Shropshire and Staffordshire Strategic Health Authority

Futures through the eyes of the Health System Simulator

Final Report - October 2004 (updated March 2005)

Developed by the Whole Systems Partnership

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Executive summary

1 Approach

The Health System Simulator '*translates existing knowledge and the outcomes from the Strategic Health Authority visioning process into a flexible evidence based tool that links and quantifies the whole system in such a way as to inform medium to long term development plans'*. It has established a basis on which to develop and challenge people's understanding of how the health system 'fits together' in the context of performance targets and policy objectives.

The process of developing the tool has included:

- Workshop sessions with Strategic Health Authority staff designed to determine the key questions, overall architecture and focus areas within the Simulator;
- Undertaking a comprehensive 'horizon scan' with regard to social changes, policy direction and technological developments;
- The development of systems modelling skills amongst a core group of SHA staff to facilitate and test the development of the tool and ensure ongoing application;
- Discussion with a small number of 'critical friends' in refining the overall approach;
- Data collection and its validation for use in the model;
- The development of scenarios and outputs that can inform strategic policy direction, performance monitoring priorities and ongoing learning.

The project has been undertaken between April and October 2004 and has therefore been able to inform and be informed by the parallel processes of capacity planning, workforce planning and the choice directive implementation.

The Health System Simulator has been constructed for Shropshire and Staffordshire health economies separately. It is a population based tool and therefore reflects the necessary commissioning decisions facing PCTs as well as providing an indication of the levels of capacity that may be required from acute trusts and independent sector providers to meet the needs of these populations.

It has been built in a way that enables it to be sensitive to demographic change, rates of access and lengths of stay in hospital across different age bands and specialties as well as reflecting implications for the community. Key links between the different sectors of the Simulator tool allow for shifts from secondary to primary and community services, for example through the introduction of approaches to the management of long term conditions and the development of intermediate care. The Modernisation Agency '10 High Impact Changes' agenda is also reflected in the Simulator.

Of particular significance in the Simulator tool is the ability to reflect changes in capacity requirements in the shifting numbers and profiles of workforce requirements. This is achieved by identifying key drivers for different staff groups and aggregating these into levels that reflect the Agenda for Change programme. Such an approach has been able to identify broad outcomes to inform strategic workforce planning decisions.

Key messages arising from the project have included:

1. The value of the modelling process in facilitating a learning environment that can constantly challenge how we see the health system evolving, or

being transformed over time, and the benefits of sharing this learning process more widely;

2. The importance of identifying key areas where performance is dependant on changes in behaviour and therefore where the role of the SHA and commissioning processes will be to facilitate and enable change;
3. The opportunity to use the Simulator tool to challenge people's language and perception of the system within its traditional boundaries and pathways;
4. The uncertainty of the future – however helpful a Simulator tool is in scoping the potential impact there will always be significant additional 'intelligence' about possible futures that will remain unquantifiable and will rely on expert judgement and political will to understand and effect necessary changes.

2 Futures

This report contains a thorough review of potential future scenarios and reflects these in outcomes from the Simulator tool. The changes that face us in developing appropriate health care systems up to 2007/08 are identified as:

- Integrated primary, community and social care with clear pathways into and out of secondary and tertiary systems;
- A priority given to keeping patients out of hospital;
- The active management of the higher risk group of individuals shown to be multiple users of health and/or social care services;
- The promotion of self care and shared care between the individual and the state;
- The role of doctors as leaders, as commissioners of care and as multiple site practitioners;
- An improved use of information, better streaming of data and greater clarity in the questions the data needs to address for strategic purposes;
- The role of carers, local networks of support and social care staff in an increasingly mobile population that can leave older people in greater need of support from statutory agencies.

Looking further ahead the report describes the issues we will face up to 2012/13 which, for service provision include:

- More explicit standards of care, improvements in standards of care, and increased disclosure of medical information. There is likely to be greater freedom of medical information including more rights for patients over medical records and clinical information;
- An increase in self care;
- More explicit standards of performance in order that consumers are able to make more informed choices about services;
- Increased choice of supply, with services provided by a range of suppliers including those from other European countries;
- Response from health providers to an increasingly diverse set of patient needs;
- More time required for doctors and other health professionals to review clinical information on patient conditions and to have access to respected sources on these issues.

Key drivers, their likelihood and their potential impact are all summarised to inform the use of the Simulator tool. They are described as demographic changes, changing models of care, new ways of managing long term conditions, modernisation of the long term care sector, shifts in the burden of disease, shifting workforce requirements and availability, new technologies, financial pressures and changing expectations of the consumer/citizen.

3 Simulator outputs

Up to 2007/08 there are very clear performance requirements for the two health economies of Shropshire and Staffordshire. They are:

- Achievement of the 18 wk waiting time target;
- Reduction in occupied bed days for unscheduled care of 5%;
- Required investment in community matron capacity in line with the commitment for 3,000 such posts across England by 2007/08;
- Achievement of day case rates to the DoH targets for 2007/08;
- A continued shift from day cases to outpatients and primary care.

The Simulator has been initialised to deliver on these requirements in the context of a 1.5% increase in underlying rates of access, such that the required performance is:

- Removal of all over 6 week waiters for outpatients and over 6 week waiters for day case or inpatient treatment (leaving up to 6 week maximum wait for diagnostics within the overall process);
- A reduction in length of stay for all specialties of 10%;
- A 10% shift of procedures currently carried out as day cases, half and half to outpatients and to primary care and a 10 % shift of outpatient procedures to primary care;
- A 10% reduction in follow-up outpatient appointments;
- The appointment of community matrons – 36 in Shropshire and 79 in Staffordshire;
- 15% of over 75 year olds receiving unscheduled care in hospital being discharged early to intermediate care settings;
- 10% of over 75yr old admissions from A&E diverted to intermediate care.

The outputs in terms of capacity are reflected in the table below. Sensitivities to each of the assumptions and comparisons with capacity planning and workforce planning projections are then made.

Shropshire:	**Staffordshire:**
Total hospital beds fall from 853 to 775;	Total hospital beds fall from 1,995 to 1,888;
Outpatient rooms rise from 36 to 37;	Outpatient rooms level at 102;
Number of Consultants rises from 195 to 204;	Number of consultants rises from 389 to 397;
Intermediate care clients rise c.50 to 168;	Intermediate care clients rise from c.100 to 326;
A rise in direct staff costs of 6% over the 5yrs;	A rise in direct staff costs of 4% over the 5yrs;
The % spend in the community on direct staff costs rising from 37 to 42%;	The % spend in community settings on direct staff costs rising from 39 to 43%;
Additional day cases pa of c.800 due to reductions in waiting lists and a further 3,400pa by 2007/08 due to system changes.	Additional day cases pa of c.1,100 due to reductions in waiting lists and a further 2,000pa by 2007/08 due to systems changes.

Some key conclusions from this baseline scenario for 2007/08 include:

- That achieving diversion from A&E for older people has the most significant impact on achieving the target for a reduction in unscheduled occupied bed days;
- That the required number of acute beds will fall over this first period by either 9 or 5% (Shropshire and Staffordshire respectively);
- That there will need to be a significant, at least three fold, expansion in intermediate care capacity to achieve the targets;
- That there will need to be a significant and sustained increase in capacity to undertake day cases in both health economies;
- That there will need to be additional capacity or improved efficiency in outpatient departments of in Shropshire on top of the anticipated 10% reduction in follow up appointments.

The report then goes on to suggest 10 high level performance indicators for inclusion in a Performance Dashboard. This will provide feedback on key targets and facilitate improvements in our understanding and representation of the respective health systems within the Simulator.

A further set of scenarios are developed for 2012/13 in which the impact of continued underlying increases in access rates, demographic changes and the extension of both community and hospital performance improvement are compared. This set of scenarios suggests that sustaining the progress made to achieve the 2007/08 performance targets will require more than the maintenance of new patterns of care. The benefits of further progress in the hospital sector, particularly in reducing lengths of stay, is highlighted.

However, when a reasonable underlying increase in rates of access is included at 1%pa it is necessary to employ a combined strategy of continued progress in both hospital and community sectors to achieve performance targets likely to be set for the medium to longer term in the light of what we know is possible from international comparisons.

4 Next steps

The Simulator tool is a first step toward understanding in a more comprehensive and evidence based way how capacity requirements will shift across the health systems within the Strategic Health Authority over the medium to longer term. Using the tool will improve people's understanding of this system and should also lead to improvements in the Simulator tool itself.

The simulator reflects our current understanding of system relationships and our ability to obtain validated and robust data for the different elements of the model. We believe that the group of people involved have provided the basis for a well informed, high level, strategic map of the system and that data sources made available have been robust and well tested through the capacity planning and workforce planning processes. Where there are uncertainties about the assumptions underlying new services or a range of possible trajectories these have been accommodated by providing an ability to run different simulations on the basis of a range of values.

Implementing the proposed performance dashboard and online version of the Simulator tool will provide an environment in which there can be ongoing learning and feedback. In addition the tool should be used to stimulate discussion and reflect on the key strategic decisions that will shape the future of our health systems.

1 Introduction

1.1 Background and objectives

Shropshire and Staffordshire Strategic Health Authority commissioned this work to help it undertake its strategic role in setting the context and assessing local plans for service or capacity development. It recognised the challenge of assessing, on a sound evidence base, the range of targets and initiatives that local health economies are expected to deliver.

The objective for the project was therefore:

"To translate existing knowledge and the outcomes from the visioning process into a flexible evidence based tool that links and quantifies the whole system in such a way as to inform medium to long term development plans."

The approach to delivering on this objective has been to undertake a process that has ensured participation and engagement of key SHA staff throughout the project as well as testing out emerging findings with individual 'critical friends'.

The project has consisted of:

- Workshops to ensure participation and capture of the 'whole system' in the modelling approach;
- Parallel development of capability in systems modelling using ithink© software;
- An iterative process of knowledge capture, model development and feedback to the wider group.

This process is illustrated in Figure 1.

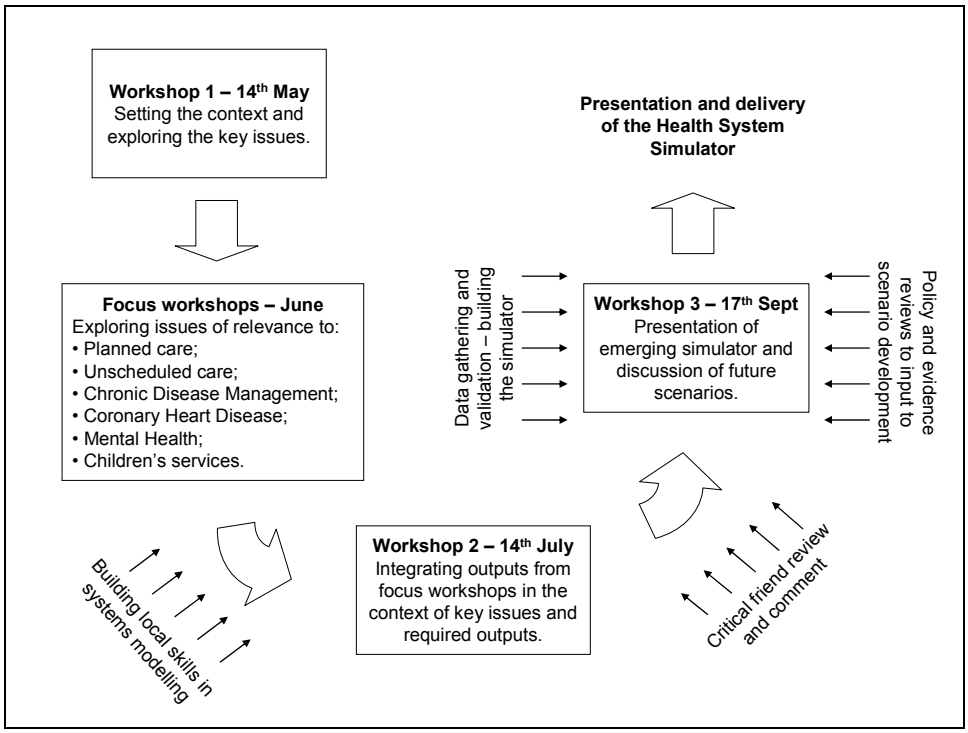

Figure 1 Process undertaken to arrive at the Health System Simulator

A report outlining progress up to and including the outputs from the workshop on the 14th July is available separately and includes:

- A fuller description of the project brief;
- A summary of the SHA vision statement for 2009 which has set the context for much of the work;
- Discussion of the key questions the model would be seeking to help answer as well as the project boundaries and scope;
- A discussion of key drivers and model architecture for six focus areas, namely planned care, unscheduled care, chronic disease management, coronary heart disease, mental health and children's services;
- An initial architecture for the Health System Simulator.

This final report builds on the foundations of Phase 1 and provides the main support to understanding the broad assumptions, evidence and outputs of the Simulator tool. It describes:

1. The response made to the initial outputs by a number of 'critical friends' within the Shropshire and Staffordshire health economy.
2. The development of the assumptions and considerations in each of the focus areas as they are translated into the Health System Simulator.
3. A summary of work undertaken to develop scenarios over the timescale of the Health System Simulator that have identified issues for wider consideration and which will help inform judgement about future resource and capacity requirements.
4. Outputs from the simulation at a macro level and in response to the initial key questions identified at the outset of the project.

1.2 The Health System Simulator

The purpose of the Health System Simulator is therefore to:

- Inform infrastructure development and guide the assessment of investment strategies such as SHA capital, Strategic Services Development Plans or Strategic Outline Cases;
- Indicate the balance of provision, for example between intervention and prevention or between secondary and primary care;
- Inform the development of key enabling strategies, particularly workforce;
- Benchmark 3 yr capacity plans;
- Identify key areas of performance that are critical to achieving the desired long term strategic redesign envisaged.

It consists of three initial products as well as the foundation for the development of three further elements:

1. Simulators built using 'ithink'© simulation software for the Shropshire and Staffordshire health economies;
2. This report summarising the process and outcomes of the project;
3. A technical document as well as the data sets that underpin the simulator;
4. On-line versions of the Simulator tool;
5. A Performance Dashboard that is informed by the outputs of the models;
6. Further sub-models in key focus areas with Mental Health expected to be the first to be completed.

In addition the project has ensured sufficient levels of proficiency in the use of the simulator amongst SHA staff to develop new scenarios and derive new outputs from the simulator; update and further validate assumptions underlying the simulator; develop additional elements within the simulator; and explore additional uses of the modelling approach in related areas.

The structure of the simulator is illustrated in Figure 2. Separate models have been built using identical structures but different demographic and capacity starting points for Shropshire and Staffordshire.

The model has four main sectors:

1. A planned care sector in which reductions in waiting lists are reflected alongside shifts to day cases. This will help inform decisions about capacity particularly in relation to Independent Sector Treatment Centres;
2. An unscheduled care sector that reflects the impact of developments such as long term conditions chronic disease management and intermediate care in avoiding inappropriate admissions and supporting early discharge in line with government targets;
3. A long term conditions sector initially reflecting intensive case management envisaged for 'Level 3' clients;
4. A primary and community care sector that reflects activity in planned and unscheduled care that can be provided in more local settings.

The key interrelationships between the four sectors enable the Health System Simulator to identify a whole system response to policy and performance targets at a macro level. The drivers for each sector are discussed in more detail in the Phase 1 report and part 2 of this report.

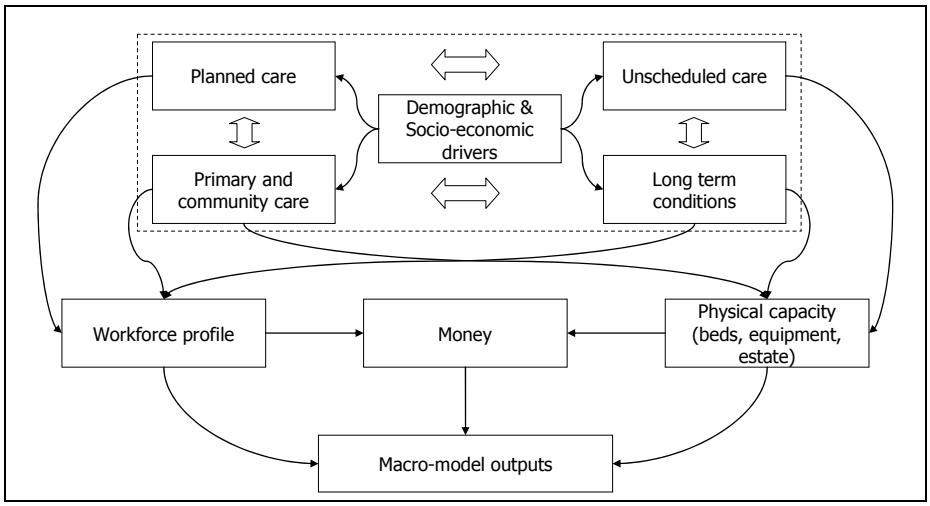

Figure 2 Overview of the model sectors being developed

1.3 Future areas of development

The key sectors of the Simulator tool illustrated above build on the focus area discussions in the first phase of the project. Some areas however have not been translated or reflected in detail in the Simulator tool at this stage, and new areas of potential focus have emerged. It has been considered necessary to explore separate development tracks for these areas.

1.3.1 Children's services

Children's services have been identified as an area for possible development after completion of the Health System Simulator, perhaps at a Local Authority level. The Simulator currently reflects capacity requirements for the 0-14 age band within the model, however the dynamics of that system will reflect the broad assumptions of the Simulator rather than issues specific to children's services. Key messages from the early stages of this project for future reference included:

- The likelihood that the next 3-5 years would be focussed on organisational change with the anticipation that improved protection from harm resulting from more co-ordinated services would help, in the longer term, to address the rising mental health issues amongst young people and potentially reduce the number of children going into care;
- Whilst the overall population of children is 'relatively stable' there are particular groups that are likely to increase in terms of both numbers of children and service requirements including children with disability and children from ethnic minority backgrounds;
- Consideration would also need to be given in any future modelling to changes in the absolute levels of child poverty.

Future service models for children are likely to be far less 'buildings' focussed and more dependent on networks and integrated services across the key agencies supporting children in their families.

1.3.2 Mental Health

A mental health model designed to explore the impact of issues identified in the first phase of this project is being developed in parallel with the Health System Simulator. It will have a focus particularly on the Shropshire health economy and issues arising from the requirement to reprovide from Shelton Hospital. This work will continue after the initial delivery of the macro model at the end of October 2004.

Key issues that have arisen, building on the outputs from Phase 1, include:

- The centrality of home treatment, case finding and self help in new models of care;
- The importance of specialist provision where necessary;
- The relationship between specialist provision/providers and the wider network of services that will be part of a market of provision – a key potential future role for specialist Trusts may well be providing 'kite marks' and a clinical governance infrastructure for other provider organisations.

1.3.3 Coronary Heart Disease

The Simulator tool enables broad conclusions on capacity requirements for cardiology and cardiothoracic surgery to be considered. In addition the chronic disease management model reflected in the tool mirrors that anticipated in coronary heart disease services. However, the special factors and detail necessary to do justice to this focus area have not been appropriate to include in the Simulator tool at a macro level.

1.3.4 Orthopaedic services

The specialisation and sub-specialisation within orthopaedic services, coupled with issues of demand and access rates reflect the broader approach but require more detail than can be included in the Simulator tool. A separate development path is therefore being considered.

1.4 Critical friend discussions[1]

During the latter stages of the project discussions with a small number of 'critical friends' was undertaken with the purpose of testing out the emerging approach to the Health System Simulator. These discussions also ensured that key drivers for change were properly reflected and gave an opportunity to horizon scan to inform the development of scenarios, outlined later in this report. Whilst people were chosen for their potential input to a specific focus area other key themes emerged that are reflected here.

Five of the focus areas were covered by specific input by an individual 'critical friend'[2]. Other sources of input have included a presentation at the Workforce Development Stakeholder Board on the 30th September.

Where the feedback was specific to an area of the model under development comments are integrated into the relevant section of this report. However, additional generic themes also emerged including:

Plurality in the provision of services: the growing reality of a market in the provision of care across different sectors (and particularly important for the mental health model).

Choice: the big driver is to respond to society's expectation of growing individualisation and personalisation through the brokering of choice and provision of care that reflects these aspirations.

Workforce issues: the key priority for the future is to expand the range and depth of the primary care workforce as well as develop the necessary generic workforce that can respond to the choice brokerage concept noted above. Modernising medical careers will have both a capacity and capability impact on services.

Ethnicity: whilst not specifically addressed or reflected in the current Simulator tool there may be benefit in considering this as a development of the demand side of the model in the future.

Language: this is a key driver in any change process, for example relationships between model sectors could usefully be described as gateways and need to be understood in relation to new opportunities, new protocols and new skills across the whole system. Some adjustment to language has taken place during the process of developing the model, for example 'chronic disease management' = 'the management of long term conditions' and 'unscheduled care' = 'unscheduled care'. However, there has also been comment that language should be used in a way that challenges perceptions about how the system needs to be 'freed-up', for example in talking about booked appointments rather than GP referrals, thus making the point that GP's are not necessarily the only 'broker' of access to secondary care in the future.

1.5 10 High Impact Changes

The Modernisation Agency published its' '10 High Impact Changes for Service Improvement and Delivery' in September 2004. The contents represent the bringing

[1] Critical friends included Mike Cooke, Chief Executive, South Staffordshire Healthcare NHS Trust (Mental Health), Ian Rogerson, Chief Executive, North Staffordshire Hospital NHS Trust (Unscheduled care), Jackie Daniel, Chief Executive, Robert Jones/Agnus Hunt Orthopaedic Hospital NHS Trust (Planned Care), Andrew Donald, Director of Service Improvement, Newcastle Under-Lyme PCT, and Stephen Bridgeman (Long Term Conditions), Kieron Murphy, Chief Executive of East Staffordshire Primary Care Trust (Children's Services) and Sylvia Wyatt, NHS Confederation.

[2] Coronary Heart Disease being the exception but see previous section.

together of a wide range of evidence and examples from the Modernisation Agency's programmes reflecting possible shifts in service provision that the Health System Simulator explores.

The document reflects a 'best practice' approach with much content devoted to individual case studies as well as some indication of the potential for generalising this. A summary of particular aspects that have been reflected in the development of the Health System Simulator can be summarised as:

- ***Location of care:*** A continued shift from inpatient to day cases, from day cases to outpatient procedures and from outpatient procedures to primary care. The report suggests that improvement in the proportion of treatment carried out as day cases as opposed to inpatients in the range of 6-10% is still possible. This poses a further challenge that reaching future targets may be as dependent on changing culture and perception as on anything else such that, for example, the presumption should be on undertaking a procedure as a day case unless there are specific reasons for an overnight stay;
- ***Length of hospital stay:*** There remain changes to be made, particularly in diagnostics and reduced variation in discharge planning, which can continue to reduce the length of stay of patients who do require admission. A saving in bed days of 10% is suggested;
- ***Meeting outpatient waiting time targets:*** Increasing the use of one-stop clinics and post operative follow-ups being undertaken in primary care or by using clinical nurse specialists instead of consultants can contribute significantly to achieving the 6 week maximum wait target for referral to first outpatient and subsequently the time before treatment can be carried out;
- ***Long term conditions:*** With 3% of at risk over 65 year olds accounting for 35% of unscheduled admissions there is considerable potential for improved management of these patients and reduced reliance on hospital services. Reducing unscheduled admissions for older people by 15% has been demonstrated along with a reduction in length of hospital stay of 31%. A reasonable target for the later is suggested as 25%;
- ***Workforce:*** Consideration of the roles and functions of staff has led to improved capacity utilisation, for example enhanced medical secretary roles have released 2 hours of consultant time per week from administration.

1.6 Key messages

During the project the SHA team have developed their expectations from the work to include a broader set of outcomes than just identifying numbers that inform the capacity debate. Key messages and learning points that have emerged include:

1. The value of the modelling process in facilitating a learning environment that can constantly challenge how we see the health system evolving, or being transformed over time, and the benefits of sharing this learning process more widely;
2. The importance of identifying key areas where performance is dependant on changes in behaviour and therefore where the role of the SHA and commissioning processes will be to facilitate and enable change;
3. The opportunity to use the Simulator tool to challenge people's language and perception of the system within its traditional boundaries and pathways;

4. The uncertainty of the future – however helpful a Simulator tool is in scoping the potential impact there will always be significant additional 'intelligence' about possible futures that will remain unquantifiable and will rely on expert judgement and political will to understand and effect necessary changes.

Over-reliance on the outputs of the Simulator tool without reflecting local intelligence and addressing the necessary political elements of such judgements should be avoided.

2 Translating the focus areas into the Health System Simulator

2.1 Introduction

This section builds on work undertaken in Phase 1 of the project (contained in a separate report) and describes the key drivers and outputs underlying each of the key sectors within the Simulator tool as well as contributions made by critical friends[3].

The emerging model architecture was illustrated in Figure 2 on page 3. The four sectors are planned care, unscheduled care, long term conditions and primary and community care. These are driven from a demographic sector, and other sectors are used to determine workforce and capacity requirements. The key interrelationships between the four sectors enable the simulator tool to identify a whole system response to policy and performance targets at a macro level.

The simulator is sensitive to specialties (12 specialties/groups identified in the capacity planning process) and age bands (0-14, 15-64, 65-74 and 75+) to enable demographic shifts as well as new models of care to be reflected. It projects forward from a baseline position at 2003/04 through to 2007/08 and then on to 2012/13.

2.2 Demographics

2.2.1 Population changes

ONS population projections for unitary and county authorities from 1996 to 2021 have been used as the basis for population projections. Whilst some updated projections based on 2002 mid-year estimates have been published for County Authorities this is not the case at present for Unitary Authorities. Without a complete set of revised assumptions it has been considered necessary to retain the 1996 projections.

Evidence from the projections that have been published suggest that the second period covered by the simulator tool (2007/08 to 2012/13) will experience significant additional demographic pressure over and beyond that already factored in using 1996 projections, particularly in Shropshire County.

2.2.2 Health of the older population

With regard to the health of older people there is evidence to suggest that over the last twenty years older people have actually been spending progressively longer at the end of life with a limiting long term illness.

ONS data for England identifies a life expectancy at 65 of 13 years for men and 17 for women in 1981 rising to 16 and 19 years respectively in 2001. The same data also provides an indication of life expectancy with limiting long-term illness. This has also risen, but at a greater rate than overall life expectancy resulting in an increased time

[3] Full details of assumptions and datasets underlying the simulator tool, as well as technical notes on the modelling approach adopted are contained in a separate report.

over which both men and women can be expected to experience limiting long-term illness toward the end of life. This period of limiting long term illness has risen from just under 7 years to about 8 years when averaged for men and women, or a rate of just below 1% a year over the period 1981 to 2001.

2.2.3 Meeting unmet need

Evidence[4] suggests that referral rates to outpatients vary across the five quintiles of deprivation. The variation is not, however, linear with access rates higher in the least deprived quintile but otherwise fairly level. This may suggest a level of unmet need amongst all but the least deprived quintile (in the order of 7%[5]).

As both Shropshire and Staffordshire have approximately the same proportion of the population in the least deprived quintile (11% and 12% respectively) the levels of unmet need expressed in this way would be roughly the same in each health economy.

The simulator allows for scenarios to be explored that close this gap, for example by meeting 20% of the unmet need through raised referral rates to outpatients there would be an increase in the number of referrals by c.1.4% (i.e. 20% of 7%). Increased access rates may result from increases in primary care services and/or making information about health conditions more readily available in targeted locations or to key client groups.

2.3 Planned care

Building on work in Phase 1 of this project critical friend discussions suggested that the future for planned care will be one in which organisational boundaries become less important with flexibility and choice driving the capacity requirements. The private sector would also play an increasingly important role. In addition the role of intermediate care and step down facilities would play their part in routine planned care interventions.

A key feature moving forward will be to ensure an appropriate balance between generalist and sub-specialty capacity and scoping requirements for tertiary centres across the health economy. Continued development in process changes such as pre-operative screening will continue to play an important part in improved system efficiency.

A simplified model for the planned care sector is illustrated in Figure 3. The baseline data for this sector includes:

- Referral rates from GP to outpatients by age and specialty per 1,000 population (first OP);
- The percentage of outpatients referred for treatment by specialty;
- The percentage of treatments referred as day cases;
- Current waiting lists for day case and inpatient treatment;
- Current and projected capacity for day cases and inpatient planned care (by specialty);
- Length of stay for inpatient planned care (by age and specialty).

The targets that drive this part of the Simulator tool include:

- Shifts from inpatient to day case, day case to outpatients and outpatients to primary care in line with the Modernisation Agency 10 high Impact changes;

[4] Ref – Key Health Statistics from General Practice, 1998. Office of National Statistics.
[5] This figure is calculated by standardising the access rates for each deprivation quintile.

- Waiting time from GP referral to treatment of 18 weeks, made up in the Simulator tool by a 6 week maximum wait for initial consultant opinion (outpatient appointment), and a reduction in people waiting for treatment to significantly below 12 weeks to reflect the need for access to diagnostic procedures;
- Reductions in lengths of stay.

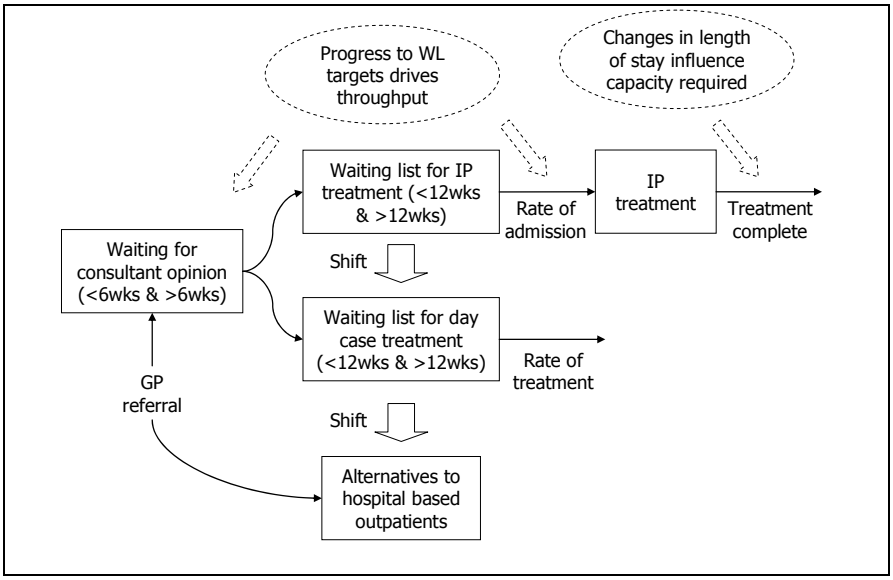

Figure 3 Simplified model architecture for planned care

The Simulator allows for targets, for example those reflecting a secondary to primary care shift, to be the basis of sensitivity or scenario development where different rates are applied to determine levels of confidence and potential ranges of impact.

The Simulator identifies:

- A profile of outpatient first appointments;
- Numbers on inpatient and day case waiting lists;
- A profile of day cases by specialty;
- A profile of inpatient planned care episodes and capacity requirements.

2.4 Unscheduled care

In almost every aspect of this project, whether through research, workshop participation or critical friend comment, it has become clear that there will continue to be significant adjustments in the unscheduled care sector over time. Some of the key issues identified have included:

- The reconciliation (partial or fully) of different assessment protocols at the 'front door', for example through NHS Direct and at A&E;
- The impact of unscheduled care requirements arising from other sectors, for example social services, psychiatry, crisis resolution services, user help-lines, housing, child protection etc. A discussion of alternative scenarios suggested that unless co-ordinated the increasing range of out of hours provision (each with A&E as a potential back-stop) could cause significant pressure on the system;
- The enthusiasm for chronic disease management needs to be backed up with steady and realistic progress with the recognition that adopting a

culture (and providing necessary resources) for case finding and the wider implications of this approach could be slower than expected or desired;

- GP recruitment and pro-active development of primary care services in areas previously not well served will create demand on the wider system;
- The contribution of intermediate care has been positive but there are concerns that access criteria have remained relatively narrow whilst there are much broader needs than can be met through a 'pure' intermediate care model.

Figure 4 provides a simplified model of the unscheduled care sector of the Simulator tool, together with links to primary and community care and the management of long term conditions. It identifies the alternative routes to hospital for unscheduled care and the necessary capacity building in managing long term conditions and the 'intermediate tier' to shift this in terms of admission rates and reducing lengths of stay.

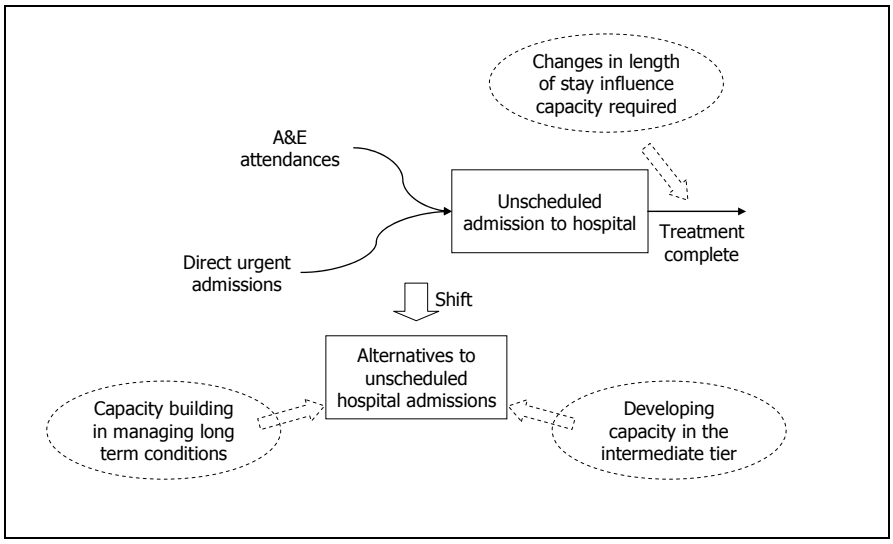

Figure 4 Simplified model architecture for unscheduled care

The baseline data for this element of the model includes:

- A&E attendances and 'destinations';
- Demographic changes;
- Annual direct unscheduled admissions (not via A&E);
- Length of stay for unscheduled care by age and specialty.

The targets of importance in this sector reflect a focus on the appropriate (and reduced) use of hospital for responding to unscheduled care needs as represented by a reduction in occupied bed days. Again key elements of the Simulator are subject to variation to enable the development of different scenarios and sensitivities within the model including:

- Annual changes in A&E admissions;
- The % of attendances admitted;
- Annual percentage change in direct unscheduled admissions;
- The length of stay by age and specialty.

Outputs from this element of the model will include:

- Total A&E attendances;
- Numbers of hospital admissions from A&E;
- Bed capacity profile and occupied bed days.

2.5 Management of long term conditions

Complementing the unscheduled care sector in hospital with an enhanced capacity and capability in dealing with unscheduled care needs in the community has been a major theme throughout this project. This relies, in part, on the development of the concept of '*care orchestration*' i.e. care management with a particular emphasis on the co-ordination of support to the client. 'Community Matrons' are likely to be used sparingly although the implications arising from referral and support requirements will be significant with important contributions being made from social care as well as health.

The environment in which people live with long term conditions is particularly susceptible to effective medicines management, good quality equipment, the provision of a network of support and carer infrastructure. In addition consideration needs to be made of alternative locations for planned and unscheduled care that is provided locally wherever appropriate and safe to do so.

Crystal ball gazing to 2012/13 would see extensive use of case finding techniques and a sophisticated process to identify the full range of needs for 'at risk' clients. People would increasingly look after themselves using a wide range of technologies and information sources and would know when expert support is required. Care needs would be anticipated with unscheduled care being restricted to major trauma rather than the breakdown of existing support networks or failure in the self care regime.

This Simulator tool has been developed on the basis of the national model for chronic disease management in the NHS Improvement Plan (July 2004) and the associated targets for investment in 'Community Matrons'. Whilst the local interpretation and language used to describe these services is likely to evolve the underlying assumptions will, we believe, remain valid.

The Simulator therefore establishes an initial set of assumptions based on:

- There being 1 community matron per 1,000 over 75 population by 2007/08;
- A case load for these community matrons of 30 each;
- A reduction in unscheduled hospital admissions for these clients of 10% based on an average of 3 such admissions;
- A reduced length of stay for those who do require an unscheduled hospital admission of 3 days;
- A community bed requirement for 50% of those admissions that have been avoided with a 5 day average length of stay.

The Simulator provides outputs including the number of level 3 clients supported, savings in occupied hospital bed days and numbers of alternative community beds required. The impact of new strategies for long term conditions on 'level 2' and 'level 1' clients in relation to expert patient and self care programmes have not at this stage been incorporated into the Simulator tool.

2.6 Primary and community care

The primary and community care sector reflect the shifts identified in the other sectors as well as natural shifts resulting from demographic changes and underlying changes in GP consultation rates. These include:

- Shifts from hospital referrals to outpatients;
- Development of minor injury unit capacity;
- The development of an intermediate tier of services;
- Potential implications for social care staff in specific and relevant areas.

Particular importance in this sector has been placed on developing outputs for workforce requirements driven by both underlying demographic changes and the impact of shifts from secondary care outlined above.

2.7 Workforce and financial consequences

The approach to determining workforce requirements is based on the Agenda for Change levels but on a simplified basis as follows:

- Level 9 – equivalent to a consultant or GP;
- Levels 7&8 – equivalent to an advanced practitioner or nurse consultant;
- Level 5&6 –a qualified nurse, physiotherapist or equivalent practitioner;
- Levels 2,3&4 – equivalent to assistant practitioners or healthcare assistants.

The baseline position in terms of numbers of staff in different locations and at different levels has been identified and a process of mapping these onto current activity levels has been undertaken. Shifts in capacity requirements for care therefore translate into changing workforce requirements.

Each of the four broad groups of staffing has been allocated a direct cost which has enabled outputs from the model to be translated into high level cost estimates based on the workforce profile required to deliver the shifting balance of care.

3 Future scenarios

3.1 Introduction

"The future is likely to be made up of both probabilities and possibilities. So future study can aid policy development by highlighting the big picture and by prompting debate about what factors might change the status quo".

Policy futures for UK health

"In practice most problems lie between the extremes of messes and difficulties. Systems thinking is most useful in identifying and illuminating differences in perspectives and objectives between different participants, or competing elements. It alerts one to contexts and interactions that might have been overlooked within more detailed analyses. Systems thinking can provide a context in which more detailed analysis can be carried out to and interpreted."

Jake Chapman: Systems failure.

This section of the report seeks to:

- Set an initial context in which current health policy is being developed, covering both the political and social aspects;
- Develop a perspective of health services, both in their organisation and delivery by the year 2008, identifying the key drivers for change;
- Anticipate the key trends and potential shape of health services to 2012/13.

This consideration of possible futures will inform scenarios that can be built into the Health System Simulator and provide a wider backcloth to assist in translating the model outcomes into strategic decisions and action.

3.2 Background

Health policy is often concerned with resolving tensions between a desire for collective good on the one hand, and moves to bring services closer to individual choice on the other. The debate is not unique to health and appears in many government functions. However, health has unique resonance in people's lives; it is both a uniquely "public good" on the one hand and is an intensely private, individual matter on the other. It raises issues of access, equality, equity, and social justice.

The pace of technological, scientific, organisational and political developments in health simply make these tensions more acute. For example, developments in genetics could change the focus of health towards preventive population measures whilst at the same time highlighting debates about the rights of individuals to determine their own lives, to live their lives freely, and to have the right to refuse treatment.

The drive towards national IT networks in health that can be used to monitor population health and aid research crystallises debates about individual patient rights to privacy in terms of their own medical records. There is rising technical expertise in health but with the possibility that technical channels of communication do not necessarily enhance the quality of this communication. There is increasing therapeutic potential in health but, at the same time, increasing strain on the workforce within health services.

However, these features operate within a wider system of health delivery in a rapidly developing pluralist system in which the consumer will increasingly hold the balance. Health policy will increasingly operate within these tensions. Each component is desirable by somebody and to some extent. It is therefore possible that shifts and trade-offs between these tensions will increasingly determine policy and therefore impact upon both the location, method and organisation of health delivery.

The tensions also need to be placed in the more varied social, economic and political context of the next ten years during which there will be shifts that will have impact on these tensions. Such shifts may eliminate tensions, or exaggerate the gaps between them. They will have to be addressed by policymakers either through decision-making on behalf of the electorate, or through more explicit public debate on what possible solutions to the tensions might be. The tension inherent in our current health systems are reflected in Table 1.

These inherent competing tensions will play out during the course of the next ten years in ways which will require a constant adjustment in planning assumptions in terms of volume, capacity and location.

3.3 Future trends

Consideration will need to be given as to the impact of these competing tensions on our future ability to meet the demands of the public in the context of limited public expenditure and the need for increased efficiency in how we use our current stock.

3.3.1 Demography

Population Growth; over the next ten years the population will grow by 4 percent from 49 million to 51 million - all other things being equal one would expect an equivalent growth in healthcare demand. However all other things are not equal. The population is ageing, obesity rates are rising and the expectations of the population are growing. Healthcare demand is likely to exceed underlying population growth.

The drive for public and preventive health measures across the population	v's	Increasing co-morbidities and individual responsibility for health
Preventative services	v's	Treatment and intervention
Health indicators	v's	Treatment indicators
Universal coverage	v's	Consumer choice
Societal factors affecting health	v's	Behavioural factors affecting health
Central managerial controls such as governments and performance evaluation	v's	Localities priority setting and decision-making
National IT networks used to record and analyse and share patient information	v's	Individual rights with respect to medical records and patient information
Increasing technical expertise	v's	Limitations of relying on technical channels of communication with individuals
Increased funding for IT in line with overall growth according to NPfIT	v's	Locally gap in funding for IT threatens spend on patient care
New knowledge facilitating preventive strategies in society	v's	Individual right to refuse treatment
Global prevention strategies against communicable diseases	v's	Individual freedom of movement
Increasing therapeutic potential	v's	Health workforce under pressure
Global health measures	v's	The role of nation state in making health policy
Sustainable public finance through universal taxation	v's	More heterogeneity in health financing including opportunities and incentives for individuals to opt out of public treatment or to provide top up funds
National population measures	v's	Targeting of health policy towards specific sub-population groups
Informed and assertive patients	v's	Time pressures on health professionals, which reduces contact with patients, and time for professionals themselves to be informed
Complex scientific and technological processes	v's	Demand for assurances on public safety issues
Concentration of specialist expertise and equipment in smaller numbers of larger centres	v's	Diagnosis, treatment and monitoring taking place outside hospital including self-diagnosis and homecare
Scientific and technological discovery	v's	Systematic evaluation of health interventions
Globalisation and Europeanisation; policy shifts upwards	v's	Devolution and decentralisation; and policy shifts downwards
Containing overall government health expenditure	v's	Rising public expectations about what health services should deliver and who pays
Inter-sectoral approaches in health which require a central, strategic lead	v's	Devolution and decentralisation of policy decisions
Monitoring and assessment at national level	v's	Reduced control for central departments
National priorities	v's	Developing meaningful programmes of care at the local level

Table 1 Tensions inherent in the healthcare system

Significant population flows; there will continue to be significant flows of people as a result of internal and external migration. The proportion of people from ethnic minority groups will grow. A more ethnically diverse population could create demand in specific disease areas, e.g. coronary heart disease, diabetes and renal services. Population shifts will also have implications for the healthcare workforce and will need to be reflected in local workforce strategies.

Financial and social patterns; single person households currently make up 30 percent of all households, triple the proportion in 1961. The average family size is predicted to plateau at 1.75. Lone parent families now account for 9.5% of our households, a growth of 30 percent in the last decade - the trend towards single living and lone parent families will continue. These trends are likely to put additional pressure on healthcare services:

- Lone mothers are 1.8 times more likely to report poor health than those living with a partner;
- Separated, widowed or divorced men are 50 percent more likely to consult a GP than those who are married or cohabiting.

Increasing life expectancy: people are living longer. Over the next 20 years overall life expectancy is expected to grow by an average of just under two months per annum. Life expectancy for the over 65s is growing even faster. The balance between young and old is also changing. In 1971 the ratio of under 16 is to over 65 was 2:1, and by 2015 it will be one to one. This challenges both the underlying economics of the welfare state as well as our capacity to recruit a workforce that will meet future health-care demand.

Health and social care workforce implications; the workforce is ageing too. Almost half the nursing workforce is over 40. There is also a significant gender imbalance in the workforce as 80 percent are women and a particular reliance on highly skilled workers (20 percent of graduates against an average of 12 percent across the UK). The total entrance to higher education in 2010 will be around 300,000. In order to meet workforce targets the NHS would need to attract 20 percent of all those in higher education. Radical new workforce strategies will be required.

3.3.2 Burden of Disease

Falling rates of premature mortality from cancer and coronary heart disease; circulatory diseases account for 33 percent of premature deaths, cancer for 36 percent. Reducing premature mortality from these two major killers is a policy priority. In the last three years, death rates from circulatory disease have fallen by 13.7 percent, on course to achieve the target of 40 percent reduction by 2010. Rates of premature mortality from cancer have fallen by 6.3 percent, on course to achieve the target reduction of 20% by 2010. However, this means that people are living longer with the possibility of developing other cancers and heart failure in later life.

Major health risks from smoking, alcohol and rising rates of obesity; lifestyle factors continue to present major risks to public health. The prevalence of obesity in England has almost trebled since 1980 and in 2001 was an issue for 22 percent of the population. The proportion of children who are obese has also grown. Obesity magnifies the risks of heart disease, diabetes and cancer, and has been estimated to shorten life by nine years.

Smoking kills over 120,000 people in the UK each year. It is also estimated to reduce life expectancy by 14 years. The prevalence of smoking has now levelled out but rates in the lowest socio-economic groups remain double that in the highest. Smoking has been identified as the primary preventable reason for the gap in healthy life expectancy between rich and poor.

25% of men and 17 percent of women consume over the recommended number of alcohol units a week. This has been growing in women, in particular those aged 16 to 24. There is a marked gradient of alcohol consumption with age. 16 to 24-year-olds consume treble the units per week consumed by people over 65. Alcohol-related deaths are avoidable and are an important cause of premature mortality. For men dying from alcohol-related causes before aged 75 the number of life years lost rose from 37,119 in 1991 to 66,492 in 2000 - an increase of 80 percent.

Increasing numbers with chronic and ageing related disease: 17.9 percent of the population in England have limiting long-term illness such as arthritis, asthma or coronary heart disease. In some areas this is as high as 31 percent and is likely to magnify the already significant burden of disease in the population as well as increase the numbers with multiple health problems. The burden of chronic disease is rapidly increasing worldwide. It has been projected that by 2020, chronic disease will account for three-quarters of all deaths. Almost half of the total chronic disease deaths are attributable to cardiovascular diseases. Obesity and diabetes are also showing worrying trends, not only because they already affect a large proportion of the population, but also because they have started to appear earlier in life.

Mental Health: mental health problems affect over 25% of all people at some time in their lives. Around 20 percent of all patients seen by primary healthcare professionals have one or more mental disorders. At a global level mental health problems are predicted to grow from 12 to 15% of the total disability burden by 2020. In the UK there has been an increase in poor mental health in children and young people over the last three decades. Poor mental health is predicted to become the major new burden of young adults. This will particularly affect those in poverty. Children in poverty experience significantly more mental health problems than children from families in the top income brackets.

Risks from communicable diseases: increasing mass migration and international travel spread disease more rapidly than in the past. A recent example is the outbreak of severe acute respiratory syndrome and the emergence of drug resistant organisms. The short-term capacity to tackle these is uncertain but in the longer term medical advances offer the hope of vaccines for the major infectious diseases and effective drugs for treatment.

3.3.3 Public values and expectations

Throughout society there is a shift from a hierarchical culture to one that empowers people to participate and work collectively. Household spending on services has grown as a percentage of all household spending. This is a culture in which products are customised to meet the needs of the individual. A 24-hour, seven-day a week culture in which services are available when you want them, where you want them, and how we want them will prevail. Patients of the future will expect quicker access, more choice and an improved care experience.

People are also taking an increasing interest in health. The use of alternative and complementary therapies is growing rapidly. These will become progressively integrated into mainstream health care provision. Individuals are increasingly using the internet to research health information and access online support communities. While the trend towards easy communication offers many positive opportunities for individuals, it also presents risks. The recent MMR debate reflects the decreasing deference that people have with government advice, even when backed by scientific evidence.

More positively the growing interest in and knowledge about health provides the opportunity to create expert patients, empowered to manage their own care. The relationship between patients and clinicians could change to become one of mutual co-

operation rather than dependency. This in turn could lead to improved clinical outcomes and better utilisation of scarce health-care resources, although differential take-up due, for example, to levels of literacy should not be allowed to increase health inequalities.

Society's attitude to work is changing. Quality of life is seen as being as important as absolute wealth, and the achievement of a work/life balance has become a major priority for people. Many are juggling care and job commitments. In the 2001 census 5 million people in England and Wales said they were providing unpaid care, one million for over 50 hours per week. This has implications for future workforce planning assumptions.

3.3.4 Medical Advances

The understanding of disease mechanisms will grow rapidly in the next two decades. New pharmaceuticals and other medical advances will place growing pressures on health care budgets.

Medical devices are increasing in intelligence, falling in size and reducing in cost. As a result medical diagnostic and treatment technologies will be accessible to more professionals and in locations closer to, and including, the individual's own home. The more effective combination of existing technologies will enable stepped changes in the effectiveness of medical intervention and treatment.

Genetic screening is already well-established and genetic tests are available for over 400 diseases. In the longer term advances in genetics could move the medical system from one based on diagnose and cure to one based on predict and prevent.

Rapid advances in surgery supported by advances in imaging have been made over the last 20 years and are expected to continue over the next 20 years. The decreased trauma associated with minimally invasive procedures will continue to reduce the length of hospital stay, as well as extend the age range of eligible patients.

3.3.5 Information Technology

The amount of health information on the web is increasing rapidly. In the future, systems will offer powerful support to people as they explore this information rich environment. The Web is not only supporting access to health information, it is also supporting access to people and advice. This is likely to lead to increasing levels of '*disintermediation*' or the process by which 'consumers' and 'suppliers' are increasingly able to connect directly rather than through a mediator – in traditional supply chain language this is equivalent to doing away with the insurance broker and dealing direct, or buying on-line from the warehouse rather than from a high street outlet. This will challenge the traditional role of the GP as gatekeeper to a secondary care system.

In the future the Web is expected to help people make contact with others in their own neighbourhoods and act as a binding force within local geographies. This offers the potential for online support to turn into face-to-face support from your neighbours.

Protocol based expert systems will enable automated diagnosis as well as provide clinical decision support. The electronic health record will be able to communicate with every kind of medical device, so that a complete health record can be securely viewed, anytime, anywhere. The record will be able to hold moving as well as still images.

This will impact on the day to day management of care by practitioners, who with e-mail facility, single assessment communication, e-booking and prescribing, could significantly speed response and access. This will heighten expectations and could in itself give rise to call centre technology, providing people with an available supplier at an acceptable cost and location with evidence of positive outcomes.

There will also be significant potential for efficiency gains through improved workload and scheduling systems, managing patient flows, just-in-time delivery systems and the automation of procedures and data collection.

3.3.6 Globalisation and Localisation

The most notable health threat is the transmission of infectious disease. The great increase in the numbers of people travelling across the world produces thousands of potentially infectious contacts daily. Large migration flows could create sudden peaks of demand, without the resources to support them. Regulations on access to prescription drugs in one country may be undermined when a neighbouring country allows the unrestricted access to antibiotics.

The capacity to share evidence about the outcome and effectiveness of health care will be an opportunity, with telemedicine and robotics expert care being delivered remotely. For the most complex and specialised of procedures consultants may travel the world.

The deficit in numbers of professional staff has led England to recruit significant numbers of nurses and doctors from abroad. The current workforce predictions assume that this practice will be sustained over the next ten years. However the worldwide demographic changes could threaten this. For example the US is predicting a 1.1 million shortfall in nursing staff by 2020. The UK will face increasing competition in attracting overseas staff. In addition UK nurses could be an attractive recruitment option for other countries given their high educational standards.

There is an increasing demand and expectation for regional local decisions within a wider constitutional and global framework. Within the UK this is exemplified by the devolution of powers to Scotland, Wales and Northern Ireland, including health policy and is likely to be followed by the establishment of regional assemblies.

3.3.7 Conclusion

Significant changes are therefore anticipated over the next 10 to 20 years. There is, however, considerable uncertainty. It is therefore necessary to face up to a number of risks as well as opportunities:

- An ageing, obese and unfit population could increase health and social care demand, and restrict workforce supply by reducing the number of people fit to work;
- An ageing, but fit and willing to work population, could reduce health and social care demand and increase workforce supply;
- An informed public can take more responsibility for their own health care and reduce demand, but can also become more aware of healthcare possibilities and increase demand;
- Medical advances could reduce demand, and relieve financial pressures for more effective interventions, but could also increase demand and increase financial pressures through the increased capacity to treat;
- New information technology and communication capabilities delivered through the National Programme for IT can significantly improve workforce productivity, but also has the potential to create additional workload as a result of the increased capacity to communicate and gather data;
- While new treatments and less invasive surgical interventions could achieve a reduction in the use of hospital beds, new infectious diseases could create pressure for additional health and hospital bed capacity.

3.4 Looking ahead – 2007/08

3.4.1 Introduction

In this paradox of opportunities and challenges, and of conflicting drivers for change is it possible to predict a system of health care for 2008 in which the supply and demand equation might be better balanced?

What we can say is that there will be key levers in balancing that supply and demand, but that they need to be set in the context of improved performance, quality and a consumer view. A whole system view of changes in healthcare delivery mechanisms, maximising a broad range of locations for health care diagnosis and delivery, and building capacity with capability will determine whether, by 2008, the alternative infrastructure for health care will be in place in order to maximise the further opportunities that need to be taken by 2012/13. It is interesting to note that the Wanless "fully" engaged scenario for 2020 depended on two key uncertainties:

1. How to improve the productivity of the NHS;
2. To what extent people would look after themselves.

He further suggested the two outstanding pieces of work the government should be undertaking, which potentially have marked impact upon his scenarios. These were:

1. Increased integration between health and social care;
2. Determining key productivity improvements.

His vision of the NHS in 2020 was one in which:

- Patients were fully involved in treatment and prevention;
- Initial diagnosis was in a variety of settings beyond the GP surgery;
- Primary care had broadened;
- The majority of general hospital care was delivered outside of large hospitals;
- Hospital treatment waits of two weeks.

In many respects this has the potential to be viewed as a very conservative scenario given the potential level of change that could be achieved if specific elements of health-care policy and delivery were confronted in the period up to 2008. There is growing evidence of the potential for change in the key areas of:

- Managing chronic disease and building alternative models of care;
- Modernising older people services and integrating professional skills into a single point of entry to a whole system of provision, with specific emphasis on the development of an intermediate tier;
- Achieving a downward devolution of skills and decision-making within the current workforce and at the same time developing new, more generically based working practices;
- By building a vigorous new market through: payment by results; the patient choice initiative, extended beyond current proposals; developing a mixed economy of care; stimulating new entrants into primary care; greater consumerism and information; and the availability of information on evidence based practice.

In addition the implications of Payment by Results, Foundation Trusts and the Pay Reforms all have the potential to provide incentives and/or competing disincentives to achieve the potential of some of these changes. So how are the years leading up to 2008 likely to be characterised? Most observers suggest the following policy and practice areas will have the greatest impact.

3.4.2 Long term conditions and chronic disease management

60% of adults in England report a chronic health problem. In the UK around a quarter of those people with a long-standing problem have three or more conditions, making care far more complex. Poor management of chronic diseases leads to wasteful use of high-intensity resources. 80% of bed days in hospital are currently used by emergency admissions, many of which are preventable.

By strengthening primary and community services many patients may never need hospital. Of the 11 leading causes of hospital bed use in the UK 8 are due to conditions which if we strengthened community care could lead to a fall in admissions. 50% of bed day use is accounted for by only 2.7 percent of all medical conditions, most of which are chronic diseases. The extent to which people will choose these options in the light of increasingly sophisticated technologies delivered in acute settings is still to be fully tested at a population level.

Evidence is beginning to emerge that the achievement of a 30 percent reduction in admissions could be affected by 2007/8. The lessons that can be drawn from the work at the Castlefield group practice in Runcorn are increasingly supported by that emerging from the pilot sites adopting the principles of Evercare across England.

Castlefield was able to demonstrate the following improvements:

- In heart disease it has long been known that modifying lifestyle and taking aspirin and beta-blockers helps to prevent heart attacks. More recently, the effectiveness of lipid-lowering drugs and controlling blood pressure have been proven. Identified patients on the practice list who had heart disease enabled a practice nurse to run clinics for such individuals. Lifestyle and medication issues were addressed and recorded and follow-up maintained. The outcome was a reduction in heart attacks by more than 50 percent and deaths by an even greater rate.
- Diabetes is a more complex condition because it affects several different organs but it can be managed in a similar way. With the combination of nursing, dietetics and podiatry skills the appropriate management and interventions were offered. Significant improvements in health were obtained.
- In mental health Castlefields contributed to an arrangement with the local hospital to provide proactive care based in the practice. A small team of two community psychiatric nurses, a social support worker and counsellors was established. They were made responsible for all mental health management of the Castlefield patients. They had to manage referrals so that they could cope with the volume and respond to urgent problems. They followed the patient right through the whole system, attended outpatients, arranged depot and group therapy in the practice and undertake out outreach. Over a three-year period the biggest impact was reducing the number of acute admissions and length of hospital stay. In all 2537 bed days less than were anticipated added up to a potential saving of over £1 million worth of pressure on the hospital.
- In elderly care a significant amount of work was undertaken on a multidisciplinary basis. Through a range of interventions with those at the greatest of risk of repeated admissions up to 1,000 bed days were saved.
- A cancer nurse was introduced into the practice and a cancer register was established. A lot of work was done to improve the use of the cancer fast-track referral systems. In the subsequent 12 months, the numbers known to the hospital increased to 25% of the total in Runcorn. However, the share of admissions and beds was less than this and the proportion of cancer cases dying fell to half that expected.

The experience at Castlefields is an example of how general practice can exploit its long-term relationship and commitment to a registered population to improve the outcome for patients with long term conditions. It is a reasonable assumption to make that many of these lessons will have been absorbed into mainstream practice by the year 2008.

Lessons learnt from the implementation of the Evercare programme in the UK will provide for much of the process and structural change to occur in the UK health-care system over the next few years. The importance of making progress on these is not to be underestimated and include:

- Improved case finding with a far greater identification of the higher risk population in any one GP practice who might be responsible for 35 percent of unscheduled admissions of all people over 65 years of age (Evercare finding). Three out of four of these high-risk patients were not on a district nurse caseload;
- The use of meaningful data to anticipate and plan interventions, particularly relating to hospital admissions enabling the improved coordination of multidisciplinary working to prevent inappropriate hospital stays;
- That data requires transformation to create strategic information;
- Active case management of complex care through the necessary pathway;
- Role re-engineering to enable learning new skills to be applied by a whole range of professionals, and in ways which allow for the development of single point of access at primary care;
- The development of an intermediate tier of provision, pluralist in nature and which seeks to define a culture of enablement and citizenship acting assertively to prevent inappropriate admission and facilitate optimum discharge - supporting and developing alternative sites in locations for their management of emergency care;
- Promoting the development of the expert patient, self-care and self-management in much the same way as models of care are emerging in mental health services;
- The development of GPs with special interests, specialist social workers, advanced nurse practitioners and consultant nurses to allow for the devolution of traditional secondary care responsibilities to a community infrastructure able to provide support to both emergency and chronic conditions;
- The increasing sophistication of commissioning through composite bodies tasked with managing and understanding both clinical practice and trends in the patterns of care.

3.4.3 Costs and efficiency

There is increasing acknowledgement that tomorrow's health systems will be even more costly, for example advances in technology mean that we can do much more, but with implications on costs, which with an increasing proportion of older people in the population will increase demand. Whilst the impact of these may be limited up to 2008, they could make a significant contribution during the years leading up to and beyond 2013

What is important is that some 75% of health spending comes from the public purse and as the proportion of the population in their working years decreases, tax revenues will fall whilst government financing of healthcare will need to increase. Something will have to give – less generous benefits or more tax. The current 'pensions crisis' precipitating an increasingly impoverished ageing population will compound the issue.

However, this returns to the debate within the Wanless report, namely increasing evidence from the Organisation for Economic Co-operation and Development projects that there remain many opportunities to improve the performance of health systems in terms of the health outcomes they achieve, the services they provide and their responsiveness to patients and consumers. There remains great potential to exploit information technologies in health care systems and associated payment arrangements.

Ultimately increasing efficiency may be the only way of reconciling high demand on health systems with public finance constraints. Changing how health funding is spent, rather than mere cost-cutting, is key to achieving better value for money. Correcting the economic incentives faced by providers and consumers is important. In the UK balancing on the one hand current local funding deficits with increasing costs associated with policy initiatives in nGMS, the National Programme for IT, Agenda for Change, Consultant Contract and others – and at the same time redesigning processes and delivery mechanisms to increase efficiency, will be at the centre of the managerial challenge.

Increasing pressures on local authority budgets will sharpen the debate about the role of the public sector and the level of subsidy required in public services. The possible impact on health demand within the context of increasingly difficult political issues associated with levels of local taxation and pressures on overall public expenditure through the universal taxation system, decreasing numbers of contributing workers and the rising growth of 'poorer' pensioners will lean heavily on healthcare systems.

3.4.4 'Care givers'

Recent research in the United States raises interesting questions about the availability of 'hands-on' assistance to those increasing numbers who will require long term care, increasingly pre-dominant in 2013 and beyond. The current development of a spectrum of accommodation for long term care from people's own home through a range of supported living settings, extra care housing, residential and nursing care settings, can be labour intensive. Previously these support activities have been provided by family, friends and volunteers as well as paid individuals. Given the number of people who may well be in the spectrum of long term care settings it is important to ask whether there will be enough paid care givers and family care givers to meet projected long term needs.

Currently many persons who need such support have a number of family members available to provide care, or there are care givers still available in the market. However, we are already seeing a diminishing number of entrants to provide such care, with competition from other sectors for their time. Alongside this reduction in the availability of paid caregivers the number of family members able to provide such a role is anticipated to decrease further and faster.

The development of networks of older people providing mutual support, providing incentives for individuals to work longer, and establishing improved training and pay for substitute carers may enable the development of the necessary infrastructure to support the redesign of healthcare delivery envisaged for the future.

3.4.5 Technology changes

Advances in technology and its application in healthcare have far reaching consequences for increasing costs but also in relocating functions and in redesigning delivery. Perhaps one of the most advanced examples of this is in Southern Spain with the Evisand (Virtual Environment for Health) project, which has seen the development of tele-medicine services across a network of 3 million residents to provide on-line

consultations, virtual support for health emergency situations and multi-purpose training for health professionals.

The Evisand system provides telemedicine services through a network of 37 health care facilities, including health centres and hospitals, facilitated by a central communications hub. It reaches 33.5% of the Andalusian population in non-metropolitan and rural communities. Services are delivered electronically by a range of experts in cardiology, radiology, paediatrics, psychiatry, dermatology, neurosurgery and ophthalmology.

The virtual support allows for diagnostic quality transmission of x-ray, CT scan and ultrasound images, as well as ultrasound frame to frame video sequences that are all enabled through a broadband telecommunications base connecting patients and healthcare facilities. This system allows for high quality video conferences with motorised cameras on 21" monitors. Computers are linked with various medical equipment, such as radiological scanners, electrocardiograms and medical digital imaging systems, which perform tasks through defibrillator type monitors.

Evisand has experienced favourable results in service delivery, efficiency and cost savings. Online consultations represent 80% of their medical activity and 20% of emergency assistance. The consultations, averaging 17 minutes, have resulted in approximately 76% of patients not needing to be transported to hospital. 80% of those involved preferred this form of consultation, resulting in less crowded hospitals and reductions in costs.

Small developments are already occurring in the UK where an independent provider working with secondary and primary care systems will undertake the management of chronic disease specific conditions through a combination of call centre technology and adapted technology to provide personal monitoring with clinical support over 24/7.

Such European and UK advances are promoting more active use of technology supporting clinical diagnosis and treatment that potentially offers a more cost effective direction for healthcare delivery. Its impact may be both pre and post 2013 with the infrastructure for such advances being developed in the lead up to and during 2007/08.

3.4.6 Summary

The period up to 2007/8 will be a time of structural and practice changes with the groundwork laid for medium to longer term development of sustainable and alternative patterns of care with a less pronounced reliance on our traditional hospital bed based system. The extent to which some of these will impact on the period up to 2007/08 will need to be considered carefully and factored into judgements arising from this project. A new emphasis will, though, have emerged namely:

- Distinctly integrated primary, community and social care with clear pathways into and out of secondary and tertiary systems;
- A priority given to keeping patients out of hospital;
- The active management of the higher risk group of individuals shown to be multiple users of health and/or social care services;
- The promotion of self care and shared care between the individual and the state;
- The role of doctors as leaders, as commissioners of care and as multiple site practitioners;
- An improved use of information, better streaming of data and greater clarity in the questions the data needs to address for strategic purposes;

- The role of carers, local networks of support and social care staff in an increasingly mobile population that can leave older people in greater need of support from statutory agencies.

3.5 Looking ahead – 2012/13

Through rising public expectations there is likely to have been a power shift in the health sector away from professionals and towards patients, users and consumers of services. In line with developments in other services patients will have higher expectations of health services, they will be more aware of their right to choice and participation in discussions about health care and treatment, they will be more assertive in articulating their expectations to health professionals, and they will be more aware of the wider context of health service provision through IT and the various media. Health care will have become a more tradable commodity that allows consumers to compare health services, their availability and their quality across countries.

The implications for policymakers will be;

- An increasing focus on individual's responsibility for their own health. This might even involve the possibility of an individualised contract for health where the individual has certain responsibilities to undertake in improving their health as well as expectations about treatment and services they are likely to receive. Treatment may no longer be a right;
- The need to shift the health system from one in which expenditure is primarily focused on health care rather than public health or preventative measures such as tackling health inequalities;
- A widening gap between those who have access to health information and those who do not, leading to a differentiation or tiers of health consumers;
- Greater public involvement in prioritising decisions over service provision.

And for service provision:

- More explicit standards of care, improvements in standards of care, and increased disclosure of medical information. There is likely to be greater freedom of medical information including more rights for patients over medical records and clinical information;
- An increase in self care;
- More explicit standards of performance in order that consumers are able to make more informed choices about services;
- Increased choice of supply, with services provided by a range of suppliers including those from other European countries;
- Response from health providers to an increasingly diverse set of patient needs;
- More time required for doctors and other health professionals to review clinical information on patient conditions and to have access to respected sources on these issues. Consultation between health professional and patient may take longer and change form as information exchange takes place. New training in communicating with patients and information technologies will be required for practitioners.

3.6 Looking further ahead – the ageing population.

The WHO states that:

"……..by 2025 there will be more than 800 million people over 65 in the world, two-thirds of them in developing countries…….Even in wealthy countries, most old and frail people cannot meet more than a small fraction of the cost of the health care they need. In the coming decades, few countries will be able to provide specialised care for their large population of aged individuals"

The most significant impact from the ageing UK population will take place in about 30 years from now. In 2036 there are expected to be more than 7 million people over the age of 75, compared to approximately 4.3 currently. There are some alternative macro economic scenarios for such an ageing population and there may well be some evidence of these emerging by 2013. For example the costs of ageing exacerbates a situation of low economic growth and high unemployment; social welfare systems are called into question, leading to conflict between beneficiaries and contributors to social security systems and taxation. Life cycles generally change, with work, training, and free time succeeding each other throughout life.

So the implications may well be for policy-making:

- Increasing importance of broad policy objectives towards maintaining and promoting the health of older people, which includes participation in work, leisure activities, maintaining personal and social networks and housing, amongst other factors;
- Increasing disability and illness, in particular in the chronic conditions associated with ageing, such as dementia, musculoskeletal diseases, cardiovascular diseases and sensory impairment and the need to address the treatment and care of increasing numbers of people with these problems;
- Significant resource implications for the health service, local authority social services and for individuals who contribute towards the cost of long-term care.

Implications for service provision are likely to be:

- A broad range of service needs in order to maintain health and well-being of older people including housing, medical care, transport and support links;
- Shifting health service resources towards older people particularly in relation to the treatment and long-term care of those with chronic diseases;
- Continuing difficulties of assigning responsibility, ensuring adequate monitoring systems and providing effective, fair and appropriate treatment for older people, both in terms of funding in relation to health and social care and in service provision, which is carried out by different organisations such as acute hospitals, community organisations and social services.

3.7 Assessing new technologies

There is increasing therapeutic potential, technical expertise and an awareness of the contribution to preventative strategies in the health service arising from new technologies. Current interest is focused on assessing and evaluating what technology can do and at what cost, and what programmes should be funded from health budgets. Developments such as NICE, evidence based medicine and clinical governance are strengthening the relationship between research and practice in healthcare. With the drive towards national guidelines in treatment and the use of research evidence in healthcare decision-making there will be a requirement to tackle the issue of

technologies and improve systems of assessment and evaluation of such technologies within healthcare.

The implications for policy-making might well be;

- Opportunities for individuals to take greater responsibility for their own health, including self-diagnosis and self treatment or home-care. Older people may benefit from treatment within their homes rather than being hospitalised, particularly if there are family and social support networks around them;
- The risk of increases in socially induced inequalities in health status through the adoption of new technologies amongst more 'health literate' groups with the potential for this to draw funds away from those who may be in greater need;
- Increasing requirements to research, anticipate, monitor and evaluate new technology with new guidelines required from NICE;
- An acceptance of managed access and the entry of technologies;
- Heightened debate about ethical issues provoked by new technologies and scientific developments.

The implications for service provision might be:

- Increased potential for screening and treatment of common disorders;
- Influence on the location of care and greater concentration of specialist expertise and equipment in a smaller number of larger centres dealing with complex cases - driven by the increasing sophistication of medicine;
- More diagnosis, treatment and monitoring taking place outside the hospital, including increases in self diagnosis and homecare;
- More conditions treated locally in small centres linked telemetrically to specialist centres;
- Increasingly blurred distinctions between primary, secondary and tertiary care;
- Reductions in lengths of hospital stay but potentially more visits as new technologies emerge;
- Influence on who provides care;
- Role substitution amongst health professionals;
- Need for different training and more frequent updating of skills to manage new technology;
- Training and education of health professionals to deal with new technology;
- Increased requirement to use research evidence as a basis on which to plan and make decisions at the organisational and commissioning levels.

3.8 System Performance and Quality

Health expenditure represented 7.7% of GDP in 2003/04, rising to 9.4% by 2007/08. Whilst current levels are below European comparators the objective is to match the European average over this time period. The majority of that activity is contained within a single, taxation funded NHS. The system does not have complete mechanisms for assessing its performance, for evaluating what it does, and for disseminating knowledge within the system about where resources should be allocated, or what the most effective treatments and procedures are.

Given these deficiencies, system performance and quality in the health sector are becoming more important and are likely to intensify between now and 2013. This means developing a system of assessing performance in health, both in terms of health

service indicators and national health outcome indicators. Performance needs to be compared against other developed nations and for varying performance in outcome data within areas of the UK. Broader indicators of national performance have now been set out and comprise health improvement, fair access, effective delivery of appropriate care, efficiency, patient care experience, and health outcomes. These broad headings indicate a shift towards outcome measurement.

Arising from these shifts the implications for policy-making by 2013 would be;

- Policymakers having to defend UK health against alternative systems and against an international comparisons of performance;
- Improved mechanisms for holding government to account for how it spends public money on health, as performance becomes more transparent;
- Potential tensions between private industry (e.g. pharmaceutical companies) and government in the use of drugs and new technologies;
- Conflicts between competing priorities in health using evidence based medicine.

The implications for service provision are likely to be:

- Greater openness about procedures, so that patients can make better informed choices about care;
- For patients, improvements in performance could bring potentially better services based on evidence and best practice that are available throughout the country, shorter waiting times and rights to treatment if the treatment has proven outcomes;
- For professionals, the changes mean more evidence based treatment which will have training implications. Professionals will face more explicit measure of their performance, they will be judged against their peers and will have to take steps if they are found to be underperforming;
- Commissioners will have a more explicit basis for decisions, improved evidence base and greater opportunity for local populations to challenge and hold to account. There may well be some potential conflict between clinical and financial decisions on whether to provide treatment or service.

3.9 Summary

Developing the environment in which the desired changes have the greatest opportunity for success will be important. The key elements to lever that change, and which therefore inform the scenarios addressed in the Health System Simulator include:

- The extent to which the principles inherent in any case finding approach at practice and cluster level is actively undertaken and incorporated into an active case management approach to ensure targeted risk management which will negate the need for repetitive emergency care responses including hospital admissions and readmissions;
- The development of both clinical and commissioning skills to inform the development of capability and capacity in settings other than those in hospital; and the co-relationship of capital investment in primary care and community settings with a pronounced emphasis on a diagnostic capability;
- The level of integration and of commissioning activity at a locality level to ensure a comprehensive single point of entry into a single system of care which is designed to respond appropriately and immediately over 7/24;

- The readiness of workforce planning to balance the development of specialist skills with those of modular trained workers (whether these be for single task or generic);
- The financial capacity of the current health economy which will determine the ability to move forward on an 'invest to save' approach which has been fundamental to the development of Evercare models nationally. This requires a local ability on the one hand to deal with the rigours of PbR and at the same time ensure that redesign of service models is undertaken on the basis of realigning the use of financial resources;
- The pace of developing service models that reflect an ability to deal with current need in a contemporary manner i.e. those being developed in mental health services, in the care of older people, in chronic disease management and in children's services. Much of this will require there to be in place new information sharing agreements, data collection and analysis of a more sophisticated kind, together with organisational arrangements that better reflect an integrated capacity to deliver person centred care.

Issues that need to inform the wider consideration of future strategies and support action arising from the wider project include:

- Ensuring rigour in the recruitment and retention approaches adopted in the local market where there should be a pronounced strategy to target predictable skills shortages. Levels of competition for recruitment with an increasing likelihood of foundation trusts and the private market being able to pay a premium either through incentives or other means;
- Identifying approaches to achieving efficiencies in a difficult policy context of promoting choice and opportunity, increasing access for groups who traditionally have been excluded, a tariff based cost system resulting in the need for the development of sophisticated information based management of commissioning and pathways of care;
- The trajectory for the development of information technology both in the gathering and management of information, as well as in the use of futures technology for managing clinical risk in a wider range of settings. These will be skills in high demand;
- A level of engagement at practice, locality and constituency levels with the wider population to promote informed decision-making, the allocation of resources, and the priorities for action as consumer need will increasingly reflect individual perspectives and generational differences making it difficult to provide services or responses from fixed points in a system which are distant from the individual.

Driver	2007/08	2012/13	Comment
Demographics – changing balance in the population structure with increasing numbers of those in later life, living longer. Single person households increasing.	Certain but limited impact	Certain and increasing impact	The implications of the shifting demographic profile will quicken in pace over the second 5 year period with very significant further impact likely after 2013 for which preparation in service redesign in the short to medium term is essential.
Changing models of care – shifts in the location of interventions from one part of the secondary system to another, increasing rates of day case surgery, utilisation of primary care settings for surgical procedures and new entrants into the market.	Highly likely with moderate impact	Timing and extent of continued shifts less certain with potential for significant impact but shifts from tertiary centres to secondary centres could displace	These patterns have been self evident in the NHS over the last 10 years, but increasing drives for efficiency, improvement of alternatives to hospital settings and PbR should accelerate the shifts. Locality (practice) commissioning should incentivise shifts allied to technological advances. Primary care facing diagnostic centres and referral centres will screen out secondary referrals.
Management of long term conditions – moves towards proactive management rather than reactive, with intensive case management of those at greatest risk, improved case finding and primary/secondary intervention as its core purpose.	Certain change with significant and growing impact	Continued extension of impact	All commentators reflect on this as the critical change mechanism. There is already sufficient evidence to promote optimism in it changing the pathway of care and reducing impact and demand on the secondary system. Case finding and active case management will reduce 'crisis' and promote more preventive medicine, including self-management. Intensive case management will reduce readmissions and support care at home.
Modernising the spectrum of long term care arrangements – more comprehensive development of an 'escalator' of supported accommodation, purpose built and with sympathetic design, supported by technological developments to improve the management of personal risk.	Possible development with limited initial impact dependant on extent of roll-out	Virtual certainty and potentially significant impact	The combination of developing a greater range of supported accommodation in a range of design friendly build, aided by technology to support the management of risk, will have significant impact on the ability to manage long-term conditions and emergency care. However, capacity and capability in primary and community services at significantly increased levels will need to have occurred.
Shifts in the burden of disease – increasing levels of obesity and growing numbers of those with long term conditions. Smoking will continue to cause concern particularly amongst young people, as will sexually transmitted diseases.	Possible significance with potentially high impact	Likely and with increasingly significant and high impact	Whilst specific disease patterns are being changed others arise as patterns of activity amongst younger people give rise to concerns. Obesity and concern about mental health have potentially significant impact on the declining workforce and the numbers available to work, as well as increase demand on the health system.

Driver	2007/08	2012/13	Comment
Workforce – an ageing workforce, under significant pressure for changes in practice, shifts in role, increased inter-professional working and more focussed on 'locality'.	Possible scenario but with potentially significant impact on ability to initiate redesign	Virtual certainty with potential to seriously compromise ability to deliver necessary changes	Role redesign with continuing shifts in devolving responsibilities and increasing skills will gather pace. However, the combination of retaining and re-skilling the existing workforce and attracting increasing numbers into health delivery from a declining workforce may prove a major inhibitor.
New technologies – will support the relocation of diagnostic and treatment facilities away from traditional hospital sites. Allied developments in telemedicine, e-solutions and call centre technology will create more potential for diversion and early intervention. However, costs and the development of increasingly hi-tech facilities may offset access and service cost savings.	Some impact, particularly in housing support systems	High impact on relocation but potential cost impact also	Will make major contribution to improving access and speed of response through enabling multiple relocation of facilities (diagnostic, advisory) that will qualitatively improve the consumer experience. However, the balance may well lie in increasing costs for replacement and maintenance and the provision of 24/7 availability. A differing workforce, with technological competency will be necessary.
Finance – pressures on current levels of funding will be exacerbated by developments in IT, contract changes and underlying pressures. Public finance for health is unlikely to be a priority against education and law and order. Efficiency and redesign will need to fund new approaches. Personal taxation levels will stay the same or reduce as a new 'political' front opens up to reduce access/promote top-up and develop personal insurance.	Likely and with significant impact	Continued high probability and high impact	Has the potential to have a negative impact on the speed and comprehensive nature of the changed systems of delivery. With the size of the available workforce diminishing, the reluctance to further raise taxation to fund public services and the costs of new technology, realignment of current services will be critical through redesign processes. The question will be whether this release can 'fund' both current pressures and develop new systems and models of care. Real efficiency in process and delivery will need to be achieved.
The consumer/citizen – an increasingly discerning and informed consumer on the one hand and tax payer on the other will demand close to home care, immediate access, convenience and efficiency and may well wish to effect a 'pay as you go' approach supplemented by current tax levels. Core NHS with 'top-up' personal finance or insurance.	Likely development with some impact	Virtual certainty with potential for significant impact	Has the potential to be the most powerful driver for change, particularly in care close to home and the use of technology to promote convenience. Likely to require high levels of evidence for intervention and immediacy of action. Will wish to see efficiency in exchange for continued high levels of personal taxation.

Figure 5 Summary of critical drivers and potential impact

4 Simulator outputs

4.1 Introduction

This project set out to answer some specific questions about the extent and distribution of capacity across the Shropshire and Staffordshire healthcare systems in the medium to longer term (initially to 2007/08 and then to 2012/13). To this point the report has described the process by which each aspect of the health system has been considered and the possible context within which future scenarios will be played out. This is vital 'intelligence' to inform the use of the Simulator tool in a way that considers the desirability and likelihood of different futures.

4.2 Priorities and performance to 2007/08

4.2.1 Baseline scenario

For the first period it is essential that the health system delivers on the following key performance and development priorities:

- Achievement of the 18 wk waiting time target;
- Reduction in occupied bed days for unscheduled care of 5%;
- Required investment in community matron capacity in line with the commitment for 3,000 such posts across England by 2007/08;
- Achievement of day case rates to the DoH targets for 2007/08;
- A continued shift from day cases to outpatients and primary care.

The Simulator has been initialised to deliver on these requirements in the context of a 1.5% increase in underlying rates of access, such that the required performance is:

- Removal of all over 6 week waiters for outpatients and over 6 week waiters for day case or inpatient treatment (leaving up to 6 week maximum wait for diagnostics within the overall process);
- A reduction in length of stay for all specialties of 10%;
- A 10% shift of procedures currently carried out as day cases, half and half to outpatients and to primary care and a 10 % shift of outpatient procedures to primary care;
- A 10% reduction in follow-up outpatient appointments;
- The appointment of community matrons – 36 in Shropshire and 79 in Staffordshire;
- 15% of over 75 year olds receiving unscheduled care in hospital being discharged early to intermediate care settings;
- 10% of over 75yr old admissions from A&E diverted to intermediate care.

The outputs in terms of capacity are reflected in Table 2. In addition Table 3 identifies the sensitivities of the different aspects of performance on key outcomes in terms of capacity requirements.

Table 3 suggests that achieving reductions in length of stay in the hospital is critical to achieving the key performance target of reducing unscheduled occupied bed days by 2007/08. There is, however, evidence of a potential trade off between the 10% reduction in length of stay in the baseline scenario and changes in underlying rates of access which are increasing at 1.5%pa. The latter would need to be eradicated if the effect of not achieving reductions in length of stay were to be offset.

Shropshire:	Staffordshire:
Total hospital beds fall from 853 to 775;	Total hospital beds fall from 1,995 to 1,888;
Outpatient rooms rise from 36 to 37;	Outpatient rooms level at 102;
Number of Consultants rises from 195 to 204;	Number of consultants rises from 389 to 397;
Intermediate care clients rise c.50 to 168;	Intermediate care clients rise from c.100 to 326;
A rise in direct staff costs of 6% over the 5yrs;	A rise in direct staff costs of 4% over the 5yrs;
The % spend in the community on direct staff costs rising from 37 to 42%;	The % spend in community settings on direct staff costs rising from 39 to 43%;
Additional day cases pa of c.800 due to reductions in waiting lists and a further 3,400pa by 2007/08 due to system changes.	Additional day cases pa of c.1,100 due to reductions in waiting lists and a further 2,000pa by 2007/08 due to systems changes.

Table 2 Baseline simulator outputs for Shropshire and Staffordshire

Some key conclusions from this baseline scenario include:

- That achieving diversion from A&E for older people has the most significant impact on achieving the target for a reduction in unscheduled occupied bed days;
- That the required number of acute beds will fall by either 10 or 4% (Shropshire and Staffordshire respectively);
- That there will need to be a significant, at least three fold, expansion in intermediate care capacity to achieve the targets;
- That there will need to be significant and sustained increase in capacity to undertake day cases in both health economies;
- That there will need to be additional capacity or improved efficiency in outpatient departments of between 2 and 5% on top of the anticipated 10% reduction in follow up appointments.

4.2.2 Comparison with capacity planning assumptions

The Simulator tool uses baseline access rates for 2003/04 contained in capacity planning submissions made by PCTs and validated by the Strategic Health Authority during the summer of 2004. It also reflects the specialty breakdown and can generate outputs that can be compared with capacity projections. This section seeks to give an initial indication of the compatibility of the projections within the capacity planning submissions and the outputs from the baseline scenario described above.

General and acute beds: in comparison to modest falls in the requirements for general and acute beds, capacity planning assumptions are for no change;

Intermediate care beds: capacity planning assumptions allow for an increase in intermediate care beds of c.1/3 in comparison to a projected increase in intermediate care clients of more than three fold compared to the Simulator baseline scenario;

Access rates: capacity planning assumptions reflect an initial rate of +3% followed by a levelling out for written GP referrals compared with an assumption within the Simulator that these will continue to grow at 1.5%pa;

Additional day cases: Capacity planning assumptions indicate a level of additional ISTC activity for ordinary and day case procedures of c.9,000 by 2007/08. The level of additional day case procedures indicated in the simulator baseline scenario described above is for an equivalent of c.6,000 day case procedures by 07/08 (including the clearance of waiting lists) and dependant on both increased day case rates and shifts from day case to outpatient and primary care procedures.

It would therefore seem that underlying capacity planning assumptions need further refinement generally and significant challenge with respect to intermediate care.

4.2.3 Sensitivity for the 2007/08 baseline scenario

Table 3 illustrates the outputs for the baseline scenario compared with the position in 03/04 (rows 1 and 2). It then identifies the impact of removing one of the underlying assumptions in turn from row 3 downwards.

	Shropshire						Staffordshire					
	% change in Unscheduled obds	Acute beds required	Additional day cases pa by 07/08	Outpatient rooms required	Intermediate care clients	Percent of staff costs incurred in the community	% change in Unscheduled obds	Acute beds required	Additional day cases pa by 07/08	Outpatient rooms required	Intermediate care clients	Percent of staff costs incurred in the community
Position in 03/04	N/A	853	N/A	36	50	37	N/A	1995	N/A	102	100	39
Baseline scenario for 07/08	-4.3	784	4200	37	167	42	-5.9	1910	2000	102	326	43
+0.5%pa in access rates	-1.9	803	5100	38	170	41	-3.5	1957	4200	104	331	42
No reduction in LOS	+5.5	871	4200	37	168	41	+3.6	2122	2000	102	326	41
No LTC service developed	-2.6	795	4200	37	167	39	-4.2	1934	2000	102	324	41
No early discharge	-3.0	792	4200	37	68	41	-4.8	1924	2000	102	136	42
No A&E divert achieved	+0.1	811	4200	37	167	41	-1.6	1970	2000	102	136	42
No shift from DC	-4.3	784	8400	37	167	42	-5.9	1910	12000	100	326	43
No reduction in F up OP	-4.3	704	4200	40	167	42	-5.9	1910	2000	107	326	43

Table 3 Sensitivity of baseline scenario to different elements of performance

4.2.4 Workforce and resource implications

The method for calculating workforce requirements has been to allocate staff groups from the aggregated PCT workforce returns to the levels in the Agenda for Change reforms. This has provided four groups of staff equivalent to:

- Levels 2 to 4 or unqualified staff;
- Levels 5 and 6 or qualified staff;
- Levels 7 and 8 or advanced practitioner grades;
- Level 9 or consultant level staff.

The Simulator links different 'capacity drivers' to each staff group from within the model, thus reflecting the shift in activity across the workforce and between sectors. The direct staff costs and balance between the two sectors is reflected in Table 4. The Simulator tool suggests an increase of 18% in community staffing costs and a reduction of 4% in hospital staffing for Shropshire and corresponding figures in Staffordshire of +12% and -3%, assuming the baseline performance scenario.

However, consideration of workforce projections against outputs from the Simulator tool suggests a level of discrepancy. Table 4 suggests that the workforce projections do not fully match the shifts required to deliver the performance targets contained in the baseline scenario of the Simulator tool. Whilst the financial outputs from the Simulator only reflect direct staff costs (plus training) they do indicate a broadly affordable projection for the baseline scenario – an increase of 4% in Staffordshire and 6% in Shropshire in total to 2007/08. The financial implications of workforce projections, however, are unlikely to be affordable with increases in community workforce approaching that suggested by the Simulator tool but increases in the hospital sector significantly higher than Simulator projections.

	Shropshire		**Staffordshire**	
	Projections	**Simulator outputs**	**Projections**	**Simulator outputs**
Consultants	+26%	+5% (Level 9 hospital)	+30%	+3% (Level 9 hospital)
GPs	+4%	+2% (Level 9 community staff)	+9%	+1% (Level 9 community staff)
Acute nursing	+32%	-4% (Level 5&6 hospital staff)	+9%	-3% (Level 5&6 hospital staff)
Health visitors	+4%	+18% (Level 5&6 community staff)	+6%	+12% (Level 5&6 community staff)
District nurses	+10%		+22%	

Table 4 Comparison of workforce projections with Simulator outputs for the baseline scenario

4.3 Performance monitoring and organisational learning to deliver change

The simulator tool has identified a number of key areas where achievement of the 2007/08 performance targets is clearly dependant on matching levels of activity or capacity in different sectors of the health system. It will be critical, for example, to monitor closely both access rates and changes in length of stay to identify the impact on broad capacity requirements, and particularly the level of unscheduled occupied bed days.

In addition it will be vital to ensure capacity is developed in intermediate care to a level perhaps not previously envisaged. Monitoring this sector and its impact on the wider system will be critical despite there being no consistent track record of aggregating such activity in the past.

It is therefore proposed that a set of high level performance indicators be developed that can be aggregated on the basis of PCT populations for Shropshire and Staffordshire with the aim of them being updated on a monthly basis. A set of 10 such indicators, informed by the outputs described in this report, are suggested in Table 5.

Indicator	Target	Suggested band of tolerance	Comment
Change in cumulative GP written referrals compared to previous year	+1.5%pa	+1% to +2%	Aggregated figures for Shropshire and Staffordshire. 'Drill-down' data may be helpful at specialty level.
Change in cumulative A&E attendances (excluding minors) compared to previous year	+1.5%pa	+1% to +2%	Aggregated figures for Shropshire and Staffordshire. 'Drill-down' data may be helpful at specialty level.
Change in cumulative unscheduled care admissions compared to previous year	+1.5%pa	+1% to +2%	Aggregated figures for Shropshire and Staffordshire. 'Drill-down' data may be helpful at specialty level.
Cumulative unscheduled occupied bed days compared to the same point 12 months previous	-1%	Must be reducing	Should be an aggregate figure at Shropshire/Staffordshire levels derived from admission and length of stay data.
Aggregate length of stay for inpatient treatment	-2%pa	Suggest threshold of -1.5%	Should be an aggregate figure at Shropshire/Staffordshire levels derived from admission and length of stay data.
Admissions to intermediate care services and growth on previous year	+27% growth pa	Suggest range of 20-30%	New data collection methods will be needed to aggregate this to the required level.
Clients being actively managed through case management approach by 'community matrons'	From 0 in 03/04 to 1,078/2,300 in 07/08	+/- 10% of target level	New data collection methods will possibly needed to aggregate this to the required level.
Total waiting for over 6 weeks for an outpatient appointment compared to same time 12 months previous	Determine straight line reduction to 0 at March '08	+/- 10% of target level	Currently part of performance monitoring but will require aggregation. Additional 'drill-down' data may be helpful at specialty level.
Total waiting for over 6 weeks for an inpatient procedure compared to 12 months previous	Determine straight line reduction to 0 at March '08	+/- 10% of target level	Currently part of performance monitoring but will require aggregation. Additional 'drill-down' data may be helpful at specialty level.
Follow-up outpatient attendances	-2%pa	Suggest threshold of -1.5%	Aggregate figure at Shropshire and Staffordshire levels. Additional 'drill-down' data may be helpful at specialty level.

Table 5 Suggested performance indicators and initial bands of tolerance

It is envisaged that this list will be developed in the period immediately following the submission of this report and that the resulting Performance Dashboard will play a significant part in enabling progress toward achieving the key targets for 2007/08 in a way that is reflected in Figure 6.

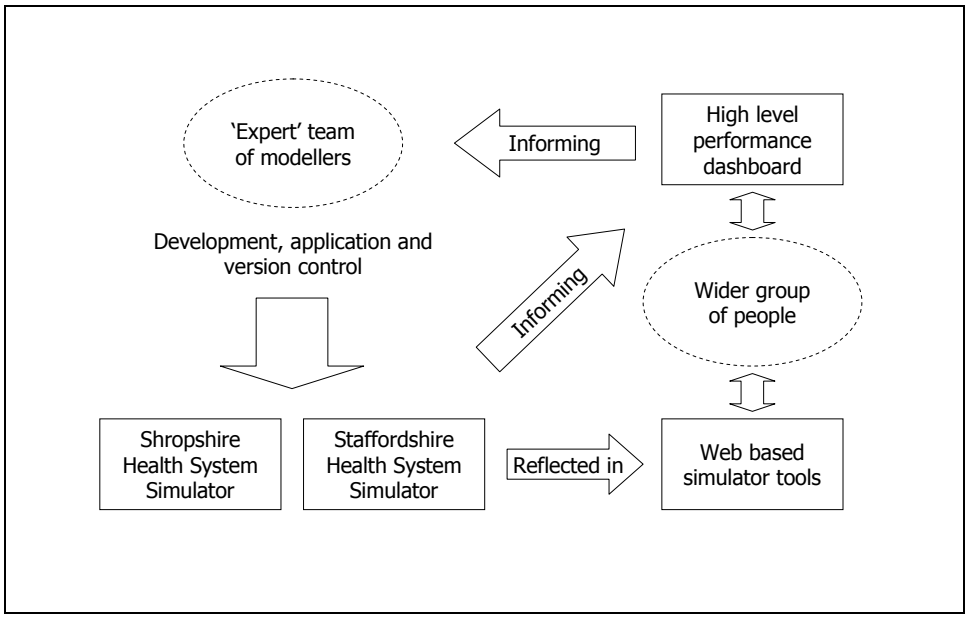

Figure 6 Setting the Simulator tool in the context of performance improvement and organisational learning

What is anticipated in Figure 6 is a system in which there is ongoing learning as a consequence of:

1. Allowing the Simulator tool to inform a high level performance dashboard;
2. Making available to senior performance managers both the dashboard and a web based version of the Simulator tool to enable them to explore the trade offs between the different elements of the baseline scenario as performance against these key indicators emerges;
3. Encouraging action that will enable health systems to better reflect the required achievements indicated by the Simulator tool;
4. Facilitating dialogue and the development of the Simulator tool to better reflect both system behaviour and outputs.

4.4 Looking ahead to 2012/13

At the end of the first period in the Simulator tool the 18 week target for a maximum wait from GP referral to treatment will have been met. This will have created an underlying requirement for additional activity up to 2007/08 in the acute sector that is illustrated by a small but noticeable step change at the transition between the two time periods. The extent of this underlying additional activity is illustrated in Table 6.

	Shropshire	**Staffordshire**
Additional outpatient rooms	Less than 1	Approximately 1
Level 9 hospital staff	+3	+6
Day cases	+400 a year	+1,900 a year

Table 6 Indication of underlying additional activity required to reduce waiting times

Key questions that need to be asked over the longer term are fully explored in the earlier sections of this report. They include:

- Whether there continues to be underlying increases in rates of access or a levelling out;
- The impact of increased demographic pressures;
- Whether there are further/more radical reductions in hospital lengths of stay;
- Whether, when and to what extent there could be a step change in the technological context enabling a greater ability to manage risk in the community;
- The development and impact of expert patient programmes, self management and patient expectations.

This section is designed to use the Simulator tool to explore a number of these issues using a small number of scenarios (Table 7):

1. A baseline scenario in which the progress in shifting the balance of care and achieving the 2007/08 performance targets is maintained but not built on and underlying increases in rates of access continue (row 3).
2. A second baseline scenario in which underlying increases in rates of access are removed such that only demographic changes are reflected (row 4).
3. With no underlying increases in rates of access a community scenario where further progress is made in the impact made by the management of long term conditions through case management systems simulated by larger case loads for community matrons and increasing success in reducing hospital admissions as well as increased success in diverting admissions from A&E and securing early discharge (row 5).
4. With no underlying increases in rates of access a hospital scenario in which there are continued reductions in length of stay and further shifts from day case to outpatient or primary care procedures (row 6).
5. A combined community and hospital scenario with moderated increases in the underlying rates of access (row 7).

These scenarios are not designed to be mutually exclusive but rather illustrate the comparative scale of impact for different areas of focus that, in turn, should inform the type of performance targets required.

Sustaining the progress made to achieve the 2007/08 performance targets will require more than the maintenance of new patterns of care. Even with the removal of underlying increases in access rates, as in the '12/13 baseline 2 scenario, (which is probably not likely or achievable) the overall hospital capacity drifts back toward 2003/04 levels.

The relative benefits of further progress in the hospital sector, particularly in reducing lengths of stay, is further highlighted in comparing the community and hospital scenarios. However, when a reasonable underlying increase in rates of access is re-instated at 1%pa it is necessary to employ a combined strategy of continued progress in both hospital and community sectors to achieve performance targets likely to be set for the medium to longer term in the light of what we know is possible from international comparisons.

	Shropshire						Staffordshire					
	% change in Unscheduled obds from 03/04	Acute beds required	Additional day cases pa from 03/04 by 12/13	Outpatient rooms required	Intermediate care clients	Percent of staff costs incurred in the community	% change in Unscheduled obds from 03/04	Acute beds required	Additional day cases pa from 03/04 by 12/13	Outpatient rooms required	Intermediate care clients	Percent of staff costs incurred in the community
Position in 03/04	N/A	853	N/A	36	50	37	N/A	1995	N/A	102	100	39
Position in 07/08[6]	-4.3	784	4200	37	167	42	-5.9	1910	2000	102	326	43
Baseline 1[7] for 12/13	+10.5	893	8400	40	208	41	+6.1	2129	9600	107	393	41
Baseline 2 for 12/13	+2.5	828	5300	37	198	42	-1.6	1975	2500	100	374	43
Community scenario[8]	+3.0	846	4600	37	251	42	-8.5	1878	2500	100	448	44
Hospital scenario[9]	-9.1	735	800	36	198	44	-12.7	1754	-7900	95	374	45
Combined[10]	-11.1	732	2700	37	246	44	-14.4	1756	-3700	99	464	45

Table 7 Longer term scenarios to 2012/13

[6] Assuming achievement of 07/08 Performance Targets.
[7] Baseline 1 with continued underlying increases in access rates of 1.5%pa. Baseline 2 removes these completely to leave only demographic influences.
[8] With no underlying increases in access rates, increases in divert from A&E from 10 to 15%, early discharge from 15 to 20%, community matron case load from 30 to 50 and percent of admissions saved for case managed clients from 10 to 20%.
[9] Continued increases in reductions in lengths of stay, reduction in follow up outpatients, shifts from day cases to outpatients and from outpatients to primary care all moving from 10% at 2007/08 to 20% by 2012/13.
[10] This scenario combines the community and hospital scenario but adds a 1%pa underlying growth in access rates.

4.5 Next steps

The Simulator tool is a first step toward understanding in a more comprehensive and evidence based way how capacity requirements will shift across the health systems within the Strategic Health Authority over the medium to longer term. Using the tool will improve people's understanding of this system and should also lead to improvements in the Simulator tool itself.

The simulator reflects our current understanding of system relationships and our ability to obtain validated and robust data for the different elements of the model. We believe that the group of people involved have provided the basis for a well informed, high level, strategic map of the system and that data sources made available have been robust and well tested through the capacity planning and workforce planning processes. Where there are uncertainties about the assumptions underlying new services or a range of possible trajectories these have been accommodated by providing an ability to run different simulations on the basis of a range of values.

Implementing the proposed performance dashboard and online version of the Simulator tool will provide an environment in which there can be ongoing learning and feedback. In addition the tool should be used to stimulate discussion and reflect on the key strategic decisions that will shape the future of our health systems.

Appendix – Acknowledgements and people involved

1 Participants in the workshop programme

The workshop programme described in the early part of this report was attended by a cross section of senior Strategic Health Authority staff:

Sharon Palser, Andrea Green, Joanne Harding, Rebecca Woods and Anne Antoszewski from Modernisation;

Vanessa Barrett, Anthea Clegg, Barbara Newms, Winsome Stack, Rob Willoughby and Andrew Lavelle from Health Strategy;

David Mountford and James Norman from Performance and Finance;

Pam Campbell, Colin Harriden, Julie Hewitt, Emma Horley and Lynne Sterry from Workforce Development.

2 Project team/modellers

A 'project team' were provided with training and support in the development of skills in the use of the simulation software. They also provided invaluable advice and a wide range of data and interpretation during the project. Particular thanks are extended to Andrew Lavelle, Rebecca Woods, Lynne Sterry, Andrea Green, Mike Wren and Anne Antoszewski.

3 'Critical friend' involvement

As discussed in the main body of this document a number of 'critical friend' discussions were held mid-way through the project to inform and advise on the way in which each focus area was being appraised and with respect to future scenarios that should be considered in the development of the simulator.

Mike Cooke, Chief Executive, S. Staffordshire Healthcare NHS Trust (Mental Health); Ian Rogerson, Chief Executive, North Staffordshire Hospital NHS Trust (Unscheduled care); Jackie Daniel, Chief Executive, Robert Jones/Agnus Hunt Orthopaedic Hospital NHS Trust (Planned Care).	Andrew Donald, Director of Service Improvement, Newcastle Under-Lyme PCT Long Term Conditions); Stephen Bridgeman (Long Term Conditions); Kieron Murphy, Chief Executive of East Staffordshire Primary Care Trust (Children's Services); Sylvia Wyatt, NHS Confederation.

4 Steering Group

The project Steering Group was responsible for ensuring the project delivered to the agreed outcomes. Contact can be made with any of these but in particular with Anne (01785 252233) or with Peter (07834 209461 & at peter.lacey@thewholesystem.co.uk.)

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