



Costs of eating disorders in England: Economic impacts of anorexia nervosa, bulimia nervosa and other disorders, focussing on young people

May 2012

Pro Bono Economics is pleased to introduce this report, the work of John Henderson from the Department of Health.

Pro Bono Economics was founded in 2009 with the aim of bringing the skills of economists into the third sector, pro bono. Many charities could benefit from the skills of economists, particularly in helping to measure their results and impact. We hope that by bringing together economists and charities we can not only benefit individual charities but also publish economic analysis that can help the third sector more broadly.

Beat works across the UK supporting people affected by eating disorders – sufferers and their family and friends – and campaigns on their behalf. They provide helplines, run support groups and work to raise awareness, making information on eating disorders available through a number of channels.

To date, information on the cost to society of eating disorders has been scant. John Henderson sought to bring together data on the subject in order to gain a view on the cost of eating disorders in England, particularly looking at impacts for young people.

We hope that this report will contribute towards the work of Beat in raising awareness of eating disorders and, by adding an economic dimension to the argument, strengthen the case for intervention. We also hope that it reinforces the PBE message that economic analysis can have value in the third sector.

We would like to thank Derrick Jones and Rebekha Wright at the Food Standards Agency who peer reviewed this piece of work. We are also very grateful for comments and advice from Susan Ringwood, Chief Executive of Beat; Michael Parsonage, Centre for Mental Health; and Panos Zerdevas, Department of Health.

The views expressed in this report are entirely those of the author and do not represent the views of the Department of Health.

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Contents

Costs of eating disorders in England:	4
Abstract:	4
Introduction and Background	4
The economic context	4
Aims of this paper	5
What are eating disorders?	7
Types of eating disorders	7
Classification of eating disorders	7
Economic and social costs in England	7
Prevalence	9
Adult psychiatric morbidity in UK	10
Prevalence in USA – teenagers	12
Prevalence in US adults	13
Healthcare Costs	15
NHS hospital admissions	15
Trends	15
Age profile	16
Age and type of eating disorder profile	17
NHS healthcare costs	17
Number of admissions	17
Inpatient days	17
Inpatient costs	18
Costs for young people versus all age groups	18
Overall costs of NHS inpatient care	18
Outpatient / A&E	19
Primary care	19
Costs of private healthcare	20
Total healthcare costs	22
Premature Mortality	23
What impact does mental illness have on life expectancy?	23
Cost of mortality	25
Disease burden	26
DALYs in Australia amongst females aged 15-24	26
Extrapolation to England	26
Comparison of ‘mortality’ and ‘disease burden’ approaches	28
Education, Employment & GDP	29
Long-term follow-up of cohorts	29
Educational impacts	30
Earnings impacts	30
Potential impact on earnings in England	32
Conclusion: Overall Total Costs For England	36

Costs of eating disorders in England:

Economic impacts of anorexia nervosa, bulimia nervosa and other disorders, focussing on young people

Abstract

Objective: To try to form a comprehensive view of the overall costs to society of key eating disorders in England, especially amongst young people, and the main elements of the costs, including costs to the NHS, to employers and employees, and the health burden.

Method: Based on search of available literature, and NHS data.

Results: Estimates of overall healthcare costs are £80m-£100m, costs of reduced GDP may be £0.23bn-£2.9bn, and costs of reduced length of life and health around £0.95bn-£6.6bn, making a likely total of at least £1.26bn per year.

Conclusion: While there are substantial costs for NHS and private health-care, the costs of lost output and human costs are considerably higher.

Introduction and Background

An eating disorder is a psychological condition, characterised by abnormal eating habits that are detrimental to physical and mental health. In February 2011, the Department of Health launched a cross-Government strategy for Mental Health, “*No Health Without Mental Health*”¹. This noted the high costs of mental health problems:

The economic context

1.17 Mental ill health represents up to 23% of the total burden of ill health in the UK – the largest single cause of disability. Nearly 11% of England’s annual secondary care health budget is spent on mental health. Estimates have suggested that the cost of treating mental health problems could double over the next 20 years. More than £2 billion is spent annually on social care for people with mental health problems.

¹ “No Health Without Mental Health: A Cross-Government Mental Health Outcomes Strategy for People of All Ages ”

<http://www.dh.gov.uk/en/Healthcare/Mentalhealth/MentalHealthStrategy/index.htm>

² See chart on following page.

³ [Parliamentary Office of Science & Technology \(2007\) Eating Disorders, Postnote 287, UK](#)

1.18 Detailed estimates in 2003 put the costs of mental health problems in England at £77 billion, including costs of lost productivity and the wider impacts on wellbeing. More recent estimates suggest that the costs may now be closer to £105 billion², of which around £30 billion is work related. Sickness absence due to mental health problems costs the UK economy £8.4 billion a year and also results in £15.1 billion in reduced productivity. Mental health problems add considerably to the costs of the education and criminal justice systems and homelessness services. They are also the most common reason for incapacity benefits claims – around 43% of the 2.6 million people on long-term health-related benefits have a mental or behavioural disorder as their primary condition.

1.19 There are also the further, incalculable costs to the individual, their family and their community of lost potential and unrealised hopes and goals. The majority of mental health problems affect people early, interrupting their education and limiting their life chances.

1.20 We spend a great deal of public money on dealing with the consequences of mental health problems. Much of this money could be spent more efficiently, and many of the personal, social and economic costs could be prevented, by addressing the causes of these problems and identifying and treating them if, and as soon as, they arise.

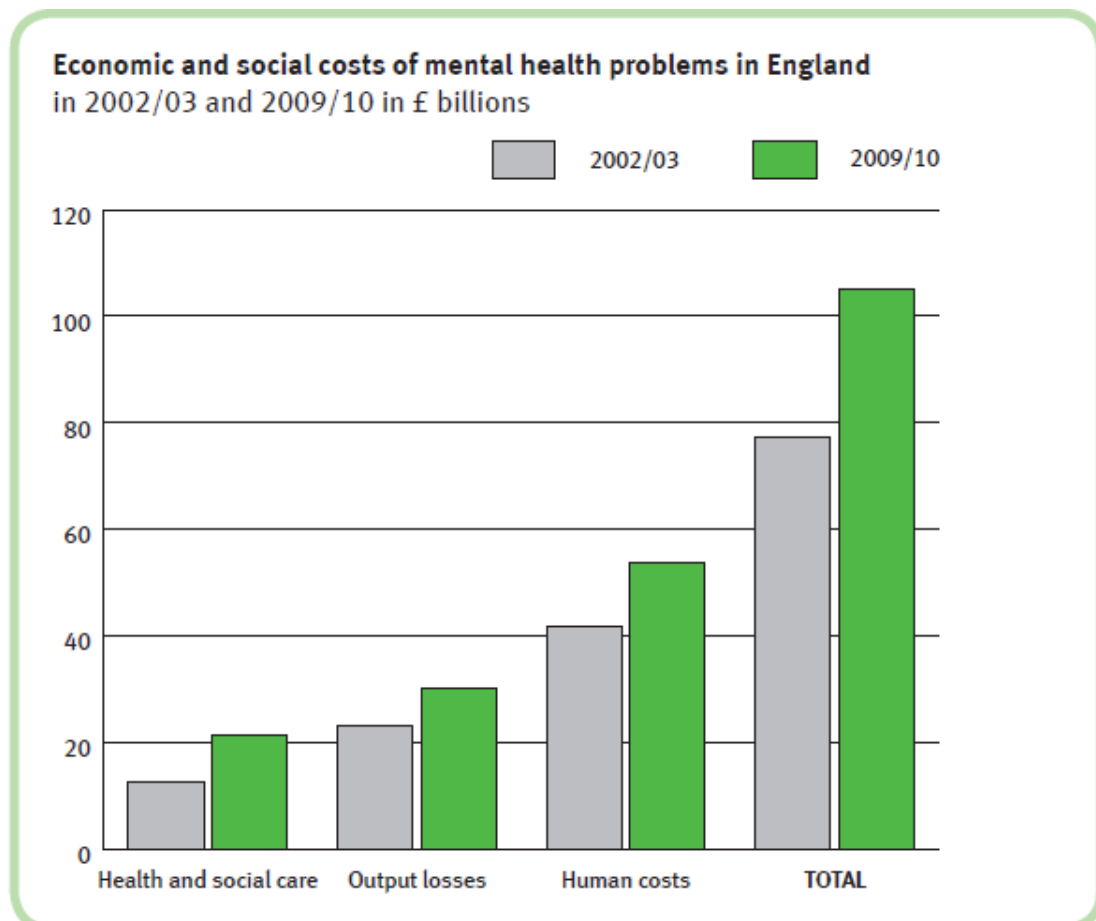
Aims of this paper

With this as the context, this report for Beat aims to set out and update the main economic impacts of eating disorders, such as anorexia nervosa and bulimia nervosa, in young people, and other age groups. A paper by the UK Parliamentary Office for Science and Technology³ noted that “The financial burden posed by eating disorders has never been properly estimated, but is likely to be substantial.” This report aims to address that deficiency.

² See chart on following page.

³ Parliamentary Office of Science & Technology (2007): *Eating Disorders*; Postnote 287, UK Parliament: <http://www.parliament.uk/business/publications/research/briefing-papers/POST-PN-287> Subsequently, ref 23 below also addressed the deficiency; this report aims to update and expand the information in that study.

As in the chart below, the costs here are set out in terms of healthcare costs, output losses, and human costs.



Source: Centre for Mental Health⁴

⁴ "The economic and social costs of mental health problems in 2009/10"
http://www.centreformentalhealth.org.uk/pdfs/Economic_and_social_costs_2010.pdf
Note that in the above chart, the figures for the earlier year were just updated using relevant price indices to give figures in 2009/10 prices.

WHAT ARE EATING DISORDERS?⁵

Eating disorders are characterised by an abnormal attitude towards food that causes someone to change their eating habits and behaviour.

A person with an eating disorder may focus excessively on their weight and shape, leading them to make unhealthy choices about food with damaging results to their health.

Types of eating disorders

Eating disorders include a range of conditions that can affect someone physically, psychologically and socially. The most common eating disorders are:

[anorexia nervosa](#) (AN), when someone tries to keep their weight as low as possible, for example by starving themselves or exercising excessively
[bulimia nervosa](#) (BN), when someone tries to control their weight by binge eating and then deliberately being sick or using laxatives
[binge eating](#), when someone feels compelled to overeat.

Classification of eating disorders⁶

A diagnosis of AN requires all of the following features:

- a body weight at least 15% below that considered normal for a person's age and height, and refusal to maintain weight at a normal level;
- an intense fear of gaining weight or becoming fat;
- a distorted perception of one's body weight and shape, for example a conviction that one is overweight, and ideas of self-image and self worth that are strongly influenced by body weight;
- amenorrhoea (the absence of menstrual periods) in female patients, for at least three consecutive months.

A diagnosis of BN requires all of the following features:

- recurrent episodes of binge eating, in which the person eats an unusually large amount of food, whilst experiencing a sense of lack of control over eating;
- recurrent inappropriate compensatory behaviour, such as self-induced vomiting, misuse of medication, fasting or excessive exercise;
- a self-image that is unduly influenced by body weight or shape.

The behaviours described above must have occurred on average at least twice a week for at least three months.

Economic and social costs in England

The figures in this report are expressed in terms of the annual costs for England – with a population of about 52.5 million people in 2011⁷. They are also illustrated for populations of 100,000 in England – which may be a scale that local healthcare organisations can more readily relate to.

⁵ Source: NHS Choices: <http://www.nhs.uk/Conditions/Eating-disorders/Pages/Introduction.aspx>

⁶ Source: reference 3 above.

⁷ Annual Abstract of Statistics, 2010
http://www.statistics.gov.uk/downloads/theme_compendia/AA2010/aa2010final.pdf

While eating disorders tend to be more common at younger ages, and so younger people are a key focus of this report, costs for all ages are nevertheless included where possible⁸.

⁸ Part of the reason for variations in the age ranges included owes to the disparate set of sources used, which did not have common age group coverage.

Prevalence

Determining prevalence is not straightforward as there are differing estimates of the prevalence and incidence of anorexia nervosa and bulimia nervosa. Some recent examples are given below.

INCIDENCE

*Scottish NHS Mental Health Strategy*⁹ (2004):

Anorexia nervosa: new cases 8.1/100,000 total population

Bulimia nervosa: new cases 11.4/100,000 total population

PREVALENCE: INTERNATIONAL (DUTCH STUDY)

Review of the prevalence and incidence of eating disorders

Hoek & van Hoeken, 2003¹⁰:

Anorexia nervosa: 370/100,000 young women

& 40/100,000 young men (assuming 10% of cases are male)

Bulimia nervosa: 1,500/100,000 young women

PREVALENCE IN YOUNG TEENAGERS, GB

A survey carried out by the Office for National Statistics (on behalf of the Department of Health and the Scottish Executive):

*"Mental health of children and young people in Great Britain, 2004"*¹¹:

Prevalence of mental disorders, children aged 11-16

Eating disorders: 0.4%

= 400/100,000 11-16 year-olds

PREVALENCE IN TEENAGERS, UK

Royal College of Psychiatrists: *"Eating Disorders – Key Facts"*¹²

Who gets eating disorders?

"Eating disorders are around ten times more common in girls and women. In teenagers, they affect seven girls in every 1000 but only one boy in every 1000"

= 700/100,000 girls

& 100/100,000 boys

= approx 400/100,000 teenagers

⁹ "Framework For Mental Health Services In Scotland" (2004)

http://www.show.scot.nhs.uk/publications/mental_health_services/mhs/ServiceElements/ServiceProfiles/SP10.pdf

¹⁰ Hoek HW, van Hoeken D (2003). 'Review of the prevalence and incidence of eating disorders'. *International Journal of Eating Disorders*, vol 34, pp 383–96.

¹¹ "Mental health of children and young people in Great Britain, 2004", Table 4.1, published 31 August 2005: <http://www.ic.nhs.uk/pubs/mentalhealth04>

¹² Royal College of Psychiatrists: Eating Disorders – Key Facts
<http://www.rcpsych.ac.uk/mentalhealthinfo/problems/eatingdisorders/eatingdisorderskeyfacts.aspx>

The severity threshold for defining eating disorders may vary between assessors and studies, which may partly explain differing estimates of prevalence. Further, the above estimates of prevalence may be strongly influenced by rates of clinically diagnosed cases who are being treated by the healthcare system. (Moreover, clinical definitions too may evolve over time as understanding improves¹³.) So, in addition to those included in the above estimates of prevalence, there may be a wider group of people many of whom are undiagnosed and not in treatment.

Adult psychiatric morbidity in UK

Perhaps the most recent and definitive source for England is the 2007 *Adult Psychiatric Morbidity Survey* (APMS) a general household population survey, which in the 2007 survey included the “SCOFF” screening tool to identify eating disorders.

The screen was found to have good specificity and sensitivity, as demonstrated by strong concordance with clinical diagnosis. However, as with other lay administered screening tools, the prevalence obtained is likely to be an overestimate of the rates of eating disorder that would be found through clinical investigation. Diagnosis of an eating disorder requires a full clinical examination.¹⁴

This source defined a positive indication of an eating disorder as a score of 2 or more items answered positively out of the 5 asked about. An additional question was asked of this group: “Did your feelings about food interfere with your ability to work, meet personal responsibilities and/or enjoy a social life?”. Findings were as in the table below:

¹³ DSM-5 is the planned fifth edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*. It is due for publication in May 2013 and will supersede the DSM-IV which was last revised in 2000. DSM-5 will include new recognition of binge eating disorder and improved criteria for anorexia nervosa and bulimia nervosa, as well as recommended changes in the definitions of some eating disorders now described as beginning in infancy and childhood to emphasize that they may also develop in older individuals. <http://en.wikipedia.org/wiki/DSM-5>

¹⁴ NHS Information Centre, NatCen and University of Leicester (2009) *Adult Psychiatric Morbidity Survey* edited by Sally McManus, Howard Meltzer, Traolach Brugha, Paul Bebbington, Rachel Jenkins: <http://www.ic.nhs.uk/statistics-and-data-collections/mental-health/mental-health-surveys/adult-psychiatric-morbidity-in-england-2007-results-of-a-household-survey>

Screen positive for eating disorder in past year, by age and sex								
All adults								2007
SCOFF score ^a	Age group							All
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
2 or more ^b	6.1	5.1	3.3	3.7	2.0	1.5	0.5	3.5
2 or more with significant impact	1.7	0.7	0.3	0.8	0.1	0.3	-	0.6
Women								
2 or more ^b	20.3	12.6	10.0	9.9	3.9	2.4	0.9	9.2
2 or more with significant impact	5.4	3.6	2.5	3.1	0.9	0.6	0.1	2.5
All adults								
2 or more ^b	13.1	8.9	6.6	6.8	3.0	1.9	0.8	6.4
2 or more with significant impact	3.5	2.1	1.4	1.9	0.5	0.4	0.1	1.6

As there are approximately 7 million people in England aged from 15-24, applying the rate found in the APMS – ie 3.5% – would suggest that there are likely to be about 245,000 people with eating disorders that interfere with their life in this age group (over three quarters of these being female)¹⁵. This would equate to about 470 young people aged 15-24 with such eating disorders in a general population of 100,000.

The rates found by the APMS peaked in the 16-24 age group. Rates in people of younger ages are not available from the APMS, but they are unlikely to be negligible. Indeed the NHS data (see next section) suggest as many hospital admissions amongst 10 to 14 year-olds as amongst 20 to 24 year-olds. As an estimate of prevalence in the 10-14 group we therefore use the rate found by the APMS for the 25-34 group – ie 2.1%. This would increase the total number in England with eating disorders aged under 25 to about 310,000, and the number in a general population of 100,000 would increase to nearly 600.

In the general population there are about 43 million people (22m women and 21m men) in England aged 15 and over, so applying the rates found in the APMS would suggest that there are likely to be about 675,000 adults with eating disorders that

¹⁵ It is thought that the average duration of eating disorders is about 6 years (source: Beat). This would imply that the annual incidence was about one sixth of the prevalence – if so, about 40,000 young people in England may develop an eating disorder each year.

interfere with their life (550,000 women and 125,000 men). Including children aged 10-14 would increase this to about 740,000. This would equate to about 1400 people with such eating disorders in a general population of 100,000¹⁶.

Applying some of the other estimates of prevalence would suggest much lower numbers. For example, as estimated by the report *Mental Health of Children and Young People in GB*¹¹, or the Royal College of Psychiatrists¹², if the rate were only 400 per 100,000 (0.4%) then the corresponding number of young people aged 15-24 may be around 28,000. And if the number of adults with eating disorders is 2¾ times the number of young people aged 15-24 (as suggested by the APMS) then the overall number of adults may be around 77,000. However, as suggested above, such lower numbers are likely to omit many undiagnosed, untreated, and less severe cases.

Prevalence in USA – teenagers

By way of comparison, prevalence figures for the USA are shown below.

The first chart¹⁷ gives eating disorder prevalence in US teenagers, and defines an eating disorder broadly as anorexia nervosa, bulimia nervosa, and/or binge eating disorder. The prevalence rate among 17-18 year-olds, at 3%, is a little lower than the 3.5% found by the APMS. However, this could be expected as the US figures include the three specific disorders mentioned above, whereas the APMS figures for England are based on self reports of any eating disorder that interferes with life.

While the differing definitions hinder direct comparisons, the US rates nevertheless seem similar to those found by the APMS. This chart also shows that girls are more than 2½ times as likely as boys to have an eating disorder (whereas the APMS had a ratio slightly over 3 in the 15-24 age group).

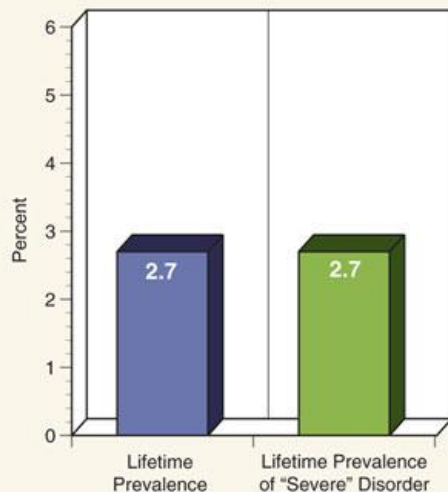
¹⁶ The APMS notes that eating disorders are strongly associated with psychosis and also with borderline personality disorder, and there are weaker associations with other conditions such as depression. Hence some costs that are attributed to eating disorders in the sections below may be partly attributable to these other co-morbidities. Unfortunately, from the data we have, there is no practical way of disentangling their relative contributions; however, this reinforces the need to be cautious about causality.

¹⁷ Source: National Institute of Mental Health:
http://www.nimh.nih.gov/statistics/1EAT_CHILD.shtml

Eating Disorders

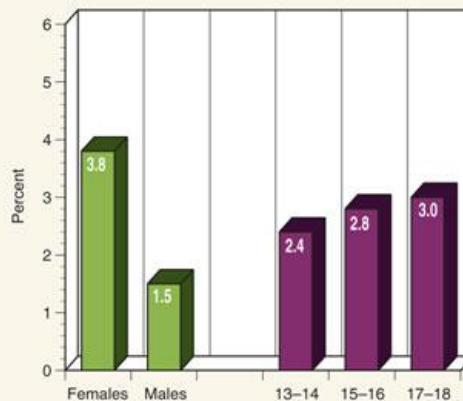
Lifetime Prevalence of 13 to 18 year olds

- **Lifetime Prevalence:** 2.7% of 13 to 18 year olds
- **Lifetime Prevalence of "Severe" Disorder:** 2.7% of 13 to 18 year olds have a "severe" disorder



Demographics (for lifetime prevalence)

- **Sex and Age**



- **Race:** Not Reported

Merikangas KR, He J, Burstein M, Swanson SA, Avenevoli S, Cui L, Benjet C, Georgiades K, Swendsen J. Lifetime prevalence of mental disorders in U.S. adolescents: Results from the National Comorbidity Study-Adolescent Supplement (NCS-A). *J Am Acad Child Adolesc Psychiatry*. 2010 Oct;49(10):980-989.

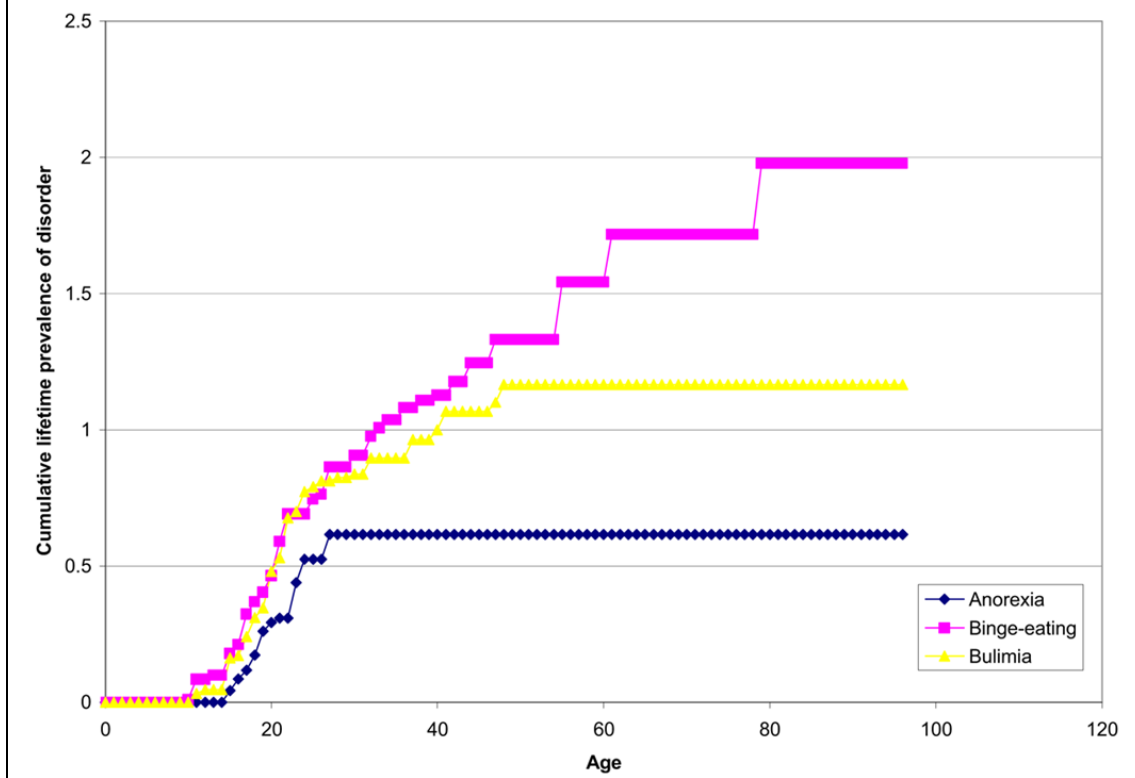
Prevalence in US adults

"The Prevalence and Correlates of Eating Disorders in the National Comorbidity Survey Replication"¹⁸ gave lifetime prevalence estimates of anorexia nervosa, bulimia nervosa, and binge eating disorder of 0.9%, 1.5%, and 3.5% among women, and 0.3%, 0.5%, and 2.0% among men.

The authors of this US study report that "Median age of onset of the ... disorders ranged from 18–21 years. The period of onset risk was shorter for anorexia nervosa than for the other disorders, with the earliest cases of the other disorders beginning about 5 years earlier than those of anorexia nervosa (ages 10 vs. 15), and no cases of anorexia nervosa beginning after the mid-20s". See chart below.

¹⁸ J I Hudson *et al* (2007), 'The Prevalence and Correlates of Eating Disorders in the National Comorbidity Survey Replication', *Biol Psychiatry*. 2007 February 1; 61(3): 348–358 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1892232/pdf/nihms19542.pdf>

Median age of onset in the USA ranged from 18–21 years: see chart.



Unfortunately it is not easy to use these for comparisons, as the figures for the USA are for cumulative lifetime risk, whereas the UK figures from the APMS are a single point-in-time snapshot. Nevertheless, the US figures indicate that the lifetime prevalence risk for women for the 3 disorders is 5.9% (0.9+1.5+3.5%), and for men it is 2.5% (0.3+0.5+2.0%). Further they indicate that the most common onset ages are the late teens and 20s. The APMS found prevalence of eating disorders that interfere with life was highest in the age group 16-24, at 5.4% for women and 1.7% for men. So the US and UK figures do not seem inconsistent.

Healthcare Costs

The NHS Hospital Episode Statistics (HES) on eating disorders have been analysed by the NHS Information Centre¹⁹. For this they classified eating disorders using the ICD-10²⁰ (Code *F50*) *Eating Disorders*. Key findings are set out here.

NHS hospital admissions

In the period from July 2009 to June 2010:

- There were 2,579 hospital admissions (termed “finished consultant episodes”, or FCEs) for all eating disorders compared to 2,316 in the previous 12 months, representing an increase of 11%.
- 90% (2,326) of the FCEs were female; this is the same as the previous 12 months when 90% (2,079) were female.
- The average episode duration was 38 days.

Trends

The general trend in admissions over the past couple of years has tended to be upwards overall. The chart below shows FCEs for eating disorders by month from June 2008 to June 2010.

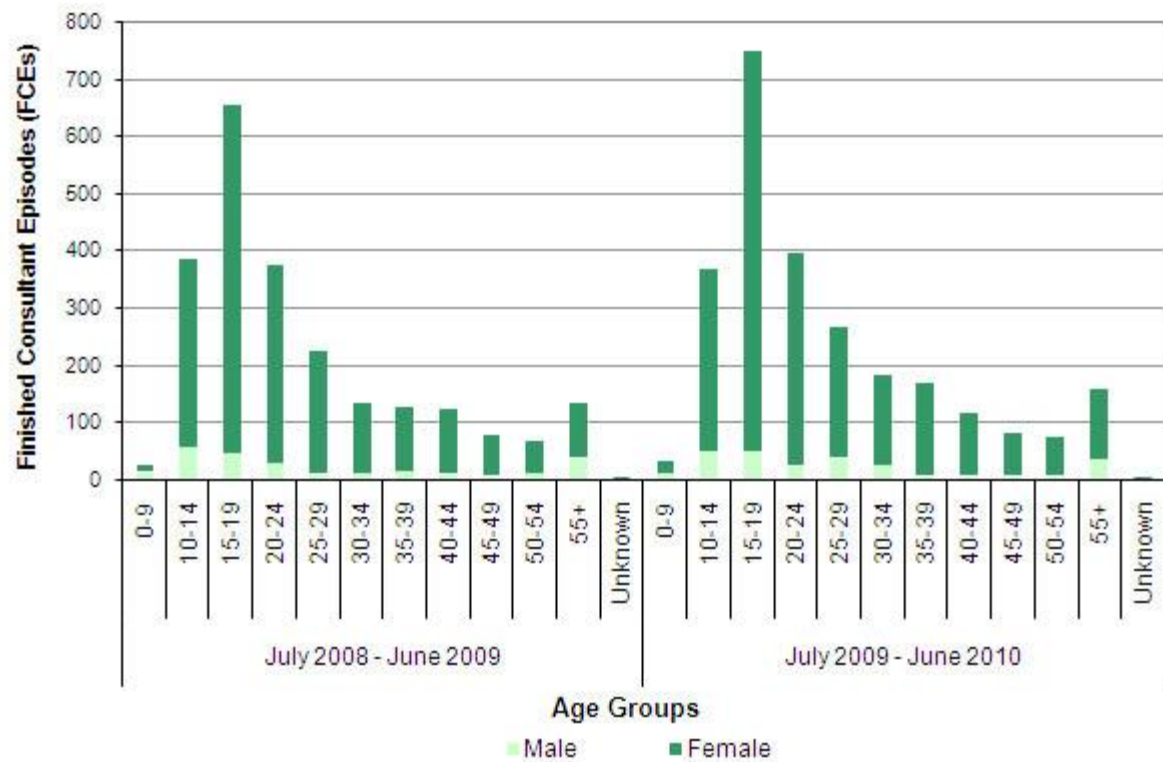
¹⁹ Hospital Episode Statistics, HESonline: ‘Topic of Interest – Eating Disorders’
<http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1489>

²⁰ The ICD is the international standard diagnostic classification system; ICD-10 is the tenth and latest revision currently in use: <http://www.who.int/classifications/icd/en/>



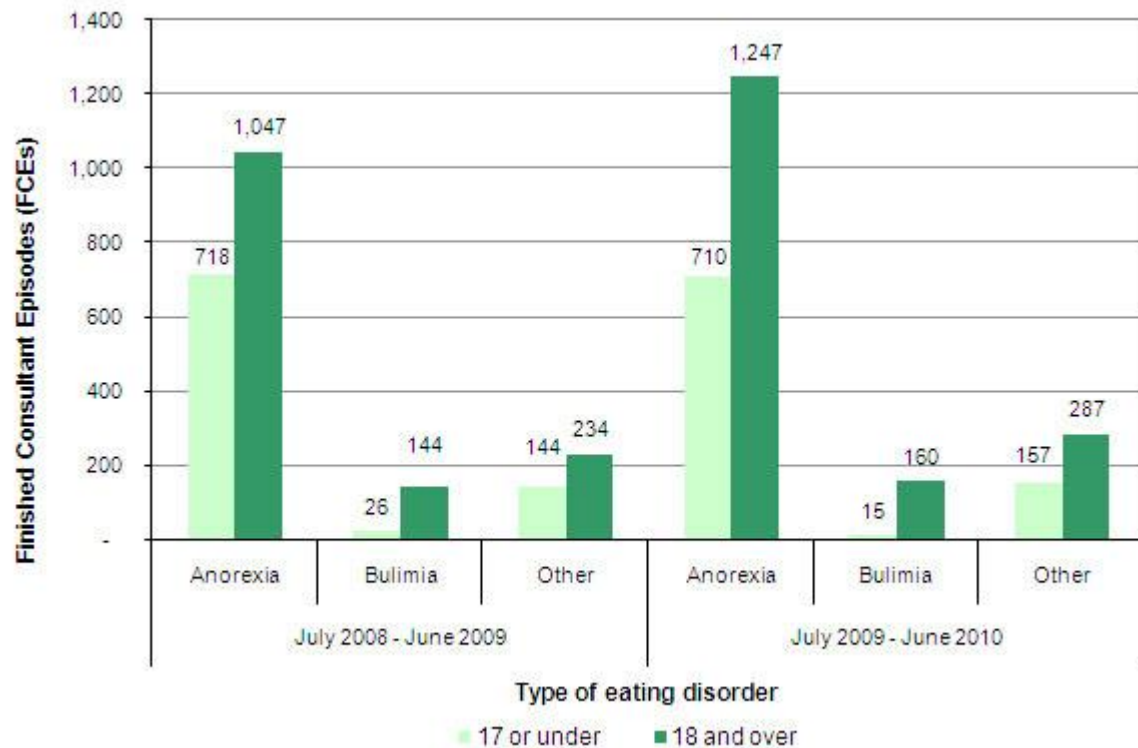
Age profile

The graph of HES data below shows that young women aged between 10 and 24 are most frequently admitted to hospital for an eating disorder.



Age and type of eating disorder profile

The graph of HES data below shows FCEs for eating disorders by type of disorder and by age from July 2008 to June 2010. Anorexia makes up the majority of admissions.



NHS healthcare costs

Number of admissions

There were 2,579 finished consultant episodes in England in the year to June 2010

⇒ FCEs 5/100,000 population per year

Inpatient days

The average episode in hospital lasted 38 days. Therefore the total number of inpatient days was:

98,000 inpatient days in England

⇒ IP days approx 200/100,000 population per year

Inpatient costs

We use average NHS unit costs for England. These are taken from the publication “Unit Costs of Health & Social Care” 2009/10²¹.

This has costs for both adults’ services and children’s services:

Specialist inpatient services - eating disorder (adults) – cost per bed day

£426 in 2009/10

or approximately £450 in 2011/12 prices

Children’s specialist inpatient services (weighted average of eating disorder, and mother and baby units)

£586 in 2009/10

or approximately £620 in 2011/12 prices

This gives an average²², for all ages, of about £510 per bed day.

Costs for young people versus all age groups

Young people aged 15-24 make up a little less than half the number of hospital admissions (around 45% of FCEs). Including those aged under 15 would increase this to about 60% of admissions. Hence we estimate that the NHS costs for young people aged under 25, are over half – perhaps 60% – of all the costs to the NHS of tackling eating disorders.

Overall costs of NHS inpatient care

Total number of inpatient days: 98,000 in England, at £510

⇒ IP days about 200/100,000 population per year, at £510

Total cost: about £50 million in England

⇒ 5 IP episodes: about £100,000 /100,000 population per year

(As above, over half of these sums would be for young people under 25.)

²¹ “Unit Costs of Health & Social Care” 2009/10; PSSRU, University of Kent
<http://www.pssru.ac.uk/uc/uc2010contents.htm>

²² Weighting adult to children’s costs at 2:1 (approximately). (Children = under 16 years.)

Outpatient / A&E

“Paying the Price”²³ assumes outpatient costs are approximately 40% of inpatient costs. This would imply a cost of about £20 million in England

⇒ & approx £40,000 /100,000 population per year

An alternative estimate can be derived from unpublished data from the NHS Hospital Episodes Statistics, which indicate that there were about 18,000 outpatient appointments for eating disorders in England in 2010. The cost of these, for adults, in “Unit Costs of Health & Social Care”²¹ was on average £158 per attendance in 2009/10. At 2011/12 prices, this would be about £170. Hence the total cost for 18,000 appointments would be about £3 million for England.

⇒ & approx £6,000 /100,000 population per year.

Primary care

We do not have direct data on GP care for people with eating disorders. One study²⁴ analysed new diagnoses of anorexia nervosa and bulimia nervosa in general practice, using the General Practice Research Database with data from GP practices covering over 3 million patients in the UK. They found the overall incidence of anorexia and bulimia to be:

⇒ AN: new diagnoses 4.7/100,000 population per year

⇒ BN: new diagnoses 6.6/100,000 population per year

This makes a total of 11.3 new diagnoses per year, per 100,000 population. In the English population of 52.5 million, that means nearly 6,000 new cases in general practice annually. If prevalence is 6 times incidence¹⁵, this would mean about 36,000 cases known to GPs. Prevalence rates could therefore be approximately:

⇒ AN: prevalence in general practice 28/100,000 popn.

⇒ BN: prevalence in general practice 40/100,000 popn.

²³ Paul McCrone *et al* (2008) ‘Paying the Price: The cost of mental health care in England’ The King’s Fund http://www.kingsfund.org.uk/publications/paying_the_price.html
The source for this assumption was a study from the USA, and may not reflect the NHS.

²⁴ Currin, Schmidt, Treasure & Jick (2005), Time trends in eating disorder incidence, *Brit J Psychiatry*; vol 186; pp132-135. <http://bjp.rcpsych.org/content/186/2/132.full>

NICE²⁵ reported that the *Third National Survey of Morbidity in General Practice* found that each year 100/100,000 females and 60/100,000 males consulted their GP for anorexia nervosa (but no data for bulimia nervosa or other eating disorders were available). If incidence and prevalence have remained stable, so that these figures can be combined, this would suggest approximately 3 GP visits for each prevalent case of anorexia, and about 42,000 GP visits for AN in total in England annually.

If there are also 3 GP visits annually for each prevalent case of bulimia nervosa, then this would mean about 63,000 GP visits for BN in total in England. The total would therefore be 105,000 extra GP visits per year for AN and BN combined.

The full cost of a GP consultation²¹ is about £40. Therefore 105,000 consultations would cost about £4.2 million for England annually.

⇒ & approx £8,000 /100,000 population per year

Of course, this omits the possible visits to GPs for other types of eating disorders and, perhaps more importantly, consultations for other conditions caused or exacerbated by disordered eating.

On the other hand, data from Scotland²⁶ suggest only half as many general practice consultations for eating disorders as the estimates above – ie primary care consultation rates of 100/100,000 population.

Perhaps, therefore, there may be a margin of error in these estimated primary care costs of 50% or more (ie costs may range from £2m to £6m+).

Costs of private healthcare

Unfortunately, data are lacking on the extent of private provision of services for people with eating disorders. This is an important gap, as such provision is probably extensive.

²⁵ NICE (2004) *Eating Disorders*; Clinical Guideline 9; <http://www.nice.org.uk/CG9> see section 2.6.1

²⁶ ISD Scotland, *Practice Team Information Statistics* (2005/06): <http://www.isdscotland.org/Health-Topics/General-Practice/PTI-Statistics/>

One study has surveyed the provision of child and adolescent mental health service (CAMHS) facilities in England and Wales²⁷. This found:

Eating disorder units

Nine units (98 beds) are located in four out of the nine regions, namely the South East (26 beds), London (50 beds), Eastern (20 beds) and North West (2 beds). Only 18% of these beds are managed by the NHS.

And more generally, for all types of CAMHS

80 units were identified; these provided 900 beds, of which 244 (27%) were managed by the independent sector.

In other words the private CAMHS beds amounted to nearly two fifths of the NHS beds.

An earlier study was conducted jointly by 'Health Which?' and the Eating Disorders Special Interest Group of the Royal College of Psychiatrists²⁸. This too found that the number of private clinics was about two fifths of the number of NHS clinics.

Hence, extrapolating from the above studies, it could be estimated that the costs of private healthcare might be around 40% of the costs of NHS healthcare for eating disorders. If so, the costs of private provision could be around £25 to £30 million. (Some of this provision may actually be paid for by NHS contracts with private providers.²⁹)

²⁷ Anne O'Herlihy *et al* (2003), 'Distribution and characteristics of in-patient child and adolescent mental health services in England and Wales'. *Brit J Psych*, vol.183; pp547-551 <http://bjp.rcpsych.org/content/183/6/547.full.pdf+html>

²⁸ Royal College of Psychiatrists (2000), (CR87), 'Eating disorders in the UK: policies for service development and training'. <http://www.rcpsych.ac.uk/files/pdfversion/cr87.pdf>

²⁹ It is uncertain to what extent the privately-owned beds and services are used and paid for by private patients, and to what extent some are used for providing services under contract to the NHS. Services paid for by the NHS ought really, of course, to count as NHS rather than private expenditure.

Total healthcare costs

The estimated NHS costs are made up of £50 million for inpatients, and perhaps £5 to £20 million for ambulatory care (outpatient and primary care combined³⁰).

Adding around £25 to £30 million for private healthcare costs gives a total healthcare cost of roughly £80 to £100 million per year. Perhaps 60% of these costs are for the under-25s.

It should be noted that there is much uncertainty around some of these costs. The £50m for NHS inpatient costs is probably reasonably robust, but unfortunately we cannot be confident that the other £30 to £50m is accurate (and the scale of the inaccuracy is uncertain).

³⁰ The estimates for outpatient costs are from £3m to £20m, and illustrative costs for primary care are from £3m to £27m. £20m to £30m has been picked as being around the middle of this combined range.

Premature Mortality

There is some useful information about mortality risks in the evidence supporting the Government's mental health strategy (see page 1 above): "*No health without mental health: the supporting evidence*"³¹.

What impact does mental illness have on life expectancy?

"On average, people with mental illness die five to ten years younger than the general population."³¹

Table 3: Standardised Mortality Ratios relating to Common Mental Health Disorders

Mental disorder	SMR	Comments
All forms of mental disorder	1.5	
Schizophrenia	1.6	Unnatural causes: 9 x more common
Bipolar disorder	1.7	
Depression	1.4	
Panic disorder	1.7	
Eating disorders	5.4	Self-starvation caused 65% of deaths
Alcohol abuse/ dependence	1.9	
Substance misuse	4.9	
Personality disorders	1.8	Unnatural causes: in 52% of deaths

Compared with other common mental health disorders, people with eating disorders have the highest standardised mortality ratios – nearly 5½ times that of their peers. This is similar to the ratio found in Sweden for people hospitalised for anorexia (see below).

A particularly useful study is that by Papadopoulos *et al*³². This Swedish study found all the women – 6009 patients – who were hospitalised with anorexia nervosa (main or secondary diagnosis) over the previous thirty years, and followed them up using Swedish registries. "Only females aged 10 to 40 at the time of discharge were included. This age limit was utilised in order to eliminate diagnostic misclassification (eg feeding complications in children or older individuals)." Among this group there were 265 deaths recorded, which was 6.2 times the expected number - ie 222 excess

³¹ Royal College of Psychiatrists (2011) '*No health without mental health: the supporting evidence*' <http://www.rcpsych.ac.uk/pdf/No%20Health%20-%20the%20evidence%20revised%20May%2010.pdf>

³² Papadopoulos FC, Ekblom A, Brandt L, Ekselius L (2009) 'Excess mortality, causes of death and prognostic factors in anorexia nervosa' *Brit J Psychiatry*, vol 194, pp10-17.

deaths, and a rate of 37 excess deaths per 1000 hospitalisations. Just under half the deaths were from “unnatural” causes, such as suicide, and just over half were from “natural” causes, including cancer, respiratory and cardiovascular disease. (The average age at first admission for anorexia was 19.4 years, and the average length of follow-up was 13.4 years. Average length of first hospital stay was 36 days.)

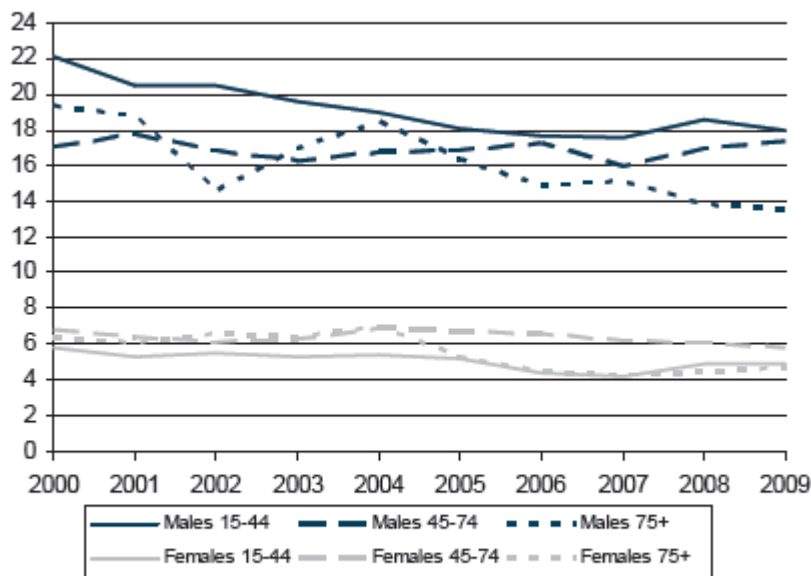
This excess mortality rate has therefore been applied to the patients hospitalised with anorexia nervosa in England aged 10-40. HES data were interrogated to obtain the number of people admitted to NHS hospitals with anorexia in 2010/11. There were around 2300 people admitted with anorexia (main or secondary diagnosis) – and 94% of these were female. Of these around 80% were aged 10-40 – ie about 1840 people. In this group the median age was about 20 years old, and the majority, about 1150, were aged under 25, and of these about 90% were aged 15-24. If their excess mortality rate is the same as in the Swedish study, then we would expect 68 excess deaths among these 1840 people (before the year 2024). And over 38 of these deaths would be amongst those aged 15–24 when admitted (about 36 female and 2½ male).

We could compare these with the numbers of deaths from suicides and transport accidents. For females these extra deaths are equivalent to well over half the number of suicides in young females (there were about 56 deaths from intentional self-harm in England in 2009 amongst females aged 15-24) and over a third of the number of transport deaths in young females (there were about 103 deaths from transport accidents in England in 2009 amongst females aged 15-24)³³. For males the deaths from intentional self-harm were about 228, and from transport accidents about 427, in the 15-24 age group in England.

³³ Figures for England & Wales were scaled down by 0.9523 for females and 0.9535 for males to reflect English population shares; deaths by age and cause for England & Wales sourced from ONS ‘*Mortality Statistics 2009 DR_09*’:
http://www.statistics.gov.uk/downloads/theme_health/dr2009/dr-09.pdf

Figure 2. Suicide rates by sex and age, United Kingdom, 2000–2009

Age-standardised rates per 100,000 population



Source: Office for National Statistics, General Register Office for Scotland, Northern Ireland Statistics and Research Agency

Source: ONS³⁴

Cost of mortality

Across HM Government there is a widely used figure for the “cost of mortality” known as the “value of preventing a fatality” (VPF)³⁵.

The current VPF is about £1.8 million – although this was derived in the context of preventing deaths on the roads, where average age at death is older than in the case of eating disorders³⁶. The Department of Health judges that this VPF would be consistent with a value for a “quality-adjusted life-year”, or QALY, of about £60,000³⁷. Typically, a female who died aged around 20 would, on average, lose about 40 QALYs (present value³⁸). Multiplied by 68 deaths annually, this means a loss of around 2700 QALYs. Multiplying by £60,000 per QALY:

⇒ £60k x 2700 QALYs = about £160 million in England

³⁴ ONS ‘Suicide rates in the UK 2000-2009’:

<http://www.statistics.gov.uk/pdfdir/sui0111.pdf>

³⁵ http://www.hm-treasury.gov.uk/d/green_book_complete.pdf

³⁶ In 2010 for females in England & Wales, 51 years was the mean age at death from land transport accidents (ICD V01-V89). Source ONS *Mortality Statistics (Series DR) 2010*:

<http://www.ons.gov.uk/ons/rel/vsob1/mortality-statistics--deaths-registered-in-england-and-wales--series-dr/2010/dr-table5-2010.xls>

³⁷ DH guidance document: “DH Technical Guidance on Impact Assessments” updated 2010.

³⁸ This is the present value, after discounting at 1.5%, of future quality-adjusted life expectancy, using population averages for expected longevity and morbidity.

⇒ about £300,000 /100,000 population

Disease burden

An alternative approach is to estimate both the mortality and morbidity burden using a measure such as disability-adjusted life-years – reflecting both life-years lost from premature mortality and reduced ‘quality of life’ from illness. Such estimates have been made by the Australian Institute of Health & Welfare³⁹. This put eating disorders in 6th place for women aged 15-24 in terms of years of disability-adjusted life-years:

DALYs in Australia amongst females aged 15-24

(in 2003 there were 1.346m females 15-24 in Australia⁴⁰)

	Total	per 100,000 females 15-24
Anxiety & depression	29,946	2225
Asthma	6,641	493
Migraine	6,217	462
Genitourinary disease	5,676	422
Intimate partner violence	5,455	405
Anorexia+bulimia nervosa	4,639	345
Road traffic accidents	3,572	265

Extrapolation to England

If the prevalence and burden are similar between Australia and England, then we can extrapolate to England (whose population is about 2½ times larger than Australia’s).

345 DALYs per 100,000 implies about 12,075 DALYs for England (given about 3.5 million females 15-24 in England). We should then scale this up by about 5% to

³⁹ Australian Institute of Health & Welfare (2007), *The burden of disease and injury in Australia 2003* <http://www.aihw.gov.au/publication-detail/?id=6442467990>

⁴⁰ Australian population data by age and gender are at <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3201.0>

reflect DALYs in males, making about 12,600 DALYs for England's 15-24 year-olds. The Australian analysis also has DALYs for the under-14 age group – these come to nearly 20% of the DALYs for the 15-24 group. If England is similar, this would increase the above figures to about 15,000 DALYs for England's under-25 age group.

⇒ 28 DALYs /100,000 population in England

These DALYs can be costed at a figure equivalent to using the VPF (mentioned above⁴¹) – that is about £60,000 per QALY or per DALY.

⇒ 15,000 DALYs x £60k = about £900 million in England

⇒ £1.7 million /100,000 population

In this Australian study the total number of DALYs due to eating disorders for the whole population was about 31% higher than for the females aged 15-24. Applying this to England⁴² would mean:

⇒ 15,800 DALYs for people in England

⇒ 30 DALYs /100,000 population in England

And the cost of these would be:

⇒ 15,800 DALYs x £60k = about £950 million in England

⇒ £1.8 million /100,000 population

An alternative estimate could be obtained by multiplying the prevalence estimated using the APMS – ie 740,000 people – by a weight to reflect reduced 'quality of life'⁴³. The QALY weight used in the UK for 'moderate anxiety/depression', with no

⁴¹ See footnotes 35 and 37.

⁴² Note that the methodology of the Australian AIHW study (ref. at footnote 39) used international evidence, not evidence special to Australia. Their methods were as follows:

Eating disorders

Estimates for bulimia are based on a prevalence rate of 0.7% among Swiss 14–17 year old females (Steinhausen et al. 1997). This is the mid-point in the range of prevalence between 0.5% and 1% reported from more rigorous epidemiological studies (Gilchrist et al. 1998). We calculate a remission rate of 0.21 from figures reported in a review of follow-up studies (Keel et al. 1999). We derive incidence and duration estimates for women from these figures using DisMod, assuming the age at onset is between 14 and 29 years with no increased risk of mortality. Estimates for anorexia are based on a 0.5% prevalence among females older than 15 years (Gilchrist et al. 1998; Keel et al. 1999) and a remission rate of 0.11 calculated from a follow-up study (Strober et al. 1997). We use DisMod to derive incidence and duration estimates for women from these figures, assuming the age at onset is between 14 and 29 years with an increased annual risk of mortality of 0.59% (Sullivan 1995). We assume the incidence in males is 10% of the rate in females. We use the Dutch weight of 0.28 for both types of eating disorder.

⁴³ The Australian study used a weight of 0.28. This weight was taken from a Dutch study, in which a score of 72% (ie loss of 28% from full health) was calculated using QALY

other problems, would be 0.15⁴⁴ (ie about a one seventh reduction from full health). Combining these would suggest a loss of 111,000 QALYs – and at £60,000 per QALY this would mean a cost of over £6.6 billion in England (and over £12 million per 100,000).

Comparison of 'mortality' and 'disease burden' approaches

The DALYs cover both years of life lost through early death *and* reduced quality of life, so we should expect this figure to be higher. It should be noted that the size of loss of quality of life is highly uncertain, particularly for the wide group suggested by the APMS. Hence these figures should be regarded as indicative rather than definitive. Yet, caveats notwithstanding, these estimates suggest a potentially huge disease burden.

dimensions of health, with 'moderate anxiety/ depression' but 'no problems' on the other dimensions of mobility, self-care, usual activities, pain or cognition. See Stouthard *et al* (1997) *Disability weights for diseases in the Netherlands*, Dept Public Health, Erasmus University [study category 19.4]: <http://dare.uva.nl/document/174853>

⁴⁴ The scoring algorithm is, for example, given at: <http://www.archive.official-documents.co.uk/document/doh/survey96/ehch5a.htm#note19>

Education, Employment & GDP

As eating disorders have a high burden in terms of reduced health and increased morbidity, it is to be expected that this could impact on the education, employment and work output of those affected. Onset of these disorders also occurs at a critical period in people's lives (see *Prevalence* section above).

“Eating disorders have a substantial impact on social functioning, including occupational and educational impairment. The peak age of onset occurs when people are in secondary school, in higher education or at the beginning of their working careers, ie at a crucial stage in their educational and psychosocial development.”⁴⁵

Ideally we would want to know the impact of eating disorders on schooling, educational attainment, work absence, and work productivity, both in the short term and the long term over people's careers. This would require very long-term follow-up of those affected.

Long-term follow-up of cohorts

While the ideal data seem unavailable, nevertheless a very useful study has estimated the impacts of adolescent mental health problems, in general, on future life, including earnings. This is the report by the Sainsbury Centre for Mental Health (and others) on “*Childhood mental health and life chances in post-war Britain; Insights from three national birth cohort studies*”⁴⁶. This study examined the long-term consequences of childhood and adolescent mental health problems, for adult mental health and a wide range of economic and social outcomes, using a unique British resource: three national birth cohorts that have been tracking large representative samples of people born in the UK in 1946, 1958 and 1970.

⁴⁵ Simon, Schmidt & Pilling (2005), ‘The health service use and cost of eating disorders’, *Psychol Med*: vol 35, pp1543-1551

⁴⁶ Centre for Mental Health, “*Childhood mental health and life chances in post-war Britain; Insights from three national birth cohort studies*”:
http://www.centreformentalhealth.org.uk/publications/life_chances.aspx?ID=596

The study reports associations, which do not necessarily prove causation – as there may be other factors that explain the results found, such as poverty or intelligence perhaps. Nevertheless, most of the important effects found in this study could not be accounted for by either socio-economic background or childhood IQ.

Educational impacts

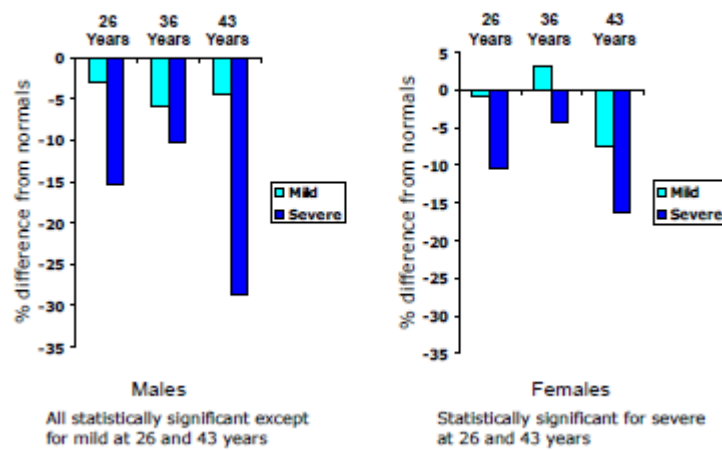
Some of the findings related to educational attainment – eg:

[Compared with adolescent conduct problems] For adolescent emotional problems the picture was generally less pronounced, although those with evidence of these problems in the 1946 cohort still had lower odds of achieving advanced qualifications [defined as 'A' level or equivalent, or higher], women strikingly so. However, after accounting for socio-economic background and childhood IQ, men in the 1958 and 1970 cohorts with emotional problems had significantly *higher* odds of obtaining advanced qualifications.

Earnings impacts

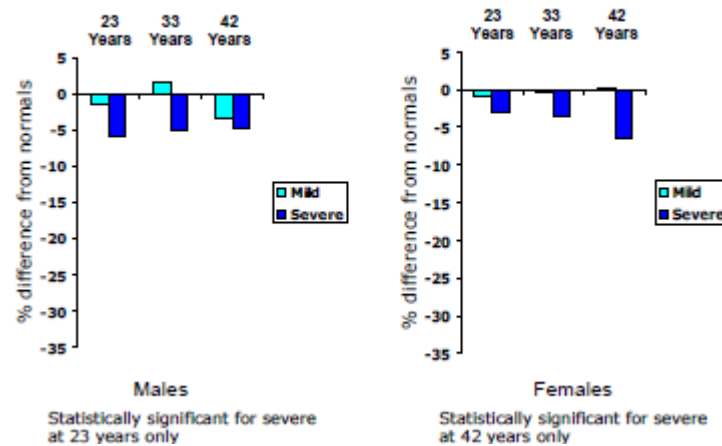
For the calculation of economic impacts of eating disorders, of particular relevance are the effects that the study found on adult earnings. These are shown in the charts below – for the three different cohorts.

Figure 26. Percent differences in gross hourly earnings in relation to adolescent emotional problems: 1946 cohort



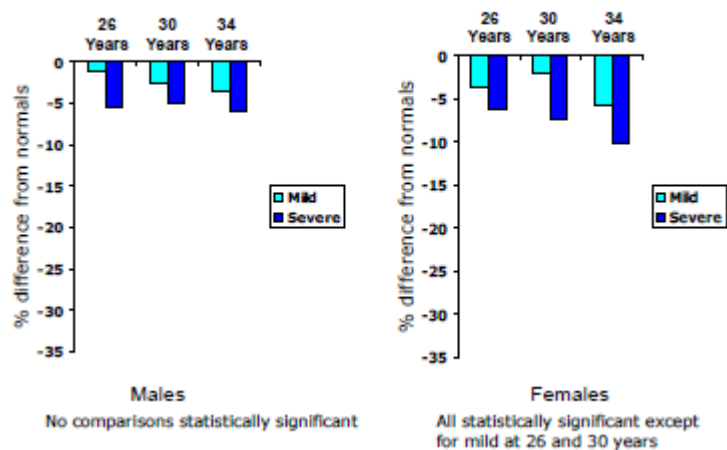
1946 cohort: (p40)

Figure 28. Percent differences in gross hourly earnings in relation to adolescent emotional problems: 1958 cohort



1958 cohort: (p41)

Figure 30. Percent differences in gross hourly earnings in relation to adolescent emotional problems: 1970 cohort



1970 cohort: (p41)

The earnings of the 1946 cohort seemed most affected by adolescent emotional problems, the 1958 cohort least affected, and the 1970 cohort was in the middle. In the 1970 cohort:

“the effects of adolescent emotional problems on earnings were of relatively small magnitude compared to conduct problems, although they were stronger in women than men; after allowing for father’s social class, childhood cognition, childhood hyperactivity and educational attainment, women in this cohort with severe adolescent emotional problems were earning over 7% less than women without emotional problems.”

In competitive markets, it is conventional to regard earnings as reflecting ‘value added’ or ‘productivity’. The above findings are used here to illustrate the potential significance for the economy.

Potential impact on earnings in England

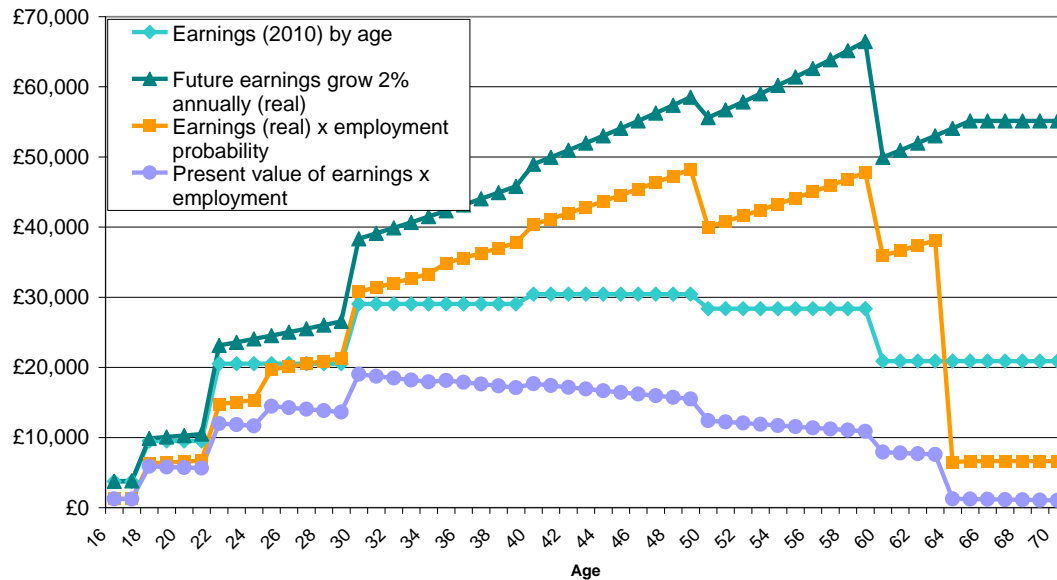
I have therefore calculated what a reduction in pay might mean, in terms of total lifetime earnings. This starts with the profile of lifetime earnings for the UK, using data from the Annual Survey of Hours and Earnings⁴⁷ on earnings by age, in 2010. These produce the profile of average earnings by age shown in the chart below (turquoise profile). The trend growth in the economy suggests that future earnings will grow annually, in real terms, by 2%, so this is incorporated (dark green profile = highest line). This is then multiplied by the probability of being in employment at each age (orange profile)⁴⁸. Finally the figures are ‘discounted’ using the standard discount rate of 3.5%⁴⁹ (blue profile = lowest line).

⁴⁷ ONS, Annual Survey of Hours and Earnings, ASHE 2010;
<http://www.statistics.gov.uk/statbase/Product.asp?vlnk=1951>

⁴⁸ Taken from the ONS Labour Force Survey; employment rates by age (2008) published in *Annual Abstract of Statistics 2010*: <http://www.ons.gov.uk/ons/rel/ctu/annual-abstract-of-statistics/no-146--2010-edition/annual-abstract-of-statistics.pdf>

⁴⁹ Discounting reflects society’s preference for having goods or earnings sooner rather than later. 3.5% is the discount rate recommended by HM Treasury. http://www.hm-treasury.gov.uk/d/green_book_complete.pdf

Average UK earnings - age profile



Total lifetime earnings sum to about £1.62 million on average⁵⁰. After discounting, the present value of this sum is about £0.64 million (from the perspective of a cohort at the beginning of their earning career).

We take the present value of lifetime earnings as about £0.64 million, and the effects seen in the 1970 cohort females as representative of the impacts on future earnings: “women in this cohort with severe adolescent emotional problems were earning over 7% less than women without emotional problems” *ceteris paribus*. In other words, we assume that, had it not been for their adolescent emotional problems, these people could be producing and earning as much as their peers. 7% of £0.64 million is about £45,000 – so this is our estimate of the present value of lifetime lost earnings.

⁵⁰ The earnings and employment figures used in the analysis, and shown in the above graph, are for 'persons', not women only, even though women make up the great majority of people with eating disorders. This is for 2 reasons: (i) looking to the future, pay and participation rates may become more equal between men and women; and (ii) to the extent that there is a reduction in earned income for women (eg when looking after young children) this generally reflects a substitution of unpaid work for paid work – so this method may be a (rough) way of capturing some of the impact upon unpaid work as well as paid work.

In the *Prevalence* section, the APMS was used to estimate that there may be about 310,000 people in the under-25 age group with an eating disorder that interferes with their life. We assume incidence to be about one sixth of this – around 50,000 per year⁵¹. This is the annual number to which the above loss of earnings would be applied.

- ⇒ = £2.25 billion lost earnings in England
- ⇒ over £4 million lost earnings /100,000 population

A more conservative estimate could be made – this could be based on the estimates of incidence seen in general practice found by Currin *et al*⁵². They found incidence amongst young people aged 10-19 as follows:

- ⇒ AN: new diagnoses 18.0/100,000 population per year
- ⇒ BN: new diagnoses 19.2/100,000 population per year

Applying these rates to young people aged 10 to 24 would suggest an incidence of about 4,000 new cases of AN and BN in England each year. These are cases diagnosed by GPs, and so probably represent the more severe part of the spectrum. This may correspond to the “severe adolescent emotional problems” in the longitudinal studies referred to above. If so, the lost earnings would be

- ⇒ £0.18 billion lost earnings in England
- ⇒ over £0.3 million lost earnings /100,000 population

The impact on the economy is greater than the loss of earnings to the individual. Employers’ overhead costs are generally assumed to be around 30% of earnings⁵³; adding this cost gives a better measure of lost output for the economy. Based on incidence of 50,000:

- ⇒ x 1.3 for GDP cost = approx £2.9 billion reduction in English output
- ⇒ over £5.5 million lost output /100,000 population

⁵¹ It is thought that the average duration of eating disorders is about 6 years (source: Beat), which implies annual incidence of about one sixth of prevalence. If so, each year about 40,000 young people in England may develop an eating disorder that interferes with their ability to work, meet personal responsibilities and/or enjoy a social life.

⁵² Currin, Schmidt, Treasure & Jick (2005), Time trends in eating disorder incidence, *Brit J Psychiatry*; vol 186; pp132-135. <http://bjp.rcpsych.org/content/186/2/132.full>

⁵³ Better Regulation Executive, ‘UK Standard Cost Model Manual’, section 5.9.2: <http://www.bis.gov.uk/files/file44503.pdf>

Or, based on incidence of 4,000:

- ⇒ approx £0.23 billion reduction in English output
- ⇒ over £0.4 million lost output /100,000 population

Again, these estimates are uncertain. But their potential magnitude suggests that they ought to be considered very seriously, and hopefully researched further.

Conclusion: Overall Total Costs For England

In this final section we draw together the results from the previous sections.

One caveat to bear in mind is that when using figures from the *Adult Psychiatric Morbidity Survey*¹⁴, that survey found evidence of co-morbidities¹⁶. Eating disorders were strongly associated with psychosis and with borderline personality disorder, and less strongly associated with depression. Unfortunately, it is not possible to disentangle their relative impacts – so some of the impacts on morbidity and quality of life, in the section on disease burden (page 26 above) and potential earnings losses (page 33 above) may be partly attributable to such co-morbidities. This therefore reinforces the need to be cautious about causality.

In summary, our indicative estimates of the overall total costs are as in this table:

Costs	Data / extrapolation source			Ages		Estimates	
	HES	APMS	Other	Up to 24	25+	Lowest	Highest
Inpatient	£50m			£30m	£20m	£50m	£50m
Outpatient/A&E	£3m		£20m			£3m	£20m
Primary care	£4m					£2m	[in above]
Private healthcare			£25m			£25m	£30m
Total healthcare				£55m	£35m	£80m	£100m
"Indirect costs" (wider economic costs)							
Reduced GDP in later life		£2,900m	£230m		£230m	£230m	£2,900m
<i>Lost earnings</i>		£2,250m	£180m		£180m		
"Intangible costs" (quality & length of life)							
Disease burden		£6,600m	£950m	£900m	£50m	£950m	£6,600m
<i>Premature mortality</i>			£160m	£110m	£50m		
Total costs						£1,260m	£9,600m

Note that an unknown share of the "indirect" and "intangible" costs may be due to co-morbidities

Thus the overall costs could be:

- Probably over £80 million as the value of healthcare treatment costs;
- Probably over £230 million as the present value of reduced GDP (conceivably perhaps twelve times this figure);

- Probably over £950 million as the value of reduced length of life and health (conceivably up to seven times this figure).

This makes a total of over £1¼ billion for England, per year – and perhaps many times higher. Hence, while there are substantial costs for NHS and private healthcare, the costs of lost output and human costs are likely to be very much greater.