Lifetime suicide rates in treated schizophrenia: 1875–1924 and 1994–1998 cohorts compared†

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Background Recent interest in suicide rates in schizophrenia has been considerable.

Aims To establish the lifetime suicide rate from the pre-chlorpromazine era and to compare this with recent lifetime suicide rates for schizophrenia.

Method We have compared suicide and suicide attempt rates for 741 admissions for schizophrenia and 1303 admissions for psychoses to the North Wales Asylum between 1875 and 1924, with first admissions for psychosis in North West Wales between 1994 and 1998.

Results The suicide rate in schizophrenia between 1875 and 1924 was 20 per 100 000 hospital years, a lifetime rate of less than 0.5%. The suicide rate for all psychoses was 16 per 100 000 hospital years. Current rates of suicide for schizophrenia and other psychoses appear 20-fold higher.

Conclusions These findings point to an increase in suicide rates for patients with schizophrenia.

Declaration of interest D.H. has links with all major pharmaceutical companies and has been an expert witness in legal cases involving psychotropic drugs. A.P.R. and R.T. have been consultants for or received educational support from most major pharmaceutical companies.

In patients with schizophrenia, lifetime suicide rates of 10% are widely cited from both pre- and post-community care eras (Meltzer et al, 2003). However, studies from the pre-community care era have yielded estimates of a lifetime suicide risk ranging from 0.03% to 18% (Miles, 1977), with data for the largest samples indicating a 1–2% lifetime risk. This raises the possibility that the modern treatment of schizophrenia is linked to an increased rate of suicide. Possible increases in suicide risk mediated via deinstitutionalisation, restored insight, inadequate treatment dosages and adverse effects of treatment have been proposed (Caldwell & Gottesman, 1990). In North Wales, a historical database, which is particularly useful for studies of mental health service utilisation, has been established and may help to shed light on this question (Healy et al, 2001).

METHOD

We have used two data-sets, namely the North West Wales historical database, and data on recent first admissions for psychosis in North West Wales.

North West Wales historical database

The first data-set consists of admissions from North West Wales to the North Wales Asylum at Denbigh during the 50-year period from 1875 to 1924. This time frame was chosen for three reasons. First, religious and legal sanctions on suicide in the UK had been removed by that time, and although there have been variations, suicide rates in the UK were no lower in the 1870s or in any intervening period than they are now. Second, suicides occurring in all British asylums at that time were subject to compulsory notification, which means that data are available for external reference for the North Wales figures. Third, all asylum deaths had to be reported to the coroner.

The records from the North West Wales service provide an opportunity to shed some light on comparative rates of suicide and suicide attempts in patients with schizophrenia from the pre- and post-community care eras, as the population of North West Wales has remained essentially unchanged in numbers and ethnic mix for 120 years. Thus in 1891 the population was 232 109, with 116 924 people aged between 15 and 55 years, and in 1996 the population was 240 683, with 119 323 people aged 15–55 years (Southall et al, 2004). Second, the region has remained undeveloped, so patterns of service utilisation can be more readily compared over time in this area than elsewhere. Third, major geographical and financial constraints have minimised the clinical and economic selection biases that appear to have affected other pre-community care studies of mental health service utilisation. Fourth, the incidence of schizophrenia in North West Wales has remained constant over 125 years (Harris et al, further details available from the author on request).

The procedures underpinning diagnosis have been outlined elsewhere (Healy et al, 2001). All diagnoses were made according to ICD–10 criteria (World Health Organisation, 1993) and had been made before this study of suicides and suicide attempts was undertaken. The historical records offered five sets of information that were relevant to diagnosis. First, all patients were compulsorily detained, and their records included the medical and legal certificates outlining the circumstances that led to detention. Second, the records contained standard demographic data, including age, gender, level of education, employment status, marital status, family history of mental illness and previous mental or physical illness. Third, there were standard assessments of each patient’s dangerousness, suicidality and seizure-proneness, together with information on food refusal and a range of other clinical features. Fourth, there was a description of each patient’s mental and physical state on admission. Fifth, there was a set of case notes covering the patient’s stay in hospital until discharge or death. We were able to retrieve the records of past admissions as far back as 1865, and of subsequent admissions up to 1965. Clinicians made diagnoses on the basis of a full set of records from all admissions for each
patient, rather than simply on the case record for that admission.

Based on this information, diagnoses for schizophrenia (F20), schizoaffective disorders (F25), delusional disorders (F22) and acute and transient psychotic disorders (F23) were relatively clear-cut. The remaining patients were diagnosed as unspecified non-organic psychoses (F29) if the clinical picture was insufficient to distinguish clearly between a mood disorder with psychotic features and a schizophrenic or delusional disorder. As some of the patients diagnosed as F23 and F29 may have had a schizophrenic or schizoaffective disorder, we have supplied data for suicidality for all patients in whom a psychosis was diagnosed.

Data on suicides and suicide attempts could be readily obtained from the notes. It was a requirement of admission to hospital between 1875 and 1914 that patients be categorised in terms of their suicide risk (Anderson, 1987). In North Wales, this led to standard assessments (not suicidal, suicidal, actively threatening suicide or attempted suicide). For 9% of patients in the total sample, no explicit indication of suicidality was provided. As the recording of suicidality was mandatory, we have assumed that these patients were not suicidal on admission. The accompanying case notes for these patients give no indication of in-patient suicidality.

Concern that the stigma associated with suicide might have led to underreporting of suicides in these records seems to be misplaced for a number of reasons. First, both suicides and suicide attempts were recorded explicitly in the notes. Second, it was compulsory for such deaths to be notified, and the suicide figures appeared in the annual asylum report. Third, deaths by suicide were determined in this cohort, 440 of the 594 patients with schizophrenia (n=234) or attempted suicide (n=315). The overall rate of admissions for suicidality was therefore 26%, with an 8.1% rate of suicide attempts on admission. The group of patients who were seriously mentally ill (all admissions except for patients with dementia, organic psychosyndromes or learning disabilities) had a rate of suicidality of 29.5% and a rate of suicide attempts of 9.5% on admission.

For patients with schizophrenia and other psychoses in both the historical and recent cohorts, the mean age at onset, male:female ratios, rates of detention and median lengths of stay are outlined in Table 1, together with the total length of stay in hospital (hospital patient years) and illness duration (patient contact years) for the historical cohort. In the historical cohort, 440 of the 594 patients with schizophrenic disorders (74%) died in hospital, often after earlier discharge.
after admission while on escorted day leave.

Data for the acute, transient and non-organic psychoses groups are also shown in Table 2. Overall, the 1303 admissions for psychoses gave rise to 68 suicide attempts on admission, 7 suicide attempts in hospital and 47 patients threatening suicide or being put on a suicide card.

For schizophrenia, the occurrence of 2 suicides in 9960 patient contact years or 2 suicides in 12467 patient years yields suicide rates of 20 per 100 000 patient contact years or 13 per 100 000 patient years, or a 0.2% lifetime rate in a sample in which 80% of deaths were confirmed, or a 0.33% rate in a sample of confirmed deaths. The Suicide attempts rate ranges from 74 per 100 000 patient contact years for clear suicide attempts in hospitals to 459 per 100 000 patient contact years for possible suicide attempts. Figures for suicide attempts, including attempts on admission, range from 496 per 100 000 patient years for confirmed suicidal acts to 799 per 100 000 patient years for possible suicidal acts.

There are a number of sources of external validation of these results. Asylum returns indicate that suicides as a proportion of total deaths in British Victorian asylums decreased from 0.63% in 1867 to 0.14% in 1911 (Anderson, 1987). In North Wales there were 4 deaths by suicide out of a total of 1842 deaths in care (i.e. 0.22% of deaths). The proportion of deaths by suicide in the sample of deaths among patients with schizophrenia was 0.45%. The proportion of psychotic deaths that were a result of suicide was 0.33%. The best recent comparable lifetime figure for deaths by suicide as a proportion of all deaths among patients with schizophrenia is 1.23% (Mortensen & Juel, 1993).

These results are also internally validated by the rates of suicides and suicide attempts in patients with unipolar depression. Of this group of 659 admissions, which led to 1418 hospital exposure years, 228 patients (35%) were considered suicidal on admission, and 140 patients (21%) had made a suicide attempt, representing a 56% rate of serious suicidality. Once admitted, 110 out of 659 patients were considered suicidal and were put on suicide watch, and 18 patients made a suicide attempt in hospital. Of these, two attempts were fatal and a further three suicides were recorded in the week following discharge, with one more suicide taking place within 2 months of discharge. Five of these 6 suicides involved female patients. This yields suicide rates ranging from 140 to 351 per 100 000 patient years, based on 2 or 5 suicides. The incidence of suicide attempts in hospital ranges from 1263 per 100 000 hospital years for definite suicide attempts to 8982 per 100 000 hospital years for possible suicide attempts. These rates of serious suicidality are consistent with historical perceptions that affective disorders

### Table 1  Demographic characteristics of the cohorts for the periods 1875–1924 and 1994–2003

<table>
<thead>
<tr>
<th></th>
<th>Number of patients</th>
<th>Number of admissions</th>
<th>Mean age at first hospitalisation (years)</th>
<th>Male:female ratio</th>
<th>Median length of first admission (%)</th>
<th>Proportion detained on first admission (%)</th>
<th>Total cohort hospital years in total cohort (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schizophrenia (1875–1924)</td>
<td>594</td>
<td>741</td>
<td>30.9</td>
<td>50:50</td>
<td>6.9</td>
<td>100</td>
<td>9960</td>
</tr>
<tr>
<td>All psychoses (1875–1924)</td>
<td>1041</td>
<td>1303</td>
<td>35.4</td>
<td>49:51</td>
<td>2.1</td>
<td>100</td>
<td>12 208</td>
</tr>
<tr>
<td>Schizophrenia (1994–2003)</td>
<td>139</td>
<td>NA</td>
<td>29.9</td>
<td>65:35</td>
<td>0.08</td>
<td>66</td>
<td>NA</td>
</tr>
<tr>
<td>All psychoses (1994–2003)</td>
<td>238</td>
<td>NA</td>
<td>34.6</td>
<td>59:41</td>
<td>0.07</td>
<td>61</td>
<td>NA</td>
</tr>
</tbody>
</table>

NA, not available.

### Table 2  Suicidal ideation and suicide attempts at admission and during hospitalisation in North Wales for the periods 1875–1924 and 1994–1998

<table>
<thead>
<tr>
<th></th>
<th>Number of admissions (number of patients)</th>
<th>Suicidal on admission</th>
<th>Suicide attempt on admission</th>
<th>Suicidal in hospital</th>
<th>Suicide attempt in hospital</th>
<th>Suicides in hospital</th>
<th>Suicides in 5 months after discharge</th>
<th>Suicides in 5 years after first admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>All psychoses (1875–1924)</td>
<td>1303 (1041)</td>
<td>184</td>
<td>68</td>
<td>47</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Schizophrenia (1875–1924)</td>
<td>741 (594)</td>
<td>107</td>
<td>43</td>
<td>28</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Delusional disorder</td>
<td>185 (153)</td>
<td>25</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other psychoses</td>
<td>377 (296)</td>
<td>52</td>
<td>20</td>
<td>13</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unipolar depression</td>
<td>659 (569)</td>
<td>228</td>
<td>140</td>
<td>110</td>
<td>16</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>All psychoses (1994–1998)</td>
<td>NA (160)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Schizophrenia (1994–1998)</td>
<td>NA (85)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

NA, not available.
posed a greater suicide risk than schizophrenia, and are also in line with epidemiological studies from the early psychotropic period of suicide in depression (Hagnell et al, 1981). In addition, they indicate that the low incidence figures for suicidal acts in patients with schizophrenia in this study do not stem from a reluctance to record suicidal acts.

**Suicide rates during the period 1994–1998**

During the 10-year period from 1994 to 2003 inclusive, 238 patients who were given a diagnosis of F20 to F29 made first contact with the mental health services in North West Wales. Of these 238 patients we followed up the 133 members of the 1994–1998 cohort for a 5-year period, giving 665 patient years, of which there were 5 suicides in this cohort. Of these, 4 suicides involved women and 1 involved a man. Four of the patients who completed suicide had a diagnosis of schizophrenia or schizoaffective disorder, and one had a diagnosis of psychosis unspecified. Two suicides occurred in in-patient or support unit settings, two occurred within 1 month of discharge and one occurred during the 5-year follow-up period. This yields an overall suicide rate of 752 per 100,000 patient years for that 5-year period, with a higher rate of suicide for the 76 patients with schizophrenia.

Given the higher risk of suicide during first episodes of schizophrenia, the appropriate pre-community care comparison group consists of patients who completed suicide during the first 5 years of contact with the asylum service. In the case of patients with schizophrenia, in the 1875–1924 cohort this represents 1 suicide in 594 individuals monitored over 2970 patient years, or a suicide rate of 34 per 100,000 patient years. There can be less confidence about the follow-up of patients with non-schizophrenia psychosis, but 1 confirmed suicide in 1041 individuals monitored over 5205 patient years gives an incidence of 19 per 100,000 patient years. These figures indicate that there is a substantial difference between the pre- and post-community care periods.

**DISCUSSION**

This study of suicide rates among treated patients during the period 1875–1924 in North Wales provides the largest database from the pre-community care era (in terms of patients and deaths) for lifetime suicide rates in patients with non-affective psychoses diagnosed by present-day criteria. It also offers pointers to lifetime suicide attempt rates in patients with psychosis from the pre-community care era. This patient group seems to be less limited by selection biases than other populations for which data have been published, and there appear to be a number of sources of external and internal validation of the results.

**Pre- and post-community care lifetime suicide rates in patients with schizophrenia**

The apparent suicide rate of 20 per 100,000 hospital years, or an observed lifetime suicide rate of 0.46%, undermines claims that the lifetime suicide rate among patients with schizophrenia or psychoses in the pre-community care era was of the order of 10%. The North Wales findings support estimates of a lifetime rate of 1–2% or lower reported in the methodologically stronger studies of the pre-community care era, rather than the commonly cited rate of 10%, which stems from patient samples that were subject to considerable economic and clinical selection biases (Bleuler, 1978), or patients with incomplete follow-up (Rennie, 1939), or patient cohorts that were identified when distinctions between manic–depressive and schizophrenic disorders were blurred.

However, these figures cannot be viewed as representative of the natural rate of suicide or suicide attempts in untreated schizophrenia in the pre-community care era, in that hospitalisation aimed to minimise the risk of suicide (Anderson, 1987). The methods that were used to manage suicidality in the Victorian period overlap with the methods that are used today, and included the removal of sharp utensils, belts and shoelaces, the dispersal of groups of suicidal patients, and observation. The greatest differences between 1900 and 2000 were that in the Victorian period patients could more readily be kept on locked wards, were not discharged until the risk of suicide was thought to have completely passed and were not discharged on recently instituted psychotropic medication.

However, although the rates reported here may not represent the natural rate for suicides in patients with schizophrenia, the differential rates for suicidality in the groups with schizophrenia and depression both before admission and in hospital in the historical sample point to a lower inherent suicidality in patients with schizophrenia compared with patients with depression.

A suicide rate of 10% in patients with schizophrenia is also commonly cited for the post-community care era (Meltzer et al, 2003). In contrast, the most comprehensive analysis of the present-day lifetime risk of suicide in schizophrenia indicates that there is a 4% lifetime suicide rate based on a standardised mortality rate of 8.43% (95% CI 7.98–8.95) (Harris & Barraclough, 1997; Inskip, 1998). Applied to an international population lifetime risk of suicide of 16 per 100,000 person years, this would give a best estimate of 135 per 100,000 patient years for suicide rate (95% CI 128–143 per 100,000). Adjusting for the slightly lower general rate of suicides in the UK (10 per 100,000) compared with the international average would yield a value of 84.5 per 100,000 patient years. Applied to North Wales, these figures would suggest that there has recently been a possible modest increase in suicide rates among patients with schizophrenia.

However, when cohorts are compared over a controlled 5-year follow-up period, the number of suicides in the 1994–1998 cohort in this study appears to be considerably higher. This cannot be explained in terms of the higher proportion of male patients in the recent sample, as in both the historical and recent cohorts suicides in North Wales predominantly involved female patients. Furthermore, these findings point to a risk period for present-day patients that is in line with findings from the National Confidential Inquiry (Department of Health, 2001).

A number of other studies point to an increased lifetime rate of suicide for patients with schizophrenia in recent times. First, a data-set on suicides from 2.5 million patient years of hospitalised US veterans between 1950 and 1975 shows comparable suicide rates in veterans treated for general medical and neuropsychiatric conditions between 1950 and 1955, but thereafter an 8-fold increase in suicide rate among neuropsychiatric patients compared with general medical patients (Farberow et al, 1978; reports available from D.H. on request).
Second, there is evidence that the trend towards increased suicide rates has continued beyond the 1970s, with a 1.56-fold (95% CI 1.01–2.41) higher relative risk of suicide in first-episode schizophrenia in Denmark in the 1980s compared with the 1970s (Mortensen & Juel, 1993), although in the 1990s Danish suicide rates in patients with schizophrenia decreased in line with a declining national suicide rate (Nordentoft et al., 2004). Furthermore, in the largest study of suicide in first-episode schizophrenia to date, Mortensen & Juel (1993), reported a 50-fold increase in suicide rates for first-episode schizophrenia in the modern era compared with the general population norm. These Danish rates are higher than the rate for pre-community care first-episode schizophrenia and it is now generally accepted that antipsychotics might cause problems, especially if there are drugs available that may minimise those hazards, as has been suggested for clozapine (Meltzer et al., 2003). It will also be vital to monitor risk periods in line with the recommendations of the National Confidential Inquiry (Department of Health, 2001).

Possible mediators of treatment-related hazards
Taken together, these data-sets support observations extending back to the use of reserpine in the 1950s, which suggested that antipsychotics might cause problems for some patients (Healy & Savage, 1998). The literature from the early period of antipsychotic usage partly attributed an apparently new risk of suicide to deinstitutionalisation, as well as to the use of inadequate doses of antipsychotic drugs and to the return of insight following treatment with antipsychotics (Beisser & Blanchette, 1961; Hussar, 1962; Saugstad & Odegard, 1979). However, there was also concern about pharmacologically induced hazards, such as akathisia and dysphoria, which have been the focus of attention in subsequent years (Hogan & Awad, 1983; Drake & Ehrlich, 1985), and it is now generally accepted that akathisia is linked to suicide (American Psychiatric Association, 2000). Such adverse effects can clearly interact with deinstitutionalisation if they develop in relatively unsupervised settings (Caldwell & Gottesman, 1990).

A further hazard, which has received little attention, is discontinuation of treatment (Gilbert et al., 1995; Tranter & Healy, 1998). A study of FDA medical reviews of the registration trials for antipsychotic agents indicates that suicides and suicidal acts occurred during the run-in/placebo washout phase of these trials when many patients had their previous antipsychotic treatment terminated. Suicides also occurred during the 30-day discontinuation period after the studies had ended, but:

Withdrawal phenomena were not formally assessed after patients discontinued risperidone. Several patients committed suicide within one month of discontinuing risperidone; however, it does not seem reasonable to attribute this to withdrawal, given the absence of other indicators of a risperidone withdrawal syndrome and the fact that schizophrenia is known to be a risk factor for suicide.

(Mosholder, 1993)

A consideration of the historical and contemporary data-sets in the present study suggests that discounting suicide data in this way may not be appropriate. The results reported here indicate that in patients with affective disorder, the overall effect of modern methods of treatment, perhaps by benefiting some and not others, has been to leave the suicide rate unchanged. In contrast, the historical suicide rates for patients with schizophrenia who were treated within asylum settings were so low that deinstitutionalisation, other social changes and novel psychotropic drug treatments, or some interaction of these influences, will almost inevitably have led to increased rates of suicide. If this is the case, it is essential that patients are monitored closely for treatment-related risks of suicide, especially if there are drugs available that may minimise those hazards, as has been suggested for clozapine (Meltzer et al., 2003). It will also be vital to monitor risk periods in line with the recommendations of the National Confidential Inquiry (Department of Health, 2001).

The only conclusive way to demonstrate either a drug treatment-mediated or an institutional setting-mediated reduction or increase in suicidality in patients with schizophrenia is by means of a placebo-controlled randomised trial in first-episode schizophrenia, which would necessarily need to run for several years. This may be practically impossible, as first episodes are
often not recognised as such, and placebo samples in subsequent episodes are confounded by past exposure to therapeutic agents, as well as the selective influence of a range of other factors on the original population. In the absence of a placebo-controlled, first-episode trial, epidemiological data from treated and untreated populations will continue to have an important role in any consideration of this issue.

ACKNOWLEDGEMENT

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REFERENCES


CLINICAL IMPLICATIONS

- The widely cited lifetime rate of 10% for suicide in patients with schizophrenia is incorrect for both the pre- and post-community care eras.
- The best estimate for the lifetime rate of suicide in patients with schizophrenia in the pre-community care era is of the order of 1% or less.
- Although deinstitutionalisation is probably the single most important factor in determining suicide rates in patients with schizophrenia, pharmacotherapy appears to contribute to this risk, and is the element of current care that is under most clinical control.

LIMITATIONS

- The comparator sample of present-day patients with psychosis was relatively small.
- Current clinical recording methods do not make the recording of suicidial acts mandatory, so data on this important variable were lacking for the pre-schizophrenia cohort.
- Unlike a randomised trial, this epidemiological study could not control for a range of important variables.

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