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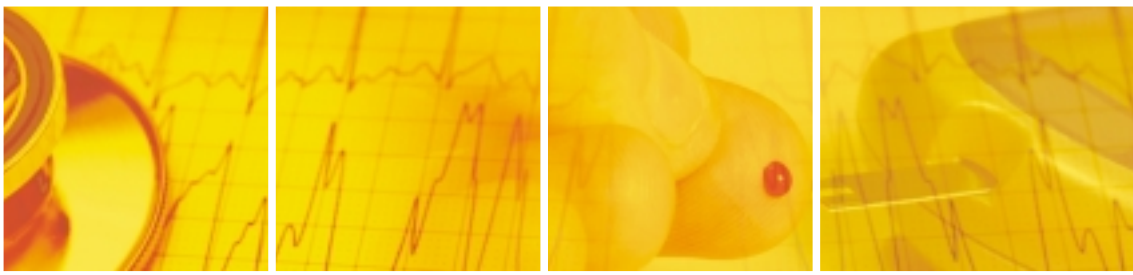

CHD and Diabetes in Wales: Meeting the Challenges

A Final Report for ABPI Wales

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Foreword

The more effective management of people with chronic illnesses and diseases lies at the heart of the Welsh Assembly Government's strategy to achieve a formidable step-gain in the health of the people in Wales. *Designed for Life*[1] sets the context for health service development in Wales and is pivotal to the success of that strategy. It provides the framework for an achievable and laudable aspiration that in the next ten years the people in Wales shall benefit from progressive improvements leading to the establishment of world class health and social services in Wales. This report for ABPI Wales is a timely and valuable focus on Type 2 diabetes and coronary heart disease (CHD). These are among the leading long-term and chronic conditions that currently burden society in Wales[2] and pose very considerable challenges to the limiting of their predicted growth and impact on health and wellbeing and, by more coherent and concerted interventions, to achieving tangible successes in their prevention, detection, and management.

People who are living with chronic conditions, such as diabetes and CHD, are prey to far reaching implications and consequences of their ill-health and disease which can adversely influence their independence and abilities to cope, and profoundly affect their families, other carers and social networks. The right forms of support, encouragement, integrated models of management and care, and self-management are increasingly needed across the social spectrum, public health, and healthcare provision. And, not least, as this report emphasises, recent innovations in pharmaceutical and medical devices can offer substantial benefits to patients themselves, to more effective control of the disabling and life-limiting manifestations of the diseases, to potential reduction in adverse sequalae and, arguably, may bring benefits to the general economy itself. A cautious eye is always needed in balancing an uncritical acceptance of growth projections and estimates against the unknowable influences and unforeseen contexts of future scenarios. But, on current evidence, a reasonable case is made that innovations in pharmacotherapies applied to Type 2 Diabetes and CHD should bring benefits to the overall management of patients with these chronic disease.

It is also refreshing that patient empowerment, life-style and behaviour change, diet and enhanced physical activity are recognised in the report as critically important factors in disease evolution and its management that must be, and

indeed are being, addressed by the Welsh Assembly Government. It is evident too, as described in the report that the burden of these diseases and their patterns of growth will vary across Local Health Boards reflecting, among other things, demographic and socio-economic profiles, and the prevalence of multiple disadvantages in the constituent communities. This will provide a challenge for targeted commissioning of health services in which cost-effectiveness of new pharmaceutical interventions should weigh heavily in the proper allocation of inevitably limited resources.

This is a balanced report which does provide valuable information on recent innovations in pharmaceutical and other therapies in the management of Type 2 diabetes and CHD. It has an abundance of data and is well-referenced. I endorse the conclusion in the comprehensive and concise Executive Summary, that (to paraphrase) the sheer magnitude of costs and consequences to the people of Wales of diabetes and CHD demands that all stakeholders are brought on-side to achieve that step-gain in the management and support for people with these chronic conditions.

Professor Mansel Aylward CB
Chair: The Wales Centre for Health

[1] *Designed for Life*, Welsh Assembly Government, 2005

[2] National Public Health Service for Wales. A Profile of Long-Term and Chronic Conditions in Wales; Wales: WAG, 2005

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Acknowledgements

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Executive Summary

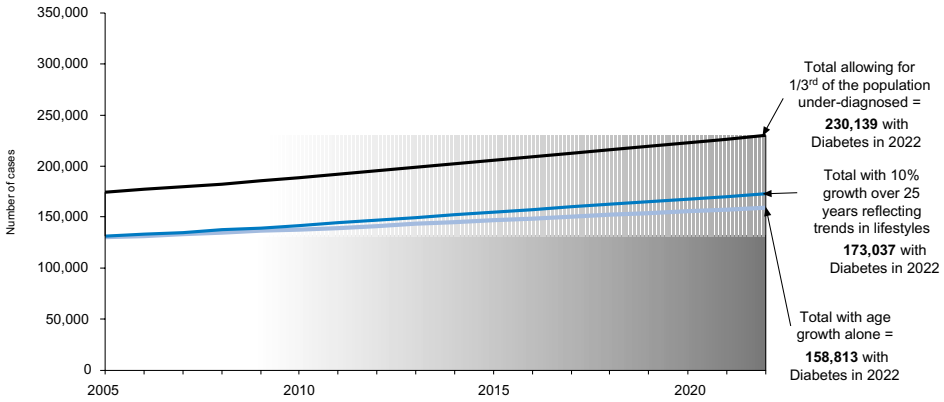
Wales faces a higher prevalence of limiting long term illness than any other part of the UK with the exception of the North East of England. The causes are varied; levels of deprivation, lifestyle and socio-economic factors and perhaps a tendency for health systems to focus on treating rather than preventing illness. In Wales, the Welsh Assembly Government has long supported a focus on Public Health initiatives aimed at prevention and behaviour change and more recently reviewed its health care strategy with the publication of *"Designed for Life"* (National Assembly for Wales, 2005). Central to this strategy is a re-modelling approach to long term conditions based on the delivery of chronic disease management by an extended primary care team including an increased emphasis on early diagnosis, treatment and monitoring.

In this report we highlight the current and future burden of two long term illnesses; Type 2 diabetes and coronary heart disease (CHD). For both diseases we examine the factors that can contribute to the development of disease, such as diet and levels of physical activity, and present data on variations across Local Health Boards. We also look at the burden of these diseases on patients, the health system and the economy and then assess the implications of future growth in prevalence. We illustrate how innovations in treatment coupled with other healthcare and non-healthcare interventions such as patient empowerment and self management, educational campaigns, life-style change and related public health initiatives, can help to manage this disease burden. Although we focus primarily on pharmaceutical innovations we recognise that many other innovations, such as those in medical devices, and how health systems operate (i.e. better administrative co-ordination and joint working) all play an important role in responding to the challenges of the increasing numbers of people with CHD and Type 2 diabetes.

A Growing Disease Burden

Our analysis proves that both of these diseases impose a significant burden on the health system in Wales. Research suggests that the annual health care costs of a patient with Type 2 diabetes are over 6 times higher than the costs for a person without diabetes. The majority of these costs occur in the hospital sector as a result of complications and related diseases. Many complications, and in some cases related diseases, can be reduced through good management. The burden of diabetes will grow. At the moment there are over 112,000 people diagnosed with diabetes in Wales – a prevalence of 3.8 per cent of the population, which is higher than the UK average of 2.3 per cent. An ageing population will contribute to growth in the number of cases, but other factors are important. Poor diet, obesity and lack of physical exercise have the potential to greatly increase this burden. Over the next 20 years the number of people with diabetes could double (Figure 1). The pattern of growth will vary across Local Health Boards, reflecting their different demographic and socio-economic profiles. The economic burden is significant as it is estimated that a patient with diabetes, who develops complications, looses £14,000 per year through an inability to work.

Figure 1 Scenarios on the Impact of Lifestyle Trends and Improvements in Diagnosis on the Number of People with Diabetes, Wales, 2005-2022



Source: NERA calculations using Welsh Health Survey Data 2003/4 for percentage of adults reported being treated for diabetes by age and GAD population forecast

The example of CHD is similar (and indeed closely linked to Type 2 diabetes). The morbidity and mortality impacts of CHD are significant and again patterns vary across Local Health Boards. Whilst mortality from CHD has fallen consistently over the last 50 years, the UK has generally performed badly compared with other Western European countries. Current estimates suggest that just over 120,000 people are treated for CHD in Wales. This represents a significant cost to patients and the health system, and the burden is set to grow. The National Audit Office (NAO) suggests that by 2010 over a quarter of all adults will be obese (increasing the relative risk of angina, a symptom of CHD by around 2%). We estimate that the total economic burden of CHD to Wales is £435 million (in 1999 financial values) .

Managing Disease

Wales is taking a collaborative and multi-disciplinary approach to tackling these disease trends. Guidelines and strategies for managing diabetes and CHD have been set out, including treatment guidance (i.e. All Wales Diabetes Consensus Group) and the formation of cross-disciplinary clinical networks (i.e. Cardiac Networks). Local Health Boards are being assessed against the standards set by the National Service Frameworks for Diabetes (2004) and CHD (2001).

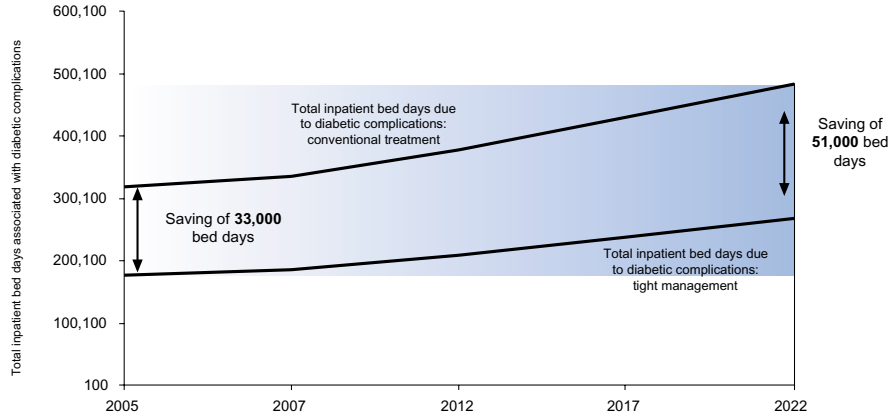
Patient Empowerment

It is recognised in Wales that health information is essential for a fully engaged society in which people understand and take full responsibility for living healthier lives and for decisions about their healthcare. Particularly important in the optimum management of diabetes, for example, is how to interpret changes in the results of self monitoring and how to balance lifestyle changes and medication accordingly. It is reassuring that both centrally and locally funded initiatives promote the importance of education to people with diabetes.

The Importance of Innovation

Innovations in pharmaceuticals and medical devices are playing an important role in managing both diabetes and CHD. There is compelling evidence that by intervening early and providing good management the benefit to patients and the health system are significant. Tight management of those with diabetes has been shown to reduce complications associated with the disease, such as kidney disease and eye disease. Innovations make this management approach much easier and potentially increasingly common. There are more pharmaceutical therapeutic options for managing diabetes, new delivery approaches (no longer relying entirely on injections) and medical device innovation. Together this has improved testing for diabetes and the monitoring of blood glucose levels. Such innovations offer benefits to patients but also bring savings for the health system. We estimate, for example, that tight management of Type 2 diabetes could have saved around 33,000 hospital bed days in Wales in 2005. The additional cost of tightly managing patients would largely have been off-set by savings elsewhere (Figure 2). In addition, there are potential benefits to the economy through reductions in employee sickness absence. We estimate this benefit, in 2005, could have been around £48million (2004 values). Advantages to the carers of people with tightly managed diabetes further increase the scope for overall economic benefit.

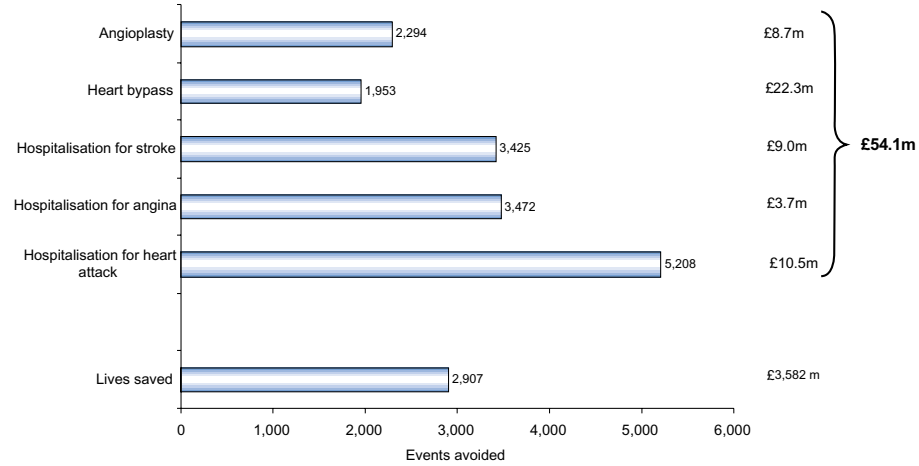
Figure 2 Estimated Inpatient Days with Tight and Conventional Management of Type 2 Diabetes, Wales



Source: NERA calculation using Gray, A., Raikou, M., McGuire, A. et al (2000) Cost effectiveness of an intensive blood glucose control policy in patients with type 2 diabetes: economic analysis alongside randomised controlled trial (UKPDS 41), British Medical Journal, Vol 320 pp1373-78 and

Innovations in medicines to tackle CHD are also likely to bring substantial benefits. Lipid lowering drugs (statins) offer significant benefits to patients and the health sector by reducing the consequences of CHD such as angioplasty, hospitalisation for stroke and heart by-pass operations. We estimate that this could save in the order of 112,000 bed days over 5 years. Figure 3 further illustrates the financial benefits for Wales over a 5-year period. By far the biggest benefit of statins is the lives they save – in Wales this is estimated to be almost 3,000 lives saved over 5 years. We estimate that the economic benefit to Wales of such large reductions in mortality is in excess of £3.5 billion.

Figure 3 Events and Costs Avoided from Statins Over 5 Years, Wales



Source: NERA calculations using HPSCG (2002) data and data on estimated number taking statins in Wales supplied by the ABPI and HRG costs provided to NERA from Welsh Assembly Government (Personal Communication 7.4.06)

Other medicines also bring significant benefits in terms of lives saved. Thrombolytic medicines have significantly improved survival following a heart-attack. These medicines work by breaking down blood clots, and restore blood flow to the heart following a heart attack. Thrombolytics are most effective when delivered within 60 minutes of a heart attack. This can be a challenge, particularly in rural areas.

Future Challenges

An evidence-based approach to tackling chronic disease including the optimal use of new and established medicines is fundamental to the success of *Designed for Life* with its aim of reduced hospital admission and improved health outcomes for the population of Wales.

It is clear that the number of people with CHD and Type 2 diabetes will grow in the future, and correspondingly so too will the costs to patients, the health system and especially the economy if a sub-optimal approach is taken. This reflects an ageing population, but also the lifestyle and diet trends. These trends are a significant challenge to Wales because they are hard to change. Policy makers have recognised the challenge they represent and the need to act. The emphasis is very much on reducing incidence, improving diagnosis and intervening early. Such an approach cuts across health interventions and innovation in medicines and medical devices are already supporting this through better diagnosis, new treatment options and improved management of disease. Variations across Local Health Boards indicate that challenges still remain, but that the scale of costs and consequences of diabetes and CHD outlined in this report emphasise the importance of maintaining and building on the existing positive policy emphasis. To achieve this we suggest an orchestrated and collaborative approach involving all stakeholders.

1 Introduction

Innovation is recognised as a vital part of responding to and managing ill-health in modern health care systems. Innovation can take a variety of forms. It may be a new method for surgery (e.g. coronary artery by-pass grafts, which help to fix blockages in the vessels around the heart), new approaches in delivering health care (e.g. pre-hospital thrombolysis, which helps to prevent blood clots, which can permanently damage the heart after a heart-attack) and new medicines and devices (e.g. statins). These innovations have brought substantial, although varied benefits, including; saving and improving the quality of life of both patients and carers, avoiding hospitalisation, the wider benefits to the economy of fewer sickness absence days and also the more efficient use of health and social service resources.

This report does not undertake a complete review of innovations in health care systems. Rather, it focuses on case studies exemplifying how innovations have led to benefits in responding to and managing CHD and Type 2 Diabetes in Wales. Wales has seen improvements in CHD mortality, however this trend remains above the rest of the UK. Wales needs to continue to respond to this challenge.

This report initially considers the factors which affect health in Wales. It covers both lifestyle factors, relevant to the prevalence and incidence of long term chronic conditions and the wider determinants of health. We then consider specifically the current burden and management of diabetes and CHD whilst also discussing how this impacts on the health economy. Having established the context, we use case studies which highlight improved management in both Type 2 diabetes and CHD through the optimum use of innovative technology and patient education. To conclude we examine the increasing challenge faced by health providers in Wales in terms of the future scale of costs for diabetes and CHD.

2. Health and Health Determinants in Wales

2.1 Health Status in Wales

It has been recognised that the Welsh population suffer from poor health. The Welsh Assembly Government note that:[1]

- Mortality rates in Wales are among the worst in Western Europe
- Death rates from heart disease in Wales, and the UK, are substantially higher than in many Western European countries
- Wales has amongst the highest rates of cancer registrations in Western Europe
- There is consistently poor health in the South Wales valleys – 2000-2002 death rates in Merthyr Tydfil were almost 50 per cent higher than in Ceredigion
- Wales has a much higher percentage of people reporting a long term limiting illness than in England – the highest levels are seen in the South Wales valleys
- Mortality rates from cancers are worse in Wales than in England and Northern Ireland, although better than in Scotland
- In the 2001 census, the percentage of people in Wales reporting that their health was not good was 12 per cent compared to 9 per cent for England, and all Welsh local authorities had rates above the English average

Health is a function of a number of factors which interact in complex ways. The following sections highlight lifestyles in Wales and the wider determinants of health.

2.2 Lifestyle Inequality in Wales

There is a wealth of evidence on the importance of lifestyle for contributing to a fit and healthy population. This is important not only for quality of life but also important for the knock-on benefits for the health system and local economy. There are differences in lifestyle trends across Wales and in comparison to other parts of Great Britain.

Smoking

Smoking is recognised as a major factor in causing CHD. Smoking prevalence is also greater in unskilled and manual social groups compared to those in professional groups. Passive smoking has also been shown to be an important contributor to CHD in adult non-smokers.[2] In Wales there are significant

1 Health Challenge Wales and Welsh Assembly Government (2005) Inequalities in Health: The Welsh Dimension 2002-2005

2 Petersen, S, Peto, V and Rayner, M (2004) *Coronary Heart Disease Statistics: 2004 Edition*, British Heart Foundation Health Promotion Research Group, Department of Public Health, University of Oxford

differences in smoking prevalence. The Isle of Anglesey has the highest proportion of adults who **smoke** (33%) compared to Monmouthshire with the lowest (20%). The average across Wales is 26 per cent. This compares to 26 per cent of men and 23 per cent of women in England and 29 per cent of men and 22 per cent of women in Scotland.[3] There is some evidence of a downward trend in smoking in Wales with 32.5 per cent smoking daily in 1985 compared to 26 per cent in 2003/4.[4]

Alcohol

Alcohol consumption is a cause for concern for a number of impacts on health. Regular heavy alcohol consumption and binge drinking are associated with physical problems, antisocial behaviour, violence, accidents, suicide, injuries and road traffic accidents.[5] Again, there are differences across Wales, with Merthyr Tydfil having the highest proportion of adults who **drink more than recommended limits** (21 units and 14 units a week for men and women respectively) (48%) compared to Ceredigion with the lowest (33%). The average across Wales is 40 per cent.[6] Regional differences are also seen in England, with the proportions consuming more than the recommended daily level of alcohol are lowest in London for men and London and the East of England for women, and highest in the North East for men and Yorkshire and the Humber for women.[7]

Diet

Diet has been recognised as a major factor in the level of CHD, with around 30 per cent of deaths from CHD due to unhealthy diets.[8] Current guidelines suggest that 5 portions of fruit and vegetables should be eaten a day. Ceredigion has the highest proportion of adults who eat **fruit and vegetables** to at least recommended levels (45%) compared to Rhondda, Cynon, Taff with the lowest (33%). The average across Wales is 39 per cent. There is a north-south gradient in both fruit and vegetable consumption. People in Scotland, Wales and the North of England eat considerably less fruit and vegetables than in the South West and London.[9]

3 Steven Allender, Viv Peto, Peter Scarborough, Anna Boxer and Mike Rayner (2006) *Coronary heart disease statistics*. BHF: London

4 Health Survey for Wales 2003/4, Health Promotion Wales

5 The Scottish Health Survey (1998)

6 Health Survey for Wales 2003/4, Health Promotion Wales

7 Steven Allender, Viv Peto, Peter Scarborough, Anna Boxer and Mike Rayner (2006) *Coronary heart disease statistics*. BHF: London

8 Petersen, S, Peto, V and Rayner, M (2004) *Coronary Heart Disease Statistics: 2004 Edition*, British Heart Foundation Health Promotion Research Group, Department of Public Health, University of Oxford

9 Steven Allender, Viv Peto, Peter Scarborough, Anna Boxer and Mike Rayner (2006) *Coronary heart disease statistics*. BHF: London

Physical Activity

Physical activity is an independent risk factor for CHD and has an impact on the majority of other risk factors for CHD. Reducing exercise has been linked to increasing levels of Type 2 diabetes.[10] Those who are relatively inactive have almost twice the risk of CHD than those who are active.[11] Ceredigion has the highest proportion of adults who take **regular exercise** (37%) compared to Wrexham with the lowest (25%). The average across Wales is 29 per cent.

Weight

An increase in Type 2 diabetes has been attributed to increasing levels of obesity amongst children and young people.[12, 13] Recent evidence suggests that the way that excess fat is distributed is of vital importance in risk for CHD. Larger waistlines increase the risk of heart disease (known as central obesity).[14] It has also been shown that children from lower socio-economic groups are more likely to be overweight than children from higher socio-economic groups.[15] Blaenau Gwent has the highest proportion of adults who are **overweight or obese** (59%) compared to Ceredigion with the lowest (47%)[16]. The average across Wales is 54 per cent. There is some evidence that there is an upward trend in the number who are overweight or obese. In 1985, 43.4 per cent classed as overweight or obese rising to 54 per cent in 2003/4. Eighteen per cent of adults in Wales were classified as obese in 2003/4.

We can build on the picture of lifestyle trends seen in different parts of Wales to look at those areas which face the greatest challenges in changing lifestyles by looking at the composite ranking of regions. This is based on all the lifestyle factors (the worst region being ranked 1 and best region ranked 22 and summing the ranks across 5 lifestyle factors[17]). The composite ranking of LHBs is provided in Figure 2.1. This shows that Rhondda, Cynon, Taff, has the greatest challenges in changing lifestyle habits in Wales compared to Ceredigion, which ranks the highest.

10 Scottish Executive (2002) *Scottish Diabetes Framework*

11 Scottish Executive (2002) *Coronary Heart Disease and Stroke: Strategy for Scotland*

12 House of Commons Health Committee (2004) *Obesity. Third report of session 2003-04*, London: The Stationery Office Ltd.

13 Scottish Intercollegiate Guidelines Network (1996) Obesity in Scotland: Integrating Prevention with Weight Management: A National Clinical Guideline Recommended for use in Scotland by SIGN

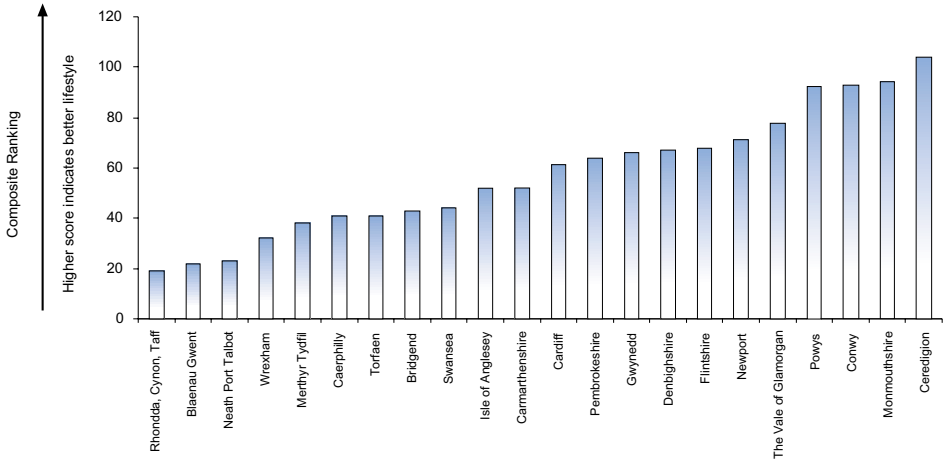
14 Haffner, S M (2006) Abdominal obesity, insulin resistance, and cardiovascular risk in pre-diabetes and type 2 diabetes, European Heart Journal Vol 8 Supp B B20-25

15 Jebb SA, Rennie KL, Cole TJ (2003) Prevalence of overweight and obesity among young people in Great Britain. *Pub Health Nutr*, 7, 461-65

16 Health Survey for Wales 2003/4, Health Promotion Wales

17 These included: smoking, consumption of alcohol above guidelines, consumption of fruit and vegetables meeting guidelines, exercise meeting guidelines and overweight or obese.

Figure 2.1 Composite Lifestyle Ranking, Local Health Boards, 2002/3



Source: NERA calculation based on Welsh Health Survey 2003/4

These rankings have significant implications. Lifestyle factors have been shown to have a direct impact on the likelihood of suffering from both CHD and diabetes. For example:

- Diet has been recognised as a major factor in the level of CHD, with around 30 per cent of deaths from CHD due to unhealthy diets.[18]
- Increased numbers of those with Type 2 diabetes has been attributed to increasing levels of obesity amongst children and young people.[19, 20 21]
- A reduction in exercise is an accepted factor in the increasing prevalence of Type 2 diabetes.[22] Those who are relatively inactive have almost twice the risk of CHD than those who are active.[23]

Research has also highlighted that if trends in physical inactivity, obesity, and diabetes continue there will be an additional 7,000 CHD deaths in 2010 across England and Wales.[24]

18 Petersen, S, Peto, V and Rayner, M (2004) *Coronary Heart Disease Statistics: 2004 Edition*, British Heart Foundation Health Promotion Research Group, Department of Public Health, University of Oxford

19 House of Commons Health Committee (2004) *Obesity. Third report of session 2003-04*, London: The Stationery Office Ltd.

20 Scottish Intercollegiate Guidelines Network (1996) Obesity in Scotland: Integrating Prevention with Weight Management: A National Clinical Guideline Recommended for use in Scotland by SIGN

21 Recent evidence suggests that the way that excess fat is distributed is of vital importance in risk for CHD. Larger waistlines increase the risk of heart disease. Haffner, S M (2006) Abdominal obesity, insulin resistance, and cardiovascular risk in pre-diabetes and type 2 diabetes, European Heart Journal Vol 8 Supp B B20-25

22 Scottish Executive (2002) *Scottish Diabetes Framework*

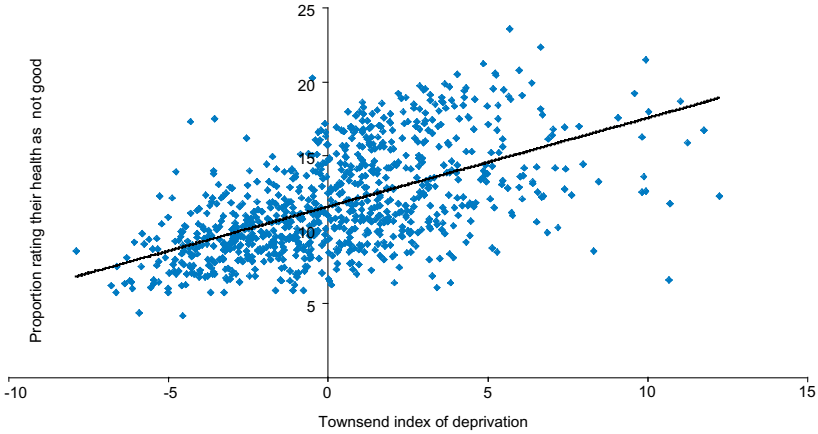
23 Scottish Executive (2002) *Coronary Heart Disease and Stroke: Strategy for Scotland*

24 Unal et al (2005) Small Changes in United Kingdom cardiovascular risk factors could halve coronary heart disease mortality Journal of Clinical Epidemiology 58 733-740

2.3 Wider Determinants of Health

A variety of factors impact on health beyond the lifestyle factors highlighted above. There is a well recognised relationship between deprivation and health.[25] Figure 2.2 illustrates the proportion of respondents by electoral division in Wales rating their health as 'not good' to the Townsend index for deprivation. The Townsend index is based upon the percentage of households with no car; percentage of households not owner occupied; percentage of people who are unemployed; and the percentage of households overcrowded.

Figure 2.2 Self-Reported Poor Health and Deprivation, Wales, 2001

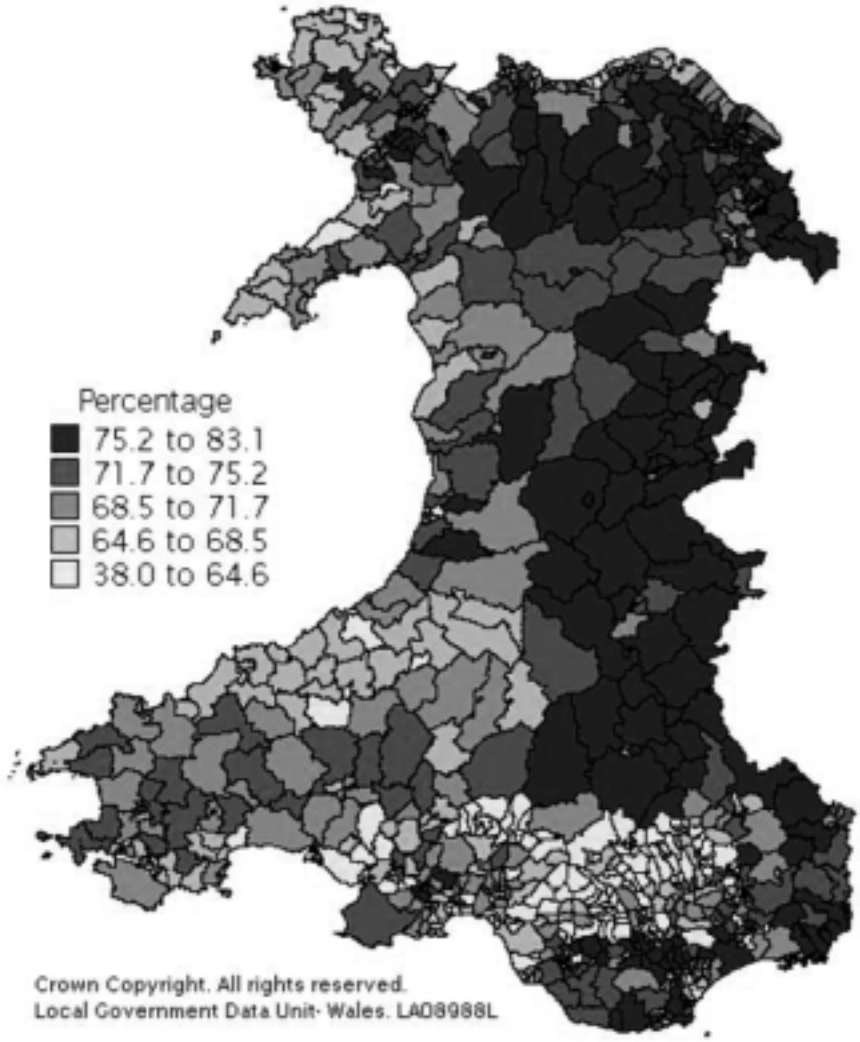


Source: National Public Health Service for Wales (2004) Deprivation and Health

There are important differences across Wales for wider determinants of health. Figure 2.3 illustrates the proportion of the working age population who are economically active by electoral division in Wales. There are marked differences across Wales with the highest proportions working in Powys, Wrexham, Conwy, Denbighshire, areas of Monmouthshire and the Vale of Glamorgan. The smallest proportions working are in South Wales Valley area, Ceredigion, Swansea, parts of Gwynedd, Carmarthenshire, the coast of Flintshire and Anglesey.

25 National Public Health Service for Wales (2004) Deprivation and Health.

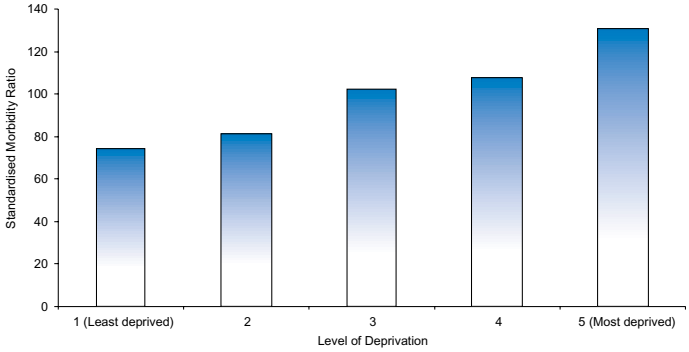
Figure 2.3 Working Age Population who are Economically Active, Electoral Divisions, 2001



Source: Local Government Data Unit and Wales Centre for Health (August 2005) A Report on Economic Activity in Wales Based on the Results of the 2001 Census

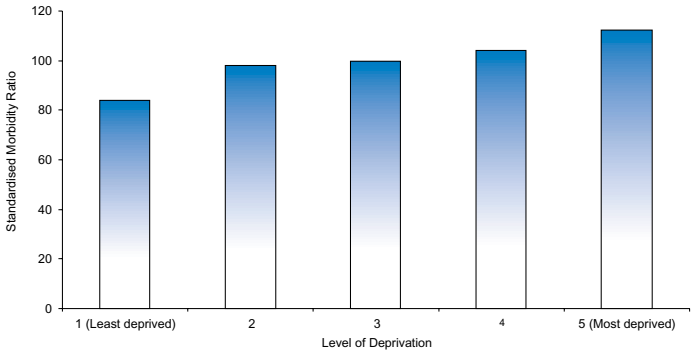
Heart disease and diabetes increase with deprivation in Wales. For example, for diabetes the Standardised Mortality Rate rises from 81 in the least deprived areas to 131 in the most deprived areas. Figure 2.4 and Figure 2.5 illustrate the increase in both diseases as deprivation increases.

Figure 2.4 Deprivation and Diabetes, Wales, 1998



Source: National Public Health Service for Wales (2004) Deprivation and Health. Notes: Figures related to people over 18, 1998

Figure 2.5 Deprivation and Heart Disease, Wales, 1998



Source: National Public Health Service for Wales (2004) Deprivation and Health. Notes: Figures related to people over 18, 1998

3. Diabetes in Wales

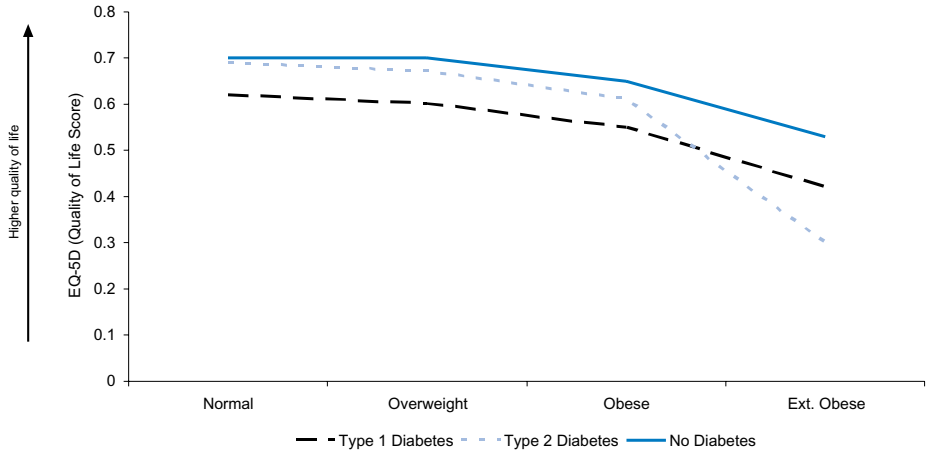
3.1 Defining Diabetes

Diabetes mellitus is a chronic condition characterised by high levels of glucose (sugar) in the blood. Diabetes occurs when the body is not able to produce enough insulin to process glucose properly. Type 1 diabetes develops if the body is unable to produce insulin, and usually appears before the age of 40.[26] This type of diabetes is treated by managed insulin replacement in conjunction with a healthy lifestyle and a balanced diet. Type 2 diabetes usually develops later in life and occurs when the body isn't able to make enough insulin or becomes resistant to insulin (and can not use the insulin produced properly). A person's lifestyle has a major influence on whether or not they develop the disease and how quickly. Making changes to these habits is a vital part of preventing and managing the disease. Type 2 diabetes is much more common than Type 1 diabetes and accounts for 90 per cent of all diagnosed cases of diabetes in the UK.[27]

3.2 Patient Impact of Diabetes

Diabetes impacts on the quality of life of those with the condition. A comparison of those with Type 1 and Type 2 diabetes, and with those without diabetes in Wales, shows that those without diabetes have higher quality of life. Quality of life falls for all these groups as their level of obesity rises (Figure 3.1).

Figure 3.1 Quality of Life of People with Type 1 and Type 2 Diabetes and Those Without Diabetes, Wales, 2002/2004



Source: Approximated from Lee, A J et al (2005) Evaluation of the Association between EQ-5D Index (health related utility) and Body Mass Index (obesity) in Hospital-treated People with Type 1 Diabetes, Type 2 Diabetes and with No Diagnosed Diabetes Diabetic Medicine 22: 1482-1486

26 Diabetes UK, http://www.diabetes.org.uk/diabetes/under.htm

27 ABPI (2006) Target Diabetes

Complications from diabetes can occur, even for those whose diabetes is initially well controlled. People with diabetes are more likely to develop complications after many years of living with diabetes, as hyperglycaemia tends to worsen over time. This can cause damage to the cells lining the blood vessels, cells in the kidney, and peripheral nerve cells. Complications include damage to small blood vessels (termed microvascular disease). When this damage occurs in the retina of the eye, it can impair or destroy sight (known as retinopathy).

When damage occurs in the kidneys, it affects their ability to filter the blood (nephropathy) and results in chronic pain or loss of sensation (neuropathy). Damage to the cells lining the large blood vessels (known as macrovascular disease) can give rise to heart attacks and strokes as well as circulatory problems (peripheral vascular disease (PVD)).[28]

Table 3.1 illustrates the incidence of complications in those with Type 1 and Type 2 diabetes.

Table 3.1 Complications of Type 1 and Type 2 Diabetes

Complication (incidence/year/1,000 persons)	Type 1 Diabetes	Type 2 Diabetes
Angina	8.8	38.4
Heart Attack	8.6	21.9
Stroke	1.1	14.2
Amputation (lower limb)	3.2	3.1
PVD	5.5	13.6
Blindness	1.1	1.6
ESRD	6.4	5.0
Deaths	**14.6**	**50.0**

Source: ABPI (2006) Target Diabetes

Evidence suggests that quality of life is lower and falls further as complications increase.[29,30]

28 ABPI (2006) Target Diabetes

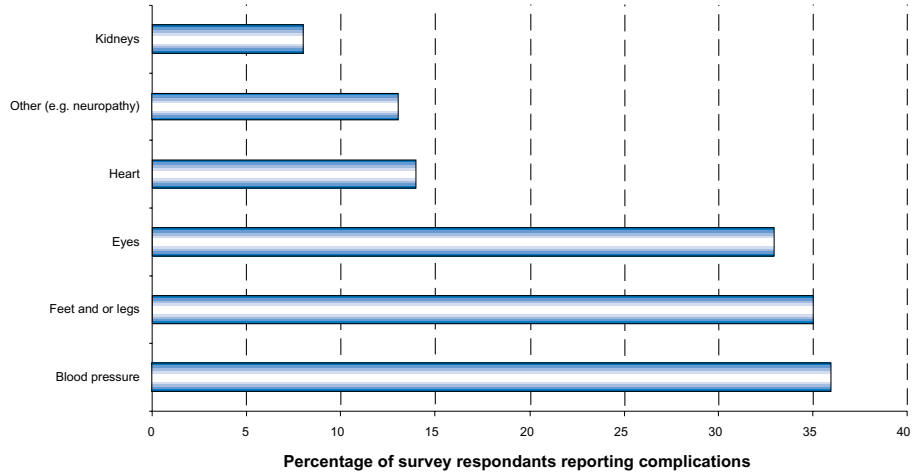
29 Goldney, R.D., Phillips, P.J., Fisher, L.J., and Wilson, D.H. (2004) "Diabetes, Depression, and Quality of Life", *Diabetes Care*, Vol 27 pp1066-1070

30 Jacobson, A.M., and De Groot, D.Q. (1994) "The Evaluation of two Measures of Quality of Life in Patients with Type 1 and Type 2 Diabetes", *Diabetes Care*, Vol 17 pp267-274

Incidence of complications can be high, over a third of patients with diabetes in Wales report high blood pressure. Other complications reported by Welsh patients with diabetes are highlighted in Figure 3.2.

Some of these complications can be avoided through screening, for example screening for retinopathy. Others can be avoided through tight management, which we discuss in more detail later in this report.

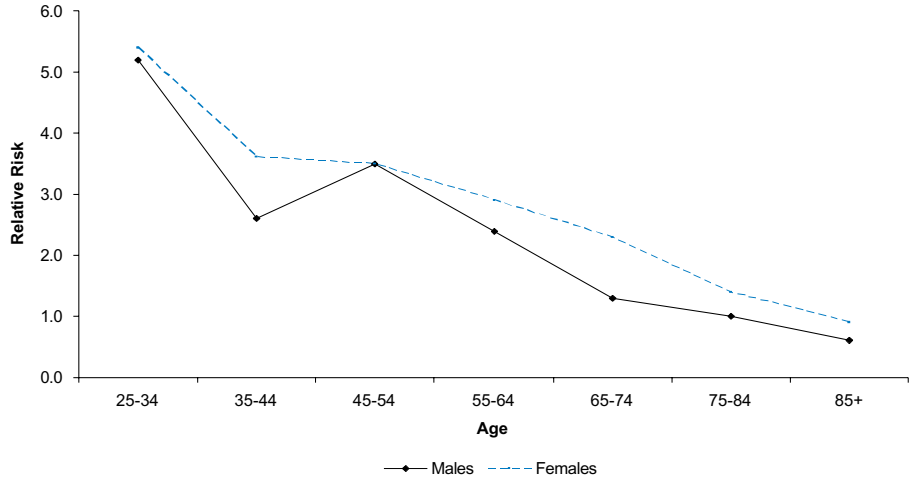
Figure 3.2 Incidence of Complications, Welsh Patients with Diabetes, 2003



Source: Audit Commission in Wales (2003) Diabetes Services in Wales: A Baseline Review of Services

These complications increase the risk of mortality for those with diabetes (Figure 3.3). This is particularly the case for young people with diabetes.

Figure 3.3 Relative Risk of Mortality for Those With Diabetes by Age, South Glamorgan, 1996



Source: Morgan et al (2000) *Relationship between Diabetes and Mortality Diabetes Care, Volume 23, Number 8,* pp 1103-1107

Diabetes can also impact on the carers of those with diabetes. We evaluate the cost to carers later in this report.

3.3 Burden of Diabetes

Estimates of the number of people in Wales with diabetes vary from 75,000[31] to 118,000.[32] Diabetes UK suggests that there are 13,000 people with Type 1 diabetes, and 104,000 with Type 2 diabetes in Wales.[33] It is mainly young people who develop Type 1 diabetes, although there has been an increase in the number of young people who are being diagnosed with Type 2 diabetes.

The latest information built up from disease registers in each Local Health Board suggests that 112,000 people have treated diabetes in Wales.[34] Table 3.2 and Figure 3.4 illustrates our estimates for each Local Health Board. The boards with the highest numbers of treated patients with diabetes include Swansea, Cardiff and Rhondda, Cynon, Taff (reflecting higher populations in these regions in addition to their prevalence rates).

31 National Assembly of Wales (2003) National Service Framework for Diabetes (Wales) Standards

32 Diabetes UK Cymru, http://www.diabetes.org.uk/cymru/English/inwales/splash.htm

33 Diabetes UK in partnership with the All-Parliamentary Group for Diabetes and supported by the Hansard Society (2005) Diabetes: State of the Nations 2005: Progress Made in Delivering the National Diabetes Frameworks

34 NERA calculation based on Statistical Bulletin: Disease Prevalence in Wales: General Medical Services Quality and Outcomes Framework SB 38/2005 15 June 2005 and Welsh

Data from the diabetes register built up as part of the Quality and Outcomes Framework (QoF) of the General Medical Services (GMS) contract is relatively new. Data from the 2004/5 QoF suggested an all Wales prevalence of 3.84 per cent, data from the 2005/6 QoF suggests that it is a little higher at 4.1 per cent.[35]

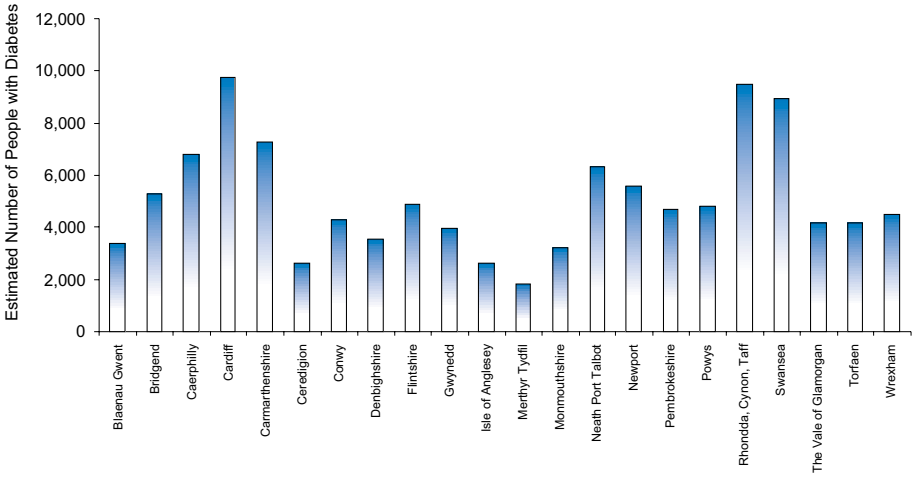
Table 3.2 Estimated Number of People Treated for Diabetes, Local Health Boards, 2005

	% with Diabetes	Population	No. with Diabetes
Blaenau Gwent	4.8%	70,064	3,363
Bridgend	4.1%	128,645	5,274
Caerphilly	4.0%	169,519	6,781
Cardiff	3.2%	305,353	9,771
Carmarthenshire	4.2%	172,842	7,259
Ceredigion	3.5%	74,941	2,623
Conwy	3.9%	109,596	4,274
Denbighshire	3.8%	93,065	3,536
Flintshire	3.3%	148,594	4,904
Gwynedd	3.4%	116,843	3,973
Isle of Anglesey	3.9%	66,829	2,606
Merthyr Tydfil	3.3%	55,981	1,847
Monmouthshire	3.8%	84,885	3,226
Neath Port Talbot	4.7%	134,468	6,320
Newport	4.1%	137,011	5,617
Pembrokeshire	4.1%	114,131	4,679
Powys	3.8%	126,354	4,801
Rhondda, Cynon, Taff	4.1%	231,946	9,510
Swansea	4.0%	223,301	8,932
The Vale of Glamorgan	3.5%	119,292	4,175
Torfaen	4.6%	90,949	4,184
Wrexham	3.5%	128,476	4,497
Wales	3.8%	2,903,085	112,154

Source: NERA calculation based on Statistical Bulletin: Disease Prevalence in Wales: General Medical Services and Quality and Outcomes Framework and Digest of Welsh Local Area Statistics 2004

35 GMS Contract Quality and Outcomes Framework Disease Prevalence 2004/5 and 2005/6 http://www.wales.nhs.uk/sites3/page.cfm?orgid=480&pid=6063

Figure 3.4 Estimated Number of People Treated for Diabetes, Local Health Boards, 2005



Source: NERA calculation based on Statistical Bulletin: Disease Prevalence in Wales: General Medical Services Quality and Outcomes Framework SB 38/2005 15 June 2005 and Digest of Welsh Local Area Statistics 2004

We have compared the prevalence rates based on the diabetes register to those derived from the Welsh Health Survey in Table 3.3. This comparison needs to be undertaken with care as the self-reporting nature of the Survey could lead to some differences in reporting. There are differences in the prevalence rates that suggest the diabetes register may currently be slightly undercounting those with diabetes. This should improve over time as more patients are identified and data recording is validated.

Table 3.3 Percentage of Adults with Diabetes, A Comparison of Diabetes Register and Welsh Health Survey

Local Authority/ Local Health Board	Diabetes Register	Welsh Health Survey	Difference
Blaenau Gwent	4.8	6	-1.2
Bridgend	4.1	6	-1.9
Caerphilly	4	5	-1
Cardiff	3.2	6	-2.8
Carmarthenshire	4.2	5	-0.8
Ceredigion	3.5	5	-1.5
Conwy	3.9	5	-1.1
Denbighshire	3.8	6	-2.2
Flintshire	3.3	6	-2.7
Gwynedd	3.4	3	0.4
Isle of Anglesey	3.9	6	-2.1
Merthyr Tydfil	3.3	6	-2.7
Monmouthshire	3.8	4	-0.2
Neath Port Talbot	4.7	6	-1.3
Newport	4.1	7	-2.9
Pembrokeshire	4.1	4	0.1
Powys	3.8	4	-0.2
Rhondda, Cynon, Taff	4.1	5	-0.9
Swansea	4	5	-1
The Vale of Glamorgan	3.5	5	-1.5
Torfaen	4.6	5	-0.4
Wrexham	3.5	5	-1.5
Wales	**3.8**	**5**	**-1.2**

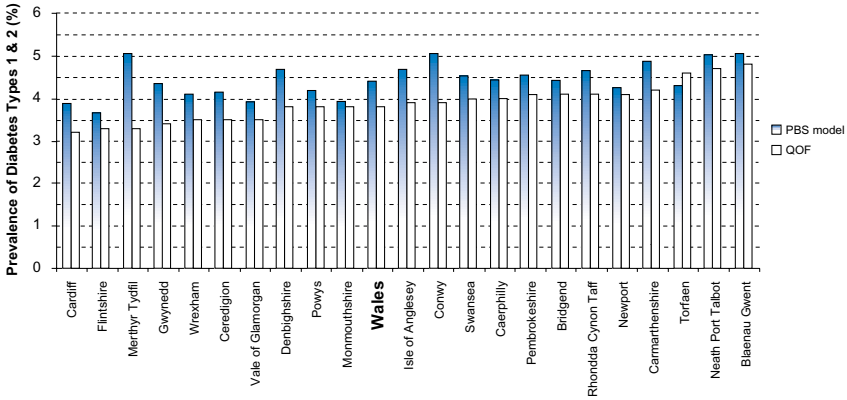
Source: Statistical Bulletin: Disease Prevalence in Wales: General Medical Services Quality and Outcomes Framework SB 38/2005 15 June 2005 and Welsh Health Survey 2003/04

Comparisons of the QoF data have also been made to the PBS model, a spreadsheet model that generates expected total numbers of people with Type 1 and Type 2 diabetes. The model draws on prevalence data for different age and ethnic groups and predicts the expected number of cases including both diagnosed and undiagnosed cases.[36] Figure 3.5 and Figure 3.6 illustrate the prevalence rates for QoF compared to those from the PBS model applied to Wales. There remain gaps between the two measures of prevalence which suggests that there are undiagnosed cases in Wales, although the scale of the likely number who are not diagnosed is lower than was anticipated.[37]

36 http://www.yhpho.org.uk/PBS_diabetes.aspx

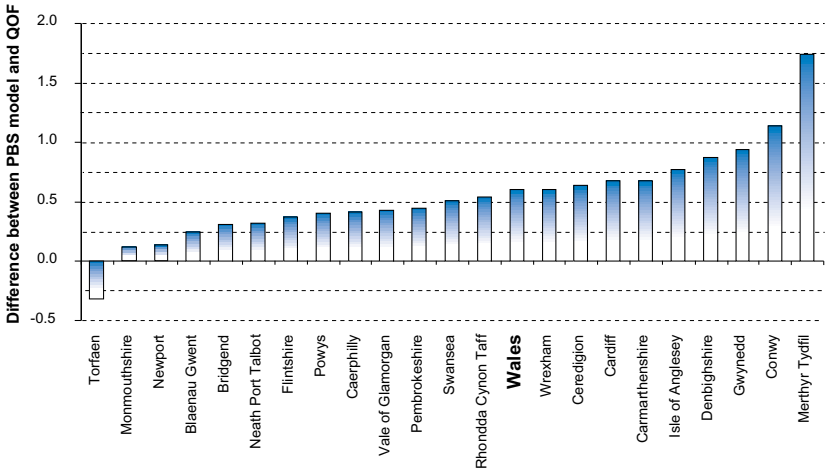
37 National Public Health Service for Wales, personal communication to NERA, (12.6.06)

Figure 3.5 Comparison of QoF and Expected Prevalence Rates



Source: National Public Health Service Health Information Analysis Team

Figure 3.6 Difference in Prevalence Rates from QoF and Expected Prevalence Rates



Source: National Public Health Service Health Information Analysis Team

3.4 The Role of Medicines and Managing Diabetes

Diabetes is treated with medicines that:[38]

- Replace insulin which is missing;
- Increase insulin production by the pancreas;
- Improve sensitivity to insulin; and
- Prevent or ameliorate the development of complications by reducing other risk factors (such as high blood pressure) or harmful biochemical changes.

The first standardised pharmaceutical treatment for the diabetes became available in 1922, with the manufacture of insulin. The first insulins, derived from beef or pig pancreas, were relatively short acting and needed to be injected into muscle 2 to 4 times a day.[39]

The first human insulin was introduced in 1982 by Novo under the medical directorship of Professor David Owens CBE, now based at Llandough Hospital, Cardiff. Subsequently, re-combinant methods have been used to prepare other modified human insulins with specific properties, and human insulins now dominate the treatment of Type 1 and Type 2 diabetes.40

In Type 2 diabetes, the use of medicines must be considered as additional to, rather than replacing lifestyle changes. There are 5 established classes of oral medicines authorised in the UK for the treatment of hyperglycaemia:[41]

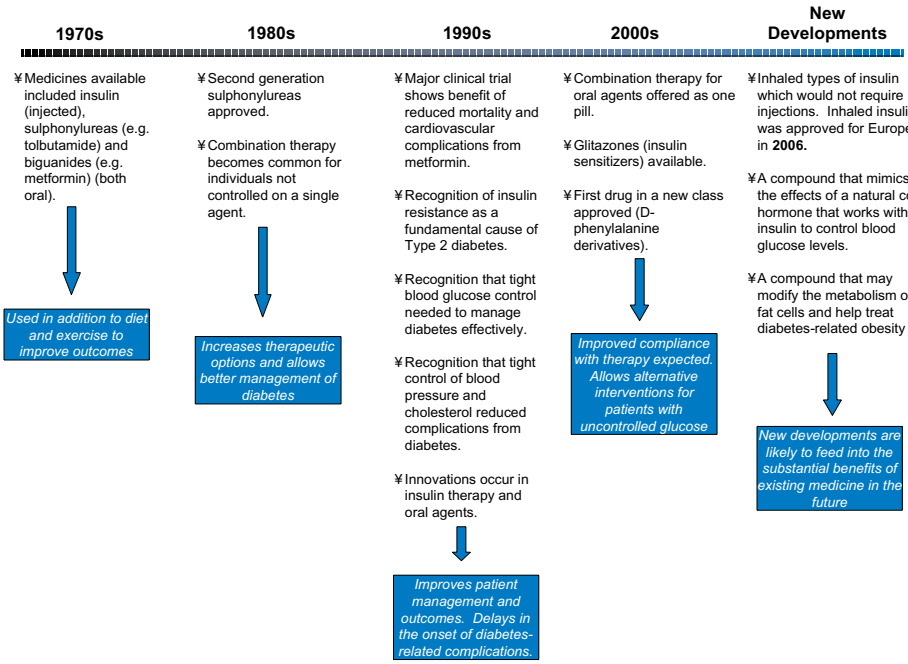
- Metformin;
- Sulphonylureas;
- Meglitinides;
- Glitazones; and
- Arcarbose.

There have been ongoing series of innovations in the available treatments bringing benefits for patients and for the health system, particularly in terms of reducing complications and enabling tight management which uses medicines and lifestyle changes to keep HbA1c levels below 7 per cent. Figure 3.7 illustrates innovations and the benefits of medicines to manage diabetes. A recent breakthrough has been the successful development of an inhaled insulin, which was licensed by the EMEA for use in Europe in January 2006. Whilst this does not mean that all insulin injections can be avoided, and it is not necessarily suitable for all those with diabetes, it has been welcomed as a step forward in treating insulin by Diabetes UK.[42]

38 ABPI (2006) Target Diabetes
39 ABPI (2006) Target Diabetes
40 ABPI (2006) Target Diabetes
41 ABPI (2006) Target Diabetes
42 http://www.diabetes.org.uk/onlinenews/NewsStory.asp?id=1102

It is also important to note that people with diabetes also benefit from medicines that are developed for CHD because there is a strong link between the two diseases. Box 1 highlights benefits from tight management of blood pressure and cholesterol. Recent meta-analysis has found that lipid lowering medicines (especially statins) significantly reduce cardiovascular risk in those with and without diabetes, and that those with diabetes may benefit more in terms of both primary and secondary prevention of cardiovascular disease.[43] We discuss the benefits of medicines for CHD in the third section of this report.

Figure 3.7 Innovations and Benefits of Medicines to Manage Diabetes



Source: The Value of Investment in Health Care: Better Care, Better Lives, MEDTAP International (2004) UKPDS 34 and ABPI; PhRMA (2003) Diabetes and Pharmaceutical Spending: New Treatments, New Solutions and http://www.pfizer.com/pfizer/are/news_releases/2006pr/mn_2006_0127a.jsp Updated version of figure published in NERA (2004) The Human and Economic Value of Pharmaceutical Innovation and Opportunities for the NHS

[43] Costa, J et al (2006) Efficacy of lipid lowering drug treatment for diabetic and non-diabetic patients: meta-analysis of randomised controlled trials, British Medical Journal Vol 332 pp1115-1118

Box 1 Benefits of Medicines to Treat CHD for People with Diabetes

Tight control of blood pressure leads to:

- 24% decline in diabetes related outcomes
- 32% reduction in mortality risk from diseases increased by diabetes
- 37% reduction in combined occurrence of eye disease (diabetic retinopathy, neuropathy and nephropathy)
- 37% reduction in the occurrence of any diabetes related complication
- 44% reduction in strokes
- 56% reduction in heart failure
- 6 patients need to be treated over 10 years to avoid developing any complication

Cholesterol lowering with statins leads to:

- 37% reduction in major cardiovascular disease events
- 48% reduction in strokes
- 27% reduction in all cause mortality
- 25% reduction in the risk of coronary events (including heart attacks)
- 23% reduction in the risk of bypass operation

Sources: Testa MA & Simonson DC (1998) Health economic benefits and quality of life during improved glycaemic control in patients with Type 2 diabetes mellitus: A randomised controlled, double blind trial, JAMA; 280 (17): 1490-1496; UKPDS (1998a) Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38, British Medical Journal; 317: 703-713; UKPDS (1998b) Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33), The Lancet; 352 (9131): 837-853; Collaborative Atorvastatin Diabetes Study Investigators (2004) Primary prevention of cardiovascular disease with atorvastatin in type 2 diabetes in the Collaborative Atorvastatin Diabetes Study (CARDS): multicentre randomised placebo-controlled trial, The Lancet, Vol. 364, Issue 9435, pg. 685

Other approaches, such as making changes to food intake/composition and exercise, are vitally important and must be undertaken in conjunction with medicines. Such lifestyle changes can be as beneficial as medicines, but may be difficult to sustain in the long term, as they require permanent changes to daily habits. However exercise in particular can have dramatic effects in improving insulin sensitivity, and reducing obesity and changing eating habits can both reduce obesity and the extremes of blood sugar variations that may be damaging in diabetes.[44]

44 ABPI (2006) Target Diabetes

3.5 The Importance of Tight Management

Tight management of diabetes, where the aim is to keep HbA1c levels within the range 6.5 to 7.5, can be achieved through the use of insulin or insulin stimulating medicines. Tight management has been shown in research to help reduce the impact, or delay the occurrence of, diabetic complications. This is recognised in the Welsh National Service Framework for Diabetes.[45] Box 2 highlights some of the benefits of tight management.

Box 2 The Benefits of Tight Management of Type 2 Diabetes

Tight control of blood glucose levels leads to:
- 12% reduction in the risk of any diabetes-related outcomes (e.g. heart attack, heart failure, stroke, amputation, death)
- Much of this is due to a 25% reduction in microvascular outcomes
- Reduction in time to first adverse event (mean gain of 1.14 years)
- Reduction in costs associated with complications

Tight management of diabetes leads to:
- Improvements in quality of life
- Positive impact on employment, absenteeism, productivity, bed days and days of restricted activity. For example, 97% of patients receiving medicines were employed compared to 85% in the group not receiving medicines

Sources: Testa MA & Simonson DC (1998) Health economic benefits and quality of life during improved glycaemic control in patients with Type 2 diabetes mellitus: A randomised controlled, double blind trial, JAMA; 280 (17): 1490-1496; UKPDS (1998a) Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38, British Medical Journal; 317: 703-713; UKPDS (1998b) Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33), The Lancet; 352 (9131): 837-853

The United Kingdom Prospective Diabetes Study (UKPDS) looked at the impact of more intensive blood glucose control policy, including the use of metformin, and found that tight management led to:[46]

- A reduction in the relative risk of any diabetes-related endpoint by 12 per cent;
- A reduction of microvascular complications by 25 per cent in newly diagnosed patients with diabetes;
- The cost per year free of complications is less than £1,200;
- Tighter blood pressure control (aiming at a blood pressure of less than 150/85 mmHg in hypertensive patients with Type 2 diabetes) reduced diabetes-related endpoints by 24 per cent;
- A reduction in deaths related to diabetes by 32 per cent;
- The cost per life year gained was approximately £720; and

45 National Assembly of Wales (2003) National Service Framework for Diabetes (Wales) Standards

46 Clarke, P M et al (2005) Cost-utility Analyses of Intensive Blood Glucose and Tight Blood Pressure Control in Type 2 Diabetes (UKPDS 72) Diabetologia 48 pp 868-877

- The use of metformin for more intensive blood glucose control in overweight patients led to a 32 per cent relative risk reduction for any diabetes-related endpoint and a 42 per cent risk reduction for diabetes-related deaths.

In addition to benefits for the individual, tight management also brings benefits for the health system resulting in lower levels of complications. The UKPDS has shown that tight management can help to reduce/delay the onset of diabetic complications.[47, 48, 49] Whilst this can increase the immediate cost of managing diabetes in primary care it can lower the later costs of treating complications. Complications often involve hospitalisation which is costly compared to primary care. Research suggests that these higher primary care costs are almost cancelled out by lower hospital care resulting from fewer complications.[50]

Recent studies have highlighted the positive impact of tighter cholesterol treatment for patients with diabetes.[51, 52, 53] These studies have influenced the Joint British Societies' guidelines (JBS 2) on prevention of cardiovascular disease in clinical practice, published in December 2005.[54]

The JBS 2 guidelines focus on the prevention of fatal and non fatal atherosclerotic[55] cardiovascular events. Prevention of events can be achieved through life style and risk factor intervention (using targets) and appropriate therapy with medicines. The JBS 2 guidelines again highlight that patients with diabetes are at high risk of cardiovascular disease. Targets for those with diabetes include:

- Blood Glucose;
- Fasting Glucose less than or equal to 6mmol/L;
- Cholesterol:
  - Total cholesterol less than or equal to 4mmol/L; and

47 UKPDS, (1998) Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38, *British Medical Journal;* Vol 317 pp 703-713

48 UKPDS (1998) Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33), The Lancet; 352 (9131): 837-853

49 UKPDS (1998) Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes (UKPDS 34), The Lancet, 1998; 352: 854-865

50 Gray, A., Raikou, M., McGuire, A. et al (2000) Cost effectiveness of an intensive blood glucose control policy in patients with type 2 diabetes: economic analysis alongside randomised controlled trial (UKPDS 41), *British Medical Journal,* Vol 320 pp1373-78

51 Heart Protection Study Collaborative Group. MCR/BHF heart protection study of cholesterol lowering with Simvastatin in 20,536 high risk individuals: a randomised placebo-controlled trial. Lancet 2002;360:7-22.

52 Sever PS, Daahlof B, Poulter NR, et al. Prevention of coronary and stroke events with atorvastatin in hypertensive people who have average or lower-than-average cholesterol concentrations, in Anglo-Scandinavian cardiac outcomes trial-lipid lowering arm (ASCOT-LLA): a multicentre randomised controlled trial. Lancet 2003;361:1149-58

53 Colhoun H, Betteridge D, Durrington P, et al on behalf of cards investigators. Primary prevention of cardiovascular disease with atorvastatin in type 2 diabetics in the collaborative atorvastatin diabetes study (CARDS): multicentre randomised placebo controlled trial. Lancet 2004;364:685-96, www.CARDs.org.uk

54 JBS 2: Joint British Societies' Guidelines on Prevention of Cardiovascular Disease in Clinical Practice. Published in Heart. December 2005 Volume 91 Supplement V

55 The build up of fatty material and cellular debris (atheroma) inside blood vessels that can restrict blood flow in the heart

  - LDL Cholesterol less that or equal to 2mmol/L; or
  - 25 per cent reduction in total cholesterol and 30 per cent reduction in LDL cholesterol whichever gets to the lowest cholesterol level.
- Blood pressure:
  - 140 mm HG systolic and 85 mm HG diastolic;
  - People with established diabetes < 130 mm Hg systolic; and
  - <80 mm Hg diastolic.

The costs of tight management compared to conventional care (primarily diet) in Wales are outlined in Table 3.4. We are not aware of any data to show the number of patients who are tightly managed in Wales and so we have shown the costs if all patients are tightly managed compared to the costs if patients receive only conventional treatment. It is estimated that the number of patients currently receiving tight management of blood glucose levels in the UK is very small, at between 100,000 and 150,000 people compared to the 1.4 million across the UK who are diagnosed with diabetes.[56] This number suggests there is scope to increase the number of patients who have their diabetes tightly managed in the UK as a whole. It is however reassuring that very high proportions of those with diabetes are receiving HbA1c tests across the UK as a whole, but there is still scope to improve on achievement of the target of 7.4 for HbA1c (Figure 3.8).

Our estimates suggest that if all those with Type 2 diabetes were tightly managed this could lead to £21 million extra spent on primary care but save £14 million in hospital care from avoidance of complications.

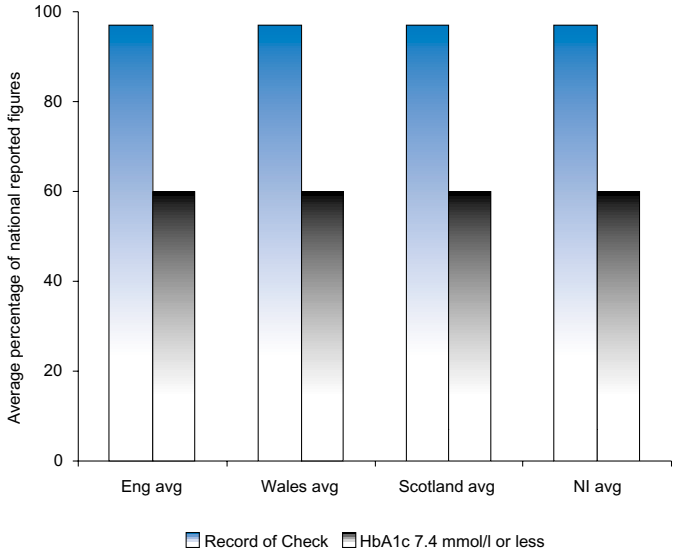
56 Diabetes UK (April 2004) personal communication to NERA

Table 3.4 Estimated Costs of Managing the Population with Type 2 Diabetes with Conventional or Intensive Medicine Treatment in Wales (2001/2 Prices)

	2005	2007	2012	2017	2022
Projected no. of Type 2 diabetes patients (000s)	132	138	154	174	194
Total primary care costs:					
Intensive medicine treatment (£m)	45	47	53	60	68
Conventional treatment (£m)	24	25	28	32	36
Change in primary care expenditure (£m)	+21	+22	+25	+28	+31
Total hospital costs (incl. complications):					
Intensive medicine treatment (£m)	76	79	90	102	115
Conventional treatment (£m)	90	94	106	121	136
Change in hospital expenditure (£m)	14	14	16	19	21
Total change in expenditure (£m)	-7	-7	-8	-9	-10

Source: NERA calculations combining cost data from Gray A, Raikou M McGuire A et al (2000) Cost effectiveness of an intensive blood glucose control policy in patients with type 2 diabetes: economic analysis alongside randomised controlled trial (UKPDS 41), British Medical Journal, 2000Vol 320 pp 1373-78 with NERA projections for numbers of diabetes sufferers in the future

Figure 3.8 National Average Proportions of Patients with Diabetes Tested for HbA1c and Achievement of Target



Source: Diabetes UK in partnership with the All-Parliamentary Group for Diabetes and supported by the Hansard Society (2005) Diabetes: State of the Nations 2005: Progress Made in Delivering the National Diabetes Frameworks
Note: Exceptions excluded from the determinator

It has been estimated that tight management is cost effective compared to conventional treatment because there is a high probability that the cost of tight management will balance out the reduced cost of complications.[57] [58] There is a high likelihood that metformin could lead to cost savings compared to conventional treatment.[59]

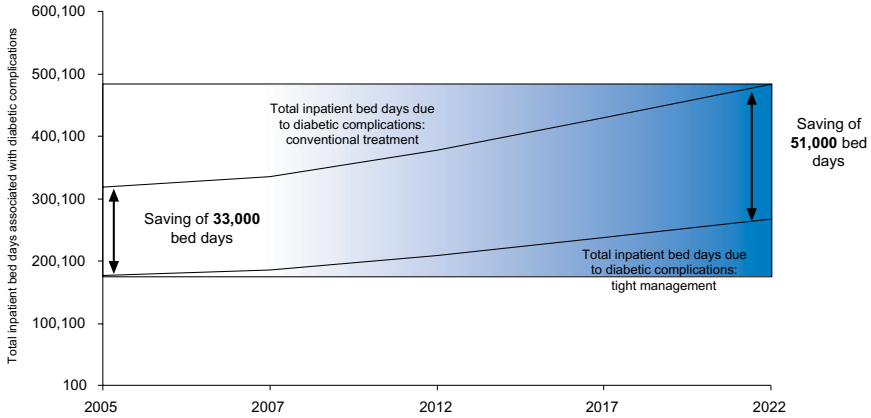
We can also estimate the impact of tight management on freeing up hospital resources in Wales. We have estimated the number and length of hospitalisations under two scenarios, all of those with Type 2 diabetes being under conventional treatment and all under tight management. Figure 3.9 illustrates our estimates. This suggests that as many as 51,000 bed days could be saved in 2022.

57 Gray A, Raikou M McGuire A et al (2000) Cost effectiveness of an intensive blood glucose control policy in patients with type 2 diabetes: economic analysis alongside randomised controlled trial (UKPDS 41), British Medical Journal, 2000Vol 320 pp 1373-78

58 Clarke, P M et al (2005) Cost-utility Analyses of Intensive Blood Glucose and Tight Blood Pressure Control in Type 2 Diabetes (UKPDS 72) Diabetologia 48 pp 868-877

59 Clarke, P M et al (2005) Cost-utility Analyses of Intensive Blood Glucose and Tight Blood Pressure Control in Type 2 Diabetes (UKPDS 72) Diabetologia 48 pp 868-877

Figure 3.9 Estimated Inpatient Days with Tight and Conventional Management of Type 2 Diabetes, Wales



Source: NERA calculation using Gray, A., Raikou, M., McGuire, A. et al (2000) Cost effectiveness of an intensive blood glucose control policy in patients with type 2 diabetes: economic analysis alongside randomised controlled trial (UKPDS 41), British Medical Journal, Vol 320 pp1373-78 and Welsh Health Survey Data 2003/4 for percentage of adults reported being treated for diabetes by age and GAD population forecast

3.5.1 Welsh Guidance on Managing Diabetes

Wales has its own National Service Framework (NSF) for diabetes. It sets out a clear set of standards for managing diabetes ranging from prevention to effective management. Box 3 outlines the standards included in the NSF.

Box 3 National Service Framework Standards for Diabetes

Prevention of Type 2 diabetes	Standard 1 The NHS will develop, implement and monitor strategies to reduce the risk of developing Type 2 diabetes in the population as a whole and to reduce the inequalities in the risk of developing Type 2 diabetes.
Identification of people with diabetes	Standard 2 The NHS will develop, implement and monitor strategies to identify people who do not know they have diabetes.
Empowering people with diabetes	Standard 3 All children, young people and adults with diabetes will receive a service which encourages partnership in decision-making, supports them in managing their diabetes and helps them to adopt and maintain a healthy lifestyle. This will be reflected in an agreed and shared care plan in an appropriate format and language. Where appropriate, parents and carers should be fully engaged in this process.
Clinic al care of adults with diabetes	Standard 4 All adults with diabetes will receive high-quality care throughout their lifetime, including support to optimise the control of their blood glucose, blood pressure and other risk factors for developing the complications of diabetes.
Clinical care of children and young people with diabetes	Standard 5 All children and young people with diabetes will receive consistently high-quality care and they, with their families and others involved in their day-to-day care, will be supported to optimise the control of their blood glucose and their physical, psychological, intellectual, educational and social development. Standard 6 All young people with diabetes will experience a smooth transition of care from paediatric diabetes services to adult diabetes services, whether hospital or community-based, either directly or via a young people's clinic. The transition will be organised in partnership with each individual and at an age appropriate to and agreed with them.
Management of diabetic emergencies	Standard 7 The NHS will develop, implement and monitor agreed protocols for rapid and effective treatment of diabetic emergencies by appropriately trained health care professionals. Protocols will include the management of acute complications and procedures to minimise the risk of recurrence.
Care of people with diabetes during admission to hospital	Standard 8 All children, young people and adults with diabetes admitted to hospital, for whatever reason, will receive effective care of their diabetes. Wherever possible, they will continue to be involved in decisions concerning the management of their diabetes.
Diabetes and pregnancy	Standard 9 The NHS will develop, implement and monitor policies that seek to empower and support women with pre-existing diabetes and those who develop diabetes during pregnancy to optimise the outcomes of their pregnancy.
Detection and management of long-term complications	Standard 10 All young people and adults with diabetes will receive regular surveillance for the long-term complications of diabetes. Standard 11 The NHS will develop, implement and monitor agreed protocols and systems of care to ensure that all people who develop long-term complications of diabetes receive timely, appropriate and effective investigation and treatment to reduce their risk of disability and premature death. Standard 12 All people with diabetes requiring multi-agency support will receive integrated health and social care.

Source: National Service Framework for Diabetes (Wales).

The QoF of the General Medical Services contract also sets out target indicators for diabetes management and treatment. These are set out in Box 4.

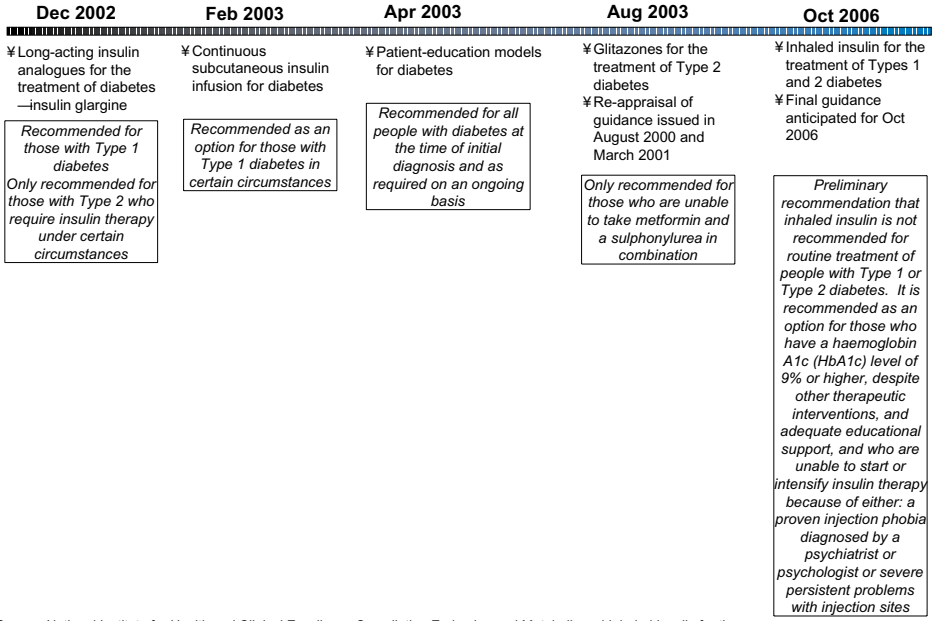
Box 4 Diabetes Indicators in the QoF

DM 1.	The practice can produce a register of all patients with diabetes mellitus
DM 2.	The percentage of patients with diabetes whose notes record BMI in the previous 15 months
DM 3.	The percentage of patients with diabetes in whom there is a record of smoking status in the previous 15 months except those who have never smoked where smoking status should be recorded once
DM 4.	The percentage of patients with diabetes who smoke and whose notes contain a record that smoking cessation advice has been offered in the last 15 months
DM 5.	The percentage of diabetic patients who have a record of HbA1c or equivalent in the previous 15 months
DM 6.	The percentage of patients with diabetes in whom the last HbA1C is 7.4 or less (or equivalent test / reference range depending on local laboratory) in last 15 months
DM 7.	The percentage of patients with diabetes in whom the last HbA1C is 10 or less (or equivalent test / reference range depending on local laboratory) in last 15 months
DM 8.	The percentage of patients with diabetes who have a record of retinal screening in the previous 15 months
DM 9.	The percentage of patients with diabetes with a record of presence or absence of peripheral pulses in the previous 15 months
DM 10.	The percentage of patients with diabetes with a record of neuropathy testing in the previous 15 months
DM 11.	The percentage of patients with diabetes who have a record of the blood pressure in the past 15 months
DM 12.	The percentage of patients with diabetes in whom the last blood pressure is 145/85 or less
DM 13.	The percentage of patients with diabetes who have a record of micro-albuminuria testing in the previous 15 months (exception reporting for patients with proteinuria)
DM 14.	The percentage of patients with diabetes who have a record of serum creatinine testing in the previous 15 months
DM 15.	The percentage of patients with diabetes with proteinuria or micro-albuminuria who are treated with ACE inhibitors (or A2 antagonists)
DM 16.	The percentage of patients with diabetes who have a record of total cholesterol in the previous 15 months
DM 17.	The percentage of patients with diabetes, whose last measured total cholesterol within previous 15 months is 5 or less
DM 18.	The percentage of patients with diabetes who have had influenza immunisation in the preceding 1st September to 31st March

Source: http://www.wales.nhs.uk/sites3/page.cfm?orgid=480&pid=10486

The National Institute for Health and Clinical Excellence (NICE) also provides a range of advice on management of diabetes, including technology appraisals on the use of medicines. Figure 3.10 illustrates a selection of technology appraisals of medicines to manage diabetes.

Figure 3.10 NICE Technology Appraisals on Medicines for Diabetes



Source: National Institute for Health and Clinical Excellence Compilation Endocrine and Metabolic and Inhaled Insulin for the Treatment of Diabetes (Types 1 and 2) http://www.nice.org.uk/page.aspx?o=332283 as at 1st August 2006

3.5.2 Progress of the LHBs

The importance of prevention and identifying those with diabetes early has been clearly recognised in Wales. There is, however, evidence that more could be done to improve early detection. In its 2003 review the Audit Commission noted that there was limited evidence of a strategic approach across LHBs to identifying patients with undiagnosed diabetes.[60]

The Audit Commission also noted that there was a lack of development of primary care services for diabetes in some areas. Other research in Wales has highlighted that there are concerns about the ability of primary care to play an active role in identifying and managing those at early risk of diabetes.[61] This reflects the opinions of some GPs and nurses that primary care may not be the appropriate place for identifying those at risk, and highlights concerns about the availability of resources to effectively manage these individuals. Whilst this research is small scale and does not include all areas of Wales it does highlight the need to ensure there are sufficient resources and willingness of staff to identify those at risk of diabetes. This is important in order to avoid the follow on costs from those who go on to have diabetes and its complications.

60 Audit Commission Wales (2003) Diabetes Services in Wales: A baseline review of service provision

61 Williams, R et al (2004) The prevention of type 2 diabetes: general practitioner and practice nurse opinions British Journal of General Practice 54: 531-535

In 2005 Diabetes UK in partnership with the All-Parliamentary Group for Diabetes and supported by the Hansard Society reviewed progress by all countries in the UK against national programmes to manage diabetes. This review highlighted a number of areas which still needed further progress and ideas for improvement put forward from those with diabetes including:[62]

- **Paediatric care:** a lack of provision of insulin pumps, poor care of children with diabetes at school and a lack of psychological support.
- **Education:** patients recognised the benefits of structured education courses and reported frustration over poor access to local courses, and problems with getting time off work to attend the courses.
- **Retinal screening:** still many people aren't being offered retinal screening, the importance of retinal screening was recognised and expressed by many people who felt frustrated that they were risking blindness.
- **Early identification:** many people felt they had the symptoms of diabetes for some time but were not diagnosed by their GP and the majority of people were in support of screening everyone over the age of 40.
- **Psycho-social:** there is very little support available to people with diabetes and their families, and more support on diagnosis was called for along with support for parents of children with diabetes and teenagers.
- **Other themes:** poor access to testing strips, a desire for more financial support for carers/parents, desire for greater access to insulin pumps, problems with overstretched healthcare professionals, difficulties in disposing of needles, and problems with transferring care when at university.

It did however recognise the steps being made. For example, the development of the Diabetic Retinopathy Screening Service for Wales (DRSSW) is a Welsh Assembly funded all-Wales initiative set up in 2003 as part of a programme of eye care initiatives in Wales. The DRSSW aims to offer digital retinopathy screening to 80 per cent of people with diabetes aged over 12 years and registered with a GP in Wales by the end of 2005, and to offer screening to all such people by the end of 2006.[63]

In the next year, the database will hold approximately 100,000 patients of which 70,000 will be screened annually. Of those screened 50 per cent will have some degree of retinopathy or other lesions (indications there may be other eye diseases).[64]

62 Diabetes UK in partnership with the All-Parliamentary Group for Diabetes and supported by the Hansard Society (2005) Diabetes: State of the Nations 2005: Progress Made in Delivering the National Diabetes Frameworks

63 http://216.239.59.104/search?q=cache:8QvzPeJxiCIJ:www.diabetes.org.uk/good_practice/retinal/Eye_screening.doc+diabetic+retinopathy+screening+service+wales&hl=en&gl=uk&ct=clnk&cd=3

64 http://www.wales.nhs.uk/sites3/page.cfm?orgid=562&pid=12776

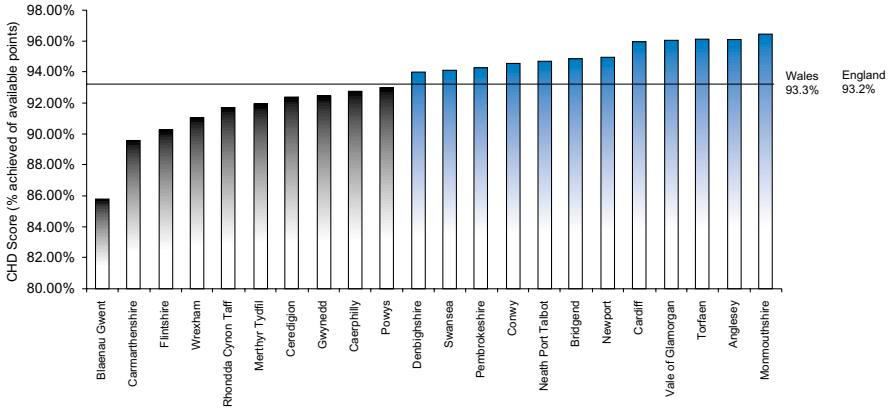
The Audit Commission also noted a number of positive examples of approaches to identify diabetes including:[65]

- In Flintshire patients are included on the CHD register if they have diabetes or are at risk of diabetes. Those on the register are offered a review with the GP or practice nurse which includes blood sugar analysis.
- Primary care practices who have developed joint CHD and diabetes clinics.
- Primary care practices who undertake opportunistic screening at new patient and well person 'health checks'.

There are also encouraging actions being taken as part of programmes funded from the Inequalities in Health Fund. For example, in Pembrokeshire there has been screening, nutrition and lifestyle change advice. Many of these clinics are held in evenings and at weekends to be more accessible.[66]

Achievement of the diabetes indicators included in the QoF highlights good practice across Wales, with all LHBs achieving at least 85 per cent of the relevant available points (Figure 3.12). This is in line with England.

Figure 3.11 Achievement on Diabetes Indicators, LHBs, 2005



Source: MSDi Contract Manager database- 2004/05 data as at end of August 2005 for Wales, and QMAS database - 2004/05 data as at end of June 2005 for England

Overall, there is evidence of improvements in the monitoring and management of diabetes. Evidence from general practices in England and Wales has found that electronic recording of HbA1c, blood pressure, cholesterol and weight has increased over the period 1994 to 2001. There has also been an improvement in control of blood pressure and cholesterol, but glycaemic control has not improved. The authors of this study conclude that *"primary care management has*

65 Audit Commission Wales (2003) Diabetes Services in Wales: A baseline review of service provision

66 Welsh Assembly Government (2005), *Inequalities in Health: The Welsh Dimension 2002-2005*

changed in accordance with best evidence. Monitoring has improved, but further improvement is possible."[67]

Recent survey work has highlighted that despite this good progress there are still challenges in ensuring access to the right care for people with diabetes. A survey presented at the 2006 Diabetes UK conference highlighted that too few people get a regular foot check up. This can increase the chance of complications, including amputation.[68]

3.6 Importance of Patient Empowerment

The benefits if all patients in Wales were tightly managed crucially rest on complete patient compliance. This is a challenge, with reports suggesting that perhaps less than 1 in 5 patients comply with all aspects of their management plan.[69] The reasons for poor compliance are varied but reflect the complexity of treatment. There are a number of programs which are focused on providing education which could contribute to improved compliance. For example:[70]

- DAFYDD. This is a structured approach to patient education focused on children, young people and their families. The programme balances learning with fun/activity and is highly interactive. The programme has been delivered in several formats, including a residential weekend.
- DAFNE. This is a structured approach to patient education focused on those with Type 1 diabetes. The programme teaches people to adjust their insulin to have a free choice of food rather than having to work around their insulin doses.
- XPERT. The XPERT Patient Programme aims to increase the knowledge, skills and confidence of people with Type 2 diabetes, so that they can make more informed decisions about treating their condition and improving their lifestyle. The programme involves the expertise of a range of health and social care staff and sessions include weight management, causes of diabetes, complications, etc.
- DESMOND. This is a structured programme for educating those with Type 2 diabetes. It helps people identify their own health risks and setting their own specific behavioural goals. This programme is delivered in primary care.

In addition, local programmes have been developed and piloted, although uptake has varied across the UK (Figure 3.14). A Welsh example includes the 'Proactive Diabetes Care' programme in Cardiff.[71] This programme includes an IT system

67 De Lusignan, S et al (2005) Trends in the prevalence and management of diagnosed type 2 diabetes 1994-2001 in England and Wales BMC Family Practice 6: 13

68 http://www.diabetes.org.uk/onlinenews/NewsStory.asp?id=1473

69 Association of the British Pharmaceutical Industry in partnership with Diabetes UK and Ask About Medicines (2006) The Diabetes Information Jigsaw

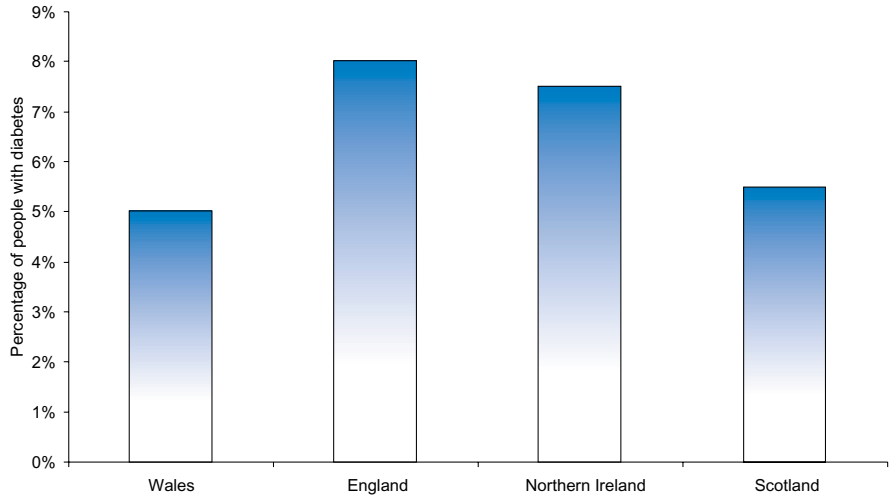
70 Association of the British Pharmaceutical Industry in partnership with Diabetes UK and Ask About Medicines (2006) The Diabetes Information Jigsaw

71 Proactive Diabetes Care (Cardiff) http://www.wales.nhs.uk/ihc/page.cfm?pid=10756

to gather and provide information for patients and the clinical management team and provide additional advice to patients. Whilst this programme is relatively small (expected to have 160 patients using the service by August 2006) it is an opportunity to test local programmes and learn how they can be most effectively delivered, with knock-on benefits for patient health and subsequent use of the health system.

To provide more information to enable patients to better manage their diabetes, pilot programmes of 'information prescriptions' have been introduced to improve understanding and support. These have the potential to contribute to good compliance which makes the realisation of the benefits of tight management more likely eg Merthyr Tydfil LHB Information Prescription.

Figure 3.12 Percentage of People with Diabetes Who Have Attended a Structured Education Course



Source:Association of the British Pharmaceutical Industry in partnership with Diabetes UK and Ask About Medicines (2006) The Diabetes Information Jigsaw

3.7 Current Impact of Diabetes on the Health System

Managing diabetes leads to a significant cost to the health system. Those with diabetes have a far higher likelihood of being admitted for hospital care than those who do not have diabetes (Table 3.5). Welsh data shows that the relatively likelihood of being admitted can be 15 per cent higher for those with diabetes in some specialties.

Table 3.5 Probability of Being Admitted to Hospital for Patients with Diabetes, South Glamorgan, 1991-1994

Specialty	Relative Probability of Admission
CHD	11.8
Neuropathy and peripheral vascular disease	15.6
Eye complications	10.4
Renal disease	14.7
Cerebrovascular disease	11.8

Source: Currie et al (1996) Patterns of In and Out-Patient Activity for Diabetes: a District Survey Diabetic Medicine 13: 273-280

Estimates of hospitalisation for diabetes vary. The National Public Health Service for Wales estimated that there were 4,650 hospital discharges in Wales in 2002. More recently the Audit Commission produced data for 2001 which suggest much higher numbers of hospitalisations (Table 3.6). This shows how complications are an important part of the use of hospital resources in Wales and the link between diabetes and CHD.

Table 3.6 Hospital Admissions in Wales for Diabetes-Related Conditions, 2001

Conditions	Number of admissions
Diabetes as principal diagnosis	5,834
Hypoglycaemia	704
Hyperglycaemia	31,284*
Diabetes ketoacidosis	1,218
Lower limb amputations among diabetic patients	385
Congenital abnormalities	52
Diabetic renal failure	225
Coronary heart disease and myocardial infarction associated with diabetes (morbidity and mortality)	1,668

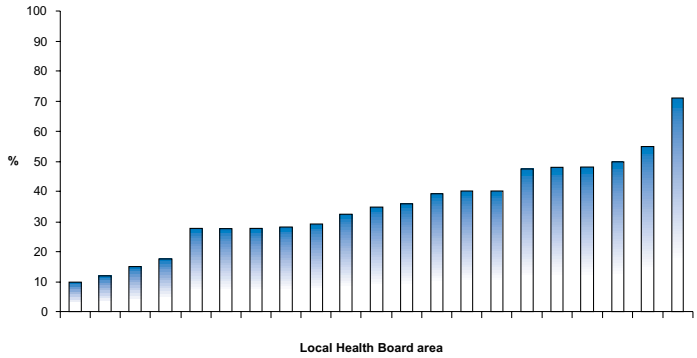
*Source: Audit Commission Wales (2003) Diabetes Services in Wales * There is no specific clinical code to identify hyperglycaemia, this would be coded under diabetes without complications, therefore figures are highly inflated*

There is no data currently available to assess the cost to primary care of diabetes, however large numbers of people are managed in primary care (up to 96 per cent of those with Type 2 diabetes, (Figure 3.13 and Figure 3.14)). Overall, Type 2 diabetes is estimated to account for 9 per cent of NHS expenditure[72], and this is expected to rise to 10 per cent by 2011.[73]

72 Williams et al (2002) The True Cost of Type 2 Diabetes in the UK: Findings from the T2DARDIS and CODE-2 UK, GlaxoSmithKline

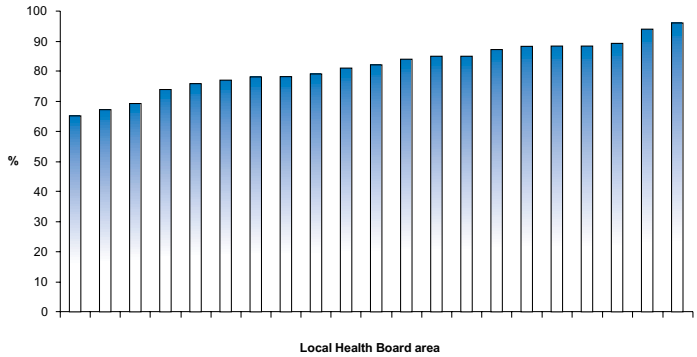
73 Levene, LS (2003) Management of Type 2 Diabetes Mellitus in Primary Care: A Practical Guide. New York. Butterworth-Heinmann

Figure 3.13 Percentage of Patients Receiving All/Most Care from Their GP Practice - Type 1 Diabetes



Source: Audit Commission in Wales (2003) Diabetes Services in Wales: A Baseline Review of Services (Anonymised data)

Figure 3.14 Percentage of Patients Receiving All/Most Care from Their GP Practice - Type 2 Diabetes



Source: Audit Commission in Wales (2003) Diabetes Services in Wales: A Baseline Review of Services (Anonymiseddata)

Note: only 21 LHBs are included in Audit Commission data.

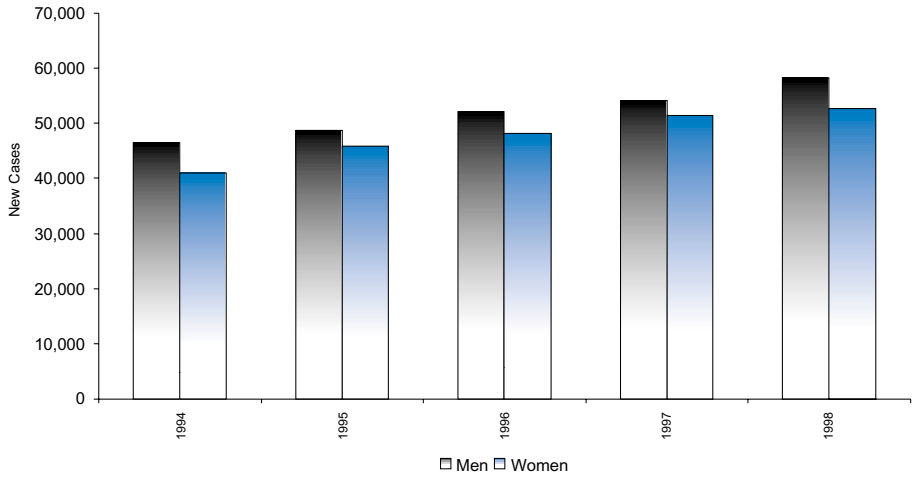
3.8 Current Impact of Diabetes on the Economy

In addition to the costs to the patient, their carers and the health system, diabetes also has an impact on the economy, both through sickness absence and the loss to the workforce of time spent caring for those with diabetes. Estimates for the UK suggest that patients with diabetes who develop complications and lose earnings are likely to lose £14,000 per year through an inability to work.[74]

3.9 Diabetes in the Future

There is evidence that the number of people with diabetes is increasing over time. Research drawing on data from GP practices across England and Wales shows that new cases of diabetes increased from 87,642 in 1994 to 111,345 new cases in 1998. Figure 3.15 illustrates the estimated number of new cases of men and women over the same time period. Research has suggested that the prevalence of diabetes has increased by 48 per cent for women and 63 per cent for men from 1991 to 2001.[75]

Figure 3.15 Estimated New Cases of Type 1 and Type 2 Diabetes, England and Wales, 1994 to 1998



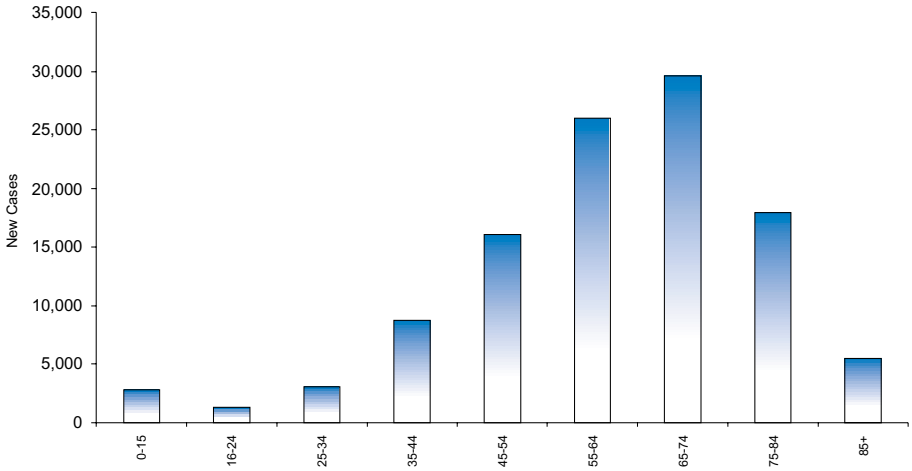
Source: Ryan, R et al (2005) New Cases of Diabetes Mellitus in England and Wales, 1994-1998: Database study, Public Health 119: 892-899

74 Greenhalgh, J., Georgiou, A., Long, A., Williams, R., and Dyas, J (2002) *Measuring the health outcome of Diabetes care*, The Nuffield Institute for Health

75 Fleming, D M et al (2005) Recent Changes in the Prevalence of Diseases Presenting for Health Care British Journal of General Practice 55: 589-595

New cases occur more often in the elderly, although there are relatively high numbers of the younger age groups who are now developing diabetes (Figure 3.16).

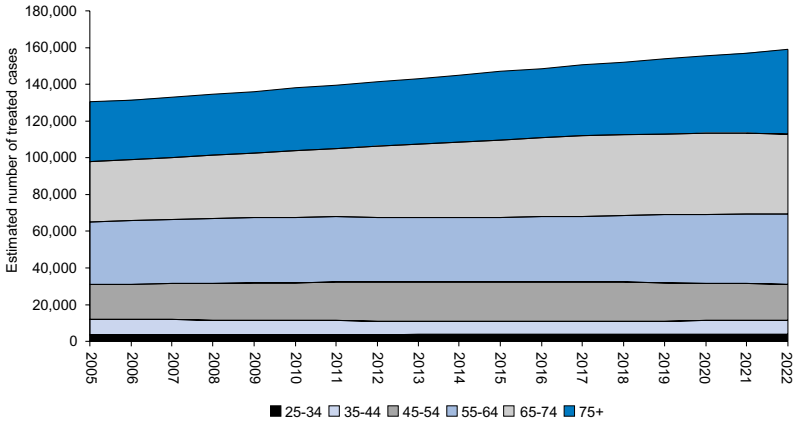
Figure 3.16 Estimated Number of New Cases of Diabetes in England and Wales by Age, 1998



Source: Ryan, R et al (2005) New Cases of Diabetes Mellitus in England and Wales, 1994-1998: Database study, Public Health 119: 892-899

We can estimate the likely number people with diabetes in the future in Wales by drawing on information on prevalence and the growing population. We have used information from the Welsh Health Survey, which has data by age band that we can project forward. This suggests that the number of people with diabetes could increase over a 20 year period by 22 per cent to over 158,000 in 2022 (Figure 3.17).

Figure 3.17 Forecasted Number of People with Diabetes, Wales, 2005 - 2022



Source: NERA calculations using Welsh Health Survey Data 2003/4 for percentage of adults reported being treated for diabetes by age and GAD population forecast

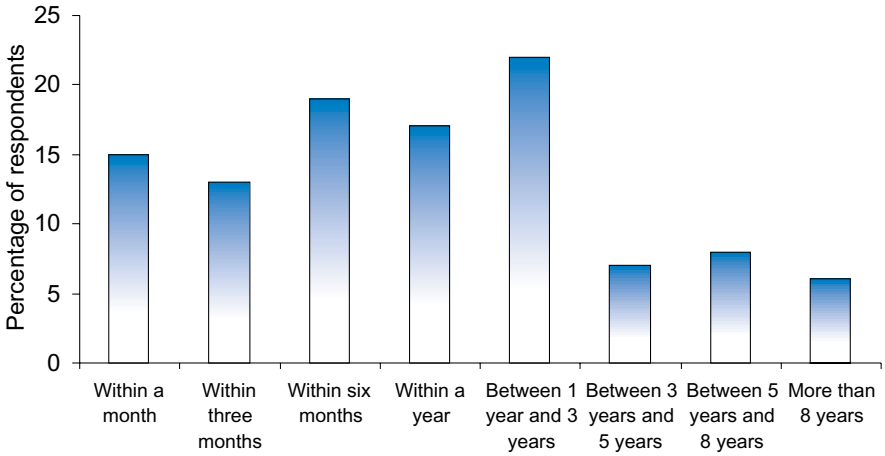
Given lifestyle trends, especially increasing levels of obesity, the true number with diabetes is likely to be even greater. The World Health Organisation (WHO) suggests that the total number of people with diabetes will double over the next 10-15 years. This rise in obesity is recognised as a major challenge for the UK.[76] There are also concerns that many people are not diagnosed early and so increase the chance of being diagnosed once complications have occurred.[77'78] Figure 3.18 illustrates the results of a survey of people with diabetes in Wales which shows that whilst the majority of those with diabetes were diagnosed within a year, there are some who were diagnosed with diabetes a significant length of time after they first became diabetic.

76 National Audit Office, Healthcare Commission, Audit Commission (2006) Tackling Childhood Obesity – First Steps

77 Audit Commission Wales (2003) Diabetes Services in Wales: A baseline review of service provision

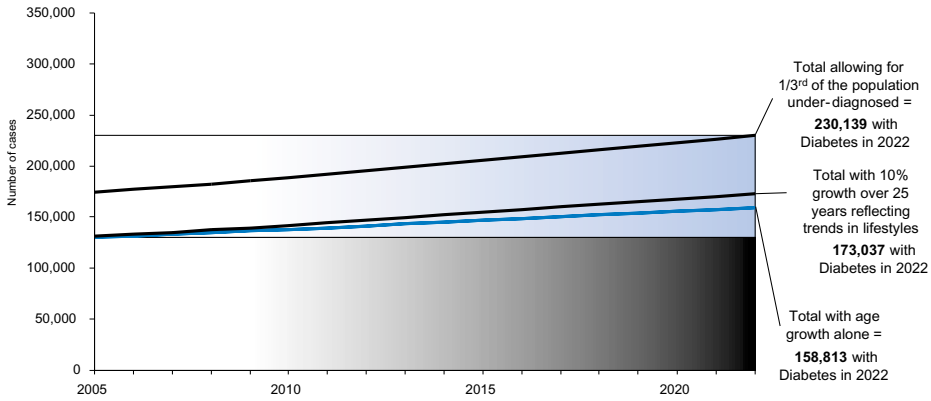
78 Diabetes UK Cymru, http://www.diabetes.org.uk/cymru/English/inwales/splash.htm

Figure 3.18 Estimated Time With Diabetes Until Diagnosed, Wales, 2005



We have used scenarios to test the impact of changes in diagnosis and lifestyle factors on the number of people with diabetes in Wales. Figure 3.19 illustrates our estimates once we adjust for lifestyle trends and under-diagnosis. This could mean that there are over 230,000 people with diabetes in Wales by 2022. This reflects a major assumption about under-diagnosis (of around a third of the diagnosed population with diabetes) rather than ageing or changes in lifestyle and it is unclear if this is a reflection of the true picture in Wales.

Figure 3.19 Scenarios on the Impact of Lifestyle Trends and Improvements in Diagnosis on the Number of People with Diabetes, Wales, 2005-2022



Source: NERA calculations using Welsh Health Survey Data 2003/4 for percentage of adults reported being treated for diabetes by age and GAD population forecast

3.9.1 Future Economic and Social Cost of Diabetes

The future costs of diabetes also includes the impact on patients and carers in terms of lost earnings. Studies in the UK have shown that 6 per cent of people with diabetes of working age are unable to work because of their condition. Those who lose earnings lose, on average, £14,000 per year, while their carers lose £11,000 per year. The majority of these people, around 70 per cent, will receive state benefits. Those with diabetes also lose, on average, £230 per annum in personal costs (which include over-the-counter medicines, residential care/nursing costs, and transport) while their carers lose £160 per annum. Diabetic complications increase personal costs by a factor of three, and also double the likelihood of needing a carer.[79]

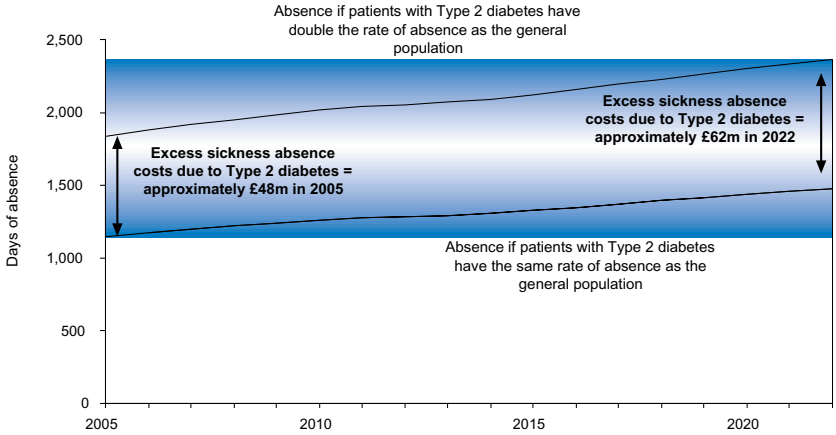
There is also a cost to the economy. Research has found that people with diabetes lose twice as many days of work as people without diabetes.[80, 81] We can estimate the impact on Wales by drawing on estimates of the higher prevalence of sick days for people with Type 2 diabetes. Figure 3.20 illustrates our estimates. This shows a cost of up to £62 million in the year 2022.

79 GlaxoSmithKline in collaboration with Diabetes UK, The King's Fund, The Nuffield Institute and Beaufort International (2002) *The True Costs of Type 2 Diabetes in the UK: Findings from T2ARDIS and CODE-2 UK*

80 Skerjanc, A (2001) Sickness absence in diabetic employees, Occup Environ Med; Vol 58 pp 432-436

81 Songer, TJ. (1995) Disability in diabetes http://diabetes.niddk.nih.gov/dm/pubs/america/pdf/chapter12.pdf

Figure 3.20 Work Days Lost Due to Type 2 Diabetes, Wales, 2005 - 2022



Source: NERA calculation based upon Welsh Health Survey Data 2003/4 for percentage of adults reported being treated for diabetes by age and GAD population forecast. Assumes absence on average in the workforce is 6.8 days and is 2.5 times higher in those with diabetes. The cost to employers is based on a CBI estimate of £476 per employee per year in 2002. This is in line with NERA (2004) The Human and Economic Value of Pharmaceutical Innovation and Opportunities for the NHS

4. Coronary Heart Disease in Wales

4.1 Defining CHD

Cardiovascular disease (CVD) is defined as disease of the heart and blood vessels. The most common manifestation of CVD is coronary heart disease (CHD), also known as coronary artery disease and ischaemic heart disease. CHD is caused by the narrowing of the arteries that supply the heart and is due to a gradual build-up of fatty material called atheroma. The narrowing can cause myocardial infarction (MI [heart attack]), angina (pain or discomfort in the chest or neighbouring parts of the body due to insufficient oxygen reaching the heart) and other forms of chronic heart disease. Angina is usually classified as stable or unstable.[82]

4.2 Patient Impact of CHD

For those who live with the condition there are significant symptoms including:[83]

- **Angina** – Angina is an uncomfortable feeling in the chest. It can feel like a heaviness or tightness in the centre of the chest, which starts behind the sternum (breast bone) and can spread to the arms, neck, jaw, back or stomach.
- **Heart Attack** – The pain from a heart attack is more severe than that associated with angina. Symptoms of a heart attack in addition to pain can include sweating (diaphoresis), nausea, light headedness, shortness of breath (dyspnea), anxiousness and sleep disturbance. In clinical terms the sudden occlusion (blockage) of a coronary artery leads to myocardial cell death (death of cells in the heart).

These are just two forms of disease which affect the heart and associated structures. Others include:

- **Atherosclerosis –** The build up of fatty material and cellular debris (atheroma) inside blood vessels that can restrict blood flow.
- **Heart Failure –** A weakening of the hearts pumping capacity to such an extent that it no longer maintains blood output adequate to the body's requirements.
- **Arrhythmia –** An irregular heart beat which may affect both ventricles and atria.

Other disorders of the heart include: infections of the muscle (eg myocarditis); valves or blood vessels; physical damage to the valves; immune disorders that result in destruction of heart tissue; congenital effects; and also conditions which affect the pericardium.

82 National Institute for Clinical Excellence (2005) Final Appraisal Determination: Statins for the Prevention of Cardiovascular Events

83 British Heart Foundation, Clinical Evidence Concise, Issue 10, December 2003, McSwenney, J C et al (2003) Women's Early Warning Symptoms of Acute Myocardial Infaction, Circulation, Vol 108, pp 2619, Bajzer, C T (2002) Acute Myocardial Infarction and www.heartinfo.org

The above symptoms and disorders have an impact on the quality of life for patients. CHD also has knock on consequences for the carers of patients, such as reducing the hours worked or giving up work altogether.

4.3 Burden of CHD in Wales

Relatively little has been known historically about the number of people with CHD in Wales.[84] New information is however becoming available through the CHD disease register set up as part of the QoF. This has provided a new set of data on the proportion of patients who are currently treated for CHD in primary care, however as stated previously, care needs to be taken in terms of epidemiological interpretation.

Based on the proportions of patients who are registered as being treated for CHD by LHB, and the number of people living in each health board area, we can estimate the number of people with treated CHD in Wales. Table 4.1 and Figure 4.1 illustrate our estimates. This suggests that there are just over 120,000 people with treated CHD in Wales. We compare the prevalence rates from the CHD disease register with the proportion of adults who report current treatment for any heart condition excluding high blood pressure from the Welsh Health Survey in Table 4.2. Whilst this is a difficult comparison reflecting the self-report nature of the survey (for example this could mean that a wider set of conditions is being included) the large differences suggest that the CHD register may not reflect all cases. This should improve over time as more patients are identified and data recording improves. 2005/6 QoF estimate of prevalence of CHD is however similar to the 2004/5 estimate, at 4.27 percent compared to 4.29 per cent.[85]

84 National Assembly for Wales (2001) Tackling CHD in Wales: Implementing Through Evidence

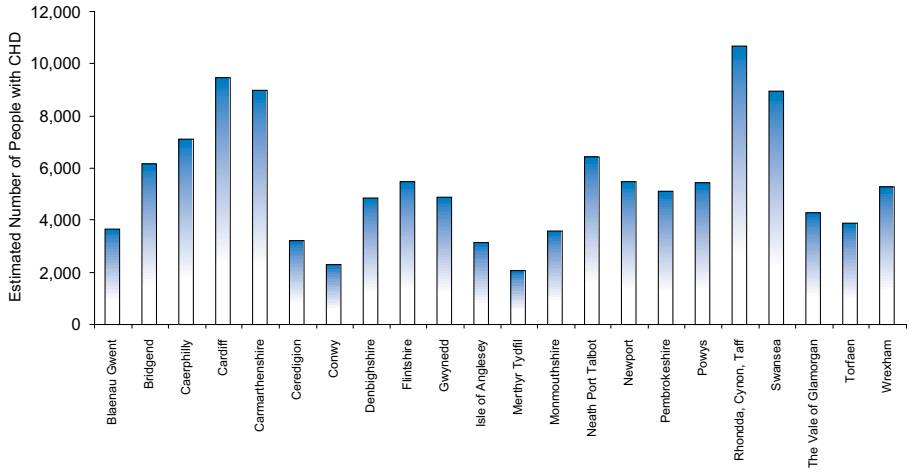
85 GMS Contract Quality and Outcomes Framework Disease Prevalence 2004/5 and 2005/6 http://www.wales.nhs.uk/sites3/page.cfm?orgid=480&pid=6063

Table 4.1 Estimated Number of People Treated for CHD, Local Health Boards, 2005

	% with CHD	Population No.	with CHD
Blaenau Gwent	5.2%	70,064	3,643
Bridgend	4.8%	128,645	6,175
Caerphilly	4.2%	169,519	7,120
Cardiff	3.1%	305,353	9,466
Carmarthenshire	5.2%	172,842	8,988
Ceredigion	4.3%	74,941	3,222
Conwy	2.1%	109,596	2,302
Denbighshire	5.2%	93,065	4,839
Flintshire	3.7%	148,594	5,498
Gwynedd	4.2%	116,843	4,907
Isle of Anglesey	4.7%	66,829	3,141
Merthyr Tydfil	3.7%	55,981	2,071
Monmouthshire	4.2%	84,885	3,565
Neath Port Talbot	4.8%	134,468	6,454
Newport	4.0%	137,011	5,480
Pembrokeshire	4.5%	114,131	5,136
Powys	4.3%	126,354	5,433
Rhondda, Cynon, Taff	4.6%	231,946	10,670
Swansea	4.0%	223,301	8,932
The Vale of Glamorgan	3.6%	119,292	4,295
Torfaen	4.3%	90,949	3,911
Wrexham	4.1%	128,476	5,268
Wales	4.3%	2,903,085	120,516

Source: NERA calculation based on Statistical Bulletin: Disease Prevalence in Wales: General Medical Services and Quality and Outcomes Framework SB 38/2005 15 June 2005 and Digest of Welsh Local Area Statistics 2004

Figure 4.1 Estimated Number of People Treated for CHD, Local Health Boards, 2005



Source: NERA calculation based on Statistical Bulletin: Disease Prevalence in Wales: General Medical Services Quality and Outcomes Framework SB 38/2005 15 June 2005 and Digest of Welsh Local Area Statistics 2004

Table 4.2 Percentage of Adults with CHD, A Comparison of CHD Register and Welsh Health Survey

Local Authority/CHD Local Health Board	Register	Welsh Health Survey	Difference
Blaenau Gwent	5.2	10	-4.8
Bridgend	4.8	11	-6.2
Caerphilly	4.2	9	-4.8
Cardiff	3.1	9	-5.9
Carmarthenshire	5.2	12	-6.8
Ceredigion	4.3	10	-5.7
Conwy	5.1	10	-4.9
Denbighshire	5.2	12	-6.8
Flintshire	3.7	10	-6.3
Gwynedd	4.2	7	-2.8
Isle of Anglesey	4.7	10	-5.3
Merthyr Tydfil	3.7	10	-6.3
Monmouthshire	4.2	8	-3.8
Neath Port Talbot	4.8	12	-7.2
Newport	4	10	-6
Pembrokeshire	4.5	9	-4.5
Powys	4.3	9	-4.7
Rhondda, Cynon, Taff	4.6	11	-6.4
Swansea	4	10	-6
The Vale of Glamorgan	3.6	11	-7.4
Torfaen	4.3	10	-5.7
Wrexham	4.1	12	-7.9
Wales	4	10	-6

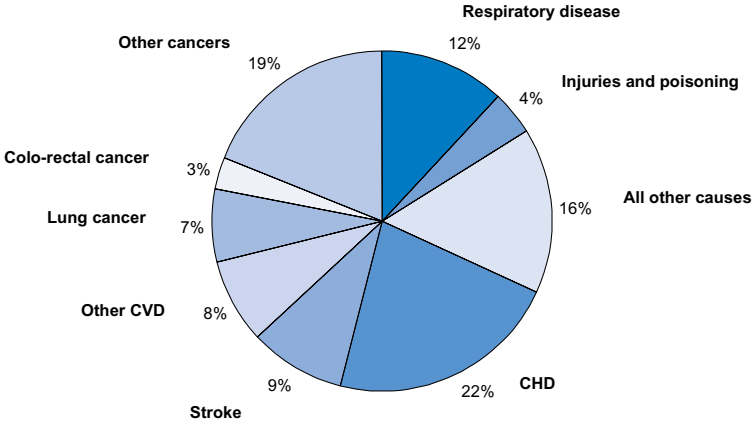
Source: Statistical Bulletin: Disease Prevalence in Wales: General Medical Services Quality and Outcomes Framework SB 38/2005 15 June 2005 and Welsh Health Survey 2003/04 Note: Welsh Health Survey data relates to current treatment for any heart condition excluding high blood pressure

4.4 CHD Mortality

CHD is the largest cause of death in men in the UK (Figure 4.2). This is despite there being marked reductions in mortality in recent years (Figure 4.3 and Figure 4.4) . Britain lags behind many other countries in CHD mortality, and the positive trends in CHD mortality currently seen cannot be guaranteed to continue (it is levelling off in the United States, for example).[86]

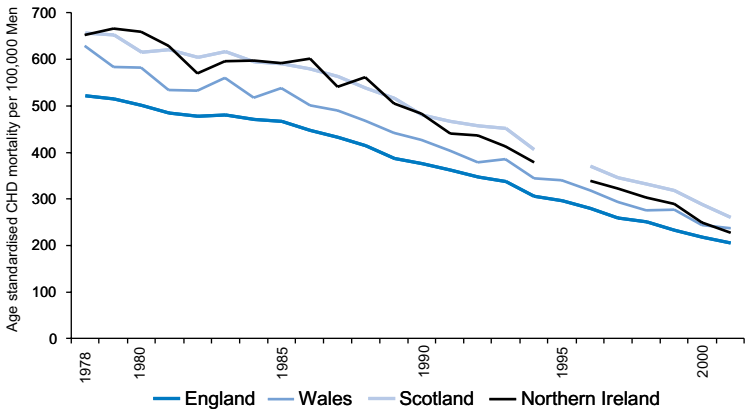
86 Unal et al (2005) Small Changes in United Kingdom cardiovascular risk factors could halve coronary heart disease mortality Journal of Clinical Epidemiology 58 733-740

Figure 4.2 Deaths by Cause, Men, 2003, United Kingdom



Source: British Heart Foundation, Coronary heart disease statistics, 2005 edition

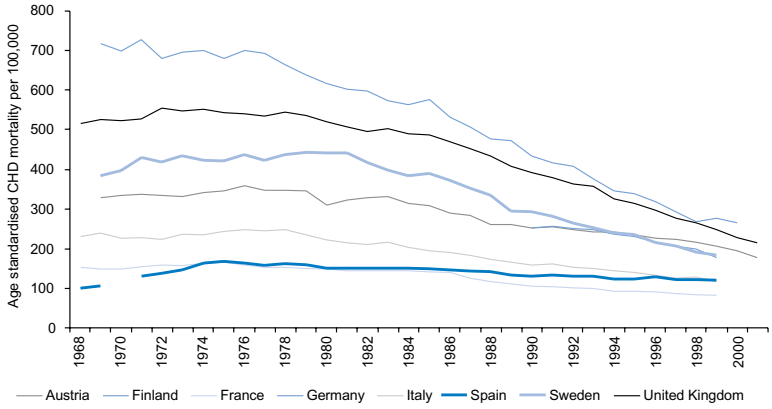
Figure 4.3 Age Standardised CHD Mortality Men Aged 34-75, 1978-2001, UK Regions



Source:BHF Coronary heart disease statistics at www.heartstats.org and Wanless (2003) Securing Good Health for the Whole Population, Population Health Trends

Reproduced from NERA (2004) The Human and Economic Value of Pharmaceutical Innovation and Opportunities for the NHS

Figure 4.4 Age Standardised CHD Mortality, 1968-2001, Selected European Countries



Source: BHF Coronary heart disease statistics at www.heartstats.org

Reproduced from NERA (2004) The Human and Economic Value of Pharmaceutical Innovation and Opportunities for the NHS

4.5 The Role of Medicines and Managing CHD

4.5.1 Role of Medicines

There are a wide range of medicines available to manage CHD as set out in Table 4.3. This highlights progress in developing medicines over the last 40-50 years. The important role of medicines in managing CHD is readily acknowledged. For example in Scotland, 40 per cent of the reduction in mortality from 1975 to 1999 has been attributed to innovative technologies in resuscitation, thrombolysis, coronary care and secondary prevention including medicines.[87]

We present 2 case studies later in this report to illustrate the benefits of innovative medicines in tackling CHD; statins and thrombolytics.

Table 4.3 Some of the Types of Medicine Available for Treating Heart Conditions

Type of Medicine	How they work	Used to treat
Diuretics	Act on the kidneys to enhance the excretion of fluids	Heart failure, high blood pressure
Angiotensin converting Enzyme (ACE) inhibitors	Block the conversion of angiotensin 1 to angiotensin II (A II)	Heart failure, high blood pressure and MI
Angiotensin II receptor antagonists	Block binding sites for A II	High blood pressure, heart failure and post MI
Beta-blockers	Act on beta receptors in the heart, kidney and blood vessels, with various effects	Heart failure, angina
Nitrates	Relax coronary arteries via the generation of nitric oxide and the redistribution of blood flow	Heart failure, angina
Statins	Block an enzyme involved in cholesterol synthesis in the body	Atherosclerosis, high cholesterol levels
Fibrates	Act on fatty droplets that circulate in the blood and carry cholesterol	Atherosclerosis, high cholesterol levels
Amiodarone	Modifies the way the body's cardiac pacemaker works	Arrhythmias
Anti-arrhythmic agents	Modify sodium, potassium and/or calcium movement into and out of cardiac conducting cells	Arrhythmias
Digoxin	Strengthens heart beat by blocking the sodium pump, plus some effects on the vagus nerve	Heart failure, artrial fibrillation
Calcium antagonists	Block calcium channels and cause dilation of blood vessels	Angina, high blood pressure
Potassium channel openers	Cause dilation of blood vessels and protect heart muscle	Angina
Antiplatelet therapy	Reduce the aggregation of platelets and reduce the likelihood of the development of a thrombus which can lead to MI	Secondary prevention of CHD

Source: Amended from ABPI (2004) Target Heart Disease. MI = myocardial infarction (heart attack).

87 http://www.show.scot.nhs.uk/sehd/publications/cdtf/cdtf-04.htm

There is debate about whether the more appropriate strategy to tackle CHD is to:

- Target the whole population – aiming to lower cholesterol uniformly in the entire population
- Target a high risk group – treating people with high cholesterol
- Target a high baseline group – treating people with an increased risk of CHD

In reality an element of each strategy is likely to be most successful. Recent analysis of targeting those at increased risk of CHD in Canada suggested that "*medical interventions with a reasonably high relative benefit (such as statins) that are targeted in high risk populations can have an important role for improving population health outcomes*".[88]

4.5.2 Managing CHD in Wales

CHD has been recognised as a major health challenge. There is a key target to reduce CHD mortality rate in 65 to 74 year olds to 400 (as measured by the European Age Standardised rate) by 2012. In addition to this target there is particular emphasis to achieve a more rapid improvement in the most deprived groups.[89]

There is a Welsh National Service Framework which sets out the standards for managing CHD in Wales. Standards include:

- **Standard One:** Development, implementation and monitoring of programmes to address tobacco use, diet and physical activity, targeted at the most disadvantaged communities in Wales;
- **Standard Two:** Everyone at high risk of developing CHD and all those diagnosed as having the disease should have access to a multi-factorial risk assessment and be offered an appropriate treatment plan;
- **Standard Three:** Everyone with an acute episode of CHD should receive high quality evidence based care;
- **Standard Four:** Everyone with heart failure should be recognised and offered appropriate evidence based care; and
- **Standard Five:** Everyone diagnosed with atrial fibrillation should be offered appropriate evidence based care.

The original CHD NSF in Wales (July 2001) is currently being updated in the light of changed clinical practice, evidence and organisational change. This update is currently in draft form and is intended for consultation during the autumn of 2006.[90]

88 Manuel, D G et al (2006) Revisiting Rose: Strategies for Reducing Coronary Heart Disease, British Medical Journal Vol 332 pp659-661

89 Welsh Assembly Government (2002) Inequalities in Health: The Welsh Dimension

90 ABPI Wales (1.09.06) personal communication to NERA

In the"*Plan for the NHS with its Partners, Improving Health in Wales*" (January 2001) the National Assembly for Wales states that this key target will be achieved "*through the progressive implementation of a National Service Framework (NSF) for Coronary Heart Disease*" (CHD NSF), through the "*development of three managed clinical networks for cardiac care in Wales*".[91]

In the *Welsh Health Circular (2001)105 (Dec 2001)*, the Assembly set out its expectations and outlined the timetable for the establishment and functions of the three Cardiac Networks. The aim of the Networks is to facilitate the implementation of the CHD NSF through partnership working with key NHS partners and health professionals in the area. The process to achieve this is outlined in the CHD NSF, where five evidence based Standards supported by thirty Key Action points and further sub targets provide a logical and systematic approach to defining and achieving minimum standards in relation to education, prevention, diagnosis, treatment, rehabilitation and terminal care of CHD within specified periods of time.[92]

In 2006, working collaboratively through the 3 Cardiac Networks:

- GPs/medial practitioners have a responsibility to refer appropriately in line with agreed local care pathways;
- Trusts have a responsibility to move patients effectively through the system from original referral through diagnosis to revascularisation or other definitive treatment. This will often involve more than one Trust; and
- LHBs and Health Commission Wales (HCW) have a responsibility to commission sufficient services and ensuring care pathways are in place and followed.

In order to maintain or improve upon March 2006 maximum waiting times, the patient journey should comply with the following sub targets:

a. A maximum wait of 6 months from receipt of GP or other medical practitioner referral by receiving Trust to initial consultant consultation;

b. A maximum wait of 4 months from consultant consultation to angiography (where appropriate); and

c. A maximum wait of 6 months to revascularisation or other definitive procedure.

91 National Assembly for Wales (2001) Improving Health in Wales: A Plan for the NHS and It's Partners

92 http://216.239.59.104/search?q=cache:pU8SsFQfpJgJ:www.wales.nhs.uk/sites/documents/442/NWCNSDP.doc +cardiac+network+wales+establishment&hl=en&gl=uk&ct=clnk&cd=1

In this context heart disease refers to coronary heart disease, heart failure or valvular heart disease in adults. A definitive procedure other than revascularisation refers to valve surgery or corrective cardiac surgery in the adult. Detailed definitions are to be developed and issued.[93]

As with diabetes there are also indicators included in the QoF to manage CHD. These indicators are set out in Box 5.

Box 5 CHD Indicators in the QoF

CHD 1.	The practice can produce a register of patients with coronary heart disease
CHD 2.	% of patients with newly diagnosed angina (diagnosed after 01/04/03) who are referred for exercise testing and/or specialist assessment
CHD 3.	% of patients with coronary heart disease, whose notes record smoking status in the past 15 months except those who have never smoked where smoking status need be recorded only once
CHD 4.	% of patients with coronary heart disease who smoke, whose notes contain a record that smoking cessation advice has been offered within the last 15 months
CHD 5.	% of patients with coronary heart disease, whose notes have a record of blood pressure in the previous 15 months
CHD 6.	% of patients with coronary heart disease, in whom the last blood pressure reading (measured in the last 15 months) is 150/90 or less
CHD 7.	% of patients with coronary heart disease, whose notes have a record of total cholesterol in the previous 15 months
CHD 8.	% of patients with coronary heart disease, whose last measured total cholesterol (measured in last 15 months) is 5 mmol/l or less
CHD 9.	% of patients with coronary heart disease with a record in the last 15 months that aspirin, an alternative anti-platelet therapy, or an anti-coagulant is being taken (unless a contraindication or side effects are recorded)
CHD 10.	% of patients with coronary heart disease who are currently treated with a beta blocker (unless a contraindication or side effects are recorded)
CHD 11.	% of patients with a history of myocardial infarction (diagnosed after 1st April 2003) who are currently treated with an ACE inhibitor
CHD 12.	% of patients with coronary heart disease who have a record of influenza vaccination in the preceding 1st September to 31st March
LVD 1.	The practice can produce a register of patients with CHD and left ventricular dysfunction
LVD 2.	% of patients with a diagnosis of CHD and left ventricular dysfunction (diagnosed after 1/4/03) which has been confirmed by an echocardiogram
LVD 3.	% of patients with a diagnosis of CHD and left ventricular dysfunction who are currently treated with ACE inhibitors (or A2 antagonists)

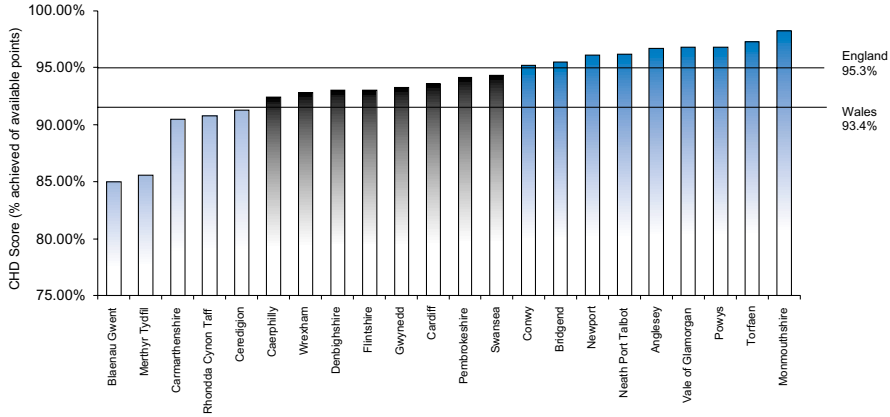
Source: http://www.wales.nhs.uk/sites3/page.cfm?orgid=480&pid=10486

93 http://216.239.59.104/search?q=cache:SIKAFAWjHsgJ:www.wales.gov.uk/subihealth/content/keypubs/circulars/safftargets06-07-e.pdf+SAFF+Cardiac+network&hl=en&gl=uk&ct=clnk&cd=3

4.5.3 Progress by LHBs

The QoF includes a set of indicators for appropriate treatment of CHD. Achievement against the CHD indicators by each LHB is set out in Figure 4.5. This shows that high scores are being achieved across LHBs (with none lower than 85% achievement). The total achievement in Wales is lower than for England and there is significant variation across LHBs. There are good examples of new approaches to tackle CHD across different parts of Wales, these include projects funded from the Inequalities in Health Fund which focus on tackling CHD and factors which increase the occurrence of CHD in deprived groups. Examples are given in Box 6.

Figure 4.5 Achievement on CHD Indicators, LHBs, 2005



Source: MSDi Contract Manager database - 2004/05 data as at end of August 2005 for Wales, and QMAS database - 2004/05 data as at end of June 2005 for England

Box 6 Examples of Programmes Funded by the Health Inequalities in Health Fund Focused on CHD and Related Factors

Plas Madoc Estate, Wrexham - 2,000 patients have been provided with an efficient and accessible primary care service, led by the practice nursing team and supported by GPs. Quality and diversity of care has been improved - reported 40 per cent reduction in smoking in the target group, 64 per cent increase in cholestorol monitoring, 31 per cent have improved blood pressure control, 183 per cent increase in statin therapy use and 68 per cent more diabetic patients with HBA1C below 7.4.

Calon Lan, Gwynedd and Ynys Mon - multi-skilled teams providing screening, smoking cessation, nutrition advice and cardiac rehabilitation. Around 15,000 (4% of the Ynys Mon population) have been in direct contact with the Anglesey project. An analysis to show the impact of cardiac rehabilitation on readmission rates has shown: 12 month readmission rate for non-CR patients of 52.58 per cent and 12 month readmission rate for CR patients who complete the programme of 7.60 per cent. A cost benefit analysis has revealed that the average cost per patient to complete the Calon Lan Cardiac Rehabilitation Programme is £490 when the cost of treating a patient following a heart attack can range from £1,700 to at least £14,000 if they have specific surgery.

Carmarthenshire - 'Tool Kit' developed to help local GPs to implement the National Service Framework for CHD. All 26 practices now have CHD registers - over 9,000 patients (around 5% of the Carmarthenshire population) identified to date and on annual recall. Of the 9,000 patients identified, 92 per cent have had their blood pressure checked in the last year, 76 per cent being under 150/90. 83 per cent have had their cholesterol checked with 61 per cent being under 5mmols. The 'Tool Kit' has also been used in the development of similar models for diabetes and obesity.

Torfaen - CHD registers validated and audited in each of the 14 local GP practices, call and recall systems now well established. Rapid Access Chest Pain Clinic (RACPC) established in July 2005 to provide a local and accessible service to patients experiencing chest pain that the GP suspects could be angina.

Rhondda Cynon Taff - the 'Heart Attack' project has established screening and intervention, exercise referral, lifestyle change and cardiac rehabilitation programmes in seventeen of the most deprived wards in Wales covering a population of around 80,000. CHD registers completed in GP practices and around 10,000 patients identified with or at risk of CHD. 1,500 patients within the target age group (30-65) have been identified for primary prevention i.e. are asymptomatic but have diabetes, hypertension or hyperlipidaemia. Around 400 patients have been identified for secondary prevention i.e. have an existing diagnosis of myocardial infarction, angina, TIA/stroke, atrial fibrillation or heart failure. Prescription for Active Living (PALS) exercise referral scheme has been highly successful with the majority of practices across the Rhondda Cynon Taff area now participating. The Food for Living Food for Life element of the project has linked successfully with local practice nurses in relation to healthy eating interventions and has implemented a host of community food projects including Get Cooking and Food Co-ops.

Royal Glamorgan Hospital's - 'Nursing Service for Heart Failure Patients' has been very successful. The number of patients readmitted to hospital with a primary diagnosis of heart failure has been reduced by 82 per cent. The total number of admissions with a primary diagnosis of heart failure has been reduced by 48 per cent. Bed occupancy has been reduced from 7.4 per cent at outset to 2.7 per cent (based on 194 medical beds). Average lenghth of stay has been reduced by 7.2days. Cost to the Trust has decreased by a nominal £53,308 per month resulting in a nominal saving over 36 months of £1,286,690. The project continues to be used as a benchmark for services throughout Wales.

Merthyr Tydfil - the 'IHD Risk Factor Intervention' project has been successful in delivering standards 1 and 2 of the National Service Framework across the Merthyr area. The project team have worked in close collaboration with local GP practices and have also established screening programmes for clients in local small businesses. Around 3,500 people have benefited from the services developed.

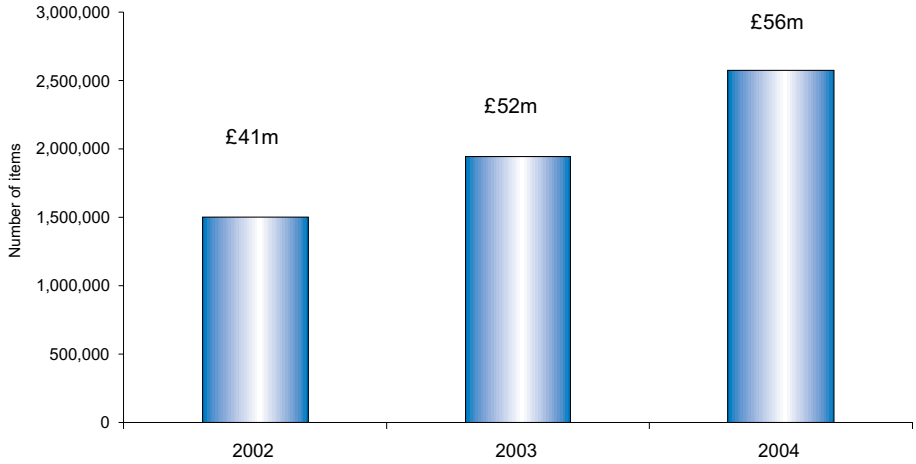
Source: ABPI Wales (1.09.06) personal communication to NERA

4.6 Statins – A Case Study

High cholesterol has been recognised as a major factor in the risk of CHD. Statins, which reduce cholesterol in the blood, are a major breakthrough for tackling CHD. Statins were first licensed in the UK in 1989 and their use has been increasing over time (see Figure 4.6 for the number of statins prescribed in Wales from 2002 to 2004).

Statins have been recommended for use by NICE, *"Statin therapy is recommended as part of the management strategy for the primary prevention of CVD for adults who have a 20% or greater 10-year risk of developing CVD."*[94]

Figure 4.6 Number of Statins Prescribed in Wales, 2002 to 2004



Meta-analysis of clinical trial results shows that statins do lead to a statistically significant reduction in the risk of all-cause mortality, cardiovascular mortality, CHD mortality, and fatal heart attack. It also shows that statins can reduce the burden on the health system by reducing the likelihood of hospitalisation for unstable angina and operations like Coronary Artery Bypass Graft (CABG) and angioplasty.[95]

We can estimate the potential scale of benefits that taking statins brings to Wales. In line with our previous reports we use the results of a major UK trial of statins to estimate the events avoided and lives saved from taking statins over 5 years. From consolidated industry data on statin sales in Wales, it can be estimated that at least 250,000 patients were prescribed statins during the year 2005/2006.[96]

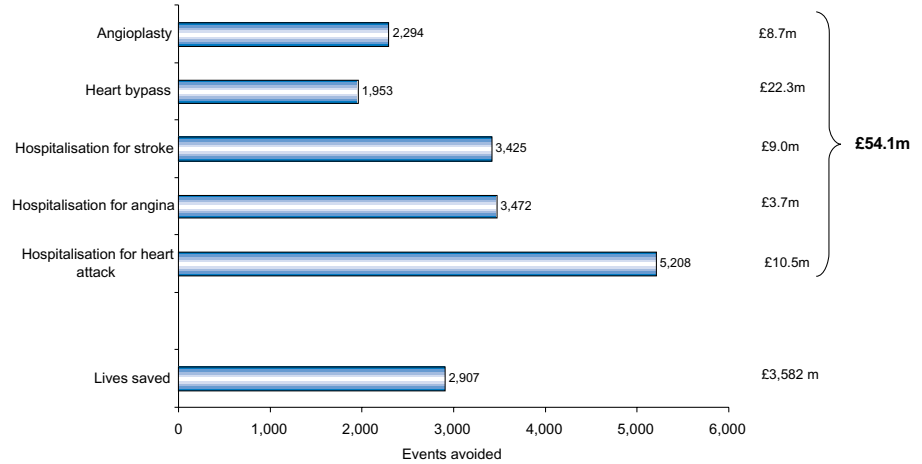
94 National Institute for Health and Clinical Excellence (2005) Final Appraisal Determination: Statins for the Prevention of Cardiovascular Events

95 National Institute for Health and Clinical Excellence (2005) Final Appraisal Determination: Statins for the Prevention of Cardiovascular Events

96 This is high compared to the 120,000 who are included on the QoF CHD register.

Figure 4.7 provides our estimates, showing estimates both of the number of lives saved and hospital admissions avoided. The number of lives saved is high (almost 3,000) and the number of hospital bed days saved is also significant (applying the 2004/5 average length of stay for cardiology in Wales (6.9 days) suggests that statins could save in the order of 112,000 bed days over 5 years).[97]

Figure 4.7 Events and Costs Avoided from Statins Over 5 Years, Wales



Source: NERA calculations using HPSCG (2002) data and data on estimated number taking statins in Wales supplied by the ABPI and HRG costs provided to NERA from Welsh Assembly Government (Personal Communication 7.4.06)

The evidence on the use of statins is increasing over time. Recent trials have found increasing reductions in events with more intensive use of statins.[98, 99] Trials have shown that more aggressive treatment to lower total cholesterol targets reduces the numbers of fatal and non fatal cardiovascular events.[100, 101, 102, 103]

97 Average length of stay from NHS Beds 2004/5 Statistical Release 100/2005 http://www.wales.gov.uk/keypubstatisticsforwalesheadline/content/health/2005/hdw20051018-e.htm

98 Heart Protection Study Collaborative Group. MCR/BHF heart protection study of cholesterol lowering with Simvastatin in 20,536 high risk individuals:a randomised placebo-controlled trial. Lancet 2002;360:7-22.

99 Sever PS, Daahlof B, Poulter nr, et al. Prevention of coronary and stroke events with atorvastatin in hypertensive people who have average or lower-than-average cholesterol concentrations, in Anglo-Scandinavian cardiac outcomes trial-lipid lowering arm (ASCOT-LLA): a multicentre randomised controlled trial. Lancet 2003;361:1149-58

100 Cannon CP, Braunwald E, McCabe CH, et al, for the Pravastatin or Atorvastatin Evaluation and Infection Therapy-Thombolysis in Myocardial Infarction 22 Investigators. Intensive verses moderate lipid lowering with statins after acute coronary syndromes (PROVE-IT) N.Engl J Med 2004;350:494-504.

101 Waters DD, Guyton JR, Herrington DM, et al. Treating to new Targets (TNT) study: does lowering low-density lipoprotein cholesterol levels below currently recommended guidelines yield incremental clinical benefits? Am J Cardiol 2004; 94:154-58

102 LaRosa JC, Grundy SM, Waters DD, et al for the Treating to New Targets (tnt) Investigators. Intensive lipid lowering with atorvastatin in patients with stable coronary disease. N Engl J Med 2005;352:1-11.

103 Pedersen TR, Faergeman O, Kastelein JJP, et al. High dose atorvastatin vs usual dose simvastatin for secondary prevention after myocardial infarction. The IDEAL study: a randomised controlled trial JAMA 2005;294:2437-45.

In other trials using high doses, statins have been shown to reduce or reverse the progression of atherosclerosis.[104, 105]

Research suggests that for every million patients with chronic or acute coronary artery disease, treated for 5 years, intensive rather than standard statin dosing would prevent more than 35,000 cardiovascular events (including more than 14,000 coronary deaths or heart attacks). This suggest 29 patients need to be treated (for 2 years following an ACS, or for 5 years in stable patients) to prevent a cardiovascular event. This in addition to the benefits achieved by standard statin therapy, which is highly effective.[106]

This research has led to updated guidance on the prevention of cardiovascular disease (the JBS 2; Joint British Societies' guidelines on prevention of cardiovascular disease in clinical practice, published in December 2005[107]). This guidance notes that:

> *"the lipid targets defined in our recommendations in 1998, and currently endorsed by the NSF on CHD, the NSF on Diabetes and the GMS contract, are now too conservative in the context of the more recent trial evidence with statins in which high risk people are now achieving lower cholesterol values"*

JBS 2 now recommends:

> "*total cholesterol less than or equal to 4mmol/L and LDL Cholesterol less than or equal to 2mmol/L Or 25% reduction in total cholesterol and 30% reduction in LDL cholesterol whichever gets to the lowest cholesterol level [for patients with established CVD, diabetes and those asymptomatic individuals at high risk, greater or equal to 20% of developing CVD.]"*

Whilst improving lifestyles is of vital importance in responding to the challenge of CHD, cholesterol levels are estimated to be the most important factor in reducing associated mortality in England and Wales. Figure 4.8 illustrates the potential reduction in CHD deaths that could occur under two scenarios, one where the recent trend in each factor continues as it is now, and the other where there is a more substantial positive change in the trend for each factor. Current trends in obesity, diabetes and physical activity are predicted to increase CHD deaths in the future. This highlights the need to look at a variety of options, including the use of statins, to manage levels of cholesterol in order to secure reductions in CHD mortality.

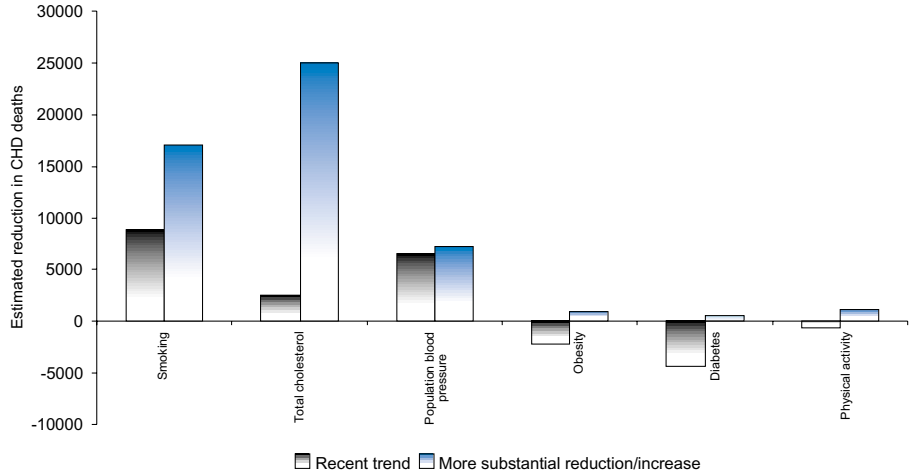
104 Nissen SE, Tuzcu EM, Schoenhagen P, et al for the REVERSAL Investigators. Effect of intensive compared with moderate lipid-lowering therapy on progression of coronary atherosclerosis: a randomised controlled trial. JAMA 2004;291:1071-80

105 Nissen se, et al (2006) Effects of Very High-Intensity Statin Therapy on Regression of Coronary Atherosclerosis JAMA Published online March 13 2006

106 Conon C, et al. Meta-Analysis of Cardiovascular Outcomes Trial Comparing Intensive Verses Moderate Statin Therapy. Journal of American College of Cardiology 2006. Vol 48, No 3 jjacc 2006: 04070

107 JBS 2: Joint British Societies' Guidelines on Prevention of Cardiovascular Disease in Clinical Practice. Published in Heart. December 2005 Volume 91 Supplement V

Figure 4.8 Estimated Reductions in CHD Mortality in England and Wales, 2000 - 2010



Source: Unalet al (2005) Small Changes in United Kingdom Cardiovascular Risk Factors Could Halve Coronary Heart Disease Mortality Journal of Clinical Epidemiology 58 733-740

4.7 Thrombolytic Medicines – A Case Study

Thrombolytic medicines are used following a heart attack. They work by breaking down the clot that has caused the heart attack so that the blood flow to the heart muscle can be restored to prevent further damage and assist healing. The sooner that blood flow can be restored, the greater the chances of avoiding further damage to the heart. Patients should be given thrombolysis within 60 minutes of calling for professional help (the 'call-to-needle' time) and within 20 minutes of arriving at hospital ('door-to-needle' time).[108]

Major innovations have occurred in thrombolytics. The relatively older thrombolytic, *Streptokinase*, has been available since before the 1970s, but newer alternatives are now available and offer substantial benefits for patients. The way in which thrombolytics can be given to patients has changed (for example from a drip to a more rapid injection) and they can now be given to patients more than once. The older thrombolytic could be given only once because it led to the development of antibodies that rendered it inactive if given again.

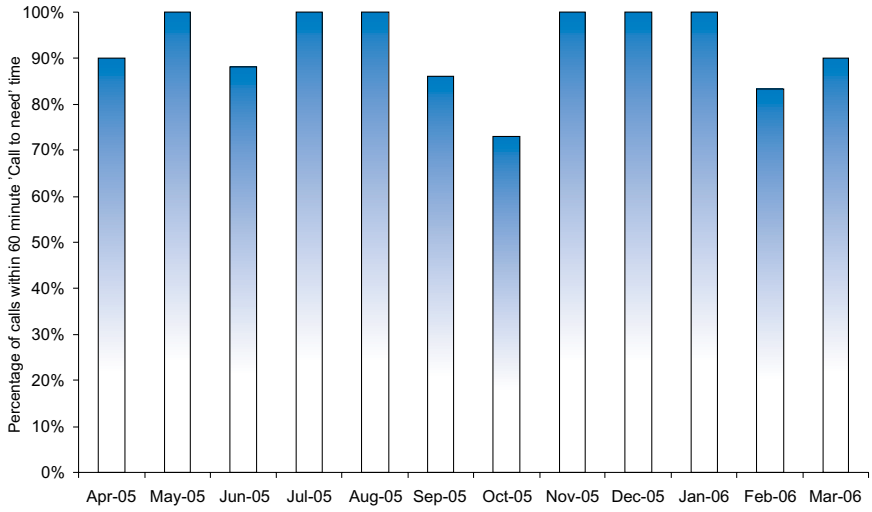
The importance of thrombolysis has been recognised in Wales. The Mid and South West Wales Cardiac Network reached agreement on the clinical evidence and precedent for early thrombolysis, administered by trained paramedics in 2003/4. It has been noted that *"pre-hospital thrombolysis has demonstrable benefits for patients who suffer a heart attack in terms of timely treatment, reduction in mortality*

108 NICE Technology Appraisal Guidance No. 52, Guidance on the Use of Drugs for Early Thrombolysis in the Treatment of Acute Myocardial Infarction

and morbidity outcomes. Early thrombolysis treatment also has potential benefits of the reduction in patients' hospital stay."[109]

Wales has been investing in making pre-hospital thrombolysis more widely available through additional paramedic staff trained to administer thrombolysis. This has led to more frequent delivery of pre-hospital thrombolysis. In April 05 to March 06, pre-hospital thrombolysis was administered 107 times, compared to 32 times from June 04 to March 05.[110] There is also a good record for delivering thrombolysis within the 60 minute 'call-to-needle' goal (Figure 4.9), although overall 'call-to-needle' times require improvement. [111]

Figure 4.9 Percentage of Calls Within the 60 Minute 'Call-To-Needle' Time, Wales, April 2005-March 2006



Source: Welsh Ambulance Services NHS Trust Pre-hospital thrombolysis Clinical Audit Report 31st March 2006
Note: Percentage includes clinical exceptions added to the numerator

109 Cardiac Networks Co-ordinating Group Annual Report 2003-2004

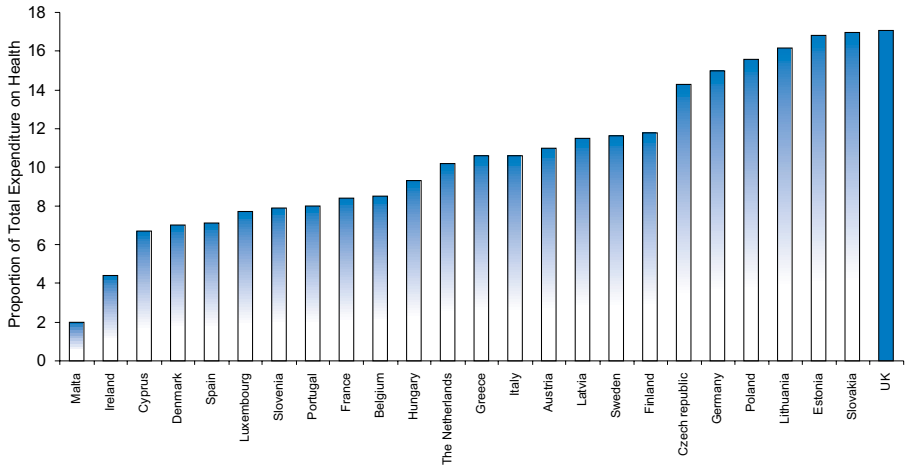
110 Welsh Ambulance Services NHS Trust, Pre-hospital Thrombolysis Clinical Audit Report 31st March 2006

111 Welsh Ambulance Services NHS Trust, Pre-hospital Thrombolysis Clinical Audit Report 31st March 2006

4.8 Current Impact of CHD on the Health System

The impact of CHD on health systems can be substantial. An international comparison highlights that the relative cost to the health system is high in the UK compared to a number of other countries (this is because of a range of factors including differences in prevalence and approaches to managing CHD). Figure 4.10 illustrate the comparison.

Figure 4.10 Proportion of Health Care Expenditure Accounted for by CHD, International Comparison, 2003



Source: Leal, J et al (2006) Economic Burden of Cardiovascular Diseases in the Enlarged European Union, European Heart Journal Advance Access Published 22nd February 2006

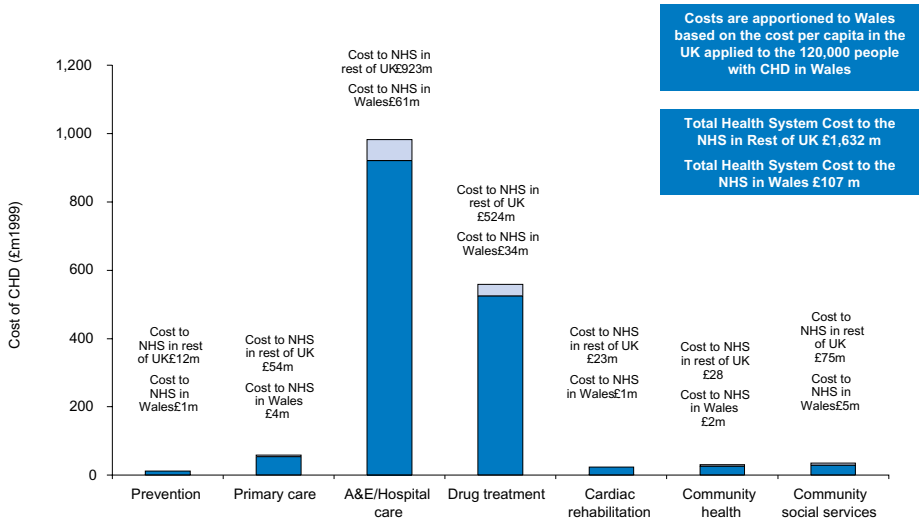
There is little information on the impact of CHD on the health system in Wales, although analysis of prescribing cost data for 2004 in Wales shows that cardiovascular prescribing accounts for around 26 per cent of total expenditure on prescribing, of which a large part is likely to be related to CHD.[112] We can however derive an indicative estimate of the costs of CHD to the health system in Wales by applying per capita estimates of the unit costs of CHD from a UK study and apply these to just over 120,000 people who have CHD in Wales (Figure 4.11). This is imperfect but provides an understanding of the relative scale of the impact. In line with our previous work in Scotland we draw on a study by Liu et al.[113] This suggests that CHD is costing the NHS in Wales, based on just over 120,000 with CHD, in the region of £107 million per year (in 1999 financial values). We have not uprated the financial values in order to allow

112 Calculated from: Prescriptions dispensed in the community in Wales, 2000 to 2004 SDR 50/2005 http://www.wales.gov.uk/keypubstatisticsforwales/content/publication/health/2005/sdr50-2005/sdr50-2005.pdf

113 Liu et al (2002) "The Economic Burden of Coronary Heart Disease in the UK" Heart Vol 88, pp 597-603 and corrected data personal communication to NERA (15.3.04)

comparability with our estimates in previous reports and with the original Liu et al study. This analysis also highlights the high burden borne by the hospital sector (accounting for almost 60% of the total cost). A more recent study has estimated the cost of CHD to the UK averaged across the whole population is €84 per person.[114] Applying this estimate to the 2.9 million people living in Wales[115] suggests that the cost would be €244 million or £172 million in 2005.

Figure 4.11 Estimated Cost of CHD to the Health System, Wales, (1999 Financial Values)



Source: NERA calculations using Liu et al (2002) The Economic Burden of Coronary Heart Disease in the UK Heart Vol 88, pp 597-603 and corrected data personal communication to NERA (15.3.04)

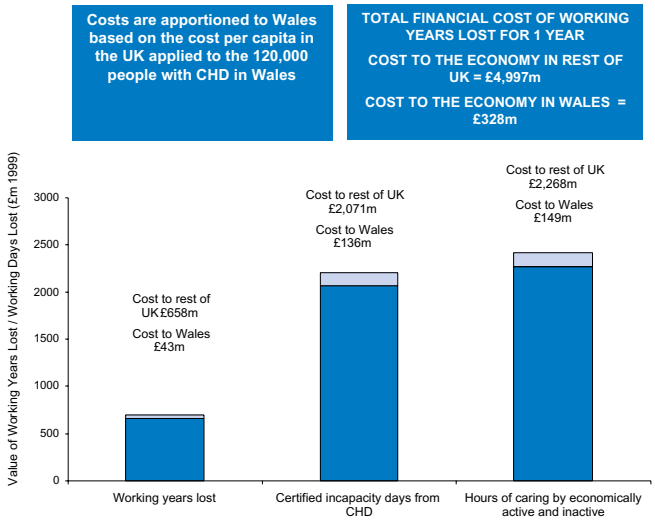
4.9 Current Impact of CHD on the Economy

We can build on estimates of the cost of CHD to the UK economy to approximate the cost to the economy in Wales (again using 1999 financial values). Figure 4.12 illustrates our estimates, which are calculated by applying per capita costs to the 120,000 people with CHD in Wales.

114 Leal, J et al (2006) Economic Burden of Cardiovascular Diseases in the Enlarged European Union, European Health Journal Advance Access Published 22nd February 2006

115 http:www.statistics.gov.uk/census2001/pyramids/pages/w.asp

Figure 4.12 Estimated Cost of CHD to the Economy, Wales, (1999 values)



Source: NERA calculations using Liu et al (2002) The Economic Burden of Coronary Heart Disease in the UK Heart Vol 88, pp 597-603

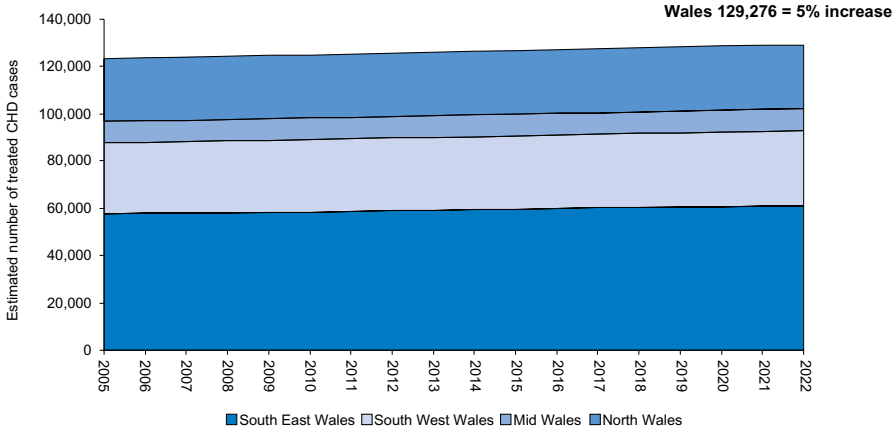
Recent estimates suggest that the total cost to the UK from CHD is in the region of £7.9 billion a year, or a cost per capita of £133. Forty five per cent is related to direct health care costs, 24 per cent to productivity losses, and a final 19 per cent to the informal care.[116]

4.10 CHD in the Future

Reflecting the uncertainties in the true number of people with CHD we have estimated the likely burden of CHD in the future using both data from the CHD register (which does not allow us to account for ageing) and information from the Welsh Health Survey (which does allow us to account for ageing). Figure 4.13 and Figure 4.14 illustrate our estimates. They are built up from applying prevalence rates to population forecasts for Wales from the Government Actuary Department. The two forecasts differ markedly and highlight the need for a consistent set of data in Wales, including information by age-group, to understand the drivers of change in the burden of CHD over time. In both, however, there is a substantial increase in the number of cases and this means that there will be an increase in demand for health services from those with CHD in the future.

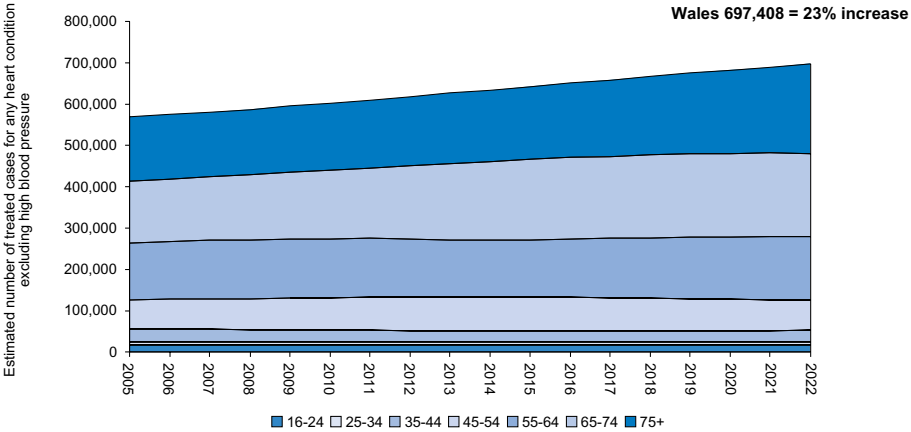
116 British Heart Foundation Statistics Database 2006

Figure 4.13 Forecasted Number of People Treated for CHD, Welsh Regions, 2005 - 2022



Source: NERA calculations using Statistical Bulletin: Disease Pr evalence in Wales: General Medical Services Quality and Outcomes Framework SB 38/2005 15 June 2005 and 2003 -Based National and Sub-national Population Projections for Wales SB 40/2005 23 June 2005

Figure 4.14 Forecasted Number of People Treated for any Heart Condition, Excluding High Blood Pressure, Wales, 2005 - 2022



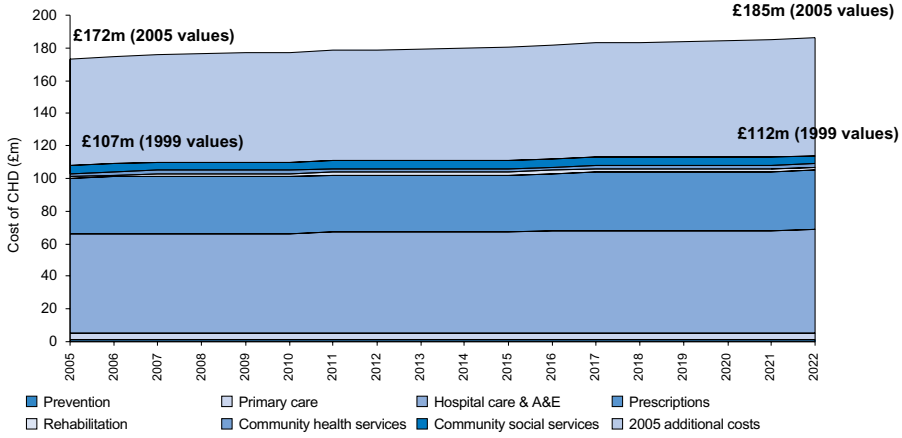
Source: NERA calculations using Welsh Health Survey Data 2003/4 for percentage of adults reported being treated for any heart disease excluding high blood pressure by age and GAD population forecast

The number of people with CHD is also likely to rise because of trends in lifestyle. For example, the National Audit Office (NAO) suggests that by 2010 over a quarter of all adults are going to be obese.[117] The NAO also suggest that being obese increases the relative risk for heart attacks by 3.2 per cent and 1.5 per cent for women and men respectively. Obesity increases the relative risk of angina by 1.8 per cent for both women and men.

4.11 Future Economic and Social Cost of CHD

The cost of CHD to the health sector will also rise given the increase in the number of people with the disease. We can proxy the likely scale by drawing on the available information on the cost of CHD. We use 2 measures: the first based on 1999 values, which breaks down costs across different components of the health sector; and another based on 2005 values, which uses average per capita cost across the entire Welsh population. Our estimates are given in Figure 4.15. Both of these measures of the cost are likely to be under-estimating the true costs. This reflects the range in estimates of CHD prevalence, which suggests that QoF data may understate the true prevalence of CHD in Wales. Also, this forecast does not account for the ageing and lifestyle trends in the population which will increase the numbers with CHD further.

Figure 4.15 Scenarios on the Future Cost of CHD, Wales, 2005 – 2022 (1999 Financial Values)



Source: NERA calculation using Liu et al (2002) The Economic Burden of Coronary Heart Disease in the UK Heart Vol 88, pp 597-603 and corrected data personal communication to NERA (15.3.04) Statistical Bulletin: Disease Prevalence in Wales: General Medical Services Quality and Outcomes Framework SB 38/2005 15 June 2005 and 2003-Based National and Sub-national Population Projections for Wales SB 40/2005 23 June 2005 and Leal, J et al (2006) Economic Burden of Cardiovascular Diseases in the Enlarged European Union, European Health Journal Advance Access Published 22nd February 2006

117 National Audit Office (2001) Tackling Obesity in England http://www.nao.org.uk/publications/nao_reports/00-01/0001220.pdf

Table 4.4 illustrates projected economic costs of CHD in Wales drawing on Liu et al (2002)[118] and including both direct health care costs and the wider costs on the economy. The costs are set to increase to in excess of £457 million by 2022 (1999 values).

Table 4.4 Projected Economic Cost of CHD in Wales, £m (1999 Financial Values)

	2005	2010	2015	2020	2022
Direct health care cost	107	109	110	112	112
Productivity loss:					
- Sickness absence	136	138	140	142	143
- Early death	43	44	44	45	45
Informal care cost	149	151	153	155	156
Total economic cost	**435**	**442**	**448**	**454**	**457**

Source: NERA calculations based on J L Y Liu, N Maniadakis, A Gray, M Rayner (2002) The economic burden of coronary heart disease in the UK, Heart 88: 597-603 and data correction from Gray, A (15.3.04) personal communication to NERA

118 J L Y Liu, N Maniadakis, A Gray, M Rayner (2002) The economic burden of coronary heart disease in the UK, Heart 88: 597-603

5 Facing the Future Challenges

The significance of the challenge of managing long-term chronic conditions in Wales is clear. Most commentators, including the National Public Health Service for Wales, agree that there will be an increasing burden on health and social care. Based on current prevalence figures for chronic conditions, within the next decade there could be 12 percent more adults with at least one chronic condition. The number of 65+ year olds in the population has been projected to increase by 20 percent. These two forecasts give rise to an extra 70,000 older people with a chronic condition in Wales by 2015. Given these figures, all aspects of service and health provision need a recognised cost-effective evidence base before widespread adoption. The increasing incidence of diabetes and CHD are two significant drivers of this growth.

The challenge this brings to Wales is all encompassing. The issue for policy-makers is how to work across healthcare boundaries and engage individuals, public health, and social care in managing the risk factors that drive this growth. Public responsibility and engagement, for example improved diet and lifestyle are important, as is the encouragement and support needed for patients to understand their own health and needs. However, once diagnosed the issue for the health service is how to best manage patients in the long term. This matters because, as this report highlights, the optimum short-term treatment and management of chronic conditions is linked to improvements in health and reduced long-term acute service needs. Admissions can be prevented if patients with a chronic condition are well managed in primary, community and intermediate care.[119]

From the statistics outlined in this report there is a variation in the prevalence, diagnosis and care of those with diabetes across Wales. Tight management of Type 2 diabetes can deliver cost-effective and quality of life improvements for patients at only a modest cost to the health service. Diabetic complications are less severe, as a result. Whilst evidence is limited, Diabetes UK suggest that patients who tightly manage their diabetes within the NSF targets are in a minority, yet improvements in service capacity and planning, added to innovative technologies have made tight management of diabetes an achievable aim. Improvements in medicine, blood testing and drug delivery mechanisms all support better treatment of diabetes. Such innovation is a dynamic process and future innovations, such as inhaled insulin, could improve concordance with treatment regimes. It is critical that such innovations are encouraged and that the long-term cost-effectiveness is recognised by both clinicians and commissioners.

119 "A profile of long-term and chronic conditions in Wales", June 2005, NPHS Wales

A similar message applies to CHD. Lifestyle and diet are important risk factors for CHD and the challenge for public health is to demonstrate cost-effective, long-term population behavioural change. The relatively high levels of deprivation in Wales only exacerbate the challenge. The health service is engaging in this challenge and mortality rates for CHD in Wales are falling, although not as fast as in other parts of Europe.

The use of statins to help reduce cholesterol levels has also grown in Wales and is predicted to deliver significant benefits to the health economy. We estimate that over a 5-year period, over 5,000 lives will be saved and around £62 million of hospital interventions will be avoided.

The experience with thrombolytic medicines illustrates the benefit of working across health boundaries and coordinating interventions. Efforts to improve "call-to-needle time" have improved access to innovative medicines, ensuring more patients benefit from their advantages. However, it is often forgotten that these changes in service provision have only been made possible through the development of innovative thrombolytics, which are more easily administered than in the past.

Innovation continues with the development of medicines with improved risk/benefit profiles, improved compliance which expand treatment options. NICE, AWMSG and others involved in developing guidance and protocols, along with policy makers have a growing responsibility to ensure that these innovations are used optimally.

An evidence-based approach to tackling chronic disease, including the optimum use of new and established medicines is fundamental to the success of "Designed for Life" and its aims of reduced hospital admissions and improved health outcomes for the population of Wales. The challenge of the future management of long-term conditions in Wales is very real and it is critical that the role and contributions of all stakeholders are encouraged and utilised.

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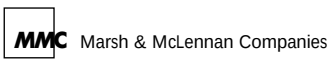

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