shake-up in how the NHS operates and is modeled, but politicians need to be brave in order to highlight the huge number of inadequate working practices, develop and establish new more efficient processes, and stop chasing votes by continually blindly lauding a work-force which in reality is often poorly motivated and overworked, which leads to sub-optimal outcomes. As ex-NHS employees, it is our view that job satisfaction and a feeling of self-worth, for most staff would increase if performing their tasks to a high level of performance led to the delivery of world-class care.

Lastly, adhering to core principles and maintaining rigorous standards does not need to be abandoned when goals and objectives are adapted to a changing world. There has never been a better time for the NHS to embrace the opportunities that are being presented by industry using the technical advances made in the fields of robotics, computer programming and artificial intelligence. There is huge potential for co-funding with the commercial sector to

support new initiatives in healthcare, and to take advantage of the value of the digital data that NHS generates daily, archives and holds.

Purpose and method

The key goals and objectives of this report are to:

- Suggest approaches to developing a more locally-delivered health service, where appropriate.
- Discuss how to incentivise individuals to have more control over their care.
- Consider how new models of public-private partnership can add value.

When it comes to NHS reform, one of the main challenges is where to focus the effort. Furthermore, in a system that is so large and so complex, in which there will be arguments for change and reform in every area, the question becomes; where should we concentrate our efforts first? The question becomes more complex when we ask ourselves why we should concentrate our efforts in any given area. The answer to this question will differ depending on who you are asking and what their motivations for change are. While politicians are more likely to be motivated by initiatives that will improve population level outcomes, at pace and with good value for money, a consultant medic working in a hospital may be more motivated by reform which allows for the most up to date and cutting-edge methods and equipment to be readily utilised on the front line. The second initiative being more costly and with less potential for large scale impact.

This report attempts to provide a simple framework for answering some of the key questions above by:

- Identifying 10 key areas of focus for NHS reform
- Discussing each area in detail with commentary on the challenges and benefits relating to each, broken down by the following 3 key drivers:
    - Funding
    - Staffing
    - Innovation
- Providing an overall analysis of the 10 key areas against the following criteria
- Cost of implementation / delivery
- Complexity of implementation / delivery
- Level of impact / outcomes
- Time to benefit (by this we mean; how long will it take to achieve the impact / outcomes)

The framework is intended to be used as decision making tool or at the very least to give policy and decision makers a clear and simple method of deciding which areas of reform should be focused on and/or need to be discussed and researched in further detail.

1. Public-Private Partnership

At the outset it is important to make a clear distinction between Public-Private Partnerships (PPP) and the types of private finance initiative (PFI) some of which were established as long ago as the 1990s and whose use within the NHS has been widely condemned over the last few years by all political parties for not representing value for money for the state. By contrast, PPPs generate joint benefits for both the public and private sector, financially and in quality of service, potentially leading to improved patient outcomes.

The case of Health Services Laboratories LLP (HSL) will be discussed fully. It is currently an example of a very successful PPP. The partners are The Doctors Laboratory Ltd., The Royal Free Hampstead NHS Foundation Trust and UCLH Foundation Trust, providing the pathology services for the these two major London teaching hospitals with the first customers being North Middlesex University Hospital and latterly Barnet and Chase Farm Hospitals. Thus providing a complete pathology service for North Central London.

HSL was established in 2015, following on from the Lord Carter review of pathology services (2006 & 2008). It continues to align with the NHS Improvement strategy for pathology consolidation (published 2017). There is huge potential for delivering better healthcare by creation of PPPs such as HSL, but it is imperative that the government wins the argument regarding the value of this type of financial model, one which is able to:

- Purchase expensive, state-of-the-art equipment without bureaucratic obstruction
- Implement changes to practice rapidly and efficiently, by discussion with NHS clinical and scientific colleagues
- Achieve cost savings through economies of scale
- Work within and maintain full quality accreditation both nationally and internationally, for all relevant schemes (i.e. UKAS, GCLP, GMP, HTA etc.)

The greatest challenge for development of PPPs is associated with the change in merging two very different cultures. The HR issues cannot be understated and remain critical for PPPs to fulfil their potential. In addition, the scope of PPPs needs to be fully assessed and whether the principle can be appropriate for all aspects of healthcare - a 'one-size-fits-all' approach may not apply. There will also always remain the danger of creating monopolies for the delivery of a particular service with lack of choice resulting from significant economies of scale.

Three things are required:

1. A vision of reform created by commissioned government reports setting out the case for change as a direct response to the Lord Carter Report.

2. NHS health professionals and managers demanding a higher level of service and who are prepared to explore new ways of working
3. Commercial partners who believe that their businesses will benefit and grow as a result of working in partnership with the public sector.

Funding

Challenges

- To align the goals of the NHS and the private partner which should be to create the highest quality and affordable service.
- Start up costs / initial investment by both parties
- Highest quality service depends on procuring / leasing state of the art equipment
- Establishing PPPs depends on critical negotiations initiated by the NHS foundation trusts to attract commercial partners. This is currently undertaken via the established NHS business tendering process but in order for industry to commit fully to the start up costs required, clear financial plan must be the starting point of all discussions for PPP development.
- Clarity around accurately costing the services prior to PPP development from the NHS perspective is confusing due to lack of uniformity across the service nationally with regards pricing processes

Benefits

- Without the current constraints experienced in the NHS Purchasing process it is possible for PPPs to plan for the future development of newer, more efficient technologies and more timely introductions of newer techniques.
- Lower overall test unit prices that benefit the NHS budget as a whole. Those foundation trusts that are partners will also share in profits made (but also have the risk of overwriting any losses). The NHS customers of the PPP will benefit from lower unit costs
- Once fully standardised and centralised the staffing costs will be significantly less than providing services at multiple facilities.

Staffing

Challenges

- Addressing the entrenched culture issues held by many NHS staff.
- NHS staff to include those moving into the PPP and NHS colleagues using the service being provided by the PPP.
- NHS staff suspicious of motives of the private partner.
- View that the close working relationship between user and provider cannot be maintained.
- Aligning private and public staff expectations and working practices (working hours. Unionisation).
- TUPE process for large and varied groups of staff is extremely complex.

Benefits

- Improved facilities enable PPPs to attract the more motivated specialist staff
- Improved working conditions
- Ability to align working hours with work/life balance

Innovation

Challenges

- From the outset, to create a financial model which allows for efficient service delivery, service development, and adoption and implementation of new technologies as part of and R&D strategy.
- Particularly for R&D activity, the high cost of implementing state-of-the-art technologies and the pace of development of new innovations means that intelligent, evidence-based decision-making becomes critical to getting successful R&D outcomes.

Benefits

PPPs have the potential to accelerate the process of testing new healthcare advances and innovations by working directly with academic centres, and taking part in large studies with increased numbers of patients on clinical trial. The scope of PPPs will create more data, more rapidly and promote its use in demonstrating the value of novel technologies. Currently, internationally agreed 'gold-standards' for treatment monitoring of disease by imaging and laboratory assays remain the status quo and will represent the 'standard of care' until a more valuable test can be clearly demonstrated.

NHS England's innovation strategy states that its ambitions are to

> *"ramp up the pace and scale of change, and deliver better outcomes for patients across all five domains of the NHS Outcomes Framework. The NHS remains a major investor and wealth creator in the UK, and in science, technology and engineering in particular. The Board's objective is to ensure that the new commissioning system promotes and support participation of the NHS in research, translating scientific developments into benefits for patients, and contributing to economic growth by exporting innovation and expertise internationally. The Innovation programme is the only mainstream activity in NHS England that directly supports delivery of these benefits."*

Despite these laudable intentions, it is our experience that these NHS-led processes remain bureaucratic and slow moving. Numerous advances in diagnostic and prognostic assays, devices and therapeutics, that have been shown to be effective in Phase 3 and 4 clinical trials, are slow to be tested in the current NHS environment. The UK's NHS R&D pathways leading to adoption and implementation of new advances remains indolent compared to the research and development models of healthcare that have been established in many other modern countries. PPPs have the potential to streamline innovation into routine healthcare.

Teaching within the NHS through collaboration with universities at the academic and research level and to improve staff's technical skills and knowledge (CPD) is crucial to developing an improved model of healthcare. This represents both a challenge to PPPs, but also a situation whereby the NHS is also likely to benefit from public-private partnership. The challenge, where much of the PPP's work maybe centralised away from Trusts is to ensure that students and health professionals are able to access these PPP facilities easily as part of continuing research programmes. The benefits to teaching the next generation of healthcare professionals, will accrue from the wider range of activities undertaken by PPPs and their engagement with forefront research studies at major academic centres.

2. Consumer-led Healthcare

Government needs to become more serious about developing and encouraging consumer-led healthcare, focusing on methods for disease prevention and reducing demand by incentivising individuals to look after their own health better. Government policy needs to be saying unequivocally that there is an expectation on us all to think about our fitness and wellbeing, but also to ensure that the public are aware that there is the opportunity for reward for pursuing a healthier lifestyle. The public cannot expect to abuse their health, make a small contribution to tax and then be 'repaired' by the NHS. A fundamental change in attitude from repair to prevent is vital. Fitness and wellbeing does not favour the wealthy in society, rich and poor alike can take more exercise, eat more healthily and develop personal networks for emotional support to improve mental health.

Funding

Challenges

The funding of programmes to promote and encourage consumer-led healthcare must critically consider the ongoing accruing value of such enterprises.

Currently, the major challenges are to:

- clearly demonstrate that invested capital leads to a significant reduction in future healthcare costs.
- identify funding streams that will support projects and posts.
- make the case clearly for the funding for more health economists in order to evaluate how reducing demand impacts on NHS budgets.

There is a large body of evidence demonstrating that in highly developed countries, such as the UK, economic growth is associated with improved health and wellbeing of the population. Government should focus policy to engage the population across all socioeconomic groups so that individuals recognise that they are key stakeholders in their own healthcare

Benefits

Clearly, reducing the risk of developing single or multiple chronic conditions with ensuing comorbidities will benefit the individual, their family, the workplace and society in general. Overall reduction of disease episodes and duration thereof will relieve pressure on NHS budgets and staff, free up key resources and facilities and decrease the number of days that people are absent from work due to illness.

The NHS will directly benefit financially by reducing costs across a range of services including, in-patient episodes, pharmacy budgets, GP and outpatient appointments, district nurse services and service provision (pathology, physiotherapy, imaging, dietetics).

Within families if the responsible adults take ownership of their health it is anticipated that they will become positive role models for children, dependents and have an influence on their close community. Within some families, breaking the cycle of multiple generations needing to rely on the state for treatment of chronic healthcare conditions leading to benefits payment must be broken. Parents have a duty to educate themselves and their children about the benefits of a more health lifestyle. In addition, reducing the numbers and duties of family carers will prevent individuals having to take time off work commensurate with the reduction in disease episodes. A healthier, fitter workforce will most likely lead to increased tax revenues, higher productivity and reductions in benefit payments.

Potentially, healthcare companies can benefit from increased market exposure and future sales by pump priming services to the individual to allow them to monitor/test/self diagnose. e.g. providing kits for Chlamydia testing which are available free of charge (FOC) for 16-24 year-olds, kidney function, blood pressure monitors and blood glucose meters, fitness monitors (e.g. Fit-Bits). Initiatives, supported financially by healthcare companies or the fitness industry, that allow individuals to gain material benefit as a response to taking up healthier activities or altering their deleterious lifestyle gives huge marketing opportunities to those commercial enterprises.

Some charitable organisations operating within the healthcare sector have to divert much of their funding and resources to support individuals with chronic conditions developed as a result of poor lifestyle choices. We believe that there is a growing expectation that the consumable spending of charities should be allocated to the most deserving causes and that a drive to encourage self-managed healthcare, will allow this.

Staffing

Challenges

Development of consumer-led healthcare will require improvements to current networks within the community to achieve autonomy in decision-making, whilst still working in collaboration with existing healthcare providers. In addition the establishment of a number of additional posts will be necessary in the following categories:

- Health economists
- Community and workplace health advisors (diet, exercise, lifestyle, drug compliance)
- Monitors and facilitators working with individuals or groups to promote and track changes in lifestyle
- Data managers and statisticians to collect, store, analyse and share data
- Marketing specialists to work with business and develop links between the NHS, the community and the commercial healthcare and fitness sectors.

Benefits

Expansion of markets for healthcare and fitness businesses should allow a combination of funding from government and the commercial sector to support new posts, leading to higher employment.

The improvement in the general health of the population should lead to significant reduction in pressure on NHS staff working centrally, across regions and locally within CCGs, Trusts and GP practices with fewer episodes of work-related stress reported.

Innovation

Challenges

Establishing and developing a new model of consumer-led healthcare will be challenging, especially in trying to sell the concept that making healthier lifestyle changes can lead to individuals or groups, gaining some privilege or material benefit. One of the key tenets though that must underpin this bold, new initiative is the idea that this enterprise is seen as party-politically neutral, and far from favouring those who are better-off in society it allows people from poorer backgrounds with less well-paid jobs to benefit from changing behaviour. Initially, the focus needs to be on fundamental changes to behaviour that require no extra cost to the individual e.g. walking up stairs rather than using lifts, walking to work and with children to school, substituting fruit and vegetables for sugary and fatty snacks, cooking from fresh ingredients rather than buying processed or takeaway meals. Especially with regards this last example it is recognised that an important factor will involve changes to families' timetables.

In order to develop robust, active networks it will be essential to tailor their activities to the community demographic. For them to function efficiently within this consumer-led healthcare space and make a real difference to the health of the population, knitting the following aspects of the project together becomes critically important:

- Finding a local champion and mentors
- Working with education in schools, FE and HE colleges
- Targeting specific groups with lifestyle and healthcare advisors
- Engaging with religious and cultural associations
- Ensuring monitors and facilitators are following up connections made to promote and track lifestyle changes
- Using marketing specialists from businesses to advise and collaborate with NHS administrators at national, regional and local levels

Benefits

Examples of incentives for promoting lifestyle changes might be to reduce individuals' prescription fees or to give vouchers for products for those that can demonstrate taking regular exercise, or can show that they have reduced intake or lowered activity related to the more destructive aspects of their behaviour (e.g. lowering their fat, sugar and alcohol intake, giving up smoking). As such there is a significant role for the food & drink, and tobacco industries to facilitate taking these issues forward, and while a step has been taken in this direction with sugar content of carbonated drinks being recently reviewed, and the implementation of minimum pricing for alcohol in Scotland, there is still a lot more that needs to be addressed.

3. Driving 'Personalised Medicine' into Routine NHS Healthcare

The revolution in genetic, proteomic and metabolomic ('omics') testing has fuelled the potential for personalised medicine (customised therapy). The knowledge around which subsets of diseases, characterised by having a particular 'omics' profile, respond to specific drugs is growing exponentially. This significant development in the manner in which healthcare can be delivered must be properly supported financially and brought more quickly into the routine diagnostic process and used more actively for treatment planning.

This area of medicine is currently heavily under-resourced and relies mainly on piecemeal funding of translational research projects at centres of academic excellence, from the National Institute of Health Research (NIHR), the Medical Research Council (MRC) and organisations for research into specific diseases like the National Institute of Cancer Research (NICR).

Adoption of state-of-the-art tests, following successful clinical-trial, for informing diagnosis and for treatment decision-making should be driven into routine service as rapidly as possible. Initially, this will require large amounts of cash investment and there will have to be a sea change in the ability of the National Institute of Clinical Excellence (NICE) and Care Commissioning Groups (CCGs) to commission the tests. But, the rewards in improved outcome should start to flow rapidly, with big cost-savings coming from discontinuing treatments that have no beneficial effect in patients with a particular genetic/proteomic/metabolomic signature.

Funding

Challenges

The relationship between funding of the testing, introduction and adoption of 'omics' assays and the ability to demonstrate economic benefit to the country of such a strategy, is extremely complex. Just as specifically designed clinico-pathological trials have been able to show that 'omic' test results can be correlated with patient response, predict outcome, and be used to guide and alter therapy, so there needs to be programmes set up to critically analyse how those changes made to the 'standard of care' impact on future costs of treatment. The amount of academic studies within this field of health economics remains pitifully low.

This new age of healthcare in which high throughput 'omics' assays become commonplace and are used by medical practitioners to plan treatment and allocate drugs to specific patients with a particular set of markers, has started to present a dilemma for pharmaceutical companies. Previously, a drug that had been developed for treating a condition would be prescribed for all patients with a particular disease at a certain stage, but customising therapy to use an efficacious drug for only a sub-set of patients that comply with known biomarker results patterns, will dramatically alter companies' business models. It is well recognised that in

many scenarios we have been over-treating numbers of patients, i.e. prescribing drugs to some people who will not respond. Previously that has meant higher revenues for the 'pharma' industry per drug, but now customised therapy has started to become a problem for companies whose R&D strategy for decades was developed within a 'one-size fits all' landscape.

In addition, pharmaceutical companies have had to adapt their R&D model to fit a targeted treatment paradigm where complex genetically-engineered proteins have to be developed to activate or block specific targets on cells to interfere with the biochemical processes of diseased cells. The 'pharma' industry is becoming smarter and leaner in terms of how it sees drug development, but equally Government will have to understand that pressure on this pathway will affect companies' balance sheets, their productivity and in turn tax revenues. Balancing this equation is the factor that the pharmaceutical industry recognises that there is a huge opportunity in target-based drug discovery, to identify markers on diseased cells that can be measured using a pathology test (companion biomarker) but also targeted for treatment with a protein therapeutic, both of which are expensive to purchase for the healthcare provider whether that is represented by the NHS or by some other insurance-based model.

If industry's R&D costs increase to facilitate this revolution there is likelihood that those elevated costs will be passed on to the NHS drugs budget (which rose from £13 billion per annum in 2010 to £17.4 billion in 2016). In the future there is a real danger that the cost of new, targeted drugs could be prohibitively expensive forcing NICE into making decisions not to fund their use for particular conditions, a situation that would almost certainly lead to poorer outcomes. In April 2017, NICE began to implement a 'budget impact test' to assess the budget impact of new products against a threshold of £20M. It states that:

> *"If the cost is projected to exceed that level in any of the first three years of use a commercial negotiation will be triggered. NHS will then attempt to reach a deal with the manufacturers to bring the cost down. If not successful NHS England will apply to NICE to delay the introduction of the project"*

Currently, prices for existing drugs are kept lower through the pharmaceutical price regulation scheme (PPRS) with the NHS receiving rebate income from the pharmaceutical industry of e.g. £628M in 2016. It is unclear as we move into the era of personalised medicine whether this pricing rebate model is sustainable.

It is our view that the Government-backed NHS financial model that effectively operates only in response to the free market is one that will not be able to remain workable in the foreseeable future. Leo Ewbank et al (The King's Fund) wrote in April 2018:

> *"To conclude, in the absence of a change in fiscal policy from the government, the scope for policy refinements to allow the NHS to maintain a balance between access to medicines, affordability and long term innovation seems increasingly limited. Difficult choices are coming more sharply into view."*

Thirdly, there is the huge challenge of setting-up costs for testing sites. Many 'omics' assays are currently performed within Academic Health Science Centres) AHSCs, but a more standardised model of 'omics' testing laboratories and treatment planning centres will have to

be developed to deal with the massive increase in range and numbers of tests, and to fully utilise all the data that will flow from their implementation.

Benefits

There is a long list of benefits that are likely to accrue from developing an NHS-wide 'omics' and personalised medicine planning programme in order to develop a world leading, 21st century healthcare service that takes account of the latest research data. This project has already been started by NHS England and was launched in 2015 with the 'The NHS Vision and Context: Genetic Laboratory reprocurement'[2]. We have a few internationally renowned centres in the UK that are well ahead of the curve and there were 13 NHS Genomics Medicines Centres (GMCs) established in 2015, with now more than 50 additional local delivery partners in place. But the issue for the UK is not access to an excellent knowledge base, the ability to set up a functioning network or even developing a streamlined model of care (as is a key goal of the project), it is the pitifully low level of funding set aside for the task. NHS England in 2015 provided only £20M of direct funding to GMCs.

Staffing

Challenges

Any expansion in the numbers and role of GMCs and as customised therapy develops a large recruitment drive will be needed to attract more graduates and trained personnel into science and medicine. More computer scientists and data handlers will be needed to deal with the logging, storing, mining and analysing the data generated.

Throughout this current development period of personalised medicine there will be need to use health economists to analyse the relationship between using 'omics' testing to customise therapy and the savings (or the extra costs) that accrue from changes to the existing 'standard of care'.

Benefits

Non-medical staff involved with personalised medicine innovations will become an increasing direct part of the treatment planning process for patients and are likely to feel more valued.

For a range of medical conditions and in most disease settings 'omics' testing and customised therapy will bring about rapid improvements in outcomes for patients. Outcomes would be assessed using quality-adjusted life year (QALY) measurements so that an economic evaluation of the value for money that is associated with these alterations to medical intervention can be made.

Innovation

Challenges

The sheer size and scope of 'omics' testing that will be required over the next decade needs to be recognised by the NHS and all that it entails with providing the funding and staffing for the GMC network to function efficiently. Taking advantage of economies of scale will help, but only if there is a commitment to establishing major testing centres, such as the PPP that has been developed to support the North London Pathology Joint Venture. Centralised facilities on

[2] Professor Sue Hill – Chief Scientific Officer for England and SRO Genomics

a grand scale, operating 24/7 can easily be sited outside major conurbations, which can be served by high speed transport links for specimen delivery and use state-of-the-art telepathology and communications networks for healthcare professionals and medical practitioners to discuss results and dictate how to use the information for treatment planning and decision-making, either within hospital sites or in Primary Care.

Benefits

These proposed very large 'omics' testing sites can become dynamic hubs for the local area in which they reside, creating jobs and attracting investment to that region - powering local economies that in some cases have become caught in a downward deflationary spiral which has led to degeneration and depression. These new centres could engage with large healthcare and 'pharma' companies and seek to draw funding towards them either in terms of being major purchasers of equipment and consumables, or by entering into partnerships with the 'pharma' industry to drive more rounds of research and development of novel drugs together with production of companion biomarker assays. Politically, there would be significant value in demonstrating that general economic growth in such previously depressed areas can be increased, as an indirect benefit of this 'omics' revolution in healthcare.

4. Maximising the Use of Existing High-Cost Diagnostic and Therapeutic Equipment

Anyone who has worked in a hospital late into the evening or at the weekend will recognise the scene in which high cost scanning machines and other specialist equipment used for imaging or therapy, lie idle. It makes no sense either operationally or financially for the use of these services to be limited to weekdays during the hours of 9 – 5pm, as it is almost exclusively throughout the NHS. We need to consider the following aspects relating to the use of our existing high-cost diagnostic and therapeutic equipment.

- Imaging technologies (X-Ray, CT, Ultrasound, MRI, PET, Endoscopy)
- Surgical and medical interventions
- Physiotherapy availability
- Hours of use of equipment

Funding

Challenges

- More trained and ancillary staff will be required with commensurate increases in budget for the Trusts. Potentially there will be increased maintenance costs for equipment.
- Increased capacity for scanning would inevitably result in higher running costs that may be offset by Trusts and imaging companies working collaboratively to support this new initiative.
- Further funding opportunities should be explored with large pharmaceutical companies and contract research organisations (CROs) to support the increasing number of clinical trials[3].

Benefits

- Improved patient outcomes, shorter waiting times, better target compliance, patient journey improved, development of local networks leading to increased capacity.
- Benefit to society, of the working population not needing to compromise hours at work to attend appointments.

Staffing

Challenges

- The change in staffing structure and establishment will need negotiation, most notably around the introduction of a more robust out of hours rota rather than being on call.

[3] NB: Adopting this development will require clear criteria for referral and subsequently close monitoring to ensure that extending the service will not abused by medical practitioners.

- More ancillary staff will be required to support the extended service.

Benefits

- Staff will receive further training that will contribute to their CPD.

Innovation

Challenges

- Negotiations with the relevant Royal College to agree and develop training plans, will be essential, and to acquire full accreditation with UKAS.

Benefits

This will widely extend the scope of practice for paramedical staff, to train to be able to diagnose (e.g. senior radiographers for plain X-ray films, consultant nurse practitioners for upper and lower GI endoscopies) and where necessary refer on to medical colleagues.

Closer engagement with industry is required to test and develop the use of medical image analysis programmes. Objective, analytical tools are becoming available to radiologists to determine regions of interest for further analysis, segment images, measure attributes, and then cluster and interrogate the data to provide objective diagnostic results. This will eventually lead to faster diagnosis and better treatment planning. Virtual reality training and teaching needs to become increasingly available for all healthcare professionals.

5. The Value of NHS Patient Data – 'the Jewel in the Crown'

Patient histories, presentation and signs, the testing and monitoring of pathology markers of disease, analysis of tissue and liquid biopsies, scanning and imaging, surgical and medical interventions, and treatments and outcomes, all yield huge amounts of important data from millions of individuals each year. The value of access to and use of data has long been demonstrated in the field of epidemiology most notably for improving public health. Major advances have been made in infection control, including prevention of tuberculosis, smallpox and polio, and more recently human papilloma virus (HPV). Despite this major role that the NHS has played, since its inception it has failed dramatically to understand the full value of all the data that it generates and holds, and the information and knowledge that that yields. It is not just the value of the data that is under-leveraged, it is the net worth of the entire NHS network.

A modern reformed UK healthcare system must bring in specialist partners within the NHS network including international healthcare organisations, from industry and the commercial sector (including large tech computing companies and experts in artificial intelligence). This will ensure that the NHS is able to leverage money and support from its massive data warehouses. Small but significant steps have been taken in this direction with some Trusts working directly with Google to store and analyse data to allow immediate action for patients at risk, i.e. 'DeepMind Health' project, 2015 - 2020, Royal Free London NHS Foundation Trust, which uses a secure mobile application called 'Streams'. Streams can send an urgent secure smartphone alert to the right clinician to help treat conditions. That alert is created from existing data records and latest tests to flag up results that show the patient is at immediate risk of acute kidney injury or sepsis.

The sharing of NHS patient data will continue though to be viewed with more than a little suspicion by the general public with regards its security and anonymity once stored in data warehouses that are external to the NHS. The role of NHS Digital will be crucial over the next few years and how it adapts to the changing world of data analysis and involves itself with 'big data' projects. At the heart of the debate about using patient data is the issue of confidentiality and towards what purpose stored data is put. The Caldicott Report of 1997 led to a set of rules and regulations being established (regulations updated in 2012 and 2016) for application to all NHS processes that deal with patient data. But, those safeguards and rules for confidentiality and depersonalisation of data were brought in at a time before the full potential for utilising medical data to predict outcome and plan treatment were known.

Recent public furore and media storms about how computer giants and social media platforms like 'Facebook' use individual's data and information from their posts to dictate what advertising content (political, commercial, social) is sent to people's accounts, has turned much public opinion against the tech giants and their use of data. It is unfortunate that just when a huge window of opportunity has opened up that could facilitate a transformation in how scientists and computer programmers utilise our medical data to develop models of therapy and diagnosis, public trust of data analysts could not be at lower ebb. There remains a role for ethics committees to oversee the use of data for medical research and development of systems. Currently, all data captured in GP practices is stored on their clinical computing system, the software provided by commercial digital partners e.g. Egton Medical Information System (EMIS), Vision, and System One. This data is stored centrally in Calculating Quality Reporting Service (CQRS) that in turn informs the performance information required for the Quality Outcome Framework.

Funding

Challenges

- To demonstrate clearly that there is huge value in the data that the NHS holds going back 70 years and which continues each day to flow into its servers. It is a challenge to convince funding organisations (apart from those huge multinational computer technology companies already working with big data projects) that providing access to the massive amount of NHS patient information will translate quickly into earlier diagnosis, better treatment and improved outcomes.
- Opt-out is now possible from May 2018, after changes to General Data Protection Regulation (GDPR) legislation. That will affect the ability for second and third parties to use data which is not anonymised and that will reduce the overall value of the NHS data storehouse.

Benefits

- Putting a price on data is difficult of course but NHS Digital must leverage its value to ensure that money comes back into the system to support the NHS's growing needs.

Staffing

Challenges

- Learning new IT systems, and changing work patterns to enable clinical staff to react to live data and treat patients at risk.

Benefits

- Time saving for healthcare professionals.

Innovation

Challenges

These include:

- Dealing with the fears and trust of the general public many of whom believe that allowing their medical information to be accessed means that it can be used nefariously. It will be critical to work transparently with NHS England's Chief Data Officer, and the Caldicott guardians - the senior health professionals who can address

the issues of confidentiality for patients and any procedure that affects access to patient-identifiable data.
- Working more closely with computer science departments at universities and at other academic centres
- Collaborating with the computer industry to develop systems that can store, mine and analyse huge datasets
- Putting in place joint funding streams with NHS England and the multinational technology companies (e.g. Google, IBM) who can utilise developments in hardware, middleware and software, programming, cognitive computing and data analytics, to establish big data projects that can lead to in silico (computer) modelling of treatment of disease.

Benefits

Use of the data to inform in silico models of diagnosis, prognosis and treatment. Examples of this type of work is the CREDO research programme (Project Leader: Professor John Fox, Oxford) which uses artificial intelligence systems and machine learning, and develops algorithms for treatment planning using a continuing stream of new patient data (about their history, type and stage of disease, 'omics' profile, surgical and medical interventions performed, drug treatment (type of drug, dose and regimen), response to therapy and outcome). Through iterative cycles which take into account all this new data, better customised therapy plans can be made.

6. The Patient Experience

The patient pathway, the quality of their journey, and their experience and how it relates to outcome are critical to consider as part of any newly modernised healthcare system. When speaking to patients one of the biggest issues that is often raised is the feeling that their healthcare is something that is going on around them, rather than being patient-focused. Information about the arrangements of tests and procedures, and in some cases the results, and the plans for treatment commonly is not available in real time and that leads to patients worrying often needlessly about when, how, where and why their care is being delivered, and by whom. For all patients requiring anything more than a basic investigation/intervention, care or treatment plans should be drawn up that identify to the patient how care will progress.

It would be critical when developing patient-NHS records interfaces to define which data and what level of information is appropriate and beneficial to be made available on-line. It is disturbing that the public are able to track a retail product order and the delivery of goods placed on-line, but that there is no will to make the information associated with our NHS journey (encounters, episodes, treatment, results) where appropriate, readily available. It is true that for delivering healthcare in most disease settings a huge complexity of interwoven services is required, but currently there is no way that a patient travelling through the system can interface with NHS IT systems (except in a very basic way regarding some appointments or for prescriptions). Full information of outcomes is available to patients with copies of outcome letters to their GPs, sent to them. In many cases, results of investigations that show no abnormality could be made available to the patient in real time. Any abnormal results must be conveyed to the patient directly by a clinician.

The patchwork set up of IT systems throughout the NHS makes this a Herculean task but one that should be addressed. Surely, future modern healthcare must see fully transparent data being made available (patient tests, diagnosis, operation schedules, appointments for interventions, treatment plans etc.) and shared through the course of their NHS journey. Checks and balances will need to be in place to preserve patient confidentiality but much of people's anxiety, leading potentially to some poorer outcomes, may well emanate from their lack of knowledge about who is doing what, when and how, and where their treatment/test/result is in the system.

Funding

Challenges

There is undoubtedly a challenge in redesigning the computing systems within the NHS so that they function efficiently and so that third parties, including patients, can selectively access the system but only under specific and appropriate permissions. The funding required for this initiative would have to in part come for commercial sector investment, and the potential for a Public-Private-Partnership with a major tech company could be explored.

Benefits

These potentially include:

- Attracting funding from the commercial sector to support NHS development of computer systems, databases and analytics software.
- Improved outcomes from reducing stress on both patients and relatives.
- A more open and transparent computer system for handling and accessing data across many disciplines.
- A streamlined system for analysing the efficiency and turnaround time for consultations, tests, interventions and treatment helping to develop a pull system rather than push which should alleviate pressures on bed usage.
- Building public trust by demonstrating openness and transparency of information.

Staffing

Challenges

- There will be a need for more computer scientists, database monitors and analysts in order to develop user-friendly systems with which public and patients can interact easily.

Benefits

- Better working relationship between healthcare professionals and their patients because clear pathways for particular disease groups will be implemented.

Innovation

Challenges

- Dealing with the issue of public trust and how patient data will be protected and remain secure under these new proposed settings is paramount.
- How existing computer database systems and software programmes interface with or are replaced by any new technology will have to be addressed so that the maximum benefit and least cost and upheaval is achieved.

Benefits

What should be developed over time is an open and transparent computerised data system that provides:

- Health professionals with a way of improving communication and networking by tracking tasks, and streamlining processes where possible
- NHS managers and data analysts with a way of monitoring and developing methods for speeding up the patient journey
- Patients, carers and relatives with appropriate levels of information which can in many circumstances help alleviate anxieties

There is a need to review the role of setting of NHS targets and that can be done in the context of establishing a more evidence-based process for data capture, storage and analysis. This will clearly identify within the healthcare delivery system, where the particular bottlenecks and lags are in the process. Analysts will then be able to identify the problems and in consultation with healthcare professionals and support staff, managers will be able to address

the reasons for non-performance against realistic targets, taking into account the scope and constraints of the service provider (size, staffing, funding, population of patients).

In addition, these changes to information highways should allow more patients to develop a better understanding of how, why, when and where their care is being managed, and under what constraints. There is a need for informed patient representation on CCG and Trust Boards, and on those that oversee regulation and compliance – these changes would only serve to facilitate that by informing potential public representatives.

7. Risk Averse NHS Culture Leads to Sluggish Innovation

In the UK our long experience of the slow introduction into routine healthcare of medical research applications and technological developments leads us to believe that there needs to be a conscious move away from a risk-averse NHS. The NHS and the whole UK healthcare environment is one where medical practitioners are either apprehensive about introducing useful new tests, devices, interventions and therapies, or cannot drive innovations into the clinical arena because of tightly constrained funding streams. We acknowledge that there has to be appropriate cost-benefit analysis performed before introduction of any innovations.

Patient safety is paramount, but fear of litigation often nags away at the back of the mind of doctors throughout the system when thinking about introducing innovative applications that might dramatically improve outcomes – that is a significant obstruction to achieving a better NHS. In addition, it is easy to see why many medical practitioners and health technologists believe that the National Institute for Health & Care Excellence (NICE) guidelines make it easy for that organisation to resist supporting the adoption and spread of exciting innovations into NHS care. NICE adoption teams will hold discussions about implementation of new technologies with colleagues at NHS England, with representatives from the national bodies that advise on best practice in specific disease settings (e.g. British Society of Gastroenterology) and with other learned and informed organisations. NICE appears though to represent the culture of a severely financially constrained system of healthcare innovation, one in which the predicted costs of adopting new tests and procedures once they are in routine practice, drives their decision-making.

To improve matters there are issues that need to be considered around 1) allocation of funding for R&D versus for adoption and spread of innovations, and 2) how those innovations should be adopted and driven into routine care, on a local basis rather than nationally. Firstly, data shows that the NHS's annual spend on adoption and spread of innovation (~£50M total between 2013-18) is only a tiny fraction of what it spends on research and development (£1.2 billion in 2014-5). That approach contrasts sharply with the evidence of how large successful businesses innovate, when often a valuable new piece of proprietary technology after being tested in the field is marketed aggressively and backed by large amounts of spending in order to promote widespread uptake. The NHS financial model for innovation, adoption and spread needs updating.

Since 2013, with the advent of local Academic Health Science Networks (AHSNs) NHS England has begun to realise the importance of supporting adoption and spread campaigns for new innovations, locally. There are now many examples of how this programme is working successfully and which are outlined below in an extract from the Ben Collins article "Adoption and Spread of Innovation in the NHS". It is heartening that these AHSNs were relicensed in

May 2018 for a further 10-year period and they should provide a stimulus to innovation adoption. It will however require a shift away from administrative layers of bureaucracy and ponderous action managed centrally by the NHS, and for these more local networks to be fully supported by significant increases in funding. Collins writes:

> *"Frustrated with the slow pace of change, there have always been voices in the NHS advocating national direction, or the use of highly directive incentive schemes, to speed up adoption of innovation. We see limited advantage in central bodies mandating adoption of the types of service innovations considered in these case studies. Local health services are complex, interconnected systems with different starting points, different challenges and finite skills and resources for innovation and improvement. External bodies are ill placed to determine which service innovations would deliver greatest value within a local system or how they should be adapted to deliver greatest impact. In any case, the evidence for service innovations is constantly shifting with new innovations emerging. If so, calls for national directives show out dated thinking on the nature of service innovation that needs to be challenged."*

Further considerations regarding the adoption and spread of innovations will come into sharp focus in the coming years as new generations become more active in consumer-led healthcare. If the value of a new test is brought up in a consultation by an informed NHS patient and practitioners agree that that test may help improve diagnosis or treatment, then as in the US that test perhaps should be requested. Safeguards can easily be put in place with a consensus of medical expertise able to confirm the validity of the test that it is performed within a quality management system, and if prescribed how to interpret the results. But, even if a new test or change to practice is shown to be valid and has passed clinical trials, issues remain about whether the system supporting it is fully accredited.

There are currently a large number of new tests and novel therapies that are not requested by practitioners and healthcare professionals, despite their knowledge that the result could significantly help them improve the value of the treatment that they can offer. Examples of this include the use of circulating tumour cell and/or DNA assays for diagnosing and staging patients with common cancers, or for many cancer patients the use of FDG-PET imaging to measure at a very early stage after initial treatment, response to therapy. Often in these disease settings the 'gold standard' test (as for FDG-PET imaging, where that gold standard remains simply a CT scan, performed one month and three months after first treatment) will always remain as part of the standard of care, unless there is a bold move to change to a potentially better innovation. This is not a challenge that can be undertaken by the NHS alone. The introduction of new, potentially improved monitoring tests, interventions and treatment modalities is often decided upon by international committees, which represent the harmonisation of national bodies responsible for particular aspects of healthcare. This is especially true for the European Union. It is possible that as a by-product of Brexit, the UK and the NHS will have more autonomy to introduce new models of care.

Budgets naturally come under pressure when expensive new tests and therapies are sanctioned and prescribed, but cost savings would accrue from early detection, diagnosis and treatment. Establishing successful PPP models could also help to drive down costs/tariffs of the tests. In addition, commercial sponsorship of these modern innovative tests, by companies

researching in this field and who have conducted expensive clinical trials to demonstrate their value, should be sought to underpin this 21st century model of high-tech healthcare. It is an unfortunate that the UKs world-class universities and academic institutions are often first to make key scientific discoveries leading to huge medical advances, but NHS adoption of them and their integration into standard practice is often very tardy. The whole NHS innovation pathway needs reform, with currently too many underfunded layers of bureaucracy existing to smooth the passage of new developments from the laboratory bench through to clinical trial, and on into testing programmes in a few Trusts before entering the clinic.

Funding

Challenges

It is important to remember that even if NICE approve the use of a new treatment or practice it will be the individual CCG that decides whether to commission or not – and that is often perceived as a 'postcode lottery'. Those CCGs though will always have to adjust their commissioning pattern to reflect the individual needs of their catchment. A recent case in the West Country highlights this dilemma. An oncology nurse in Barnstaple, with advanced bowel cancer and given three months to live was refused funding for a drug with life-changing potential. She took the initiative by applying for crowd funding for the treatment, was successful and is now in remission (BBC News Report 2.8.18). With patient responses to these treatments still difficult to accurately predict the decision-making for CCGs remains a complex issue.

To support the innovation pathway and early adoption, significant allocation of existing funds needs to be directed towards local AHSNs so that adoption of novel applications can start to permeate healthcare. In addition, new investment would have to be sought in order to support what should become a burgeoning pathway of innovation. New funding should be sought from those businesses that are likely to benefit from the new application. With regard to attempting to change long established directives for tests and treatments that have been harmonised across Europe, extensive new funding will be required to support pioneering large studies as part of an international programme of validation.

Staffing

Challenges

Some complex innovations that involve changes to procedures and the learning of new skills may require staff attending courses and developing their knowledge base. Some staff may find that stressful and there needs to be careful and considered management of the changes to the scope of existing work as appropriate, across all disciplines and grades. On occasion, new staff would have to be hired with the specific to perform complex new procedures associated with the innovation.

There is also a challenge to patients when altering their type of treatment and process. Patients and carers need to be fully supported to facilitate changes from an established regime.

Benefits

In general, managers of healthcare and other NHS staff are likely to feel much more motivated to adopt and implement innovations that have been developed and designed for local practices, rather than having to alter their procedures and processes in response to edicts

received centrally from NHS England. Patients are likely also to respond better to locally driven innovations that take account of the specific conditions from which they suffer.

Training in new skills and techniques necessary to deliver new innovations can help staff develop their experience and advance their career.

Innovation

Challenges

One of the issues around introducing new tests is that without the same standardised quality systems and infrastructure in place, assays methods, measurements, analysis and interpretation can vary. This leads to concern by International Committees that the innovation can be demonstrated as being beneficial beyond doubt, and would be able to be delivered as a quality standardised service. That is despite huge evidence and the feeling of many medical practitioners that in the right setting some new tests can be game changing for patients.

Benefits

It is axiomatic that the adoption and spread of previously trialled and tested innovations makes differences to patient diagnosis, treatment, prognosis and improves outcomes. Part of the upside for these changes to service can often be the local delivery of new services that previously had had to be delivered at regional centres.

8. Locally-delivered Healthcare: How Local is Local?

It's is critically important to consider how to deliver health services optimally and what should be the role of community care at home, local clinics, district hospitals and specialised regional centres. Whilst the NHS gains huge strength from its networking capability, its facilities and a standardised approach to working, one of the drawbacks of being a national health service is that for the most part the same standard and quality of service is expected to be delivered across all conditions, for all demographics and with all infrastructures. Whilst ideally, that standardised one-size-fits-all model is a laudable goal it wrongly tends to assume that for the most part all areas of the country and the patient population treated, come from the same starting position and have the same transport links, family and community support, work and home lives, knowledge and expectations, and access to specialist services. Government has started to address this issue and as an example announced recently the establishment of early diagnosis centres for cancer, where patients at risk of developing cancer or with early signs of the disease can attend a centre which can provide all the tests and scans required under one roof on one day. That is a start, but having early diagnosis centres in all large towns and cities is probably unrealistic given the costs of buying and maintaining new test equipment and imaging/scanning devices, and supporting that with healthcare specialists.

Clearly, there is much that can and should be delivered simply and effectively in a standardised way throughout the country such as, GP practice and dispensing, immunisations and basic monitoring and investigative tests. At the other end of the spectrum a specialist quaternary care environment has to be used to deliver the highly advanced levels of specialised medicine, monitoring and care required to undertake clinical trials of experimental medicine, and for specialist surgical and medical interventions using hi-tech equipment and trained staff. The establishment of early diagnosis centres for cancer is to be lauded and we expect many other examples of concentrating specialist facilities for addressing other disease settings and conditions more appropriately. But, to deal with further subsets of medical conditions and settings and for different patient populations, devolvement of local decision-making to a group of extremely experienced managers of healthcare will need to happen.

Currently, CCGs are tasked with commissioning and ensuring the delivery of healthcare, locally. But is that really local? Since 2013 and their establishment as 213 groups, over the last five years various mergers have occurred with more planned, such that by the end of this year there could be only 174 CCGs. Some of these e.g. NHS Birmingham and Solihull CCG serve as many as 1.2 million patients.

They have good experience now, and quite rightly are directed to act and follow NHS England statutory guidelines for routine practice. But, in terms of how they handle conflicts of interests around changing service delivery or introducing changes, they can become hamstrung. In addition, the greater the population that any CCG serves the less focused they can be on the needs of individual groups. Innovative and sophisticated thought-processes will

be required so that the best use of truly local facilities and staff can be utilised to address the health, cultural and social needs of the community. Those needs can vary dramatically for patient groups with different ethnicities, religions, finances, and the rhythm and pressures of their home and working lives. In addition, the workload and demand for particular services within any community at times can escalate unpredictably - disease epidemics, implementation of new processes, or reacting to a change in health dynamics brought about by local population immigration can all alter requirements dramatically and increase the immediate pressure on the system.

It would be nice to think that the delivery of healthcare can always be a simple and smooth process, one by which people's normal condition can be maintained or defects rectified at times so they can get back on the road to health – much like we take our cars into the garage for a service or to have a new clutch put in that has worn out. The reality is very different and perhaps we should start to think of how we react to symptoms of serious disease more like we do for accident and emergency or epidemics. It is not just about putting out fires, because as with natural disasters like with floods or reacting to changes in climate that cause long term disruption, damage to infrastructure and inevitably sometimes loss of life, are the knock-on effects for patients and health services that have to be addressed. As an analogy, in the US, if individual states cannot respond to a disaster because its effects overwhelm state authorities and local resources, they can apply for FEMA (Federal Emergency Management Agency) aid that can deliver funding, services and experts to address the immediate needs of the local population. Perhaps, for many health issues around the country that have many different causes and effects, we need to be able divert resources quickly to address the problems of individuals, groups or communities in a way that might be appropriate in one area and not in another. The NHS has to become much more flexible in the way that it makes responses to healthcare demands and we must begin to trust local managers to deliver best care as they see fit in the area or region that they know well.

Funding

Challenges

Shaping the delivery of healthcare to serve the needs of specific communities and individuals should theoretically reduce the pressures on funding by not having to always provide the high levels of staffing and investment required to ensure that larger centres or group of professionals working together as practices can operate, even when demand in these areas and communities is low at times. However, the ability of a modern workforce to move quickly and adapt to changing conditions remains a challenge.

The Blair Government from 1997 approached the issue of delivering healthcare services better by borrowing large sums of money and increasing the budget deficit, and by entering into Private Finance Initiatives (PFIs) to build or replace more and more hospitals and treatment centres. It was perceived that everyone's expectation was to have a state-of-the-art hospital on 'every street corner'. The reality of those vote-attracting programmes of building produced flagship hospitals like UCLH, a Trust that will not actually own the building that the Government leased, until 2037 whilst every year paying increasing costs to the PFI, and at the same time making it incredibly difficult and bureaucratic to alter any parts of the building to accommodate changes to services and install new equipment. Other new hospitals were built

to serve the local population and quickly became 'white elephants' often devoid of many patients requiring the services that were envisaged a few years down the line, whilst other existing Trusts in some areas were inundated, dealing with numbers of patients that were beginning to overwhelm their resources.

Benefits

A more locally managed budget by those with knowledge of local needs, epidemiology, and plans for any infrastructure developments.

Staffing

Challenges

To ensure there are appropriate levels of qualified and experienced staff to deliver healthcare locally.

To set different ways of working in the community, to deliver healthcare, fitness and wellbeing advice in many and varied settings (schools, workplace, sports clubs, clubs, supermarkets, internet groups etc).

Benefits

A newer, more flexible, autonomous work force can begin to be developed, employed and managed by the local Foundation Trust with improved recruitment and retention.

Innovation

Challenges

Innovating at local and community level can involve a huge range of changes to process, from the most simple to extremely complex. Building a robust business case to show the value of any new process or introduction of novel tests and procedures needs to be undertaken. For that to happen establishing links to other local expertise (financial, managerial and technological).

Benefits

A more autonomous workforce acting in the community at a truly local level can devise and advise on the potential for innovation.

9. Achieving Earlier Stage Diagnoses

Initiatives that help practitioners to recognise the early signs of disease must become a priority and it is heartening that 'prevent not repair' is fast becoming the maxim of the modern day NHS.

We see five major areas for consideration to achieve earlier stage diagnoses.

9.1 Centres of expertise

Centres concentrating on specific disease settings (cancer, mental health, infection, medical conditions) e.g. the establishment of early stage cancer centres for providing all tests and scans on one day in one single location.

9.2 National screening programmes for specific at-risk populations

As testament to this there have been some excellent screening programmes introduced for high risk groups (e.g. Cervical screening programme, Faecal Occult Blood Test (FOBT) for bowel cancer) but there will always be a significant number of individuals that develop conditions and present at a later stage of disease than would be ideal. NHS England is currently working towards a significant change in the process of cervical cancer screening. It is proposed that initial screening will be undertaken using genetic testing for the presence of Human Papilloma virus (HPV) in the sample. Should this be positive, further microscopic analysis will be performed to identify the stage of disease. For the premise of 'prevent not repair' the recent introduction of HPV immunisation for young girls and latterly the inclusion of young boys, will help to further minimise the incidence of cervical cancer.

9.3 Addressing the patient pathway and setting achievable, appropriate targets to streamline care management

However useful it is to detect the early signs of disease, without streamlined care plans that can deliver testing and interventions swiftly, the gains will remain small.

Focusing on targets as a measure of quality can be both counter-productive and a waste of time and effort. Whilst knowledge and compliance around the length of time taken to drive patients through the pathway is important, it does not always reflect the quality of the service provided nor will it drive improvements to care. Targets are exactly that, they should represent the objectives and goals of individuals, groups, units and organisations to improve their level of performance. Non-compliance for some cases will merely reflect the complexity of the treatment plan envisaged. What is more worrying is that objectives for hitting targets, is being compromised by the inadequacy of staff and facilities, or management. The focus must be on having the appropriate services in place to provide the level of care needed to treat patients efficiently and at the earliest time.

9.4 Establishing programmes for using new biosensors and biomarker profiles to recognise disease in advance of symptoms

There is huge challenge but also great opportunities in the developing area of using biosensor technology and determining biomarker signatures that correlate with disease presentation at an early stage. It is even possible for some biomarker tests such as investigating circulating DNA and circulating tumour cell detection assays to diagnose particular individuals at-risk of disease even when they are asymptomatic. The issue of how to drive these innovations into routine use has been addressed earlier, but it remains an untapped opportunity to improve outcomes.

What could have a more rapid and huge effect on achieving early diagnosis of many conditions is for more of the population to wear monitors such as those provided by lifestyle technology ('Fitbit'). The ability to measure and log surrogate markers of disease will increase rapidly over the next few years. Currently, wristbands which can be synchronised with smartphones and other mobile computer devices allows the wearer, and potentially health professionals, to gather data and track in real time some of their vital signs (pulse rate, VO2 Max, sleep patterns etc.). However, the vast majority of those that engage with this type of technology are already relatively fit and are interested in monitoring their own health. Adoption of this type of technology needs to be by those at risk of developing debilitating conditions across all demographics.

9.5 Better communication and awareness, public engagement and utilising personal and professional networks to flag up early signs of disease

Often the earliest symptoms of disease may be very minor and can easily be ignored or just mentioned in passing to friends and work colleagues. The workplace is likely to be an excellent source of detecting early signs of disease or health problems and we would suggest that where appropriate links between occupational health (OH) clinical staff members' GPs are maintained and strengthened. Confidentiality remains critical in this process and staff will have to be assured that discussions they may have with OH specialists would remain completely confidential for fear that their employers may think they are unreliable or seen as shirking, especially when the symptoms may be back pain, tiredness, or stress. We have to encourage people to speak to professionals earlier without any fear of being labelled work-shy. Smaller companies and organisations may need help in accessing professional occupational health services and financial help in outsourcing. In our experience speaking with OH professionals this window into early stages of disease is not being used to best effect.

Whilst all of these areas (1 -5) have seen varying degrees of implementation and development, diverting funding or attracting new sources of money is important if we are to gain the most value out of these approaches. A complete review of the current state of play for programmes for achieving earlier stage diagnoses in all of the categories detailed above is not possible here. But, it is clear that the benefits of getting these programmes right can game-changing and must form a major portion of strategic planning across the NHS.

Funding

Challenges

Any initiatives that have the potential to improve early diagnosis have to incorporate realistic and catholic funding plans. Each of the ideas above will have different financial implications. Programmes 1 – 4 are very likely to require greater amounts of consumable expenditure initially and will need capital spending for improving existing and building new infrastructure. The last initiative (5) though would produce quick gains at little extra cost and is more about changing culture and raising the awareness of how to recognise early signs of disease and encourage people to discuss their own health openly. Similarly, some of the innovations outlined in 4 (e.g. encouraging at-risk populations to wear simple monitoring devices like 'Fit-bits') would require the establishment of a dedicated educational teaching programme within the community to explain to the public about the potential health benefits of wearing data-collecting wristbands. This change in culture would demand making some provision of monitoring technology for those who cannot afford to buy it. In addition, health professionals who are in regular consultation with the public (e.g. GPs, nurses, health visitors, occupational health staff), need to be armed with the information and resources to help encourage and generate uptake in new populations.

Benefits

Clearly, all these initiatives (1 - 5) have the potential to intervene earlier in an individual's journey from health to disease. Some would demand budget increases to achieve improved outcomes, others could be promulgated with a more thrifty approach by encouraging changes in culture. Specifically though, where new technology is involved (e.g. computer hardware, software and programming, mobile devices, equipment, monitors) funding opportunities exist through partnering with technology businesses.

Staffing

Challenges

Establishing the value of many putative NHS reforms normally requires health economists to perform complex cost-benefit analyses. These studies will not only look at what cost savings might accrue from achieving better outcomes and in some places cures, but also have to consider the increased funding required to staff these initiatives. However, establishing programmes to support the premise of improving outcomes by achieving earlier diagnosis should not really require critical analysis by health economists. Simply put, Government surely has a duty to provide the resources (tried and trusted tests) that can provide earlier diagnosis of conditions, at least within at-risk populations. It is easy to argue that individuals who go on to develop life-changing conditions that could have been diagnosed at much earlier stage should feel extremely disappointed in the healthcare system. Pressure on the NHS-England and CCGs is bound to increase as consumers and patients become more educated about the value of modern testing and what benefits that can bring to them as individuals. We are hopefully still a long way from legal cases being brought by individuals who believe that it could be negligent to refuse commissioning tests that could have led to treatment that might have altered the course of their disease. But, one can't rule out such actions in the future as the public develop their knowledge of medicine and decide to contest their rights.

Benefits

The development of more and more biomarker assays provides healthcare professionals the means by which to diagnose people without always having early signs of disease. Whilst the esteem with which this new workforce will be held by the public should increase significantly, with great power (the ability to predict likely future adverse advents) comes great responsibility. This could become both an exciting but challenging environment. Informing patients that they may have an underlying condition that is not yet manifest and asking them to then change lifestyle or undergo a procedure will require good communication skills.

Innovations

Challenges

Of the new initiatives that might predict the presence of disease in the absence of obvious symptoms not all are necessarily innovative. The first on the list above (1/5) probably just needs more commitment to set up centres of excellence that can provide all the tests and procedures under one roof. Of the others, 3/5 requires a change in philosophy and strategy with a commitment to streamlining appropriate care and a move away from a target-driven culture, and 5/5 is all about opening up existing communication channels but making it easier for the early signs of disease to be noticed and acted upon.

The two other initiatives (2/5 and 4/5), will be driven by the technological advances in healthcare and medicine that continue to be developed across the sector and it is important for Government to direct sufficient human and financial resources to properly assess which of the tests and interventions that come will produce the biggest gains in early diagnosis. Simple monitoring applications like the more widespread use of lifestyle technology should be encouraged and adopted and the ability to link them to GPs or Trust based services is already available. This would provide a shared care approach but may face some opposition regarding concerns around invasion of privacy and freedom of information. These issues will have to be managed very sensitively.

10. Integrated Healthcare

All governments these days purport to achieve a properly integrated care system (ICS) that covers medical, clinical and surgical practice and mental health and social care services in primary and secondary healthcare settings. NHS England, under their 'Integrated Care' strategy have established 50 vanguard sites to provide care differently, with NHS organisations and local councils joining forces to coordinate services around the whole needs of each person. However, this idea is still in its infancy and specialist knowledge, and existing successful models are not easily found. What is clear is that in order for an ICS to work each patient case must be assessed separately on its own merit, with the care required potentially involving considering aspects like the mental state of the patient, their housing conditions, socioeconomic factors, the interaction that they have with family and friends, as well as deciding how their healthcare should be delivered.

Currently, the NHS is not set up to achieve optimal care across all these areas for individual patients, even though there are at some centres, teams of social care and occupational health workers who support Hospital Trust Departments and specialties, especially where disability or old age is a complication of their discharge from hospital. What must be addressed are not only the causes of disease, but what allows the course of any condition to worsen and have debilitating, and in some cases life-changing effects. It is anticipated that the data accruing from the 50 vanguard sites will inform how to effectively establish an integrated health, mental and social care package that can be used to serve local communities, to prevent disease and to reverse the poor levels of fitness and wellbeing amongst all age groups and across all social strata.

Funding

Challenges

Managing budgets and allocating costs across different aspects of individual patient care is challenging for managers. What would be the role of CCGs in commissioning this complexity of services, how budgets are agreed and who pays, all needs critical discussion.

Benefits

It is not expected that large sums of new money will be required to established efficient collaborative working practices, although some initial set-up costs for IT and management, and new ways of working might be required.

Staffing

Challenges

It is also conceivable that in the coming years multidisciplinary specialists in total healthcare will become established roles in ICS delivery. That will involve setting up courses, cross specialty collaborations with support from the Royal Colleges.

Benefits

Extended practitioner roles will provide a new dynamic for staff wishing to develop their skills and knowledge.

Innovations

Challenges

The main difficulties will be in aligning the NHS with Councils to manage budgets and allocating staff to patient need, working in new ways. Specialists within medical, mental health and social care

These alterations in the area of public services to develop an efficient ICS will take time to bed in and through constant review and iterative changes will begon to bear fruit. Patience will be required from both politicians and the public, and realistic objectives should be set.

Benefits

The benefits to patients, families, carers, and society generally are obvious. Better healthcare, less time off work leading to a more productive economy. For children an efficient ICS can mean less time off School with subsequent improvements to their education.

Conclusion

For much of the public, healthcare professionals within the UK and for some observers from outside, the NHS remains an enviable model of healthcare, unique in its funding model and in its adherence to its founding principles at the heart of which is the provision of care from cradle to grave, free at the point of delivery. But, despite the NHS in recent years devolving much decision-making and autonomy to local boards of Care Commissioning Groups and Hospital Foundation Trusts, it remains essentially just a well-regulated, hard-wired network of health and social care providers. It is an anomaly that the strong governance of the NHS and its highly organised structure is actually part of the reason for its gradual fall in performance over the last thirty years, and its inability to match the outcomes produced by many other country's integrated care systems within the developed world. A much more flexible, and for certain services, virtual model of working needs to be established -one that creates an interconnected set of services which addresses the current paradigms of healthcare for particular diseases and conditions, with specialist hubs. Interacting with these specialist hubs (whether forming part of the primary care infrastructure as centres for diagnostic services, or at hospital sites) patients should begin to feel that at the moment they start their NHS journey that a streamlined, efficient, state-of-the-art pathway of care is planned.

It is just too trite to rail that the NHS and social care service is under resourced and that the combined current funding (together making up 9.7% of the UK's GDP) is far too low – a fact that is now accepted by the public and all political parties alike. But even if the UK economy booms in the next ten years leading to higher tax revenues for the Treasury (which is highly unlikely post-'Brexit', given the forecasts for growth by a number of UK and independent financial institutions), or Government decides to take tough fiscal policy decisions that allow increases in spending on integrated healthcare, we firmly believe that only a radical shake-up in how the integrated care system is funded, organised and managed will start to drive costs down and improve outcomes. Regardless of the political implications for MPs and their affiliations, it is necessary to make clear that at the heart of this debate lie six fundamental changes that need to be made to the NHS to protect it and help it address current and increasing future demand:

1) There needs to be a dramatic increase in the scope of public-private-partnership for delivering NHS services, from the building of new fit-for-purpose specialist facilities through collaborative development of a more efficient and productive workforce, to business engagement with the commercial sector to operate more leanly. Only then will it be possible to attract the sorts of levels of funding and create new revenue streams that will be able support the increasing operational costs, and drive innovation

such that both the NHS and the commercial sector can share in any surpluses generated. That does not represent a privatised health service system, it is a sensible and controlled way for healthcare to be funded and delivered, with the NHS, Royal Colleges and existing specialist medical bodies ensuring a quality system is in place overseeing compliance to the highest standards, and managing the regulatory framework.

2) The 'prevent not repair' maxim that echoes around NHS England halls has to be driven through locally on the ground so that those people with preventable conditions or with diseases that can be limited in their symptoms and in the debilitation that they cause, can be educated at an early stage and invigorated to take control of their fitness and wellbeing. The expectation must be that tax-payers should have a duty as citizens to consider the consequences of their lifestyle choices and what effect that that has on their family, friends and local community. Incentivising people to make better decisions about their health will promote a revolution in consumer-led healthcare. The NHS needs to work on programmes that can help make available to people technologies that will allow them to take more control of their own wellbeing (remote sensors, monitors, telemedicine).
3) Existing facilities need to be transformed and developed so that they can be made to deliver 24/7 services in an integrated fashion so that we start addressing people as individuals with specific healthcare needs, rather than simply diagnosing and treating conditions. This recognises that one size does not fit all and while guidance can be provided centrally care packages will have to be tailored to the needs of specific patient groups and within different localities with decision-making devolved, when appropriate. That local empowerment brings challenges for collaborative working between councils, the NHS and commercial companies.
4) How the NHS embraces, rather than reacts to the revolution in personalised medicine will dictate how well the UK performs in the next two decades in terms of efficiencies and outcomes. This area of medicine and the changes to the operation of services that it dictates is one of many that requires proper analysis by health economists, to model and predict the savings made (or extra costs created) in stratifying patients for particular therapy and streamlining their treatment.
5) Over the last 20 years the change in recording data from analogue to digital form has precipitated a massive revolution in information technology. Nowhere does this become more important than in the arena of healthcare. NHS England has reacted to this by setting up NHS Digital who has a huge role to play in how patient data is collected, managed and analysed. But, there has been a huge opportunity missed by the NHS in recognising the value of the data that it holds. In 'Lady Windermere's Fan' by Oscar Wilde, a dialogue between Cecil Graham and Lord Darlington sums this up well.

> *"Cecil Graham: What is a cynic?*
>
> *Lord Darlington: A man who knows the price of everything, and the value of nothing.*

Cecil Graham: And a sentimentalist, my dear Darlington, is a man who sees an absurd value in everything and doesn't know the market price of any single thing."

1. The NHS has to stop behaving like a sentimentalist and recognise the value of jewel that it holds in its hand, and understand that the price of digital information has soared in recent years. It must be leveraged better. Working with the computing technology industry. Huge opportunities exist for using this data that goes back some 70 years for in silico modeling of treatment for patients, generating vastly improved outcomes.

6) Transforming culture is critical throughout the NHS network and everyone needs to become more responsive to change and welcome ideas for reform. That plays out for patients in terms of them starting to take more control of their own health, and for much of the workforce in convincing them not let their unrealistic ideals about the NHS prevent them engaging with and supporting bold, new initiatives. For politicians it is about encouraging collaboration with industry and visualising companies as true partners with the same goals and aspirations as NHS England, rather than holding suspicions that the whole of the commercial sector is exclusively concerned with driving up prices and paying increasingly bigger dividends to their shareholders. In reality, most healthcare and 'pharma' businesses are driven by Boards who care about making a difference to their own and other people's health and improving everyone's lives - but of course have to be committed to ensuring a viable, but robust and sustainable business plan is in place.