

National Assembly for Wales

Children, Young People and Education Committee

CAM 03

**Inquiry into Child and Adolescent Mental Health Services (CAMHS)**

**Evidence from : North Wales Department of Psychological Medicine**

**Mental Health Service Utilization in Paediatric Population: 1875 to 2008**

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## **Abstract**

**Objectives:** To investigate the frequency of admissions of under 18 years of age to mental health services in North West Wales between 1875 and 2008. There are claims that 1 in 10 children have a mental illness but there is little data on inpatient mental health service utilisation in paediatric populations.

**Setting:** This study looked at admissions at secondary care level in North West Wales. Three data samples were included; the first comprises historical asylum admissions, the second was contemporary admissions to acute psychiatric beds, and the third group comprises admissions to district general hospital (DGH) beds that resulted in a mental health coding.

**Participants:** All patients were under 18. There were 65 historical patients, 41 contemporary mental illness admissions and 943 patients DGH admissions.

**Primary and secondary outcome measures:** The primary outcome measures were diagnoses based on case notes of the historical cohort between 1875 and 1924, as well as details of paediatric admissions to mental health services from 1994 to 2008 and paediatric admissions with a mental health component to the DGH in North West Wales.

**Results:** The incidence of admission to a mental health bed was 1.55 patients per year in the historical cohort compared with 2.9 in the contemporary cohort. The overall incidence of admission to any bed in the contemporary cohort was 129 patients per year. There has been a two fold increase in the incidence of admissions for schizophrenia and related psychosis, but this likely stems from an earlier age of admission rather than a true increase.

**Conclusion:** There is a greater frequency of hospital admissions for mental health today than before. The rates reported in the contemporary general hospital sample are consistent with data from community surveys of patients meeting criteria for mental disorders and complement such data when it comes to planning for paediatric mental health services. But they also raise questions about the boundaries between disease and distress.

## **Strengths and limitations**

- This study has unique access to 19th and early 20th century's asylum records.
- The late 20th and early 21st century diagnoses are drawn from clinical consensus rather than administrative databases.
- This is a study of hospital admission incidence in a rural setting (North Wales) and is therefore one step removed from offering true incidence rates.
- As a retrospective study dealing with historical records, it carries in it the limitations associated with such a method.
- By offering data on general hospital admissions for mental disorders it sheds some light on pathways to care.

## **INTRODUCTION**

Official documents and media reports in recent years have suggested that up to 10% of children have a mental disorder [1, 2, 3, 4]. The available data underpinning this claim focus mainly on the epidemiology of different disorders and community service utilization [5-11]. The best data comes from cohort studies in New Zealand, which, using interview schedules in community samples, indicate that over 20% of subjects meet operational criteria for disorders codified in current diagnostic manuals for mental health disorders [5, 6].

There are very few data for rates of inpatient admissions for paediatric populations. We were only able to find five studies that have looked at the inpatient bed utilization by adolescent patients as part of studying the whole range of mental health service for this age group, [5, 10, 12, 13, 14].

This study explores the relative frequency of paediatric admissions to inpatient beds for mental health reasons in a contemporary and historical period as well as admissions with a mental health coding to a general hospital bed. These admissions clearly offer admission incidence and prevalence rather than true incidence and prevalence rates for childhood mental health disorders, but they may also offer some

sense of how patients or potential patients are distributed, and the possible boundaries between illness and distress.

## **METHOD**

In this study we are presenting a unique combination of three sets of data. The first one is a historical cohort from under 18s admissions from North West Wales to the North Wales asylum between 1875 and 1924, a period for which we have a complete set of records. The second group is contemporary admissions of under 18s to the Hergest unit, which is the psychiatric unit at North West Wales's district general hospital, between 1994 and 2003. These two datasets have been mined to provide admission incidence rates for a series of adult mental disorders. The third set of data comprises all under 18s admissions to the only North West Wales district general hospital between 2000 and 2008 that resulted in mental health codes on discharge.

The 19<sup>th</sup> and early 20<sup>th</sup> century hospital records of the North Wales asylum at Denbigh and records of admissions through the current district general hospital serving North West Wales offer an opportunity to study aspects of mental health service delivery, as geographical and financial constraints have meant that admissions of patients from North West Wales focus on these two facilities in a unique way (15, 16).

For the purposes of this study, we have taken all case notes of patients admitted to the asylum between 1875 and 1924. All patients were compulsorily detained and their medical and legal certificates outlined the circumstances of detention. The case notes record age, gender, educational, employment and marital status, family history of mental illness and prior mental or physical illness. Patients were routinely assessed for suicidality, violence, seizure-proneness, eating and sleeping habits as well as alcohol intake. The notes provide a detailed assessment of mental and physical state on admission as well as information on the course in hospital until discharge or death. Prior admissions could be traced back to 1865 and subsequent admissions could be followed up until 1965.

The notes for the historical cohort sample, which are more comprehensive than in other asylums of the period, were sufficiently detailed to permit contemporary consultant psychiatrists to make a retrospective ICD-10 diagnosis on each patient to allow comparability with the modern sample. The procedure followed was to give the historical records to the consultant from whose sector they would now come. This method permitted some standardization of diagnostic biases. In the case of the historical sample, it was possible to catalogue all previous and subsequent admissions of that patient. Where there were other admissions, the full details of presenting mental states and clinical course while in the asylum were included as an appendix to their first admission record and clinicians made a diagnosis with data from all admissions available to them.

All retrospective diagnoses were made according to ICD-10 criteria and had been made before this study was undertaken. The case notes give sufficient information about the onset of symptoms, the presenting mental state and the clinical course of the disorder to make these historical diagnoses reliable. There was full agreement between raters on the diagnoses. Further details of the methodology and procedures underpinning retrospective diagnosis in the asylum sample have been outlined elsewhere [15, 16].

We have not included in either the historical or contemporary cohorts any patients with a learning disability or developmental disorder. Such patients were diagnosed with idiocy or imbecility in the historical records. We have reviewed all records carrying a diagnosis of either idiocy or imbecility. Of the 13 patients diagnosed with idiocy, all met criteria for a learning disability today. Of the 11 patients diagnosed as imbeciles, 6 met criteria for learning disability with the remainder having epilepsy (2), organic brain disorder (1) or personality disorder (2).

For the purposes of comparing the incidence of mental health service utilisation between historical and contemporary periods, a contemporary sample was drawn from all admissions between 1994 and 2003 to the Hergest Unit, the only mental health inpatient service in the area. This sample offers us not just admission incidence figures for the onset of service utilisation but figures for admission prevalence during the 5 year period from first admission, along with duration of stay data.

In addition to this sample, we have obtained data for all admissions to the adjacent district general hospital that resulted in mental health codes for the years 2000-2008. In 2000, the mental health and general health service merged into one Unit and all admissions were on the same computer system, giving three years overlap (2000-2003) between this sample and the sample of contemporary admissions to the Hergest unit (1994 to 2003). We traced all patients to exclude any double counting between the General Hospital and the mental health unit (Hergest).

We have scrutinized all referrals for admission to out of area facilities to determine whether there were any additional subjects not already captured in the databases outlined above.

The overall population of North West Wales has remained the same over 100 years. A census of the population broken down by age in 1891 showed that there were 232,000 people, and in 1991 there were 241,000 in the same area. However, there was a difference in the numbers of children and teenagers between 1901 and 2001; there were 17,810 adolescents aged 15-19 compared to 13,798 in 2001 [17, 18]. When comparing historical and contemporary mental health service admissions, we have accordingly age standardized our finding to 2001 figures, and expressed the comparative finding in terms of the incidence of disorders per 100,000 adolescents population. In the period from 1875-1924, the structure of the population remained constant such that the figures offered for this group of admissions were unaffected.

## RESULTS

### Historical Mental Health Facility Admissions

Between 1875 and 1924, there were 65 admissions from individuals under 18 years of age to the North Wales asylum. Of these, 27 were for organic disorders, learning disability or epilepsy, leaving 38 functional disorders. Of these 38, 21 were male and 17 female. The average age at admission was 16.3 years with the youngest being 13 years old.

Five years from their first admission, these patients went on to have a mean of 1.55 admissions, but the median number of lifetime admissions was 1.0. Of this patient group, 4 died in care, all from tuberculosis, 3 of them within their first admission. Overall 22 (58%) were discharged recovered and a further 2 (5%) discharged relieved. The remaining 10 (26%) were still in care, having either remained in care since their first admission, or having been discharged and readmitted.

On admission, 11 patients were considered suicidal, and 4 had attempted suicide prior to their first admission. There were no suicides, five years following first admission, but there was 1 suicide attempt while in hospital.

The historical diagnoses made at time of admission were; 66% for mania, 16% for dementia, 8% for melancholia, 5% for imbecility and 5% were left undiagnosed. A historical diagnosis of mania does not refer to the modern bipolar disorder. Using ICD 10 criteria, these cases have received the contemporary diagnoses outlined in Table 1.

There were 7 (33%) male patients diagnosed with schizophrenia, compared with 2 (12%) female patients. However, if organic catatonic syndrome is included with schizophrenia, a higher percentage of female patients- 47% (n=8) - had schizophrenia, compared with 37% (n=8) of male patients.

Table 1: Retrospective Diagnoses of Historical Mental Health Facility Admissions (1875-1924)

<i>Retrospective Diagnoses</i>	<i>Male</i>	<i>Female</i>	<b>Total</b>
	N (%)	N (%)	N (%)
Schizophrenia	7 (33.3)	2 (11.8)	9 (23.7)
Organic catatonic disorder	1 (4.8)	6 (35.3)	7 (18.4)
Personality disorder	3 (14.3)	2 (11.8)	5 (13.2)
Psychosis unspecified	4 (19.0)	1 (5.9)	5 (13.2)
Neurotic disorder	1 (4.8)	3 (17.6)	4 (10.5)
Bipolar disorder	2 (9.5)	2 (11.8)	4 (10.5)
Acute transient psychosis	2 (9.5)	0 (0)	2 (5.30)
Manic episode	1 (4.8)	1 (5.9)	2 (5.3)
<b>Total</b>	21 (100%)	17 (100%)	38(100%)

During the 5 year period, these patients spent a mean of 682 days (median of 445 days) in hospital. This total number of 38 functional cases translates into an admission incidence of 2.14 patients per 100,000 population aged 10-17 per year.

Of note, none of the patients in this historical cohort of 65 under 18 years old fulfilled the diagnostic criteria for Autistic Spectrum Disorder (ASD) or Attention Deficit Hyperactivity Disorder (ADHD).

### **Contemporary Mental Health Facility Admissions**

Between 1994 and 2003, 41 patients were admitted to the Hergest Unit aged under 18 years of age. Of these, 1 was diagnosed with learning disability and another one with developmental disorder (Asperger's syndrome). Therefore, a total of 39 patients with functional disorder were included. Of these 20 (51.3%) were female and 19 (48.7%) were male. The average age at first admission was 16.36 years, with the youngest being 14 years old. Table 2 shows their consensus diagnoses.

More male patients were diagnosed with schizophrenia compared to female patients, 5 (26.3%) and 4 (20%), respectively. There was slightly earlier age of onset for male patients, mean 16.21 year, compared to female patients, 16.50 year.

As a whole, the group had an average of 2.9 admissions in the 5 years period following their initial admission. Patients spent a mean of 87 days (median 21 days) in hospital. This group of 39 patients translates to 8.75 patients per 100,000 population aged 10-17 per year.

As of 2005, 4 of the cohort were dead. Two died from suicide within 5 years from their initial admission, another 2 died later, 1 from suicide and 1 from an overdose. The 39 patients had 18 suicide attempts.

Of the 39 patients, 24 (61.5%) have no current contact with the mental health service, while 13 (33.3%) have ongoing contact with mental health service. Excluding the 2 deaths within the 5 years period, 13 out of 37 (35%) have ongoing contact with mental health service.

Table 2: Contemporary Diagnoses of Mental Health Facility Admissions (1994-2003)

<i>Diagnoses</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>
	N (%)	N (%)	N (%)
Neurotic disorder	3 (15.8)	6 (30.0)	9 (23.0)
Schizophrenia	5 (26.0)	4 (20.0)	9 (23.0)
Disorder due to drug abuse	3 (15.8)	3 (15.0)	6 (15.4)
Personality disorder	1 (5.3)	3 (15.0)	4 (10.2)
Bipolar/manic depressive disorder	0 (0.0)	2 (10.0)	2 (5.1)
Disorder due to alcohol abuse	2 (10.5)	0 (0.0)	2 (5.1)
Emotional disorder	1 (5.3)	0 (0.0)	1 (2.6)
Acute transient psychosis	0 (0.0)	1 (5.0)	1 (2.6)
Psychological/behavioral disorder	1 (5.3)	0 (0.0)	1 (2.6)
Manic episode	1 (5.3)	0 (0.0)	1 (2.6)
Depressive episode	1 (5.3)	0 (0.0)	1 (2.6)
Problems relating to lifestyle/social environment	1 (5.3)	0 (0.0)	1 (2.6)
Feared complaint, no diagnoses made	0 (0.0)	1 (5.0)	1 (2.6)
<b>Total</b>	<b>19 (100%)</b>	<b>20 (100%)</b>	<b>39 (100%)</b>

### Contemporary Mental Health Admissions to General Hospital Beds

In total 943 individuals, aged 10 to 17 years inclusive, received mental health or related coding for 1157 admissions between 2000 and 2008 to both district general hospital and mental health service beds. On average therefore 105 individuals had 129 admissions per year. This is equivalent to 0.56% of the paediatric population of North West Wales. There was a roughly doubling of the rate of admissions each year from 10 to 15 year olds and a slower rate of increase from 15 to 17 year olds.

We have excluded from the total number of admissions 7 individuals with primary learning disability or developmental disorder, including autism, as well as 44 admissions of under 10 year olds, and 70 out of area admissions. There were no under-10s in the historical sample.

Of these 943 individuals, there are 367, who were admitted between 2000 and 2003 and have 5 year tracked outcomes. Of these 367, 179 had no further admissions (48.8%), while 188 (51.2%) had at least 1 further admission to a medical or psychiatric bed or for a further self-harm episode or pregnancy related condition (See Table 3).

Within the group of 367, 157 had been originally admitted for self-harm. Of this self-harm group, 39 (24.7%) had a further admission for self-harm within the 5 year period, and of these 17 patients had between 2 and 18 admissions.

Of the cohort of 367 patients, 18 (4.9%) were admitted to a psychiatric bed at some point within 5 years of first admission. Of these 18 patients, 12 had initially had a general hospital admission, while 6 had an initial admission to psychiatric service. Of the 12 first admitted to general medical bed, 8 had been admitted for self harm, while the remaining four, one admission was abortion linked, one was for alcohol use, 1 with anxiety state and 1 drug related disorder.

Of those 18 patients admitted to Hergest unit with 5 years of first admission to the general hospital, 4 have now been diagnosed with schizophrenia, 2 with personality disorder, 2 with neurotic disorder, 2 with a depressive disorder, 1 with an organic disorder, 1 with a developmental disorder and 6 with substance abuse disorder.

From the overall group of 943 individuals, 479 were admitted because of self-harm, of whom 349 were admitted for deliberate self-harm, and 130 for self-harm of undetermined intent. Of these 479, 340 were female (71%).

There were 207 individuals with admissions to medical beds that received dual medical and psychiatric coding, of whom 100 were female (48%). There were 231 individuals admitted to medical beds with a psychiatric diagnosis of whom 120 were female (51.9%). Finally, 26 were admitted directly to a mental health bed between 2000 and 2008, of whom 7 (26.9%) were female.

The 207 individuals with dual medical and psychiatric coding had 229 admissions between them. In this group, 93 individuals were admitted for acute medical conditions, or chronic conditions such as asthma or diabetes, 50 for trauma or head injury, 30 for abortion or post-partum issues, and 34 for psychosocial problems.

In addition to their medical diagnoses, of these 207 individuals, the most common psychiatric diagnosis was for alcohol use (112), followed by depression (39), anxiety disorder (34), drug related disorder (17), unspecified nonorganic (1), personality disorder (1), sleep disorder (1), behavioral disorder (1) and no psychiatric coding (1)

In total 427 individuals (45.3%) were coded as having an alcohol related disorder, of whom 233 (54.6%) were male. Of these 138 were admissions for self-harm. In addition to the 112 patients admitted for alcohol linked problems noted above, 175 admitted to a medical ward with a psychiatric diagnosis of alcohol related problems, along with 2 admissions to the Hergest Unit for alcohol related problems.

Of the 231 admitted with a primary mental health coding, 175 were admissions for alcohol, 19 had an eating disorder, 16 had a drug related disorder, 15 an anxiety related disorder, 5 a depressive episode and 1 an organic disorder.

The patients with eating disorders had a median age of 15 years on first admission and have had 40 admissions between them to date.

The group of the 26 patients, who had an initial admission to a mental health bed, had 30 mental health bed admissions between them. The profile for these patients between 2000 and 2008 closely mirrored the earlier 1994 to 2003 sample.

From the whole cohort of 943 patients, there were 5 deaths in the 5 years period from their first admission. One was suicide, 1 drug over dose and 3 accidents.

Finally during the years 1994-2008, there have been on average 7 referrals per annum to a 5-day per week residential unit outside the catchment area. All of these patients have prior admissions to either the district general hospital or mental health beds outlined above, but their admissions and bed usage are not included in the figures above.

There were variations in the annual numbers of admissions with for instance a doubling of the numbers of individuals admitted in 2007 compared with 2002. The biggest contribution to this variation came from self-harm admissions, with for instance a 4-fold difference between 2007 and 2002 for rates of self-harm. In 2007 self harm accounted for 69.4% of admissions that year. It is of some interest that rates of suicide and related verdicts at inquest in the entire population in the area (all ages) were also highest in 2007, and were double those of 2002.

Table 3: District General Hospital Admissions with a Mental Health Code

943 individuals	1157 Admissions	
121 excluded	7 primary LD/ Developmental Disorder	
	44 under 10	
	70 out of area	
367 had 5 year follow up data	179 (48.8%) had no further admission	
	188 (51.2%) had one+ admissions	
	157 admitted for self-harm	39 (25%) had another DSH admission
		17 had 2-18 admissions
	18 (5%) had a psychiatric admission within 5 years	12 initially admitted to a DGH bed 6 initially psychiatric admissions
479 DSH admissions (71% female)	349 deliberate self-harm	
	130 undetermined cause	
231 Psychiatric admissions	175 Alcohol	
	19 eating disorder	
	16 drug related	
	15 anxiety disorder	
	5 depressive episode	
	1 organic disorder	
207 Medical & Psychiatric dx (48% females)	112 Alcohol	
	39 Depression	
	34 Anxiety	
	17 Drug related	

**DISCUSSION**

This is a first ever report of rates of inpatient service utilization for mental health disorders in paediatric populations to include both historical and contemporary figures.

Superficially the figure of 0.56% of children being admitted for a mental health related problem reported here for North West Wales contrasts with global claims that 10% or more children having a mental disorder. However it is clear there is a greater number of children with disorders severe enough to warrant hospital admission than is seen here, making it likely that there are comfortably over 1% of children with a relatively severe mental disorder in community settings.

There are only two other set of figures indicating the likely incidence of inpatient service utilization we are aware. One comes from the Christchurch cohort [5]. In this cohort, in which 25% of children in community settings met criteria for a mental disorder at some point in their career (Fergusson, Horwood, et al communication), 0.2% were admitted for serious mental disorders, with roughly 1.0% admitted for a mental health related issue, figures that have some comparability with those offered here. A closer figure (0.6%) was reported by another study (8)

One determinant for admissions to mental health beds in this age group in North West Wales during this period may have been a comparative lack of paediatric mental health beds (Tier 3 beds). This is likely to change with the development of such services, which may then paradoxically be linked to a greater admission prevalence.

Until such time as we have markers for any illnesses there may be among these disorders, it will not be possible to establish the incidence or prevalence of any mental illnesses in community samples in these age groups. In lieu of such markers, admission to a mental health bed, if only by virtue that it points to severity, acts as a proxy for such markers.

There was a two fold increase in the rates of schizophrenia and related psychoses in the contemporary compared to the historical cohort, with a similar doubling in the rates of affective disorder, and a 10 fold increase in admissions for non-affective non-psychotic disorders. In contrast there were more admissions for the mental consequences of organic disorders in the historical sample while there was an absolute increase in the numbers of admissions for social reasons in the contemporary sample.



Using admissions as a proxy marker, there might appear in the present data to be an increase in rates of schizophrenia, allied psychoses and of other serious mental illnesses such as bipolar disorder. In fact, based on the larger dataset of all admissions, not reported here, the incidence of schizophrenia has fallen in North West Wales [15] while the incidence of affective psychoses has remained constant in North West Wales from 1875 to the present day. What we are seeing in the current dataset therefore is an earlier age of admission rather than an increase in the incidence of these disorders.

A second issue of some importance is whether the prevalence of community disorders should be taken to mean that these subjects are at risk of later mental illness if left untreated in the community. Are anxiety and depressive disorders gateway diagnoses for schizophrenic psychoses or bipolar disorder in later life and would early intervention make a difference to the likelihood of progression? Or are schizophrenic and bipolar disorders qualitatively different disorders and should the provision of inpatient and specialist mental health services be driven by the relative frequency of these latter disorders.

There is some support for the gateway diagnosis point of view in that a substantial number of psychiatric unit admissions had prior admissions to a non-mental health bed. Over a longer time frame it seems likely that a greater proportion of paediatric patients admitted to a psychiatric hospital will turn out to have had admissions to a general hospital bed that has been recorded here.

Our data points to a need to target services on patients admitted to general hospital beds as in many cases problems leading to later admission will be picked up there first. Aside from those who go on to later mental health admissions there are many who go on to multiple readmissions to general hospital beds.

It would be of interest to establish what the prior General Hospital admission status might be for a representative sample of all mental health admissions later in life as well as to track over a longer time period the rates of admission from this cohort of DGH admissions. These are neglected areas of research.

Finally it is worth tracking outcomes for these paediatric samples. The mortality for psychotic patients in the modern period is greater than it was in the historical period (19). The comparatively small sample here precludes judgment on general rates but the figures give no cause for comfort.

**Declaration of interest:** None

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## References

1. Department of Health (2004) Mental Health. 1 in 10 children has a mental disorder. [www.statistics.gov.uk/cci/nugget\\_print.asp?ID=1229](http://www.statistics.gov.uk/cci/nugget_print.asp?ID=1229)
2. Ford T, Goodman R, Meltzer H. The British Child and Adolescent Mental Health Survey 1999: The prevalence of DSM-IV disorders. *J Am Acad Child & Adolesc Psychiatry* 2003;42:1203-1211
3. Observer Editorial (2014). Neglecting Mental Health will cost us dear in the future. Editorial January 26<sup>th</sup> 2014, p 40.
4. Merikangas K, He JP, Brody D, Fisher PW, Bourdon K, Koretz DS (2008). Prevalence and Treatment of Mental Disorders among US children in the 2001-2004 NHANES. *Pediatrics* 125, 75-81.
5. Fergusson DM, Horwood LJ, Lynskey MT. Prevalence and comorbidity of DSM-III-R diagnoses in a birth cohort of 15 year olds. *J Am Acad Child Adolesc Psychiatry* 1993;32:1127-1134.
6. McGee R, Feehan M, Williams SA, et al. DSM-III disorders in a large sample of adolescents. *J Am Acad Child Adolesc Psychiatry* 1990;29:611-619.
7. Ringel J, Sturm R. National estimates of mental health utilization and expenditures for children in 1998. *J Behav Health Serv Res* 2001;28:319-333
8. Burns BJ. Mental health service use by adolescents in the 1970s and 1980s. *J Am Acad Child Adolesc Psychiatry* 1991;30:144-150
9. Fleitlich-Bilyk B, Goodman R. Prevalence of child and adolescent psychiatric disorders in Southeast Brazil. *J Am Acad Child Adolesc Psychiatry* 2004;43(6):727-734.
10. Newman DL, Moffitt TE, Caspi A, et al. Psychiatric disorder in a birth cohort of young adults: Prevalence, comorbidity, clinical significance, and new case incidence from ages 11–21. *J Consult. Clin. Psychol* 1996;64(3):552-562
11. Case BG, Olfson M, Marcus SC, Siegel C (2007). Trends in the inpatient mental health treatment of children and adolescents in US community hospitals between 1990 and 2000. *Archives of General Psychiatry* 64, 89-96.
12. Merikangas Case BG, Olfson M, Marcus SC, Siegel C (2007). Trends in the inpatient mental health treatment of children and adolescents in US community hospitals between 1990 and 2000. *Archives of General Psychiatry* 64, 89-96.
13. KR, He JP, Busstein M, Swendsen J, Avenevoli S, Case B, Georgidas K, Heaton L, Swanson S, Olfson M (2011). Service utilization for lifetime mental disorders in US adolescents: results of the national comorbidity survey. *J Am Acad of Child and Adolescent Psychiatry* 50, 32-45.
14. Leaf PJ, Alegria M, Cohen P et al. Mental health service use in the community and schools: results from the four-community MECA study. *Methods for the epidemiology of child and adolescent mental disorders study. J Am Acad Child Adolesc Psychiatry* 1996;35:889–897
15. Healy D, LeNoury J, Linden SC, Harris M, Whitaker CJ, Linden D, Baker D, Roberts AP (2012). The Rise and Fall in the Incidence of Admissions for Schizophrenia: 1875-1924 & 1994-2010. *BMJ Open* 2:e000447. doi:10.1136/bmjopen-2011-000447.
16. Healy D, Savage M, Michael P, et al. Psychiatric bed utilization: 1896 and 1996 compared. *Psychol Med* 2001;31:779–790.
17. Office of national statistics, 1891 census.
18. Office of national statistics, 2001 census.
19. Healy D, LeNoury J, Harris M, et al. Mortality in schizophrenia and related psychoses: data from two cohorts, 1875 1924 and 1994–2010. *BMJ Open* 2012;2:e001810. doi:10.1136/bmjopen-2012-00181