Cost of Schizophrenia in England

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Abstract

Background: Despite the wide-ranging financial and social burdens associated with schizophrenia, there have been few cost-of-illness studies of this illness in the UK.

Aims of the study: To provide up-to-date, prevalence based estimate of all costs associated with schizophrenia for England.

Methods: A bottom-up approach was adopted. Separate cost estimates were made for people living in private households, institutions, prisons and for those who are homeless. The costs included related to: health and social care, informal care, private expenditures, lost productivity, premature mortality, criminal justice services and other public expenditures such as those by the social security system. Data came from many sources, including the UK-SCAP (Schizophrenia Care and Assessment Program) survey, Psychiatric Morbidity Surveys, Department of Health and government publications.

Results: The estimated total societal cost of schizophrenia was £6.7 billion in 2004/05. The direct cost of treatment and care that falls on the public purse was about £2 billion; the burden of indirect costs to the society was huge, amounting to nearly £4.7 billion. Cost of informal care and private expenditures borne by families was £615 million. The cost of lost productivity due to unemployment, absence from work and premature mortality of patients was £3.4 billion. The cost of lost productivity of carers was £32 million. Estimated cost to the criminal justice system was about £1 million. It is estimated that about £570 million will be paid out in benefit payments and the cost of administration associated with this is about £ 14 million.

Discussion: It is difficult to compare estimates from previous cost-of-illness studies due to differences in the methods, scope of analyses and the range of costs covered. Costs estimated in this study are detailed, cover a comprehensive list of relevant items and allow for different levels of disaggregation. The main limitation of the study is that data came from a variety of secondary sources and some official data publicly available was not the latest.

Implications for health care provision: Schizophrenia continues to be a high cost illness because of the range of range of health needs that people have. Despite the shifting balance of care away from hospital-based care, the health care costs of treating and supporting people with schizophrenia remain high.

Implications for health policies: Decision-makers need to recognise the breadth of economic impacts, well beyond the health system as conventionally defined. For example, as nearly 80% of schizophrenia patients remain unemployed, the cost of lost productivity is especially large.

Implications for further research: Better measurement of criminal justice services costs, private expenditures borne by families and valuation of lost quality of life could improve the estimates further.

Cost of Schizophrenia in England

1. Introduction

Schizophrenia can generate financial and social burdens for patients, their families and the wider society. Despite the wide-ranging cost implications that are associated with the illness, there have been few attempts to study these costs in the UK, with only three cost-of-illness studies of schizophrenia published to date [1 - 3]. The cost estimates in these studies were for the years 1990-91, 1992-93 and 1997 respectively. One of these [2] is a prevalence-based study and the other two are incidence-based studies. Prevalence-based studies estimate the economic burden to society during a given period, generally a year, whereas incidence-based studies estimate the cost of managing an annual cohort of newly-diagnosed patients over the course of their illness. Estimates of costs in the three studies therefore vary with design and also in terms of the cost components covered. Given the marked changes in the pattern of mental health care over recent years, these studies are unlikely to offer reliable estimates of the current cost of the illness in the UK. In this study we have attempted to provide an up-to-date prevalence-based estimate of all costs associated with schizophrenia for England.

2. Methods

2.1 Objective and approach

The objective was to provide up-to-date estimates of all relevant costs from a societal perspective, learning from other such studies in this field [4]. Separate estimates of

costs were made for patients living in private households, institutions and prisons as well as for those who are homeless.

The costs included were the following:

- Health service costs
- Social care costs
- Other public expenditures
- Private expenditures
- Informal care costs
- Cost of lost productivity
- Cost of premature mortality
- Criminal justice system costs

A bottom-up method was adopted for the estimation of costs. Estimates were also converted to Euros and US dollars for comparison with other national estimates.

2.2 The study population

The main source of resource use data for the household and institutional populations was the UK-SCAP (Schizophrenia Care and Assessment Program), an observational study of approximately 600 schizophrenia patients conducted by Eli Lilly & Company Limited. The sample in the UK-SCAP database consists of patients who met the diagnostic criteria for schizophrenia, schizophreniform and schizoaffective disorder (295.10, 295.20, 295.30, 295.40, 295.60, 295.70 or 295.90) according to the DSM-IV [5]. As far as possible this definition of schizophrenia was applied in the study, although due to the wide range of sources from which information was gathered, slight variations in definitions in some parts were unavoidable. Most sources however

use the ICD-10 [6], DSM-III-R [7] or DSM-IV criteria and studies have shown that agreement for schizophrenia is high across these three diagnostic systems. [8 - 9].

2.3 Prevalence rates

An obvious source of information for prevalence rates for Britain was the series of Psychiatric Morbidity Surveys conducted by the Office of National Statistics (ONS) between 1993 and 2000 [10 - 13]. The published reports from these surveys, however, present only prevalence rates for psychosis which include some disorders in addition to schizophrenia. Literature in this field is scarce and not very informative as often no distinction is made between prevalence rates for psychosis and schizophrenia.

Two studies [14 & 15] which give an estimate of the percentage share of schizophrenia among all those who presented with psychosis were useful in this context. Boydell et al (2003), in their study of incidence of schizophrenia in south-east London between 1965 and 1997, found that on average 37% of all those who presented with psychosis met the criteria for DSM-III-R schizophrenia. Brewin et al (1997) too report a figure of 37% with ICD-10 schizophrenia and schizoaffective disorder (F20 and F25) out of all those with psychosis, from their study of first contact patients during 1992-94 in Nottingham. Since incidence rates take into account only those presenting with the disease for the first time, they are likely to underestimate the true prevalence in a year. Our own analysis of the National Health Service (NHS) Hospital Episode Statistics [16] revealed that around 36% of those with psychotic disorders met the criteria for DSM-IV schizophrenia. This too is likely to be a low estimate as it only covers people whose hospital treatment was completed during the year. We assumed that on average 37% - 40% of all those with psychosis

will be positive for schizophrenia by DSM-IV criteria. We used the upper bound of 40% in our calculations.

We derived the prevalence rates for the different populations studied from the best available sources.

Household population: The per year prevalence rate for psychotic disorder among adults living in private households according to the Psychiatric Morbidity Survey 2000 was five per 1000 adults aged 16-74 [17 & 18]. Applying the proportion described above (40%), we estimated that the prevalence of schizophrenia is about 0.2%. Applying this rate to the total household population of England aged 15-74 derived from Census 2001 [19] and Population Trends [20], the estimated total number of those suffering from schizophrenia is 72,608.

Institutional population: For people living in institutions, the main source of information on prevalence rates was the 1994 ONS survey of psychiatric morbidity among adults (16-64 years of age) permanently resident in institutions catering for people with mental health problems in England, Wales and Scotland (excluding the Highlands and Islands). Sampled adults were residents of hospitals, residential care homes and alternative types of residential accommodation; institutions whose primary purpose was the long-term care of people with mental disorders. Table 1 presents the prevalence rate for schizophrenia in each of type of institution. The combined prevalence rate for all types of institutions is 56.3%.

[Table 1 here]

No recent estimates of the total numbers of persons aged 15-64 living in institutions specifically for people with mental health problems in Britain are available. The Department of Health estimate of the number of places in residential and nursing care homes for 2000-01 for England is 43,326 [21]. This includes occupied NHS beds in secure units, short and long stay facilities, available NHS residential facilities for adults, beds in private nursing homes (this includes beds for children), staffed residential home places for adults (local authority, voluntary and dual registered) and small registered residential home places. In addition to these, there are places in local authority unstaffed group homes. The House of Commons Select Committee on Health estimated that there were 1,840 such places in 1996-97 [22]. As there is no recent estimate of such places available, we have used this figure in arriving at the total figure of 45,166 residential care facilities available for mental health patients in England. The number of resident places available in the various institutional facilities is given in Table 2.

[Table 2 here]

Applying a prevalence rate for schizophrenia of 56.3% to the estimated total number of places available in these institutions gives us an estimate of 25,429 persons with the illness living in institutions in England. This is the figure used in presenting cost estimates for the combined institutional population, in Tables 6 and 7. Since costs and prevalence rates vary by type of institution, we also estimated costs for four broad categories of institutions: hospitals, nursing homes (NHS and private residential facilities and small registered homes in Table 2), staffed residential facilities (hostels but may also include some nursing homes) and unstaffed facilities (group homes). We

applied the appropriate prevalence rates (details are given in Box 1) from Table 1 to obtain the number of persons with schizophrenia in these institutions. Cost estimates presented in tables 8-12 use these numbers. It should be noted that due to the differences in the prevalence rate applied to each of type of institution, total numbers from these tables do not add up to the combined institutional population figure of 25,429 used in the tables 6 and 7.

The homeless population: The OPCS psychiatric morbidity survey of homeless adults aged 16-64 carried out in 1994 included those people resident in hostels specifically catering for homeless people, homeless families housed temporarily in private sector-leased accommodation (PSLA), people staying in night shelters and homeless people sleeping rough who visited day centres. Our analysis of this survey data showed that the prevalence of schizophrenia was 1.1% among residents of PSLA (n=268), 3% among hostel residents (n=530) and 2.2% for those in living in night shelters (n=185) and also for those using day centres (n=181). The combined prevalence rate for the homeless population according to this survey was therefore 2.32%. There is, however, some uncertainty about the accuracy of this information [23]. The Mental Health Foundation estimated that the prevalence of schizophrenia was 25% among homeless people [24]. We used this latter prevalence rate in this study.

According to the estimates provided by the Office of the Deputy Prime Minister, the number of homeless persons in England in 2003/4 was 91,160 [25]. Applying a prevalence rate of 25% to this population, gives us an estimate of 22,790 persons with schizophrenia among the homeless.

Prison population: The source of information on prevalence rates for schizophrenia and other psychosis for the prison population is the 1997 OPCS survey of psychiatric morbidity among prisoners (16-64 years of age) in England and Wales. We estimated from this survey data that the prevalence of schizophrenia is 2% among prisoners. Home office estimate of average prison population in 2005 was 76,000 [26]. The total number suffering from schizophrenia among this population was, therefore, estimated to be 1,520.

Box 1 summarises the prevalence rates for the different populations used in the study.

Prevalence rates

Household population	– 0.2%
Institutional Population (combined)	– 56.3 %
Hospitals	– 62.6%
Nursing Homes	– 54.2%
Staffed Residential facilities	– 38.4%
Group homes	– 56.4%
Homeless population	– 25.0%
Prison population	– 2.0%

2.4 Resource use and costing

2.4.1 Health and social care costs

The source for health and social care resources used for the household and institutional samples was the UK-SCAP. Patients were assessed at baseline and at six month intervals over three years. For each sample member data were collected on: GP consultations, contacts with psychiatrist, psychologist, social worker, health visitor, occupational therapist, community psychiatric nurse, other hospital nurse, support

worker, drug/alcohol workers, crisis team, attendances at workshop, day centres, day hospitals, accident and emergency units, inpatient stays at acute and psychiatric hospitals and use of medications. The aim of the study was to obtain representative data on treatment, outcome and resource utilisation so that inferences could be made regarding population characteristics. An observational study design (rather than a controlled study which would typically use a homogenous target population and a narrow range of treatments, thus limiting the external validity of the study results) was chosen in order to maximise the external validity and to ensure that estimates reflect the pattern of resource use and outcomes that occur in routine clinical practice. The sample included people living in private households (68.4%) and in institutions (31.2%). (There was one person who was homeless.) It is assumed that the sample was representative at the start of the study. We used baseline data (collected June 1999-April 2000) which cover use of services in the 6 months preceding recruitment to the study. Yearly consumption was obtained by multiplying the data entries by two.

Information on percentage of users of health and social care services for the prisons sample was obtained from the OPCS survey 1997. However, the survey does not provide information on frequency of usage. Health services in prisons are delivered in partnership with local NHS providers to ensure that prisoners are given a service similar to that which they would receive if they were still living at home in the community [27]. We, therefore, assumed that the frequency of use of services in prisons is the same as that for the household population.

Use of services by the homeless population was obtained from the OPCS survey 1994.

The most recent unit costs of health and social care prepared by the Personal Social Services Research Unit [28] were applied to the resource use data to estimate the per capita annual costs attributable to treatment of schizophrenia. All unit costs used in our estimations are listed in Appendix A. These figures were multiplied by the estimated number of users of services to arrive at national estimates of costs.

2.4.2 Other public resources used

Social security payments: UK-SCAP and published sources [29 - 30] were used for information on other public resources used, which include social security payments and administration costs relating to these payments. It is estimated that under the psychiatric reprovision package for independent living, an average weekly cost of £139 will be incurred in the payment of income support, invalidity benefit and disability allowances to persons with mental health problems [28]. We used this figure in the estimation of benefit payments received by those living in private households and those who are homeless as well as those who are in hostels and group homes. It is difficult to make an exact estimate of the amount of benefits received by those living in institutions such as hospitals and nursing and residential care homes, as the amount received varies by type of institution, eligibility of persons, amounts taken in lieu of fees and such other factors as applicable to different settings and circumstances. It is generally noted that on average a person living in institutions should be left with a minimum of £18.80 as living allowance after all payments are taken out of their benefit incomes [31]. We used this amount as a conservative estimate.

Social security administration costs: An earlier study [30] estimated that the cost of social security administration is approximately 2.5% of the value of benefits paid. As

we have no other reliable source that provides an estimate of this cost, we followed the same approach in estimating social security administration costs.

Criminal justice system costs: The percentage of persons who have had contact with the criminal justice system among the household and institutional populations was derived from UK-SCAP data. Information for the homeless population was from the Psychiatric Morbidity Survey of homeless people. For the purposes of costing we have assumed that this is contact with the police. We were able to obtain an estimate of average cost per case only for the Metropolitan Police, which is £183.84 [32]. In the absence of any other national average estimate, we used this unit cost per contact with the police.

Cost of providing accommodation to the homeless population: Cost per week per person for hostel and for private sector leased accommodation was derived from literature [29]. The cost of providing night shelters was derived from the findings reported by the Joseph Rowntree Foundation [33] based on the evaluation of the Open House Programme for People Sleeping Rough, carried out by the Centre for Housing Policy, University of York. We used the upper bound of the cost estimate provided there (£53 per resident per night). The cost of providing day care facilities for the homeless is assumed to be the same as the cost per day for local authority social services day care for people with mental health problems. This cost estimate was derived from the unit costs estimates [28].

2.4.3 Private expenditures

There are no reliable estimates or sources of data on out-of-pocket expenditures incurred by individuals and families for the treatment of schizophrenia. Information derived from published sources was used to estimate this cost component. It was estimated that in 1996/97 private expenditure on all mental health problems amounted to around £108 million for alternative medicine and about £90,000 for travel and other costs [29]. In the case of schizophrenia, expenditure on alternative medicine is likely to be very small. Since we have no basis for the estimation of this cost, we have not included it in our study. The estimate for travel and other costs falling on families of patients accounted for about 0.002% of public expenditure on health and social care in that year. In our estimation of private expenditures, we followed the approach used by the Sainsbury Centre study [30] to assume that this proportion has remained broadly constant. We also made an additional assumption that the proportion applies to schizophrenia as for any other mental health problem.

2.4.4 Informal care costs

UK-SCAP and published sources [34] were used to derive the cost of informal care. UK-SCAP provides an estimate for the percentage of relatives who provide care and Magliano et al (1998) estimated that on average carers spend 5.6 hrs a day in caring duties. (This is the figure for the English sub sample of their European study.) We combined the information to arrive at cost of informal care using the ONS 'household satellite account' approach which seeks to put a monetary value on the main forms of unpaid production in the household by imputing a value to such work on the basis of what it would cost to produce an equivalent output if undertaken as paid work by a third party. Assuming that it is non-continuous work, the appropriate wage to apply as

per the ONS approach is to use the average wage of an assistant nurse or nursing auxiliary. We used this approach in estimating this cost.

2.4.5 Cost of lost productivity

Lost productivity of patients, carers and those who are homeless as well as those who are in institutions need to be considered. Loss of output for patients living in private households and for carers has two components – loss due to unemployment and loss due to absence from work. There is also under-achievement (i.e., less than full productivity) when at work (so-called 'presenteeism'), but this latter impact is difficult to measure accurately and we were unable to find any estimates for the UK. We have not included it here. For those in institutions productivity loss will be due to unemployment.

Patients

Unemployment: In the UK-SCAP household sample 77.6% were either unemployed or otherwise economically inactive. This figure compares well with that used in previous studies [1-2]. Many local studies also report figures in the range of 69-86% [35 - 39]. Some smaller studies report much higher rates in recent years [40 & 41] but since these are local rates, we were not confident about using them in our study.

We used the figure of 78% (rounded figure from UK-SCAP data) for unemployment rate which means that around 56,635 persons with schizophrenia living in private households would have incurred production losses in any one year. Among the institutional population, 88.7% of those living in sheltered residential homes and 78.1% of those living in group homes were estimated to be unemployed. All those

living in hospitals and nursing or residential care homes were assumed to be economically inactive. To arrive at the estimate of the monetary value of lost productivity, we followed the method used in literature [1]. The number for the unemployed was combined with an average gross annual pay of £25,170 (for full-time employees during the tax year 2002/3 according to the 2003 New Earnings Survey [42]) to estimate the cost of lost productivity.

Absence from work: Estimates of the proportion of patients who take time off work due to the illness vary considerably. This is not surprising due to the small numbers of people involved and hence the difficulty in obtaining reliable and relevant information. Our analysis of the Psychiatric Morbidity Survey 2000 showed that about 19% of those in employment had taken days off work due to illness and the mean number of days lost from work due to illness was 12.5 days. Guest & Cookson (1999) [3], using information provided by a panel of experts and literature, estimated that out of the low dependency and stable patients about 25% were unable to work due to exacerbation of symptoms. We used this figure of 25% to calculate that 3,994 of the 15,974 employed persons will have disability days of about 12.5 days in a year each. Lost productivity was estimated using an average gross weekly pay of £476 for full-time employees during the tax year 2002-3 [42].

Carers

Carer unemployment: An estimate for the percentage of carers who had given up work or worked less as a result of being a carer was obtained from UK-SCAP. This was combined with the figure for average annual wages used above to arrive at the estimate for lost productivity of carers.

In the UK-SCAP 4.8% of carers had reported that they had stopped work as a result of being a carer and 15.5% had missed work sometimes due to caring responsibilities. There was no information on the number of days lost at work by those carers. We assumed that the number of days the carer is absent form work will be similar to the number of days that the employed patient would take off work due to exacerbation of symptoms and associated problems. The mean number of days lost from work due to caring responsibilities was therefore estimated to be 12.5 days.

Effect on unpaid work: There can be adverse effects on the ability of those affected by schizophrenia to carry out unpaid work such as housework. Although such output is not included in national income as conventionally measured, it nevertheless involves an economic cost. No reliable quantitative information is available for such adverse effects and therefore we did not estimate this cost.

2.4.6 Cost of premature mortality

People with schizophrenia face an increased risk of premature mortality from natural and unnatural causes compared to those without the illness. However, since the causes of excessive mortality arise not merely from schizophrenia itself but also from the altered way in which those affected with the condition are compelled or choose to live, it is not always easy to estimate mortality rates which can be ascribed to schizophrenia. Information on mortality from schizophrenia is not available from national surveys of psychiatric morbidity. One careful estimate of the excess mortality rates from schizophrenia, derived from a meta-analysis of 20 international studies covering the period 1973-1995 is provided by Harris and Barraclough [43]. They estimate that excessive mortality risk from all causes among the schizophrenia

population globally is 1.6 times that expected in the general population of similar age and gender. We used this information to estimate the cost of premature mortality from schizophrenia.

The average mortality rate for England and Wales in 2002 was 10 per thousand population [44]. Therefore we assume that mortality from schizophrenia is 16 per thousand population, giving us a total figure of 1,987 deaths per year out of a total population of 124,178 persons suffering from schizophrenia. We followed the approach used in literature to estimate the value of loss of productivity due to premature mortality and applied the value of lost output which results from a fatality used by the Department of Transport in the appraisal of transport safety arriving at the relevant cost estimate. The figure used for lost output due to mortality is £451,110. This is calculated as the present value of the expected loss of earnings plus any non-wage payments (national insurance contributions, etc.) paid by the employer [45].

Some previous studies have estimated a second component to the cost of mortality - the human cost of the life lost, which represents pain, grief and suffering to relatives and friends and the intrinsic loss of enjoyment of life. Since we have not measured the human costs of symptoms and reduced quality of life due to schizophrenia, we considered that it would not be consistent to include this component of the cost in our estimates. The estimate for cost of premature mortality in this study is therefore a conservative overall figure.

3. Results

Estimates of direct and indirect costs relating to all major cost heads identified in the previous sections for the four groups of people within the schizophrenia population, distinguished by place of residence are presented below.

3.1 Household Population

3.1.1 Health and social care costs

Percentage figures for those who have made use of health and social care resources from the household sample (n=412) of the UK-SCAP data were applied to the national figure of schizophrenia patients (n=72,608) in deriving the total numbers using each of the resources nationally, as set out in Table 3. These numbers were then multiplied by per capita yearly costs to arrive at the total national costs of each type of resource used, which are listed in the last column in Table 3. The highest cost figure, not surprisingly, is for inpatient hospital stays. Psychiatrists, day hospitals, day centres, community psychiatric nurses, workshops and social workers constitute other high cost (or more frequently used) items. Total per capita yearly cost of health and social care resources used was around £38,000, without the cost of drugs. Cost of drugs represents 8% of the total health and social care costs of nearly £545 million.

[Table 3 here]

3.1.2 Other public expenditures - criminal justice system and social security costs

Table 4 provides estimate of costs to the criminal justice system and the social security system for patients living in private households. One argument made when undertaking cost-of-illness calculations is that, since social security payments are

transfer payments, it is inappropriate to include them in cost estimates and that the only relevant cost to be considered is the cost of administration relating to these benefits payments. From an efficiency standpoint, this is absolutely correct, but from a distributional perspective it is helpful to know what these payments amount to, as they represent transfers of wealth from one part of society (taxpayers) to another (social security recipients). We assumed that the total number of people who are unemployed or otherwise economically inactive will be in receipt of social security benefits. If this assumption were true it would cost about £417 million annually to the DSS to support patients who live in private households.

[Table 4 here]

3.1.3 Private expenditure

Total public expenditure on health and social care (including medications) for those living in private households, according to our estimations is £590,309,053 per year. Following the approach described in the methods section, we estimated that total private expenditure by patients and their families will be around £11,806 per annum. This figure could be an underestimate but we have no other source of information for the estimation of this cost.

3.1.4 Cost of informal care

About 31% of the patients living in private households were looked after by an informal carer, who was spouse, relative or friend. Assuming that they spend an average of 5.6 hours a day in caring for the patient, the estimated total imputed cost of informal care would be £604.1 million annually.

3.1.5 Cost of lost productivity

Table 5 gives estimates of the cost of lost productivity due to unemployment and absence from work for both patients and carers. Cost of unemployment is nearly £1.5 billion. In addition, about £9 million is lost due to absence from work.

[Table 5 here]

3.2 Institutional Population

3.2.1 Health and social care costs

Table 6 gives estimates for the national cost of health and social care resources used by all those who are resident in institutions which are specifically for people with mental health problems. This includes all categories of residential facilities listed in table 2. The total cost of resources used by the institutional population is estimated to be around £492 million. Although only 38% of the total institutional population make use of inpatient care facilities in hospitals, this resource use accounts for 81% of the total costs. Inpatient stays cost around £41,000 per capita per annum. (It should be noted that the cost of hospital inpatient care will include institutional costs and also medication costs.) Total annual per capita cost of health and social care resources used by this population is £57,000 compared to the much smaller figure of £38,000 for the household population. Separate estimates of costs associated with patients living in each type of institution, including estimates for institutional costs, are given in tables 9 – 12.

[Table 6 here]

3.2.2 Other public expenditures

Some expenditure is incurred by the criminal justice system, although the figure is small (£350,000) compared to other cost items. We have assumed that all those living in institutions are in receipt of benefits but the amount received varies as explained in section 2.4.2 above. (See also assumptions for Table 7.) The estimate for this cost is about £78 million in benefit payments and £1.9 million in administration costs (Table 7).

[Table 7 here]

3.2.3 Cost of lost productivity

While all those who are in hospitals and nursing or residential care homes are assumed to be unemployed, some of those living in sheltered accommodation and group homes report having some kind of employment. Reported unemployment rates for those populations were applied in estimating the cost of lost productivity. The loss of productivity for the combined institutional population is estimated to be around £573 million (Table 8).

[Table 8 here]

3.2.4 Cost of hospitals

Table 9 provides estimates of national expenditure on hospitals that will be due to the treatment of all schizophrenia patients. Separate estimates of the institutional costs for secure units, short-stay and long-stay hospitals were made using appropriate unit costs for these facilities. In the absence of more disaggregated and more recent information

on prevalence by type of hospital setting, the same rate 62.6% (Table 1) was applied to all three settings. Total costs amount to about £822 million.

[Table 9 here]

3.2.5 Costs - nursing homes patients

Table 10 provides costs for the population living in NHS and private nursing homes in England. From the information in table 2 we estimate that there were 5,897 schizophrenia patients living in nursing homes in England. The cost of providing care to this population amounts to about £98 million. The cost of medications will be an additional £4 million. The cost of lost productivity is estimated at £148 million. There is also a small cost to the criminal justice system and about £5.7 million paid out in benefits.

[Table 10 here]

3.2.6 Costs - staffed residential homes patients

The number of persons with schizophrenia living in staffed residential facilities was estimated to be 5,711 (Table 11). Using the unit cost for local authority residential care in such facilities we estimate that institutional costs of caring for schizophrenia patients will be about £130 million. Using information on the use of health and social care service by this population from the UK-SCAP sample for those in sheltered housing with mental health worker present, we estimate that the cost of services used will be about £202 million. In addition, £4.5 million will be spent on medications. UK-SCAP data suggest that 88.7% of this population will be unemployed or

economically inactive. The cost of lost productivity is therefore estimated at £128 million. There is a small cost to the criminal justice system and about £41 million will be paid in benefits.

[Table 11 here]

3.2.7 Costs – patients living in group homes

The estimated number of persons with schizophrenia living in group homes is 1,038 (Table 12). Information on the use of services by this population is derived from the UK-SCAP sample for those living in sheltered housing with mental health worker visiting. The total of health and social care costs and institutional costs of such homes will be around £14 million. A little less than £1 million will be the cost of drugs. About 78% of people in this group are estimated to be economically inactive and this will cost about £20 million in lost productivity. About 7.5 million will be paid out in benefits to this population.

[Table 12]

3.3 The homeless population

Among the homeless population the estimated number of people with schizophrenia is 22,790. Estimates of the costs associated with this group of schizophrenia population are given in Table 13.

[Table 13]

The total cost of health and social care services used by the homeless population is estimated to be around £196 million. Cost of medications is about £4 million. The cost of providing all kinds of accommodation (hostels, private sector leased accommodation, night shelters and day centres) to the homeless was estimated to be about £97 million per year. About 51% of this population were in receipt of benefits and the estimated amount of payments in benefits is £85 million. About 89% of this population are either unemployed or otherwise economically inactive. The estimated cost of lost productivity is £524 million. The estimated cost to the criminal justice system is quite small but this may be an underestimate as the estimate is based on a small sample (Only one person with schizophrenia in the Psychiatric Morbidity Survey of homeless adults had reported contact with the criminal justice system.)

3.4 The prison population

The schizophrenia population in prisons make use of a variety of services.

[Table 14]

Total cost of services used by the prison population is about £3 million. We have not added the institutional costs pertaining to prisons because these are not institutions specifically dealing with mental health patients and also because it is difficult to establish which if any of these individuals is in prison because of their schizophrenia.

3.5 Cost due to premature mortality

In estimating the cost of premature mortality due to schizophrenia we included only lost productivity. The estimated value of loss of productivity due to premature mortality is £896 million for the total schizophrenia population.

3.6 Total societal costs

The results provided in sections 3.1 to 3.5 demonstrate that the cost of schizophrenia to society is substantial. In addition to the obvious cost of providing health and social care to those with the illness, there are many other direct and indirect costs. In tables 15 and 16 we summarise the total societal costs for the main categories analysed in this study.

3.6.1 Total health and social care costs

The cost of providing health and social care, including the provision of nursing or residential accommodation for schizophrenia patients, is about £2 billion (Table 15). Of this amount, a little more than £1 billion is due to the institutional costs associated with those who are living in settings specifically for people with mental health problems and those who are homeless. Hospital treatment is the most expensive with per capita yearly costs of £261,705 and accounts for £822 million (78%) of the total cost of all institutions. Other types of residential care facilities account for about £226 million of the total. Providing accommodation to homeless people costs about £97 million per year. Those living in private households account for the largest share of health and social care resources used, costing about £590 million. The homeless and the prison population account for about £200 million and £3 million respectively. While the cost of health care provided to those in hospitals will be included in the

estimate of institutional costs, those living in other types of institutions make use of a wide range of health and social care resources and the estimated cost of these resources is about £107 million.

[Table 15]

3.6.2 Total costs due to all major heads

In table 16 total societal costs from all cost headings and for all populations are presented.

[Table 16]

The estimated overall total societal cost of schizophrenia is nearly £6.7 billion. While the direct cost of treatment and care that falls on the public purse is estimated to be about £2 billion, the total burden of indirect costs on the society and on the families is huge, amounting to nearly £4.7 billion. Cost of informal care and private expenditures borne by the families is £615 million. Lost productivity due to unemployment, absence from work and premature mortality of patients is the major cost contributor, accounting for £3.4 billion. In addition to this, there is also loss of production of carers of about £32 million. Cost to the criminal justice system is about £1 million. About £570 million will be paid out in benefit payments and the cost of administration associated with this is estimated to be £14 million.

In Figure 1 the percentage shares of the main cost items are demonstrated. This shows clearly that lost productivity of patients and carers due to unemployment and absence

from work accounts for the largest share, representing little more than 38% of the total. Lost productivity due to mortality represents another 13% of the total. While informal care accounts for 9.5%, health and social care costs and institutional costs together account for 29% of the total. Cost of providing accommodation to the homeless and criminal justice services represent 1.5% and 0.02% respectively. Costs borne by the social security system are about 8.7%. Private expenditures represent a very small proportion (less than 0.01%) of the total costs and are therefore not picked up by the pie chart.

[fig1]

4. Discussion

Using a variety of sources and as comprehensive a set of information as could be obtained from national surveys, local studies and published material, this study has estimated all major costs associated with the schizophrenia population in England. Separate estimates were obtained for people living in private households, institutions and prisons as well as those who are homeless. Total societal costs amount to £6.7 billion.

It is difficult to compare the figure to previous cost-of-illness studies of schizophrenia. One reason is that estimates in all previous studies were for the UK while the estimate in this study is for England only. Secondly, the only other prevalence-based study was by Knapp [2]. The estimate of £2.6 billion in that study was conservative in that only some components of all societal costs were included. Also the method of estimation was top-down: cost estimates published by the NHS Executive were used to arrive at

costs incurred in managing schizophrenia patients in the UK in 1992/93. In contrast, this new study uses a bottom-up approach, using UK-SCAP and Psychiatric Morbidity Surveys data to estimate the cost of a comprehensive list of services used by schizophrenia populations in different settings and also to estimate other indirect costs such as cost of lost productivity for patients and carers, criminal justice system costs and costs to the social security system. Cost of informal care was also estimated based on the information from the UK-SCAP survey.

Two other studies referred to earlier (Davies and Drummond [1]; Guest and Cookson [3]) are incidence-based and therefore not are strictly comparable because of the different cost (life- time versus annual) and population (newly incident cases versus all prevalent cases in a year) bases. Methods used in the estimation of costs in these studies are also different. Davies and Drummond's estimates took into consideration only some types of services used by patients and did not consider all indirect costs associated with the disease. Although they present a prevalence-based estimate too, it is a very conservative estimate of some elements of the health care costs only. Guest and Cookson took into consideration many of the major cost components but their estimates were based on data from literature and expert opinions and a model that simulated patient movements between disease states over the first five years following diagnosis.

Despite the differences, it may be useful to look at the main characteristics of these studies in comparison to the present study. Table 17 presents such a comparison. It can be noted that a much more detailed analysis of cost bases and items is available in the present study and hence estimates of cost at many levels of disaggregation are also

available. Details of the estimates presented will also facilitate further analysis of these cost items, if required.

[Table17]

International comparison of costs of schizophrenia is difficult partly because we do not have estimates for countries in a single currency and partly because care and support systems vary considerably. Such comparisons, however, can be interesting and therefore we have converted our estimates of health care related expenditures into US dollars and euros using purchasing power parities for health. Table 18 presents these costs in international currencies, so that comparisons can be made if necessary. It was not possible to convert other costs associated with schizophrenia into international currencies as we do not have data on purchasing power parities relevant for those groups of expenditures.

[Table 18]

5. Limitations

The study has its limitations. Data come from a variety of sources. Using survey data to provide estimates has the usual limitation of the validity of extrapolating sample-based estimates to the population as a whole and the margin of error in classification and coding of data inputs. Prevalence rates can vary between regions and since the proportion of the sample with schizophrenia in national surveys is very small, it is difficult to say with certainty that they provide true prevalence rates. While the prevalence rates among the institutional populations and for those in prisons may be

fairly reliable, the same cannot be said about the prevalence rates for the household and homeless populations. We have made reasonable assumptions in deciding which prevalence rates to apply to these populations. Information on the use of health and social care services was based on the ability of patients to recall their contacts, which again may involve some degree of inaccuracy. In estimating total costs of health and social care resources used, there was a certain degree of uncertainty about how much of the inpatient facilities used by the household and homeless populations and by some of the institutional populations was already included in the costs of hospitals. Inpatient care use recorded by the non-hospital populations are likely to be short stay episodes which may be included in the institutional costs of hospitals. However, there was inconsistency in the estimated annual number of short stay facilities (7,867) and the estimated numbers of those who had used inpatient facilities during the year (12,852 among the household population with mean stay of 62 days; 8,318 among the homeless with mean stay of 37 days; 1,325 among residents of hostels with mean stay of 88 days; and 211 among residents of group homes with mean stay of 65 days). The obvious difficulty in separating hospital costs from inpatients services used by these different populations means that there is a chance of slight double counting involved. A further limitation of the study was the difficulty in knowing the exact amount of benefits received by those living in institutions. The estimate of costs to the social security system may therefore be either an under- or over-estimate. Similarly data on contact with the criminal justice system may not be accurate as number of contacts was not recorded in the UK-SCAP or the Psychiatric Morbidity Surveys. Hence the estimate of cost to the criminal justice system is likely to be an under-estimate of the true cost.

6. Conclusion

This study has estimated the societal costs of schizophrenia using the most recent data available for all major cost heads and for various settings in which patients suffering from the disease reside. Results reiterate the points made in earlier studies of cost of illness of schizophrenia that the total burden of this disease to society is huge. The estimate for the total annual direct and indirect costs is £6.7 billion. Health and social care costs account for about 30% of these costs with an estimated figure of £2 billion. Indirect cost of lost productivity is the major cost to the society, accounting for nearly 52% of the total costs. These costs are due to unemployment and absence from work of both patients and carers and also due to premature mortality of patients. Other major costs borne by the community include costs of providing informal care (9%), costs to the social security system (9%) and some cost to the criminal justice system.

The estimated number of persons suffering from schizophrenia in England is 122,347. Of this number about 59% (72,608) live in private households and account for nearly 53% of the total costs (excluding mortality costs). About 21% (25,429) live in institutions specifically catering for persons with mental health problems and they account for 31% of the total costs. About 19% (22,790) of schizophrenia patients are among the homeless population and they account for about 16% of the costs while schizophrenia patients in prisons represent about 1% (1,520) of the total number and account for only about 0.05% of all costs. (It was not possible to estimate or assign mortality rates for patients in different settings, hence the need to separate this cost in presenting the share of total costs due to different populations.)

While the accuracy of estimates in any study will be subject to the limitations of the data, the detailed analysis of costs presented in this study is unique and informative. It highlights the significant burden to the society of schizophrenia and also throws much light on the relative shares of cost items borne by different populations, different public services and departments and by the society at large.

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Appendix A: Unit costs 2005 used in calculations

GP consultations	£25 / consultation. 12.6 minutes
Psychiatrist	£204 / hr of patient contact. 30 minutes average contact
Psychologist	£72 / hr of client contact. 30 minutes
Social worker	£106 / hr of face to face contact. One hr.
Health visitor	£67 / hr of client contact. 20 minutes.
Occupational therapist	£42 / hr of client contact. 30 minutes.
Community psychiatric nurse	£66 / hr of client contact. 20 minutes.
Other nurse	£44 / client contact. 20 minutes
Support worker- health funded	£19/hr with patient. 20 minutes.
Drug/Alcohol workers	Alcohol health worker, A&E. £20 / clinic consultation
Workshop	£ 8.70 gross per hr. ½ a day.
Employment agency worker	£ 8.70 /hr. 1hr.
Crisis Team	£66 / hr of client contact. 20 minutes. (CPN costs used)
Acute & Psychiatric hospitals, Special hospitals	MH acute care = £208 /bed day
Day hospital	NHS Trust Day Care. £29/session
Day Centre	LA day care . £19/session
Accident & Emergency	National average: £110 per first attendance
Criminal justice system cost	183.84/police contact, Metropolitan police
Informal Care	£13/hr. Cost of Auxiliary nurse
Benefits paid	£139/week.Income support, invalidity benefit & disability allowance
Medications	Mean costs from UK-SCAP. Household sample (£ 1.72/ per patient per day. Institutional sample (£ 2.16/per patient per day)

Appendix A: Unit costs 2005 used in calculations

Secure units	£356. DH reference costs
Short stay hospitals	£195/day. Acute hospital services for people with mental health problems.
Long stay hospitals	£166/day. NHS long-stay hospital for people with mental health problems.
Nursing homes	£269/week. Private sector residential care for people with mental health problems.
Sheltered homes with MH worker present	£437/week. LA residential care(staffed hostel) for people with mental health problems.
Sheltered homes with MH worker visiting (group homes)	£83/week. LA residential care (group home) for people with mental health problems.
Night shelters	£53/day. Joseph Rowntree Foundation (1998)
Private sector leased accommodation	£55/week. Patel & Knapp(1998)
Hostels for the homeless	£120/week. Patel & Knapp(1998)
Day centres used by homeless	£38/day. LA day care for people with mental health problems.

Table 1: Prevalence of schizophrenia by type of institution

Type of institution	Proportion of residents suffering from schizophrenia
Hospital	62.6%
Residential care home	54.2%
Group home	56.4%
Hostel	38.4%
Ordinary housing / recognised lodge	51.1%
Other	70.8%
Overall for all institution types	56.3%

Source: OPCS 1994a [10]

Table 2: Number of places available in residential facilities for people with mental health problems in England

Type of facility	No. of places available
Hospitals[1]	
Secure units	1,667
Short stay	12,567
Long stay	3,342
Care homes[2]	
NHS residential facilities	1,280
Private nursing homes	7,280
Staffed residential homes	14,870
Small registered residential homes	2,320
Group homes[3]	1,840

Notes:
1. The figures are for occupied beds in 2002-3. (Source: DH 2006) [21]
2. The figures are for available places in 2001. (Source: DH 2006) [21]
3. The figure is for 1996-97. (Source: House of Commons Select Committee on Health Report 1997-98) [22]

Table 3: Health & social care resources used - household sample

Resources used	Sample N	% using	Mean no. of contacts / 6 months	Mean per capita cost 6 months (£)	Total per capita yearly cost (£)	Total N (England = 72,608)	Total national cost (£)
GP consultations	253	61.40	3.56	89.00	178.00	42,839	7,625,292
Psychiatrist	359	87.10	4.30	438.60	877.20	63,242	55,475,503
Psychologist	22	5.30	3.90	140.73	281.46	3,848	1,083,121
Social worker	91	22.10	6.50	689.00	1,378.00	16,046	22,111,895
Health visitor	6	1.50	9.00	201.00	402.00	1,089	437,826
Occupational therapist	47	11.40	16.20	340.20	680.40	8,277	5,631,883
Community psychiatric nurse	303	73.50	12.14	267.12	534.24	53,367	28,510,722
Other nurse	16	3.90	1.23	101.77	203.54	2,832	576,367
Support worker-health funded	51	12.40	21.80	137.00	274.00	9,003	2,466,929
Drug/Alcohol workers	6	1.50	2.83	56.67	113.34	1,089	123,441
Workshop	45	10.90	46.40	1,614.72	3,229.44	7,914	25,558,667
Employment agency worker	22	5.30	6.41	55.76	111.52	3,848	429,154
Crisis Team	26	6.30	6.04	133.00	266.00	4,574	1,216,765
Acute, psychiatric & Special hospitals	73	17.70	61.44	12,779.52	25,559.04	12,852	328,474,967
Day hospital	74	18.00	44.31	1,285.01	2,570.02	13,069	33,588,722
Day Centre	117	28.40	37.00	703.16	1,406.32	20,621	28,999,263
Accident & Emergency	46	11.20	1.35	148.50	297.00	8,132	2,415,233
Total - health & social care					**38,361.52**	72,608	**544,725,751**
Medications	412	100		1.72 / day	**627.80**	72,608	**45,583,302**

Note: The entry for mean no. of contacts corresponding to hospitals = mean length of stay.

Table 4: Costs to the criminal justice and social security systems - household sample

Criminal justice & Social security system costs	Sample N	% using	Mean no. of contacts	Total per capita yearly cost	Total N for England	Total national cost (£)
Criminal justice cost	10	2.4	1.00	367.68	1,743	**640,716**
Benefits paid	320	77.6	-	7,228.00	56,344	**407,253,044**
Social security administration costs	320	77.6	-	-	56,344	**10,181,326**

Assumptions:
1. 77.6% of those who are either unemployed or economically inactive are in receipt of benefits.
2. Social security administration costs = 2.5% of the value of benefits.

Table 5: Cost of lost productivity - household sample

Loss of productivity	%	Mean no. of days /hrs lost	Total per capita yearly cost (£)	Total N for England	Total national cost (£)
Patients					
Unemployment	78.00	365	25,170	56,635	**1,425,502,950**
Absence from work	25.00	12.5 days	1,190	3,994	**4,752,860**
Carers					
Unemployment	4.80	365	25,170	1,091	**27,466,309**
Absence from work	15.50	12.5 days	1,190	3,524	**4,193,286**

Table 6: Cost of health and social care resources used – combined institutional population

Health & social care resources	Sample N	% using	Mean no. of contacts / 6 months	Mean per capita cost 6 months (£)	Total per capita yearly cost (£)	Total N (England = 25,429)	Total national cost (£)
GP consultations	102	54.30	3.00	75.50	151.00	13,808	2,085,000
Psychiatrist	165	87.80	5.34	544.62	1,089.24	22,327	24,319,093
Psychologist	11	5.90	7.82	281.46	562.92	1,500	844,555
Social worker	72	38.30	4.56	482.89	965.78	9,739	9,406,028
Health visitor	3	1.60	8.67	193.53	387.06	407	157,481
Occupational therapist	34	18.10	17.47	366.88	733.76	4,603	3,377,240
Community psychiatric nurse	107	56.90	12.79	281.48	562.96	14,469	8,145,525
Other nurse	7	3.70	2.50	590.99	1,181.98	941	1,112,093
Support worker-health funded	30	16.00	48.00	302.40	604.80	4,069	2,460,713
Drug/Alcohol workers	1	0.50	1.00	20.00	40.00	127	5,086
Employment agency worker	10	5.30	2.50	21.75	43.50	1,348	58,627
Workshop	36	19.10	52.58	1,829.90	3,659.80	4,857	17,775,425
Crisis Team	2	1.10	1.00	22.00	44.00	280	12,308
Hospital inpatient	71	37.80	100.01	20,802.93	41,605.86	9,612	399,922,266
Day hospital	18	9.60	53.28	1,545.10	3,090.20	2,441	7,543,747
Day Centre	52	27.70	53.64	1,019.10	2,038.20	7,044	14,356,740
Accident & Emergency	19	10.10	1.11	121.58	243.16	2,568	624,515
Total - health & social care					**57,004.22**	25,429	**492,206,442**
Medications				2.16 / day	**788.40**	15,817	**12,470,123**

Notes:
1. Hospital inpatient costs will include institutional costs but such costs for other types of institutions are not included here. More detailed cost estimates are given in tables 10, 11, 12 and 13.
2. Medications cost excludes inpatients in hospitals as cost of their medications will be included in the unit cost of hospitals.
3. The entry for mean no. of contacts corresponding to hospitals = mean length of stay.

Table 7: Costs to the criminal justice and social security systems – combined institutional population

Criminal justice & Social security system costs	% using	Mean no. of contacts / 6 months	Mean per capita cost (£)	Total per capita yearly cost (£)	Total N for England	Total national cost (£)
Criminal justice cost	3.70	1.00	183.84 / per contact	367.68	941	**345,940**
Benefits paid	100.00	-	£18.80/week or £139/week	-	25,429	**78,169,052**
Social security administration costs	100.00	-	-	-	25,429	**1,954,226**

Assumptions:
1. Those in hospitals and nursing/residential care homes (n=16,900) receive £18.80 as personal allowance. Those in hostels and group homes (n=8,529) receive the same package of benefits as those living in private households. (Based on information at www.mind.org.uk) [31] We have assumed that all are in receipt of minimum package of benefits, although some may be still be partially employed.
3. Social security administration costs = 2.5% of the value of benefits.

Table 8: Cost of lost productivity - combined institutional population

Loss of productivity (Patients)	% Unemployed	Total N for England	Total national cost (£)
Hospitals	100.00	11,003	276,945,510
Nursing / residential care homes	100.00	5,897	148,427,490
Sheltered housing / hostels	88.70	5,066	127,511,220
Group homes	78.10	811	20,412,870
Total for all institution types		22,777	**573,297,090**

Table 9: Hospital costs – institutional population

Institutional costs	% using	Mean per capita yearly cost (£)	Total N for England	Total national cost (£)
Secure units	9.5	129,940	1,044	135,657,360
Hospital short stay	71.5	71,175	7,867	559,933,725
Hospital long stay	19.0	60,590	2,092	126,754,280
Total		**261,705**	11,003	**822,345,365**

Table 10: Health, social care, criminal justice, social security system and lost productivity costs: nursing homes patients

Health & social care resources	% using	Mean no. of contacts	Mean per capita cost (£) 6 months	Total per capita yearly cost (£)	Total N England = 5,897	Total national cost (£)
GP consultations	26.20	4.10	102.50	205.00	1,545	316,728
Psychiatrist	76.20	8.88	905.76	1,811.52	4,494	8,140,090
Psychologist	11.90	4.20	151.20	302.40	702	212,207
Social worker	21.40	7.56	801.36	1,602.72	1,262	2,022,565
Health visitor	2.40	24.00	536.00	1,072.00	142	151,718
Community psychiatric nurse	23.80	7.40	162.80	325.60	1,403	456,975
Other nurse	7.1	29.67	1,305.48	2,610.96	419	1,093,175
Support worker- health funded	4.80	4.00	76.00	152.00	283	43,025
Employment agency worker	4.80	1.50	13.05	26.10	283	7,388
Workshop	9.50	67.50	2,349.00	4,698.00	560	2,631,890
Crisis Team	4.80	1.00	22.00	44.00	283	12,454
Day hospital	4.8	65.0	1,885.00	3,770.00	59	222,317
Day centre	2.4	26.0	494.00	988.00	142	139,830
Accident & Emergency	9.50	1.25	137.50	275.00	560	154,059
Total – health & social care				**17,883.30**		**15,604,421**
Institutional costs	100.0		269.00/week	**13,988.00**	5,897	**82,487,236**
Total H & SC + Institutional costs				**31,871.30**	**5,897**	**98,091,657**
Medications cost	100.0		2.16/day	**788.40**	5,897	**4,649,195**
Criminal justice costs	11.90	1.00	183.84	**367.68**	702	**258,017**
Benefits paid	100.0		18.80/week	**977.60**	5,897	**5,764,907**
Lost productivity	100.0			**25,170.00**	5,897	**148,427,490**

Table 11: Health, social care, criminal justice, social security system and lost productivity costs: staffed residential homes (hostels)

Health & social care resources	% using	Mean no. of contacts / 6 months	Mean per capita cost (£) 6months	Mean per capita yearly cost (£)	Total N (England = 5,711)	Total national cost (£)
GP consultations	61.00	2.80	70.00	140.00	3,484	487,719
Psychiatrist	89.00	5.11	521.22	1,042.44	5,083	5,298,504
Psychologist	1.20	14.00	504.00	1,008.00	69	69,080
Social worker	46.30	3.91	414.46	828.92	2,644	2,191,824
Occupational therapist	20.70	17.65	370.65	741.30	1,182	876,348
Community psychiatric nurse	67.10	13.18	289.96	579.92	3,832	2,222,300
Other nurse	4.90	48.25	707.67	1,415.33	280	396,065
Support worker- health funded	18.30	66.87	1,270.53	2,541.06	1,045	2,655,695
Employment agency worker	6.10	2.40	20.88	41.76	348	14,548
Workshop	22.00	48.00	1,670.40	3,340.80	1,256	4,197,448
Hospital inpatient	23.20	88.11	18,326.88	36,653.76	1,325	48,564,473
Day hospital	12.20	31.20	904.80	1,809.60	697	1,260,824
Day Centre	39.00	50.63	961.97	1,923.94	2,227	4,285,172
Accident & Emergency	11.00	1.00	110	220.00	628	138,206
Total – health & social care				**52,286.83**		**72,658,208**
Institutional costs	100.00		437/week	**22,724.00**	5,711	**129,776,764**
Total H & SC+ Institutional				**75,010.83**	**5,711**	**202,434,972**
Medications	100.00		2.16/day	**788.40**	5,711	**4,502,552**
Criminal justice system contact	2.40	1.00	183.84	**367.68**	137	**50,396**
Benefits paid	100.00		139/week	**7,228.00**	5,711	**41,279,108**
Lost productivity	88.70			**25,170.00**	5,066	**127,511,220**

Table 12: Health, social care, criminal justice, social security system and lost productivity costs - group homes

Health & social care resources	% using	Mean no. of contacts/ 6 months	Mean per capita cost (£) 6months	Total per capita yearly cost (£)	Total N (England =1,038)	Total national cost (£)
GP consultations	64.10	3.00	75.00	150.00	665	99,804
Psychiatrist	93.80	3.70	377.40	754.80	974	734,906
Psychologist	7.80	10.20	367.20	734.40	81	59,460
Social worker	39.10	4.48	474.88	949.76	406	385,468
Health visitor	3.10	1.00	22.30	44.60	32	1,435
Occupational therapist	10.90	24.71	518.91	1,037.82	113	117,421
Community psychiatric nurse	65.60	13.57	298.54	597.08	681	406,568
Support worker-health funded	20.30	33.00	209.00	418.00	211	88,078
Drug/Alcohol workers	1.60	1.00	20.00	40.00	17	664
Employment agency worker	4.70	3.33	28.97	57.94	49	2,827
Workshop	21.90	54.21	1,008.16	2,016.31	227	458,352
Hospital inpatient	20.30	64.77	13,472.16	26,944.32	211	5,677,545
Day hospital	9.40	86.17	2,498.93	4,997.86	98	487,651
Day Centre	29.70	60.16	1,143.04	2,286.08	308	704,766
Accident & Emergency	9.40	1.17	128.70	257.40	98	25,115
Total – health & social care				**41,286.37**		**9,250,062**
Institutional costs	100.00		83.00/week	**4,316.00**	1,038	**4,480,008**
Total H & SC+ Institutional costs				**45,602.37**	**1,038**	**13,730,070**
Medications	100.00		2.16/day	**788.40**	1,038	**818,359**
Crim.justice contact	0		0	**0**	0	**0**
Benefits paid	100.00		139/week	**7,228.00**	1,038	**7,502,664**
Lost productivity	78.10			**25,170**	811	**20,412,870**

Table 13: Health, social care, criminal justice, social security system and lost productivity costs - homeless population

Homeless Population	Sample N	% using	Mean no. of contacts	Total per capita yearly cost (£)	Total N (England= 22,790)	Total national cost £
GP consultations	25	89.29	1.20	780.00	20,349	15,872,369
Psychiatrist	8	29.63	6.10	622.20	6,753	4,201,516
Psychologist	2	7.45	6.10	219.60	1,698	372,849
Social worker	8	29.63	2.68	14,772.16	6,753	99,751,625
Occupational therapist	2	7.45	6.10	128.10	1,698	217,495
Community psychiatric nurse	5	18.52	6.10	134.20	4,221	566,419
Drug/Alcohol workers	13	46.43	1.00	1,040.00	10,581	11,004,653
Mental health team specialist	13	46.43	1.00	572.00	10,581	6,052,559
Acute, psychiatric & special hospitals	10	36.50	32.64	6,789.12	8,318	56,474,276
Day hospital	7	27.00	6.10	176.90	6,153	1,088,519
Total - health & social care				**25,234.28**		**195,602,280**
Medications	7	27.00	-	**678.90**	6,153	**4,177,475**
Cost of providing homes						
Hostels		46.00	-	6,240.00	10,483	65,416,416
PSLA		23.00	-	2,860.00	5,242	14,991,262
Night shelters		16.00	-	2,756.00	3,646	10,049,478
Day centres		15.00	-	1,976.00	3,419	6,754,956
Total cost of all homes				**13,832.00**		**97,212,112**
Crim. justice sys. cost	1	3.57	1.00	**183.84**	814	**149,573**
Benefits paid	14	51.40	-	**7,228.00**	11,714	**84,669,226**
Lost productivity	25	89.29	-	**25,170**	20,349	**512,189,137**

Assumption:
1. Medications cost = Mean costs from UK SCAP total sample (£1.86/day).

Table 14: Health & social care resources – prison population

Health & social care resources (one year usage)	% using	Mean no. of contacts	Mean per capita cost / 6 months (£)	Total per capita yearly cost (£)	Total N (England = 1, 520)	Total national cost (£)
GP consultations	60	3.56	89.00	178.00	912	162,336
Psychiatrist	40	4.30	438.60	877.20	608	533,338
Psychologist	20	3.90	140.40	280.80	304	85,363
Psychotherapist	20	6.5	689.00	1,378.00	304	418,912
Psychiatric nurse	10	12.14	267.08	534.16	152	81,192
Pastor / chaplain (replaces Social worker)	30	6.5	689.00	1,378.00	456	628,368
Other psychiatric professional	40	2.83	56.60	113.20	608	68,826
Counsellor	20	2.83	101.88	203.76	304	61,943
Probation officer	30	16.2	680.40	1,360.80	456	620,525
Other source of support	60	1.23	17.96	35.92	912	32,755
Medications taken	50		1.72	627.80	760	477,128
Total costs				**6,967.64**		**3,170,686**

Assumptions made:
1. Psychotherapist = Social worker. (unit cost & no. of contacts)
2. Other psychiatric professional = Alcohol worker (unit cost & # contacts)
3. Counsellor = alcohol worker (no. of contacts only, not unit costs)
4. Probation officer=Occupational therapist (unit cost & # contacts)
5. Other source of support = other nurse (unit cost & # contacts)
6. Medications cost = Mean costs for the household sample in UK-SCAP.

Table 15: Total health and social care costs

Population	Cost of health and social care resources used		Institutional costs		Total yearly costs (colmns 3 + 5)
	Per capita yearly cost (£)	Total yearly cost (£)	Per capita yearly cost (£)	Total yearly cost (£)	
Household	38,989	590,309,053	-	-	590,309,053
Homeless	25,913	199,779,755	13,832	97,212,112	296,991,867
Prisons	6,968	3,170,686	-	-	3,170,686
Institutions					
Hospitals	-	-	261,705	822,345,365	822,345,365
Nursing homes	18,672	20,253,616	13,988	82,487,236	102,740,852
Staffed residential homes / hostels	53,075	77,160,760	22,724	129,776,764	206,937,524
Group homes	42,075	10,068,421	45,602	13,730,070	23,798,491
Total for all institutions		**107,482,797**		**1,048,339,435**	1,155,822,232
Total for all populations	**-**	**900,742,291**	**-**	**1,145,551,547**	**2,046,293,838**

Notes:

1. Health and social care costs include cost of medications.
2. Health and social care costs pertaining to the hospital population are assumed to be included in the institutional costs for hospitals.
3. Inpatient costs incurred by those in staffed residential homes/hotels and group homes (about £54 million) and those in private households (£328,474,967 in Table 3) have not been separated from the cost of health and social care resources used by those populations. As a result, there may be slight double counting involved in the total costs as the cost of hospitals may include some (but not all) of these costs.

Table 16: Total yearly societal costs of schizophrenia

Cost items	Population groups				
	Household	**Institutional**	**Homeless**	**Prisons**	**All**
	£	£	£	£	£
Health &social care	590,309,053	107,482,797	199,779,755	3,170,686	900,742,291
Institutional costs[1]	-	1,048,339,435	97,212,112	-	1,145,551,547
Informal care	604,076,284	-	-	-	604,076,284
Private expenditures	11,806				11,806
Lost Productivity					
Patients					
Unemployment	1,425,502,950	573,297,090	512,189,137	-	2,510,989,177
Absence from work	4,752,860	-	-	-	4,752,860
Mortality	-	-	-	-	896,355,570
Carers					
Unemployment	27,466,309	-	-	-	27,466,309
Absence from work	4,193,286	-	-	-	4,193,286
Criminal justice system	640,716	345,940	149,513	-	1,136,229
Social security payments	407,253,044	78,169,052	84,669,226	-	570,091,322
Social security administration	10,181,326	1,954,226	2,116,731	-	14,252,283
All costs (except mortality costs)	3,074,387,634	1,809,588,540	896,116,534	3,170,686	
Total societal costs					**6,679,618,964**
Number of people	**72,608**	**25,429**	**22,790**	**1,520**	**122,347**
Average cost (per person per year)	**42,342**	**71,162**	**39,320**	**2,086**	**54,596**

Notes:
1. Cost of health and social care resources used by those in hospitals will be included only under the heading institutional costs and not under the heading of health and social care costs for institutions.

Table 17: Main characteristics of cost of illness studies of schizophrenia in the UK

Characteristics	Study			
	Davies & Drummond 1994	**Knapp 1997**	**Guest & Cookson 1999**	**Mangalore & Knapp 2006**
Year	1990-91	1992-93	1997	2004-05
Region	UK	UK	UK	England
Method	Mainly incidence-based, top-down. Prevalence-based estimate of health care costs only	Prevalence-based, top-down	Incidence-based, simulation study based on data from literature and expert opinion	Prevalence-based, bottom-up
Population groups identified	All users of health care services	All users of health care services	Users of NHS services, residents of LA accommodation, and prisons	Private households, institutional, homeless and prisons
Costs estimated				
Health and social care	Out-patient visits, in-patient days, day care, community-based support visits, drug therapy	Out-patient care, in-patient care, primary care, community care, pharmaceutical, social services,	GP, CPN, out-patient visits- day ward, OP clinic, day centres, in-patient days- acute & psychiatric, special, LA day centres, LA accommodation, drugs- typical, atypical, adjunctive	GP, psychiatrist, psychologist, social worker, health visitor, Occupational therapist, CPN, support worker, drug & alcohol worker, crisis team worker, employment agency worker, workshop attendance, day centres, day hospital, A& E units, hospital inpatient days, medications
Institutional costs	Institutional/residential care costs included in inpatient care but not separately identified	Institutional/residential care costs included in inpatient care but not separately identified	Hospital costs included in inpatient costs but separately identified and Local authority accommodation costs	Hospitals, nursing/residential care homes, other staffed residential accommodation, group homes, accommodation for the homeless

Characteristics	Study			
	Davies & Drummond 1994	**Knapp 1997**	**Guest & Cookson 1999**	**Mangalore & Knapp 2006**
Informal care	No	No	No	Yes
Criminal justice system	No	No	Yes	Yes
Social security payments	No	Payments for residential care placements included in total costs but not shown separately	No	Yes
Social security administration	No	No	No	Yes
Lost Productivity – Patients				
Unemployment	Yes	Yes	Yes	Yes
Absence from work	No	No	Yes	Yes
Reduced productivity at work	No	No	No	No
Mortality	No	No	Yes	Yes
Lost Productivity – Carers				
Unemployment	No	No	Yes	Yes
Absence from work	No	No	No	Yes
Total societal costs estimate	**£1.7 billion**	**£2.6 billion**	**£862million**	**£6.7 billion**

Table 18: Purchasing power parities conversions of health care related costs of schizophrenia

	Currency		
	£	**US$**	**euro**
Health &social care[1]	900,742,291	2,970,785,920	1,291,016,613
Institutional costs[2]	1,048,339,435	3,457,583,889	1,502,564,763
Informal care	604,076,284	1,992,336,029	865,810,927
Private expenditure	11,806	38,938	16,921
Total costs	**2,553,169,816**	**8,420,744,776**	**3,659,409,225**

Notes:
Purchasing Power Parities for health expenditures used: £ 0.3032 (US $=1); £ 0.6977 (EU25 =1). Source: (OECD 2004) [46].

Fig. 1 Total societal costs of schizophrenia