

Summary

The resources required to deliver a high quality service will depend on the health needs and demands of the population, technological developments, workforce issues and productivity. As there is uncertainty around how these additional cost drivers will change, the Review has built up three scenarios:

- **solid progress** – people become more engaged in relation to their health: life expectancy rises considerably, health status improves and people have confidence in the primary care system and use it more appropriately. The health service is responsive with high rates of technology uptake and a more efficient use of resources;
- **slow uptake** – there is no change in the level of public engagement: life expectancy rises by the lowest amount in all three scenarios and the health status of the population is constant or deteriorates. The health service is relatively unresponsive with low rates of technology uptake and low productivity; and
- **fully engaged** – levels of public engagement in relation to their health are high: life expectancy increases go beyond current forecasts, health status improves dramatically and people are confident in the health system and demand high quality care. The health service is responsive with high rates of technology uptake, particularly in relation to disease prevention. Use of resources is more efficient.

The Review's assumptions about pay, prices and the configuration of the workforce are also discussed. These are common across all scenarios.

INTRODUCTION

- 3.1 The previous chapter set out a vision of the health service in 20 years' time based on rising patient and public expectations and the definition of a high quality service. The resources required to deliver such a service will also depend on the other main drivers of cost: the changing health needs and demands of the population, technological developments and medical advance, the use of the workforce and productivity.
- 3.2 There is significant uncertainty around how each of these will develop over the next 20 years. To reflect this uncertainty, the Review has built up assumptions about the possible impact in the form of three scenarios, described in detail in this chapter, which are intended to capture a range of possible futures:
- Scenario 1: *solid progress*;
 - Scenario 2: *slow uptake*; and
 - Scenario 3: *fully engaged*.

- 3.3 Each scenario seeks to bring together the various drivers of cost in a coherent way, to provide three plausible views of how they might impact on the use and delivery of the health service in 20 years' time. Each of the scenarios is possible, as indeed are many others. They are not forecasts and are deliberately not intended to encompass the full range of possibilities for either resource requirements, health-related behaviour or final health outcomes.
- 3.4 The three scenarios also aim to capture some of the main themes which the Review believes will be significant in helping to achieve better health outcomes over the next 20 years; in particular, the extent to which resources are used effectively and the public engage with their own health care.

Box 3.1: Scenario planning

Scenario planning exercises are used in many large organisations to build understanding of what the impact of different possible futures might be. By identifying the distinctive competencies of the organisation and the environmental influences and drivers, plausible scenarios of possible futures can be constructed. The result is a small set of internally consistent, but substantively different, scenarios which can be considered alongside each other – to assess the range of likely pressures on an organisation and to illuminate the future and better understand the key uncertainties.

- 3.5 The future health needs and demands of the population will depend on:
- changes in the **age structure** of the population, particularly the extent to which life expectancy continues to rise and the number of older people increases;
 - changes in the **health status** of the population, particularly the extent to which improvements in life expectancy are accompanied by improvements in healthy life expectancy. The levels of ill health (particularly among elderly people) are key determinants of health care use. Initiatives to improve public health and reduce health inequalities could result in reduced incidence of key diseases such as coronary heart disease and stroke across all age groups, but particularly those aged under 65; and
 - changes in the **likelihood of people seeking health care** for a given level of need. Higher levels of education and income and greater public engagement in health issues could result in greater demands, even if underlying health needs remain constant.
- 3.6 There are also several key factors which will impact on the cost and configuration of the supply of health care over the next 20 years:
- the rate of spending on **technology and medical advance**, including drugs, equipment and information and communication technology (ICT);
 - changes in the pay and productivity of the **health service workforce** and, in particular, developments in skill mix; and

- wider **productivity** gains through the more effective use of all the health service's resources.

SCENARIO SUMMARIES

- 3.7 The descriptions of the scenarios below highlight the effects which the Review has attempted to capture. In some cases this is through a well-evidenced direct impact on levels of activity in the service or the costs of delivering the service. In other cases, existing evidence has been used to approximate the likely impacts on future expenditure. Across the scenarios, different assumptions have been made about possible future health outcomes, health seeking behaviour, technological development and productivity. Details of the assumptions made are described later in this chapter.
- 3.8 All three scenarios assume investment of the core resources required for the delivery of the high quality service outlined in the previous chapter. But they differ in how well the service responds to this investment and in how health care needs and demands change. The response of the health service will be vital in determining whether it has the ability to deliver the outcomes identified. Some of these issues are considered in Chapter 6. Details in the following scenario descriptions relate to key outcomes in 20 years' time.

Scenario 1: solid progress

- 3.9 In this scenario, people live for considerably longer than they do today – life expectancy at birth¹ is 80.0 years for males and 83.8 years for females, compared to 75.8 and 80.6 today. Older people experience around 5 per cent fewer acute health problems than today. But the probability of experiencing long-term health problems at a given age is the same as today². Combined with increases in life expectancy this means that extra years are a combination of healthy and unhealthy years. Roughly speaking, half the additional years gained through higher life expectancy will be healthy.
- 3.10 A significant driver of better health in this scenario is therefore an improvement in curative care provided by the service itself. There is strong take up of medical technology and efficient use of ICT in an integrated way across the service. This and a more appropriate workforce skill mix contribute towards productivity gains increasing to 3 per cent a year over the second half of the period. The service is fully integrated, efficient and has closed the major gaps with other countries.

¹ Life expectancy at birth in a given year is the average number of years of life that a new-born baby would be expected to live assuming the death rates of that year.

² Here long-term ill health is equated with an inability to perform at least one domestic task such as shopping or cooking a main meal and/or at least one personal care such as bathing or going to the toilet.

- 3.11 In the event of ill health, people are treated well by a service which has made good progress in responding to increased investment. Reduced age discrimination and higher expectations among the elderly combine to place increasing demands on the service. Younger people are more health aware and seek care for problems which they currently tolerate without health service intervention. They visit their GP on average once a year more than now, frequently for reassurance, because they have confidence in the system.
- 3.12 Targets for public health are met – less than 24 per cent of adults smoke compared to 27 per cent today³. Less than 15 per cent of pregnant women smoke compared to 18 per cent today⁴. The number of babies born to teenage mothers in England and Wales is around 41,000 in 2005 and 24,000 in 2010, compared to 48,000 today⁵. Recent trends in the prevalence of obesity (which since 1980 has trebled for women to 21 per cent and doubled for men to 17 per cent⁶) are slowed and ultimately reversed as a result of local actions to increase levels of physical activity and provide advice about healthy diets, including the “Five a day” programme⁷. The challenging Health of the Nation targets for obesity are met with prevalence of only 6 per cent for men and 8 per cent for women.
- 3.13 Coupled with success in other areas contributing to public health – such as poverty reduction and increasing employment opportunities – health promotion measures targeted at deprived population groups help to reduce socio-economic inequalities in health. The gap in life expectancy between those in the poorest areas and the average falls by at least 10 per cent⁸. Smoking among adults in manual socio-economic groups falls from 30 per cent today to 26 per cent by 2010⁹.
- 3.14 This *solid progress* scenario is thus one of steady improvement, with current public health targets met and maintained.

Scenario 2: slow uptake

- 3.15 In this scenario, although people live for longer than today – life expectancy at birth of 78.7 years for men and 83.0 years for women – they do not live longer in good health. People aged over 65 are more likely to experience long-term chronic ill health than today. Severe, acute ill health also deteriorates, with a 10 per cent increase in health problems requiring GP visits and hospital admissions.

³ Department of Health target and Office for National Statistics (2002), *Living in Britain: Results from the 2000 General Household Survey*.

⁴ Department of Health target.

⁵ Department of Health target.

⁶ National Audit Office (2001), *Tackling obesity in England*, HC 220, Parliamentary Session 2000-2001.

⁷ The “Five a day” programme is a Department of Health initiative to provide targeted action to achieve improved access to, and increased consumption of, fruit and vegetables.

⁸ Health inequalities target, Department of Health.

⁹ Cancer Plan target, Department of Health. Figures for males and females combined.

- 3.16 The service responds slowly to its increased investment, impacting on the speed of improvements in curative care. The uptake of new technologies is relatively slow and the potential productivity improvements from better use of the workforce and integrated ICT are not fully realised. While the service offers the good quality care defined in Chapter 2, it does not offer a fully 'whole systems' approach.
- 3.17 The health of people improves slowly and inequalities in health between groups of people are unchanged. For example, targets on reducing smoking are not achieved, with prevalence remaining similar to today. Levels of obesity and physical exercise remain unchanged. There is no rise in the levels of public engagement. People visit their doctor at the same frequency as at present. Older people do not demand or receive additional care for a given level of need.
- 3.18 With unchanged levels of health inequalities and risk factors, the *slow uptake* scenario is the most pessimistic of the three.

Scenario 3: fully engaged

- 3.19 In this scenario, people live longer and in better health than they do both today and in the *solid progress* scenario. Life expectancy at birth is 81.6 years for males and 85.5 years for females. People not only live longer, but they spend a smaller proportion of their lives in ill health: as life expectancy rises, the proportion of a lifetime spent in long-term ill health declines¹⁰. Thus healthy life expectancy rises broadly in line with total life expectancy. Roughly speaking, a woman aged 78 in 2022 has the same probability of being in chronic ill health as a 73 year old today. In addition, acute ill health among the elderly declines by 10 per cent.
- 3.20 The difference between the *solid progress* and *fully engaged* scenarios is a dramatic improvement in public engagement, driven by widespread access to information – for example, through media such as the internet and digital television.
- 3.21 Public health improves dramatically with a sharp decline in key risk factors such as smoking and obesity, as people actively take ownership of their own health. The improvements seen in the *solid progress* scenario are achieved quickly and exceeded. People have better diets and exercise much more. Targets for obesity are met quickly and maintained. Fewer people smoke: only one in six compared to around one in four today, matching levels in California where there has been intensive smoking reduction in recent years. These reductions in risk factors are assumed to be largest where they are currently highest, among people in the most deprived areas. This contributes to further reductions in socio-economic inequalities in health.

¹⁰ See footnote 2.

- 3.22 Health needs and the type of care available become more sophisticated as engagement rises. The service responds as effectively as it does in the *solid progress* scenario, although differently to reflect the different needs of a *fully engaged* public. For example, uptake of appropriate technology is assumed to be rapid and effective in both, but what is appropriate in each will differ. As in the *solid progress* scenario, on average, people make one more visit to their GP each year compared to today. The very old rapidly start experiencing higher levels of hospital care than at present, because they demand more and doctors are much more likely to provide them with care based on their clinical need alone, not their age.
- 3.23 This scenario is the most optimistic of the three: a picture of rapid improvement in the health of the nation, underpinned by a *fully engaged* public and a high quality service.

SCENARIO FACTORS

- 3.24 The scenarios will impact on the future resources required for the health service both by affecting the demand for care and by affecting the cost and configuration of the supply of care.
- 3.25 The changing health needs of the population will affect demand for care. Technological developments and medical advances, use of the workforce and productivity will affect the supply. Demand and supply are not, of course, independent. For example, technological advances also expand what is medically possible, thereby extending demand.
- 3.26 Generally, changes in demand impact on the level of activity, while changes in supply impact on unit costs. A summary of the impacts of all the factors included in each scenario is provided in Table 3.1. The remainder of the chapter describes how each of these factors has been incorporated into the estimation of the resources required for the health service over the next 20 years.

Table 3.1: Summary of scenarios

	Solid progress	Slow uptake	Fully engaged
Changes in demand for care¹¹:			
UK life expectancy at birth by 2022	Men: 80.0 Women: 83.8	Men: 78.7 Women: 83.0	Men: 81.6 Women: 85.5
Long-term ill health among the elderly	No change in rates of ill health	Increase in long-term ill health	Healthy life expectancy increases broadly in line with life expectancy
Acute ill health among the elderly	5 per cent reduction by 2022	10 per cent increase by 2022	10 per cent reduction by 2022
Health promotion (smoking, exercise, diet, etc.)	Meet current public health targets leading to reductions in hospital admissions and GP visits	No change	Go beyond current public health targets leading to greater reductions in hospital admissions and GP visits, combined with higher spending on health promotion
Health seeking behaviour among over 65s	'Old old' match use of hospital and GP care per head of 'young old' by 2022	No change	'Old old' match use of hospital and GP care per head of 'young old' by 2012
Health seeking behaviour among under 65s	One additional GP visit per year on average by 2022	No change	One additional GP visit per year on average by 2022
Self-care	Switch of 1 per cent of GP activity to pharmacists; reduction of 17 per cent in outpatient attendances among 225,000 people using self-care	Switch of 1 per cent of GP activity to pharmacists; reduction of 17 per cent in outpatient attendances among 225,000 people using self-care	Switch of 2 per cent of GP activity to pharmacists; reduction of 17 per cent in outpatient attendances among 450,000 people using self-care
Changes in the cost and configuration of the supply care:			
Medical technology	Contributes around 3 percentage points a year to growth in health spending	Contributes around 2 percentage points a year to growth in health spending	Contributes around 3 percentage points a year to growth in health spending
ICT	Spending doubles in real terms by 2003–04	Spending doubles in real terms by 2007–08	Spending doubles in real terms by 2003–04
Productivity growth	Increases from 2 to 2½ per cent a year in the first decade to 3 per cent a year in the second	Increases from 1½ per cent a year in the first decade to 1¾ per cent a year in the second	Increases from 2 to 2½ per cent a year in the first decade to 3 per cent a year in the second

¹¹ Where a change is assumed, it is on present activity or unit costs. Some of these factors impact on the same part of the service, especially GPs, and the final impact calculated in the model is the combined effect of the separate factor impacts.

FACTORS IMPACTING ON DEMAND

Demography

- 3.27 People aged over 65 currently account for only 16 per cent of the population but just over a third of spending on hospital and community health services. Although in consultation the need to improve health services for children and to rehabilitate patients of working age was underlined, the Review's work on demographic change has focused mainly on the ageing of the population as evidence suggests this is the key demographic driver of cost.
- 3.28 There is uncertainty about how quickly the population aged over 65 will grow. Each scenario uses a different population projection, produced by the Government Actuary's Department (GAD), to reflect the different health outcomes between the scenarios. Each projection is based on the same assumptions about migration (annual net migration converges towards 135,000) and fertility (the average number of children per woman converges towards 1.74). The scenarios therefore differ only in their assumptions about life expectancy:
- *solid progress* uses GAD's high life expectancy assumptions. These were chosen as the central case because of evidence that past projections have tended to underestimate future numbers of elderly people¹²;
 - *slow uptake* uses GAD's principal life expectancy assumptions¹³. These are the lowest life expectancy assumptions used in the three scenarios; and
 - *fully engaged* uses high life expectancy assumptions prepared by Eurostat¹⁴ which are more optimistic than any routinely used by either GAD or Eurostat.

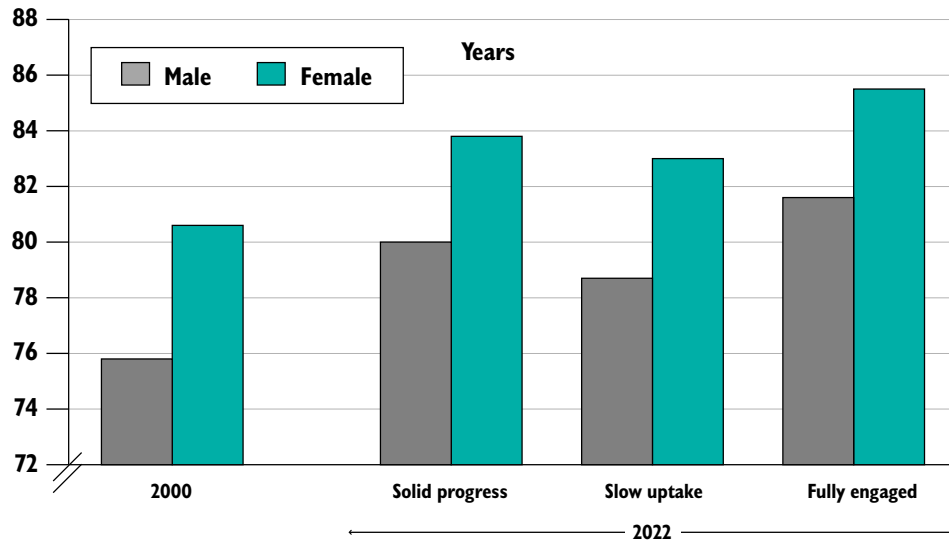
The different assumptions about life expectancy are shown in Chart 3.1. The resulting projections of the number of older people are illustrated in Chart 3.2. This shows the number of people aged over 85. There is relatively little difference between the scenarios in the number of people projected to be aged between 65 and 84 by 2022: 12.4 million in the *slow uptake* scenario compared to 13.3 million in the *fully engaged* scenario. The total UK population in 2022 varies between 64.7 million in *slow uptake* and 65.4 million in *fully engaged*.

¹² Shaw C (1994), Accuracy and uncertainty of the national population projections for the United Kingdom, Population Trends 77: 24-33.

¹³ GAD's principal life expectancy assumptions are similar to the central UK demographic projections made by Eurostat and the United Nations. Full details of GAD's 2000-based population projections are available at www.gad.gov.uk.

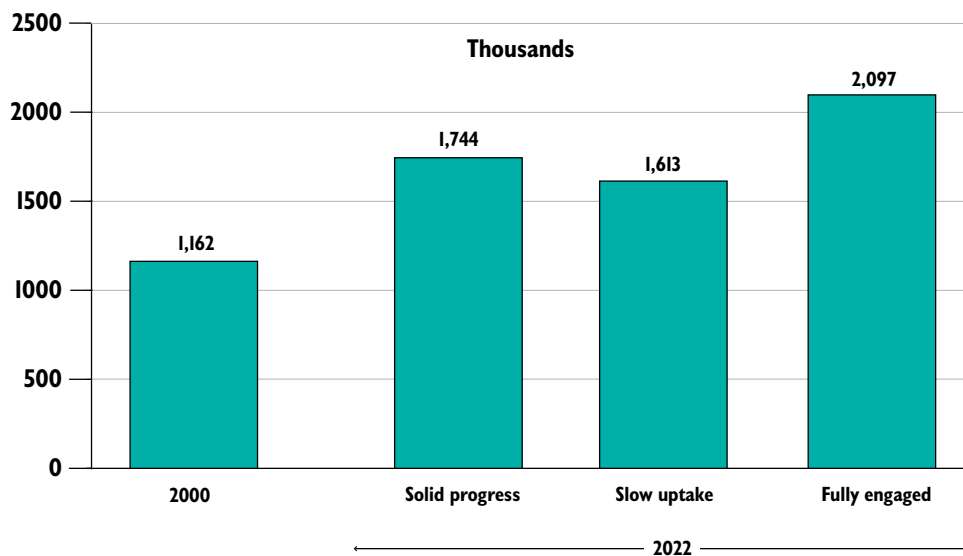
¹⁴ Eurostat is the Statistical Office of the European Communities. These high variant life expectancy assumptions were originally produced at the request of the OECD. This demographic projection was prepared by GAD using their own principal migration and fertility assumptions and the high variant Eurostat life expectancy assumptions.

Chart 3.1: UK life expectancy at birth



Source: Government Actuary's Department.

Chart 3.2: UK population aged 85 and over



Source: Government Actuary's Department.

3.29 As discussed in Chapter 9 of the Interim Report, the costs of acute care are strongly associated with proximity to death, regardless of age at death, i.e. health costs for older people are higher mainly because they are closer to death. Any analysis of demographic pressures that does not separate costs in the last year of life (i.e the costs of death) from other acute care costs risks overstating the impact on demand of more older people. So, the Review has in each of the scenarios split its modelling of the use and costs of hospital care between people in their last year of life (decedents) and those not in their last year of life (survivors)¹⁵. Such a split has not been used for social care. There, as costs increase with proximity to death, they also increase with age.

¹⁵ The Review has used Scottish linked data on hospital use for decedents and survivors, and adjusted and applied this to England data.

Health status

- 3.30 Increased life expectancy is a key indicator of improved health outcomes. Increased healthy life expectancy – arising from reduced levels of disease and disability – is another. The two are related and the health service strives to achieve improvements in both.
- 3.31 Chapter 2 outlined some specific ways in which outcomes can be influenced by the prevention and early diagnosis of specific diseases, for example, in terms of reduced hospital admissions as a result of statin uptake for those at risk of coronary heart disease (CHD) and earlier diagnosis of diabetes. The three scenarios outlined in this chapter consider how outcomes could be influenced by making different assumptions about the level of ill health and therefore demand for care, in two ways:
- changes in the levels of ill health among people over the age of 65; and
 - changes in the risk factors among those under 65 which contribute to ill health, arising from changes in the impact of health promotion and disease prevention.

These two are, of course, linked: a reduction in risk factors among people under 65 should lead to reduced ill health when these people are over 65.

Health in old age

- 3.32 As the Interim Report discussed, there is considerable uncertainty over what will happen to levels of illness among older people; this is reflected in the three scenarios. Research suggests that while levels of very serious ill health are falling, older people are experiencing more minor health problems, implying that the extent of long-term chronic conditions might rise while severe acute health problems might fall¹⁶.
- 3.33 The Review has tried to capture this distinction by considering the impact of changes in ill health among the over 65s on the demand for acute health care separately from that for long-term health and social care. In this Review, long-term ill health means the existence of some physical dependency: either difficulty with performing at least one domestic task such as shopping or making a main meal and/or at least one personal care task such as washing, bathing or going to the toilet. In the model, changes in levels of physical

¹⁶ Kelly S and Baker A (2000), Healthy life expectancy in Great Britain, 1980-96, and its use as an indicator in United Kingdom Government strategies, *Health Statistics Quarterly* 7: 32-37. Dunnell K and Dix D (2000), Are we looking forward to a longer and healthier retirement?, *Health Statistics Quarterly* 6: 18-24. Manton KG and Gu X (2001), Changes in the prevalence of chronic disability in the United States black and non-black population above age 65 from 1982 to 1999, *PNAS* 98(11): 6354-6359. Bone A, Bebbington A et al (1995), *Health expectancy and its uses*, The Stationery Office, London.

dependency only impact on long-term health and social care for people aged over 65¹⁷. In the Review’s model, acute ill health means health problems resulting in use of GP services or hospital care by those aged over 65 (except hospital stays of over 55 days which are captured in long-term care).

- 3.34 The predominant view which emerged from the consultation process is that there will be less ill health in old age, a so-called ‘compression of morbidity’. This has been modelled as an impact on acute care in the *solid progress* scenario and on both acute and long-term care in the *fully engaged* scenario. Although there are concerns about recent increases in the prevalence of obesity, future older people are likely to be healthier because of current or previous success in reducing the prevalence of smoking and general improvements in wider factors such as levels of education and income. This is supported by research and was emphasised in the consultation responses. For example, ASH (Action on Smoking and Health) commented “there are future declines in smoking-related morbidity ‘locked in’ to the current ageing population as a result of past declines in smoking prevalence” and the National Service Framework (NSF) for older people was mentioned as a key driver for reducing morbidity among elderly people.
- 3.35 It is not certain that the health of the future elderly will improve. It is possible that the risk of ill health in old age will remain the same as it is today or possibly even increase. Constant age-specific rates of physical dependency are assumed in the *solid progress* scenario. In the *slow uptake* scenario, increased use is assumed for both long-term and acute care. These more pessimistic views link with concerns that medical advance will succeed in prolonging life, but not prolonging healthy life. Thus more people with health problems are kept alive through interventions but are not cured completely and thus continue to require care. The assumptions for the scenarios are described in Table 3.2.

Table 3.2: Levels of ill health among over 65s

	Solid progress	Slow uptake	Fully engaged*
Demand for long-term care	Age-specific rates of physical dependency remain constant	Age-specific rates of physical dependency increased by 1 per cent a year	Age-specific rates of physical dependency decline broadly in line with changes in life expectancy
Demand for acute care	Use of acute care falls by 5 per cent by 2022	Use of acute care increases by 10 per cent by 2022	Use of acute care falls by 10 per cent by 2022

* Combined with a high life expectancy assumptions, this results in a reduction in the proportion of a lifetime spent in chronic ill health.

¹⁷ The data for the baseline and projections of long-term care use by those aged over 65 incorporating different assumptions about physical dependency were provided by the Personal Social Services Research Unit at the London School Economics and Political Science. For a description of their methods see Wittenberg R, Pickard L, Comas-Herrera A et al (2001), Demand for long-term care for older people in England to 2031, Health Statistics Quarterly 12:5-17. See also <http://www.lse.ac.uk/depts/lsehsc/pssru.htm>

Health promotion and disease prevention

- 3.36 Changes in the level of ill health, of course, affect all ages. The levels of ill health among those aged under 65 are closely related to levels of risk factors, such as smoking, physical inactivity, obesity, poor diet and alcohol. It is estimated, for example, that almost all the occurrence of CHD in those under 65 is preventable¹⁸. Improved public health, through health promotion and disease prevention, could therefore have a significant impact on health status and ultimately the demand for health services and the resulting cost. On top of the health benefits, it also brings wider benefits by increasing productivity and reducing inactivity in the working age population. The potential significance of public health featured strongly in the Review's consultation.
- 3.37 The extent to which individuals will take active ownership of their own health by changing their risk factors, by responding to evidence and possibly by regular checks of their health status is uncertain. The scale of the impact of promotion and prevention will depend on two principal factors: the level of public engagement; and the success of public policy in promoting such engagement through, for example, ensuring wide access to the latest evidence on risk factors or specific interventions. Public health policies themselves play a role in this, but so does wider social and economic policy, as there is a strong correlation between health inequality and socio-economic inequality. So, any changes in socio-economic inequalities could have an impact on health-related behaviours and ultimately demand for care.
- 3.38 The major killers are linked to socio-economic inequality. Excess rates of CHD and stroke among low-income groups largely account for overall health differentials. The key risk factors are much higher among people in deprived areas. For example, 35 per cent of men in manual groups smoke compared to just 23 per cent in non-manual groups; 25 per cent of children aged 2-15 in affluent families eat fruit more than once a day, compared to just 15 per cent in poorer families; and obesity is 65 per cent higher among poorer women than affluent women¹⁹. Limiting long standing illnesses (LLSI) is more prevalent in lower social classes (for example, 32 per cent in men in social class V compared to 17 per cent in social class I). It is associated with heavier demands on health services, with annual inpatient admission rates two to three times higher than for those with no LLSI. Preliminary analysis by the Department of Health suggests that if all social classes were to match class I's prevalence of LLSI, hospital admission rates would fall by 6 per cent.

¹⁸ McPherson K, Britton A and Caser L (forthcoming), Monitoring the progress of the 2010 target for coronary heart disease mortality: estimated consequences on CHD incidence and mortality from changing prevalence of risk factors. A report for the Chief Medical Officer. The Stationery Office.

¹⁹ Office for National Statistics: General Household Survey, National Diet and Nutrition Survey, Health Survey for England.

- 3.39 The Government is committed to tackling health inequalities through targeted health promotion and better access to care for those in need (encompassed in the NSFs). It is also committed to reducing deprivation more generally through, for example, tackling child poverty. In combination these commitments should ultimately reduce health inequalities. Despite evidence documented in the Interim Report that health promotion interventions may benefit middle socio-economic groups first and fastest, recent evidence suggests that efforts to reduce smoking have demonstrated particular success among deprived population groups²⁰. The Government's cross-cutting review on health inequalities is designed to ensure that health promotion efforts are directed where they are most needed.
- 3.40 Because of the close relationship between health and socio-economic inequalities and the likelihood of double-counting effects, the Review has assumed that the impact of reductions in health inequalities on future resources is captured within the assumptions for health promotion.
- 3.41 However, the likely impact of health promotion on overall demand for health care is difficult to assess. For example, estimating the impact on demand for health care of eating five rather than three pieces of fruit or vegetables a day or of exercising four rather than three times a week is fraught with methodological complications. There is a lag time between interventions and effect; interventions are rarely taken up universally by those at risk; people do not always make permanent or complete changes to their behaviour; and it is difficult to attribute changes in health status to an individual intervention. Despite methodological difficulties and the length of time needed for research, there is evidence suggesting that some health promotion interventions²¹ are not only effective, but also cost-effective over both short and longer time periods²². This point was reinforced during consultation. For example, 25 per cent of all cancers and 30 per cent of CHD are preventable through public health measures²³.
- 3.42 The Interim Report focused on smoking, but following consultation this was extended to physical activity and diet in order to reflect additional large risk factors. Because of the difficulty in assessing the impact of individual factors, the Review has not attempted to account for the benefits of each individually, but has attempted to capture them collectively by considering a reduction in demand for hospital and GP care arising from a reduction in the risk factors. Large reductions were considered for CHD and stroke as they are likely to be particularly affected by improved public health. The costs to the system of providing an expanded public health service have also been considered²⁴.

²⁰ Comment in the consultation response from the Health Development Agency based on Department of Health Statistical Bulletin (2001), Statistics on smoking cessation services in England, April 2000 to March 2001.

²¹ Health promotion is used as shorthand for interventions to reduce the prevalence of key risk factors such as smoking, physical inactivity and poor diet. Interventions may relate to primary or secondary prevention. Screening and drug-related interventions (apart from nicotine replacement therapy) are not covered here as they are captured in the NSF work described in Chapter 2.

²² International Union for Health Promotion and Education (1999), The evidence of health promotion effectiveness: shaping public health in a new Europe, Report for the European Commission.

²³ McPherson K (2001), Are disease prevention initiatives working?, *Lancet* 357: 1790-92.

²⁴ Assumptions about the costs of health promotion exclude areas already encompassed by the NSF costs discussed in Chapter 2, such as disease-specific drug-based prevention therapies and screening.

A number of contributors to the consultation, for example, the National Heart Forum and Health Development Agency, advocated greater consideration of the resources and specifically workforce requirements of a high quality public health system. The Review has used a simple approach to estimate resource requirements for an enhanced public health impact.

- 3.43 The choice of the type and level of reduction of risk factors for each scenario was based on a review of evidence²⁵. They are estimates of the potential impact of greater or lesser success in health promotion and wider public engagement in health on demand for care. Given the uncertainties involved and the assumptions that have had to be made, they merely capture a range of possible futures and are not intended to be forecasts. The Review has not attempted to capture any knock-on effects of prolonging life through avoiding early death from CHD, stroke, cancer, diabetes, etc. as the evidence about the effects is conflicting²⁶ and the Review's model was not designed to capture such impacts.
- 3.44 The scenarios reflect the possibility that current public health targets will be exceeded, given appropriate support for health promotion initiatives combined with wider improvements in education, growing affluence and generally increased awareness of healthy living.
- 3.45 The *solid progress* scenario has attempted to capture the impact on use of health services of meeting the specific English targets around smoking (in general and in pregnancy), teenage pregnancy and obesity as well as local initiatives for physical activity and diet. Specifically the model incorporates over 20 years the following changes from a 2002-03 baseline:
- a 10 per cent reduction in hospital admissions, GP visits and prescriptions related to CHD and stroke for 15-64 year olds. These reductions are largely due to reductions in the prevalence of smoking, but higher levels of physical activity and better diet also contribute;
 - a 5 per cent reduction in all other hospital admissions, GP visits and prescriptions for 15-64 year olds. These reductions are partly due to the wider health gains from reductions in smoking and partly due to the impact higher levels of physical activity and improved diet might have on other conditions such as cancer, diabetes and musculoskeletal problems;

²⁵ Key evidence used includes: Swales C (2001), A health economics model: the cost benefits of the Physical Activity Strategy for Northern Ireland – a summary of key findings; Naidoo B, Stevens W and McPherson K (2000), Modelling the short term consequences of smoking cessation in England on the hospitalisation rates for acute myocardial infarction and stroke, *Tobacco Control* 9:397-400; Russell LB, Teutsch S, Kumar R et al (2001), Preventable smoking and exercise-related hospital admissions, *American Journal of Preventive Medicine* 20(1): 26-34; Department of Health preliminary analysis of the potential health care benefits of reducing teenage pregnancies; Thoroughgood M and Naidoo B (2001), The potential impact of public policy on future exposure to risk and health status, Paper presented at the Health Trends Review Conference, October 2001.

²⁶ One study (Bonneux et al 1998) concluded that preventing fatal disease increases health care costs. It assumed that premature mortality avoided would lead to increased need for long-term care. Another report (Bates 2001) suggested smoking costs the health service 13 times more through treatment needs than it saves through early death and avoidance of future care needs. References: Bonneux L et al (1998), Preventing fatal diseases increases healthcare costs: cause elimination life table approach, *BMJ* 316: 26-29; Bates C (2001), Study shows that smoking costs 13 times more than it saves, *BMJ* 323: 1140-1.

- a 5 per cent reduction in births requiring special or intensive care due to reductions in teenage pregnancies and reduced levels of smoking in pregnancy; and
 - health promotion expenditure growing in line with expenditure on GP and hospital care.
- 3.46 The *slow uptake* scenario assumes no change in current activity and expenditure on health promotion grows in line with population growth and inflation.
- 3.47 The *fully engaged* scenario has attempted to capture the possible impact on use of health services from going beyond existing targets and, for example, meeting Californian targets for smoking. It also assumes that increased spending on health promotion would be required to meet such challenging targets. Specifically, it assumes the following changes over 20 years from a 2002-03 baseline:
- a 25 per cent reduction in hospital admissions, GP visits and prescriptions related to CHD and stroke for 15-64 year olds;
 - a 15 per cent reduction in all other hospital admissions, GP visits and prescriptions for 15-64 year olds;
 - a 5 per cent reduction in births requiring special or intensive care;
 - health promotion expenditure growing in line with expenditure on GP and hospital care, plus an additional £250 million a year by 2007-08²⁷; and
 - a reduction in statin use of over £1 billion as a result of reductions in smoking, as discussed in Box 2.3 in Chapter 2.

Health seeking behaviour

- 3.48 Changes in life expectancy and healthy life expectancy will impact on the demand for care. But demand could also change regardless of health status as a result of changes in health seeking behaviour. Such changes could occur across the whole population, or for specific groups. Changes for specific groups will be particularly affected by policy initiative, while both these and wider changes will be affected by people's levels of engagement with their health and the health service itself. Levels of education, income and media coverage of health issues are also important.
- 3.49 These factors could also encourage an increase in people caring for themselves and their families or community. The potential impact of this is discussed in Box 3.2.

²⁷ This is what is currently estimated to be spent on health promotion in England (general advice on smoking, diet, hypertension, exercise, obesity, alcohol, smoking cessation clinics, nicotine replacement therapy, National Fruit Schemes, Healthy Living Centres and Walk-in-centres) and the assumption therefore amounts to a doubling of expenditure. This would bring spending on interventions to reduce smoking in line with expenditure in California where ambitious reductions have been met.

Box 3.2: Self-care

The degree to which self-care becomes more important over the next 20 years will depend on the degree to which the public engages with health care. It is therefore closely linked to some of the other trends identified by the Review associated with rising knowledge, such as improved public health and increased health seeking behaviour.

Self-care is one of the best examples of how partnership between the public and the health service can work. The health service can support a pro-active public in promoting self-care by, for example, helping people to empower themselves with appropriate information, skills and equipment or supporting people to take a more active role in the diagnosis and treatment of a condition followed by rehabilitation and maintenance of well being. A comprehensive strategy on self-care would attempt to incorporate a wide range of approaches and models of self-care, including finding ways of providing funding, information, facilities, equipment and technology to support its development.

Increased self-care, and the more aware and engaged public associated with it, could result in useful cost benefits for the health service both in terms of levels and effectiveness of resources, arising from more appropriate use of health and social care services. For example, the Interim Report identified research which suggested that visits to GPs could decline by over 40 per cent²⁸ and outpatient visits by 17 per cent²⁹ as a result of increased self care. The Review has attempted to account for these benefits by using Department of Health estimates based on the above research which suggest that, for every £100 spent on encouraging self-care, around £150 worth of benefits can be delivered in return.

In the *fully engaged* scenario, the impact of increased self-care is assumed to be double the impact in the *slow uptake* and *solid progress* scenarios, reflecting the step change in public engagement in the former.

3.50 At present, people aged under 65 visit their GPs on average four times a year. In many cases, these visits are for minor ailments and reassurance. It is possible that in future people will visit their GP more, not less often, for a given level of need. In the future, a greater likelihood of people visiting their doctor, even if their underlying health status remains the same, could result from:

- increased health awareness and a broadening of people's beliefs about what constitutes health, resulting in demand for care of health problems that previously went untreated. This could relate to a growing intolerance of minor disorders and rising incomes and education; and
- people being more proactive in maintaining and enhancing their health and, for example, requesting regular check-ups. This is likely to result from an enhanced public health system combined with rising incomes and education.

²⁸ Fries J et al (1998), Reducing need and demand for medical services in high risk groups, *West J Med* 169: 201-207.

²⁹ Lorig et al (1985), A work place health education programme that reduces outpatient visits, *Medical care* 23, No 9: 1044-1054.

Some of this increase might be offset by greater levels of self-care. This offset reflects the fact while people may seek care more often as they become more engaged in their health, they might also seek care more appropriately.

3.51 The Review has incorporated a possible increase in health seeking behaviour into the scenarios as follows:

- *solid progress* and *fully engaged* scenarios: by 2022 one additional GP visit per person under 65 for unspecified conditions³⁰ compared to today; and
- *slow uptake* scenario: no change.

3.52 Two specific groups where demand for care could be expected to change even if their health status does not are older people and those on low incomes. These are two groups where there is evidence of inequality in access to care, i.e. their use is comparatively low given their health needs.

3.53 The NSFs discussed in Chapter 2 incorporate a policy drive towards equal access to care for equal need. Increasing access to care, particularly through targeting those most in need and least likely to seek care, will help to reduce occurrences of the inverse care law (inequalities in access to care as a result of socio-economic status). In order to avoid double-counting, the Review has assumed that the majority of costs associated with tackling the inverse care law are encompassed in the NSF costings described in Chapter 2.

3.54 In addition, wider access – combined with a clear policy direction from the NSF for older people – will help to reduce age discrimination in treatment rates among the very old. On top of the costs associated with tackling age discrimination in the health service, the scenarios incorporate changes in the demand for treatment of older people in the future.

3.55 It is likely that future older people will be increasingly intolerant of any differential access to services. They are likely to be more demanding of the health service, thanks to a greater awareness of health and available interventions. This was reflected in several consultation responses. For example, the Nuffield Trust noted increases in the number of complaints by older people and Age Concern highlighted increasing requests for screening by older people. This has been captured in the model by analysing use of GP and hospital services per head for different age groups over 65, a relatively crude way of estimating a possible impact of a more demanding future elderly population. In cases where treatment rates decline with age, it has been possible to estimate the impact on overall service use as a result of levelling up treatment rates among those over 75 to the rates found in those aged 65-74. For example, it is assumed that day case rates per head for 75 to 84 year olds would need to rise by 4 per cent to match rates for those aged 65 to 74:

³⁰ Excludes visits for CHD, stroke, schizophrenia, depression, anxiety, diabetes and asthma.

- for the *solid progress* scenario it is assumed that by 2022, hospital and GP care use per head among the over 75s will match current patterns of use among 65-74 year olds;
- for the *slow uptake* scenario it is assumed that there will be no change in utilisation rates; and
- for the *fully engaged* scenario it is assumed that by 2012, hospital and GP care use per head among the over 75s will match current use among 65-74 year olds.

FACTORS IMPACTING ON SUPPLY

Technology and medical advance

- 3.56 The Interim Report emphasised the UK's position historically as a late and slow adopter of medical technology, lagging behind comparator countries in both pharmaceuticals and 'big ticket' items such as scanners and radiotherapy equipment. It concluded that while some technologies will reduce unit costs, overall new technology is likely to continue to put upward pressure on health care spending as it enables more people to be treated and for longer periods of time.
- 3.57 The Interim Report also discussed the Review's preliminary estimate, based on the commonly used 'residual' approach³¹, that technology and medical advance have contributed around 2 percentage points to the annual rate of growth of health spending over the past 20 years. It suggested that over the next 20 years, technology spending will need to grow at a faster rate than over the past 20 years to catch up and keep up with other countries.
- 3.58 The consultation exercise yielded a variety of views about both the future impact and balance of technology spending. A number of respondents pointed to a likely shift from acute to chronic conditions and a need to shift the balance of spending away from high technology treatments to lower technology approaches focusing on the prediction, prevention and management of disease. Others expected new drug technologies – and specifically the way in which the National Institute for Clinical Excellence (NICE) develops – to be a major driver of rising spending over the next 20 years. The role of NICE is discussed further in Chapter 6. The impact of genetics was also raised during consultation. This is discussed in Box 3.3.

³¹ See pages 168-172 of the Interim Report.

Box 3.3: Genetics

The Interim Report included a discussion of the possible future impact of genetics and stem cell technology. It highlighted the significant uncertainties and differences of opinion about the likely impact of these technologies on health care spending over the next 20 years. The consultation responses have reinforced these uncertainties and differences of opinion.

It is clear that different types of genetic knowledge and technology will emerge at different times, and within each type there will be a whole spectrum of different discoveries that will happen over a period of years. But it is difficult to be more precise than this.

BUPA expects the impact of genetics to be “limited” over the 20 year period. The Nuffield Trust assumes that genetics and stem cell research will start to make an impact on costs within 15 years. Standard Life Healthcare takes the view that genetics will have a significant impact on health care spending over the next 5 to 10 years. GeneWatch UK says that “if NHS resources are not to be wasted, the potential role of genetic testing or screening in the prevention of major, complex diseases should not be over-estimated”.

In the light of the consultation responses, the Review maintains the view that there is huge uncertainty about the impact of genetics on health care spending over the next 20 years. On balance, its conclusion is that the impact on health care spending over the Review’s horizon is unlikely to be large. So it has not factored in any additional spending specifically to reflect developments in genetics.

This could well prove to be wrong and as the technology develops it will be important to revisit this assumption in future exercises of this type.

- 3.59 The Association of Community Health Councils for England and Wales thought that “a lower floor than 2 per cent should be considered” for the overall impact of technology, while others argued the need for a significantly higher rate of spending over the next 20 years – in at least one case double the 2 per cent figure. BUPA estimated that an 8 per cent a year real terms increase in hospital non-staff costs will be needed over the next 10 years to diffuse existing technologies more evenly, introduce new technologies and improve the quality of the NHS estate. The importance of the benefits of technology to the wider health service and economy was also noted by several respondents. Almost all respondents who commented on technology concluded that it would add to health spending over the next 20 years.
- 3.60 As the Interim Report emphasised, it is difficult to measure directly the impact of technology on aggregate health spending. Views differ significantly. No specific alternative methodologies to the Interim Report’s residual approach were suggested in consultation, although the Review acknowledges the limitations of this methodology. The British Medical Association said that “we would like to see further analysis aimed at isolating technological change from other elements of the residual”. The Review concurs with this view but has been unable to develop the research further itself. To do so will undoubtedly require more time and expertise than has been available to this Review. The need for further research in this area was also noted recently in an interim report on the state of the health care system in Canada³².

³² The Standing Senate Committee on Social Affairs, Science and Technology (2002), Interim Report on the state of the health care system in Canada, Volume Two: Current Trends and Future Challenges, January 2002: 43-44.

- 3.61 Part of the Review's analysis since the Interim Report has been able to provide a plausibility check on the results of the residual approach. As discussed in Chapter 2, in estimating the resources required to implement the five disease-based NSFs, the Review has attempted to identify the separate impacts due to greater uptake of technology, faster access and improved quality. This has been possible, albeit in a broad and simplistic way, because of the detailed way in which the NSFs are constructed.
- 3.62 This analysis shows that the contribution of technology to the increase in spending required to deliver the vision of a high quality service varies significantly across the five NSF areas. But the average technology contribution is around 3 percentage points a year.
- 3.63 While recognising the different approaches, this figure does not seem inconsistent with the historic figure derived from the residual approach. Given the need to 'catch up' to best practice following significant historic under-investment, the former figure would be expected to be larger than the latter.
- 3.64 Thus in projecting the impact of technology on health spending, the Review has chosen to apply the results derived from the NSF costings. By extending the NSF approach to other disease areas as described in Chapter 2, it has assumed that technology contributes around 3 percentage points a year to the cost of catching up to international standards over a period of 10 years for each disease area. As it is embodied in the costings of the current and future NSFs, this assumption is common to each of the scenarios.
- 3.65 The Review has also needed to take a view on the contribution of technology to the growth in health spending in each disease area in the 'keep up' period beyond the 10 year implementation span of each NSF.
- 3.66 In the *slow uptake* scenario, technology is assumed to contribute 2 percentage points a year to health spending growth during the 'keep up' period. This is in line with the historic average as estimated using the residual approach and consistent with the relatively low responsiveness of the service in this scenario. The *solid progress* and *fully engaged* scenarios both assume a larger technology contribution of 3 percentage points a year, the same as during the 'catch up' phase³³, as the service maintains the rapid uptake of the latest technologies. But as noted earlier in this chapter, the balance of technology spending could be rather different between these two scenarios, with more public health focused spending in the *fully engaged* scenario (for example, on screening).

³³ However, in the *fully engaged* scenario, and as discussed earlier in this chapter, some offset to spending has been assumed in the Review's modelling to reflect the successful impact of public health programmes on reducing the need for particular drugs and treatments.

- 3.67 In summary, while areas of the service are 'catching up' through the implementation of NSFs, the Review has assumed technology contributes 3 percentage points a year to spending growth. Beyond the 10-year implementation period for each NSF, the Review assumes a contribution to growth of 2 percentage points for the *slow uptake* scenario and 3 percentage points for the *solid progress* and *fully engaged* scenarios.

Information and communication technology (ICT)

- 3.68 The Interim Report emphasised the particularly poor ICT investment record of the UK health service. As shown in Chart C.8 of Annex C, the health service's annual ICT spending per employee was lower in 2000 than in any other sector of the economy considered. The UK health service also spends a significantly lower percentage of its budget on ICT than the health services of comparator countries.
- 3.69 In the UK health service, ICT systems have typically been developed and implemented in a piecemeal way at local level. While there are many examples of systems which work well for particular hospitals or GPs, the systems are not integrated across organisations or indeed sometimes across a single hospital. The Interim Report concluded that a significant infrastructure investment would be required across the service in order to reap the longer-term benefits which better integrated and more flexible ICT applications have to offer.
- 3.70 In response to the consultation question about the main ICT priorities for the health service, the majority of respondents identified the importance of the planned Electronic Patient Record (EPR) and the need to integrate ICT applications across primary and secondary care and also into social care. The development of electronic prescribing was also highlighted. Respondents emphasised the importance of ensuring that wider use of ICT is accompanied by appropriate training for all staff.
- 3.71 The Review believes firmly that the health service will need a significant programme of ICT investment to deliver first the infrastructure and then the applications which will secure the delivery of these and other targets.
- 3.72 At present, the NHS in England spends around £1.1 billion a year on ICT. The Review has incorporated in its projections a substantial increase in ICT investment. In the *solid progress* and *fully engaged* scenarios, ICT investment is assumed to double to around £2.2 billion in 2003-04, peaking at around £2.7 billion in 2007-08. Thereafter, a modest decline in the infrastructure element of investment is assumed but investment remains at around double its current level throughout the period. The same cumulative level of ICT investment is assumed in the *slow uptake* scenario, although it is phased in more slowly.

3.73 These figures are inevitably speculative, particularly beyond the short term, and are not based on detailed costings of specific investments. But the Review believes that they present a plausible view of what might be needed. They are intended to cover spending on a wide range of areas, including:

- ICT infrastructure;
- applications such as the Electronic Patient Record, electronic booked admissions, patient smart cards and the electronic staff record;
- investment in telemedicine and telecare for patients with chronic conditions;
- clinical governance support systems; and
- staff training.

Such a level of investment would raise NHS ICT spending from around 1½ per cent of total spending at present to over 3 per cent of total NHS spending.

3.74 How effective this investment proves in delivering a higher quality, more responsive health service and in reducing costs will depend on the quality of implementation. In particular, it will depend on the extent to which the investment takes place in an integrated manner with consistent standards across the whole service. These vital issues are discussed further in Chapter 6.

3.75 Quantifying the potential gains which might be delivered from such a programme of ICT investment is difficult, and for the purposes of its projections the Review has aimed to capture the benefits within a wider productivity assumption (see below). However, evidence relating to particular ICT investments – usually from the US – suggests that significant benefits are achievable, in terms of both cost savings and improvements in quality and safety.

3.76 For example, a recent report³⁴ cites the following gains achieved through the better use of ICT in health service settings:

- a study found that ‘charting errors’ in patient records occurred in 25 per cent of handwritten flow sheets. An automated patient data management system eliminated these errors and increased the number of progress notes documented by staff;
- a physician order entry system in an inpatient setting reduced length of stay by 10.5 per cent, reduced test charges by 12.5 per cent and reduced drug costs by 15.3 per cent. The total charges per admission were 12.7 per cent less for teams that utilised the order entry system than those that did not;

³⁴ Raymond B and Dold C (2002), *Clinical information systems: achieving the vision*, Kaiser Permanente Institute for Health Policy, February 2002.

- a study at Duke University found that the use of a computerised medical record system resulted in an overall time saving of 13 per cent for doctors. In another study, use of computer-based medical records contributed to time saving on follow-up phone conversations and office visits and saved the need to re-enter patient and laboratory data; and
- an antibiotic information system reduced adverse drug reactions in a particular hospital by 70 per cent, patients received excessive dosages for 2.9 fewer days and the overall cost of antibiotic therapy was reduced.

Health service workforce

- 3.77 More than 1¼ million people work in the UK health service and two thirds of the NHS budget is spent on pay. The NHS workforce is highly skilled and one in five health care workers are graduates, almost double the rate for the UK workforce as a whole. As the Interim Report demonstrated, the UK does not have enough doctors and nurses. The pay and productivity of the health service workforce will be an important driver of the financial resources required to deliver a high quality service over the next 20 years. But it is not enough to increase the financial resources available for the health service. To succeed, the service must have the right number and mix of staff in place. It takes a long time to train doctors and nurses, and workforce capacity is therefore a key determinant of the rate at which additional spending should take place.
- 3.78 The consultation responses endorsed the Interim Report's overall assessment of the shortfall in the numbers of health care professionals in the UK compared with other countries. The UK employs fewer doctors and nurses per head of population than any of the seven comparator countries considered in the Interim Report. The Nuffield Trust pointed out that the UK has also adopted a different skill mix to other European countries, being more reliant on non-professional staff and much more heavily reliant on doctors in training to provide clinical care. The Government's plans to increase the professional workforce were welcomed, but a number of respondents questioned whether they would go far enough, particularly as the Working Time Directive and changing expectations for work-life balance reduce participation rates.
- 3.79 The Interim Report argued that there will be substantial changes in the roles and responsibilities of health care professionals over the next 20 years. None of the respondents disagreed. Box 3.4 sets out a possible vision of the future. The consultation responses confirmed that there is considerable scope for skill mix changes within the health service, although all argued that this was unlikely to reduce costs overall. There was considerable support for further expansion of nurse-led services. Most of the organisations that responded considered this as positive and many highlighted the potential for further development. Alongside support for an extension of nurse-led services, there was general agreement that the next 20 years will see an extended role for

Health Care Assistants (HCAs). Many organisations raised the need to introduce a system of registration for HCAs. Many organisations pointed out that the scope for skill mix changes extends beyond the boundary between nurses and doctors. They highlighted the scope for developments in the role of allied health professionals.

3.80 While welcoming an expansion in the role of nurses, allied health professionals and HCAs, a number of organisations pointed out that increasing the supply of these groups may not be straightforward and may result in additional pay pressures.

Box 3.4: Vision of the future NHS workforce

- individuals will be responsible for more of their health care, either managing minor illnesses without the need of support from health care professionals or, working with health care professionals and pharmacists, taking a more active role in their own treatment;
- many of the first and routine contacts between patients and the health service will be provided by nurses or other health and social care professionals in community-based settings. The services might cover, for example, minor injuries, minor surgical procedures, counselling, laboratory work and care of the elderly. The settings where care would be provided include the patient's home and health centres or could be in any location via the telephone;
- health care assistants will undertake a large part of the routine work which nurses currently undertake in primary and secondary care;
- GPs will focus on patients with more complex health problems and provide a wider range of diagnostic and treatment services in the community. This will allow more services to move from secondary to primary care;
- GPs, while remaining generalists, will work with colleagues who are more specialised. They will work in teams including for example, paediatricians, geriatricians, psychiatrists and geneticists;
- more older people will be supported at home or in intermediate care facilities. Their treatment will be managed by community-based health care specialists;
- major acute hospitals will focus on providing 24 hour intensive and high dependency care. They will be centres of excellence for tertiary and high tech services. They will be staffed by doctors who are increasingly specialised and act as a centre of care networks; and
- although the increase in specialisation will continue, all specialists will have a strong general background and will work closely with community physicians to ensure holistic care for patients.

- 3.81** However, some organisations, including the Royal College of General Practitioners, while supportive of an expanded role for nurse practitioners and HCAs, were concerned about the changes in primary care envisaged. They highlighted the very high regard in which primary care services are held by patients and the general public and indeed by other countries. Continuity of care is seen as central to general practice and there are concerns that the benefits it brings – for example, in terms of better compliance with treatment – could be lost with greater specialisation and more direct access services.
- 3.82** The Review has not attempted to model different possible configurations for the use of the workforce. There are specific workforce planning mechanisms within the NHS. The Review recommends that the NHS workforce planning bodies should examine the implications of this Review’s findings for their projections over the next 20 years.
- 3.83** For the Final Report, the Review has examined whether the number and skills of the health care workforce will act as a capacity constraint on the pace of investment under each of the scenarios. To do this a separate workforce model has been developed in conjunction with the Department of Health. This compares the demand for different groups within the health service with the planned supply. The estimates of demand are based on current levels of productivity but with two important changes. First, they assume that the Working Time Directive reduces the working hours of hospital doctors to 48 hours a week. Second, they assume average length of stay in hospital falls in line with the estimates set out in the National Beds Inquiry, (see Table 3.3).

Table 3.3: Average length of stay for hospital in-patient admissions (days)

	2000	2005	2010	2015
Emergency admissions	7.76	7.27	6.35	5.43
Elective admissions	4.86	4.37	3.88	3.38

Source: National Beds Inquiry.

- 3.84** The Interim Report set out a number of other potential sources of workforce productivity gain. For the Final Report, the effect of these changes on the financial resources required is assumed to have been captured as part of the overall productivity improvement which is modelled for each scenario (see below). To have included a specific workforce factor in addition to this would have risked double counting. Changes in skill mix are examined within the workforce model as they will have an impact on any potential capacity constraints.
- 3.85** The supply estimates are based on the Government’s existing plans for training, recruitment and retention and assume all the benefits of those plans are achieved. The pay modernisation plans currently under negotiation for all professional groups should further increase supply, but at this stage the precise magnitude of the effects is still uncertain and, for this reason, has not been included in the estimates of supply.

Pay and prices

- 3.86 Over the past 20 years, pay in the hospital and community health services (HCHS) sector has risen by 2.4 per cent a year more than whole economy inflation. This increase in the total pay bill has been significantly above the average increase for specific groups of staff, reflecting changes in the staff mix over the period.
- 3.87 For a health service committed to delivering world class clinical standards based around high quality and fast access, pay levels must be sufficient to recruit, retain and motivate the number of staff that it requires with the appropriate skills. What is important in this respect is how the pay of health service staff compares with that of people in other occupations.
- 3.88 As the Interim Report demonstrated, while the relative pay of male doctors has held up, the relative pay of female nurses has slipped back over the past 25 years. While female nurses' earnings were higher than the earnings of around 65 per cent of working women in 1975-79, this figure had fallen to around 55 per cent by 1999. As the Interim Report also noted, these figures relate to the average across Great Britain. But geographical variations in health service pay tend to be much less marked than in other sectors of the economy.
- 3.89 For the purposes of its resource projections, the Review has assumed that total HCHS pay rises by 2.4 per cent a year in real terms (over and above GDP deflator inflation). This is in line with the average real increase since 1983-84. With inflation assumed to be 2.5 per cent throughout the 20 year period, this translates to a nominal increase of 4.9 per cent a year. Pay and prices in the General Medical Services sector are assumed to rise by 2.2 per cent a year in real terms, in line with the average since 1991-92. Pay in the personal social services sector is assumed to rise by 2.3 per cent a year in real terms, in line with the average between 1993-94 and 1999-2000. These assumptions are common to each of the three scenarios.
- 3.90 It should be stressed that these are simply assumptions in line with the historic averages and do not reflect a judgement about what rates of pay will actually be required to recruit and retain the staff which the health and social care sectors need. That will in practice depend on a wide range of interacting factors, the likely impact of which it is beyond the scope of this Review to assess.
- 3.91 Actual pay growth will, for example, depend on developments in the wider labour market and wider terms and conditions for health service staff. It will also depend on the success of current schemes to attract overseas recruits and people with health-related skills and qualifications back into the health service. The way in which the skill mix of the workforce, and other factors which impact on productivity, develop over the next two decades will be important, as will the scope for greater variation in health service pay between different parts of the country to reflect local labour market and cost of living differences.

- 3.92 The Review also notes the three separate, and exceptionally important, elements of health service pay reform currently in train: the Agenda for Change programme covering nurses, the GP Contract, and the Consultant Contract. Each of these should help to provide additional capacity and improve productivity. The costs and benefits, for the purpose of this Review, are effectively incorporated in the pay and productivity assumptions.
- 3.93 Price inflation of 2.5 per cent a year is assumed for the HCHS and Family Health Services (FHS) sectors, other parts of the NHS and social care. As with pay, this assumption is common to each of the scenarios.

Productivity

- 3.94 The efficiency with which the health service utilises its resources will be one of the most significant determinants of the cost of delivering high quality health care over the next 20 years.
- 3.95 The Interim Report highlighted four key areas which appear to offer the greatest potential for productivity gains:
- better use of the skilled workforce;
 - better use of ICT;
 - more self-care by patients; and
 - a redirection of existing NHS resources towards treatments which are cost effective.
- 3.96 Responses to the consultation largely agreed with these as the key drivers of productivity performance. Other factors raised included the scope for streamlining processes to cut out unnecessary delays (for example, between tests being undertaken and the results becoming available), contractual barriers within the workforce, poor management skills in some areas of the service and the gains which would be achieved by running elective services for more than the typical 40 hours per week.
- 3.97 The Review also notes the frequent debate about the extent of waste in the health service. Clearly, where inefficient or indeed inappropriate use of resources can be identified, action must be taken. The Review's estimates, therefore, incorporate savings in many of the areas which are frequently cited, including hospital acquired infections, clinical negligence and medication errors (see Chapter 2). The problems of bed blocking are also highlighted in this Report. In most cases there are some additional costs to help eliminate the waste, for example, in enhanced clinical governance.
- 3.98 Measuring productivity in a sector such as health care is not easy. Box 3.5 explains some of the difficulties and the approach which the Review has adopted in acknowledgment of these.

3.99 Box 3.5 notes that NHS productivity growth as conventionally measured (not taking account of quality changes) has averaged around 2 per cent a year over the past two decades. The most frequently cited driver of productivity

Box 3.5: Measuring health service productivity

Productivity measures the efficiency with which an organisation uses its resources to deliver particular outputs and outcomes. The accurate measurement of productivity is not, however, straightforward – particularly in services such as health and education where the majority of outputs are not priced in a market and changes in the quality of the service are difficult to measure.

In health care the difficulty in aggregating the volumes of many different types of activity is one problem. Another is that traditional measures of health service productivity have only covered part of the service and have not taken account of changes in the workforce skill mix. It has also been difficult to ensure that quality of care rather than just volume of activity is taken into account.

Measures of productivity for the wider economy such as those produced by the Office for National Statistics attempt to account for changes in the quality of outputs. Thus if a firm were to produce the same volume of output as in the previous year using the same amount of inputs but the quality of the output was deemed to have improved, recorded productivity would rise.

However, conventional measures of output used in calculations of NHS productivity do not adjust for quality changes. Thus, on such measures, if quality is improving, productivity will tend to be understated; while if quality is falling, productivity will tend to be overstated. Measured on its conventional basis (i.e. not taking account of quality change), NHS productivity growth has broadly matched that of the whole economy over the past 20 years – with growth averaging around 2 per cent a year. But such a comparison would be misleading if over this period NHS activity was rising at the expense of quality.

This also suggests that at a time when significant efforts are being made to deliver a better quality health service – as at present – conventional measures of NHS productivity are likely to understate the improvements being achieved.

While not straightforward in practice, the Review has therefore sought to consider NHS productivity on a quality-adjusted basis and split the productivity assumptions which it needs to make into two components: the first measuring the achievement of productivity improvements through lower unit costs and the second measuring the impact of improved quality.

As noted in several consultation responses, no ideal measure of productivity gain in health care yet exists and further work is therefore required. The Review agrees and by highlighting the issue hopes to encourage greater understanding and debate about the problems of productivity measurement.

improvement over this period is the impact of technology in facilitating a shift in the balance of hospital activity towards day cases and dramatic falls in average length of stay. For example, average length of stay fell by around a third in the ten years to 1999-2000. Better activity measurement and some shift in costs from the NHS to social care may also have contributed to the improvement.

- 3.100 The benefits of ICT will not come through significantly until the necessary infrastructure is built and there is early evidence both in the UK and other countries that the previously large falls in average length of stay have been levelling off. The planned significant expansion of the NHS workforce over the next few years will also act to limit productivity growth over this period. However, with the right up-front investment, there appears to be scope for significant productivity improvements in the longer term.
- 3.101 In coming to assumptions about the rate of productivity growth over the next 20 years, the Review considered an approach attempting to build up estimates from each of the individual factors likely to impact on productivity performance. But these are numerous and given the quality of information available, such a methodology was not feasible.
- 3.102 Instead, the Review has adopted an aggregate approach – although, as noted above, one which acknowledges the need to attempt to take account of the changing quality of health care. Table 3.4 summarises the aggregate productivity assumptions which have been used in the Review’s modelling, with an illustrative split between the cost reducing and quality improving elements. These are intended to capture the broad productivity gains which will be possible through better use of resources across the health service over the next two decades. They are distinct from the narrower benefits which might be expected to flow from specific initiatives which have been costed elsewhere.

Table 3.4: Breakdown of productivity assumptions, per cent a year

	Unit cost reduction		Quality improvement		Quality-adjusted productivity	
	Lower	Higher	Lower	Higher	Lower	Higher
2003-04 to 2007-08	¾	1	¾	1	1½	2
2008-09 to 2012-13	¾	1¼	¾	1¼	1½	2½
2013-14 to 2017-18	1	1½	¾	1½	1¾	3
2018-18 to 2022-23	1	1½	¾	1½	1¾	3

- 3.103 The Review is separately modelling the costs of delivering higher quality across the service (see Chapter 2) and in doing so has not explicitly taken account of the potential for improvements in, for example, use of ICT and the workforce to enable this higher quality to be achieved at lower cost than at present. It is therefore appropriate in estimating the resource requirements to include both the unit cost reducing and quality enhancing elements of productivity growth in the Review’s modelling.

- 3.104 The starting view for this aggregate approach is that the health service should at least be able to match the productivity performance of the wider service sector, where quality-adjusted productivity growth has averaged around 1½ per cent a year over the past 20 years. The lower productivity assumption shown in Table 3.4 and used in the *slow uptake* scenario is based on the health service matching service sector productivity growth, but little better. Given the position from which the health service starts and the significant investment in staff, buildings, medical technologies and ICT which is a feature of all the scenarios, this would be a particularly disappointing outcome.
- 3.105 Looking at the breakdown of the lower productivity assumption, quality improvements are assumed to contribute just ¾ per cent a year while unit cost reductions build up from ¾ per cent a year over the first 10 years to 1 per cent. This highlights the very pessimistic nature of this assumption. Unit cost reductions of no more than 1 per cent a year compare to the equivalent figure of 2 per cent achieved over the past 20 years.
- 3.106 In the higher case, which is used in the *solid progress* and *fully engaged* scenarios, quality-adjusted health service productivity growth is assumed to rise from 2 per cent a year over the next five years to 3 per cent in the second decade of the Review period as capacity constraints are lifted and the benefits of ICT and more flexible use of the workforce feed through.
- 3.107 The gains are split evenly between reductions in unit costs and improvements in quality. Unit cost reductions amount to 1 per cent a year in the first five years. This is consistent with the view of the Centre for Health Economics at the University of York which has concluded that "...as the NHS Plan has been implemented – the scope for annual unit cost reduction has fallen and at present may be no more than 1 per cent per annum". It is also consistent with estimates of the potential short-term cost reductions which might be possible through eliminating the majority of the current unit cost variation across the NHS and expected gains from improved purchasing, increasing the day case rate, reduced sickness absence, integration of human resource management and payroll and the new NHS Professionals scheme. Unit cost reductions rise to just 1½ per cent a year in the longer term.
- 3.108 Overall the Review believes that given the very significant investment which is embodied in each scenario and the potential for better use of ICT and the workforce across the entire service, this view of the scope for higher productivity gains is realistic and achievable. In consultation, The Nuffield Trust agreed with this assessment, identifying "a reasonable efficiency target of 2.5 per cent per annum in the near term and 3 per cent in the longer term".
- 3.109 The productivity assumptions set out above, while regarded as plausible and representing two distinct cases, are subject to significant uncertainty. Alternative productivity assumptions could have a large impact on the estimates of the overall resources required for the health service over the next 20 years. Chapter 5 therefore provides figures illustrating the sensitivity of the resource projections to changes in these productivity assumptions.

Links between factors

- 3.110 The drivers of expenditure are interdependent. For example, wider availability and take up of new technologies might lower treatment thresholds for procedures currently unavailable to frail patients, thus increasing demand for such care. Knowledge about new technologies available internationally may increase demand.
- 3.111 The three scenarios have sought to pick up these linkages and the Review has been careful in its modelling not to 'double count' impacts as a result of them.

CONCLUSION

- 3.112 This chapter has set out three scenarios illustrating how trends in the health needs and demands of the population, technological development and medical advance, the use of the workforce and productivity might affect the health service in 20 years' time.
- 3.113 Other scenarios are also possible: for example, one where there is a rapid improvement in overall public engagement and rapid response from the service to increased investment, especially in technology, but with a worsening of socio-economic inequalities: in effect a widening of the gap in key risk factors such as smoking prevalence, with the benefits of the high-quality service disproportionately benefiting those most affluent and knowledgeable. The Review believes this would be more likely in a country like the US where there is a strong reliance on financing through private insurance than in the UK where the majority of health care financing is through general taxation.
- 3.114 The three scenarios highlight some of the key issues explaining why the health needs and outcomes of the nation could develop differently over the next 20 years. They were chosen for that reason. In particular:
- the difference between the *slow uptake* scenario and the others is primarily one related to the response of the service itself, demonstrating the importance of curative care in improving health outcomes; while
 - the difference between the *solid progress* scenario and the *fully engaged* scenario is primarily related to the response of the public and patients, demonstrating the importance of preventative care in improving health outcomes.
- 3.115 These two aspects are considered in Chapters 5 and 6. Chapter 5 sets out the Review's projections of the level of resources required for the health service in 20 years' time under each of the three scenarios. Chapter 6 considers the use of these resources within this overall requirement. The next chapter describes the modelling approach.

