The epidemiology of severe and enduring mental ill health in Scotland

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Aims

1. To define and identify people with severe and enduring mental ill health (SEMi) in Scotland

2. To estimate the mortality of the SEMi cohort compared to the general Scottish population

3. To determine whether particular causes of death are more or less frequent in the SEMi cohort

Data sources

- Scottish Morbidity Records for Mental Health (SMR04)
  - Admission of Scottish residents to adult mental health specialities in Scotland between 1981 and 2010 (i.e. general psychiatry, forensic psychiatry and psychiatry of old age)

- NRS (formally GROS) death records from 1986 to 2010

- CATTs population estimates for 1981, 1991 and 2001 (amalgamated by 1991 Carstairs deprivation deciles)

Methods (1)

- All SMR04 records (separate admissions and transfers) relating to an individual were linked using probability matching
- All patients with an admission to a mental health specialty between 1981 and 1985 were excluded to give a cohort of patients from 1986-2010 with (as close as possible to) a **first** inpatient admission
- Patients aged under 15 at first admission were excluded
- Patients were assigned to a condition group using a diagnostic hierarchy and a complication approach

Diagnostic Hierarchy

Schizophrenia	Schizophrenia and other psychotic disorders including acute psychosis, persistent delusional disorders, schizotypal and schizoaffective disorder, and drug or alcohol induced psychotic disorder
Bipolar disorder	Manic episodes and bipolar disorder
Depression	Depressive episodes and recurrent depressive disorder (excluding persistent mood disorders such as cyclothymia)
Neurosis	Anxiety disorders and obsessive compulsive disorder
Eating disorder	Anorexia and bulimia nervosa
Personality disorder	All types of personality disorder

Complication flag

- Uncomplicated – individuals for whom all admissions to mental health specialties (and all the coding positions) were coded to diagnostic codes relating to the one diagnosis.

- Complicated – individuals for whom one or more of their admissions included additional diagnoses (in any coding position)*.

*These could include conditions occurring lower in the diagnostic hierarchy, alcohol or drug misuse (recorded within SMR04), other psychiatric problems (mainly dementia, stress reactions and adjustment disorders), or (rarely) physical health problems such as pneumonia.

Individual A

Date of admission	**Primary diagnosis**	**Secondary diagnoses**
1 Jan 1996	Depression	Alcohol abuse
12 Mar 1998	Depression	-
17 Nov 2001	Schizophrenia	Dementia

Coded to “Complicated” Schizophrenia

Individual B

Date of admission	Primary diagnosis	Secondary diagnoses
1 Jan 1996	Bi-polar	-
12 Mar 1998	Bi-polar	-
17 Nov 2001	Bi-polar	-

Coded to “Uncomplicated” Bi-polar

Methods (2)

- *A single record was then created for each* patient within the mental ill health cohort containing hierarchically defined diagnosis, complication flag, date of diagnosis, age at diagnosis, sex and deprivation category

  (date of diagnosis, age of diagnosis and demographics were based on their first admission to a mental health specialty – whether or not that was the diagnosis of interest).

Uncomplicated (1986-2010)

Conditions	N	%	Median age at admission	Median number of admissions	Median length of stay (over all admissions)
Schizophrenia	15,972	27%	40	1	48
Bipolar disorder	3,877	7%	42	1	36
Depression	33,163	56%	48	1	26
Neurosis	3,076	5%	46	1	17
Eating disorder	635	1%	21	1	49
Personality disorder	2,318	4%	31	1	9
Total	59,041				

Complicated (1986-2010)

Hierarchy	N	%	Median age at admission	Median number of admissions	Median length of stay (over all admissions)
Schizophrenia	18,933	36%	34	5	225
Bipolar disorder	5,779	11%	43	5	196
Depression	22,812	43%	41	4	82
Neurosis	2,051	4%	40	3	55
Eating disorder	216	0.4%	26	3	92
Personality disorder	2,694	5%	31	3	39
Total	52,485				

“Complicated” assignment

First (principal) diagnosis		Hierarchical diagnosis					
		Schizo-phrenia	Bi-polar	Depression	Neurotic disorder	Eating disorder	Personality disorders
Schizophrenia	9,050	9,050	0	0	0	0	0
Bi-polar	3,413	855	2,558	0	0	0	0
Depression	17,031	2,969	1,889	12,173	0	0	0
Neurotic disorder	2,739	374	194	1,275	896	0	0
Eating disorder	325	26	17	164	17	101	0
Personality disorders	2,538	588	127	789	109	16	909
Alcohol abuse	5,958	1,484	247	3,214	385	30	598
Drug misuse	1,798	689	69	683	114	5	238
Other mental disorder	9,633	2,898	678	4,514	530	64	949
Total	**52,485**	**18,933**	**5,779**	**22,812**	**2,051**	**216**	**2,694**

Deprivation (%)

	Complicated and uncomplicated combined						
Carstairs 1991 deprivation decile	**Schizo-phrenia**	**Bi-polar**	**Depression**	**Neurotic disorder**	**Eating disorder**	**Personality disorders**	**Total**
1 (least deprived)	6	9	8	7	12	4	7
2	7	10	9	9	11	6	8
3	8	10	9	8	10	8	9
4	8	10	9	9	12	9	9
5	9	10	9	10	10	9	9
6	9	9	10	11	11	10	10
7	12	11	11	12	7	12	11
8	11	11	11	10	10	12	11
9	13	9	12	12	7	13	12
10 (most deprived)	17	11	12	13	10	17	14
Total	100	100	100	100	100	100	100

Calculating *excess mortality* in the mental ill health cohort using standardised mortality ratios (SMRs)

$$\text{SMR} = \frac{\text{Number of deaths from cause X observed}}{\text{Number of deaths from cause X expected}}$$

Observed deaths

- The “single record” mental ill health cohort were matched to the NRS national death records using probability matching to identify patients who had died within the study period

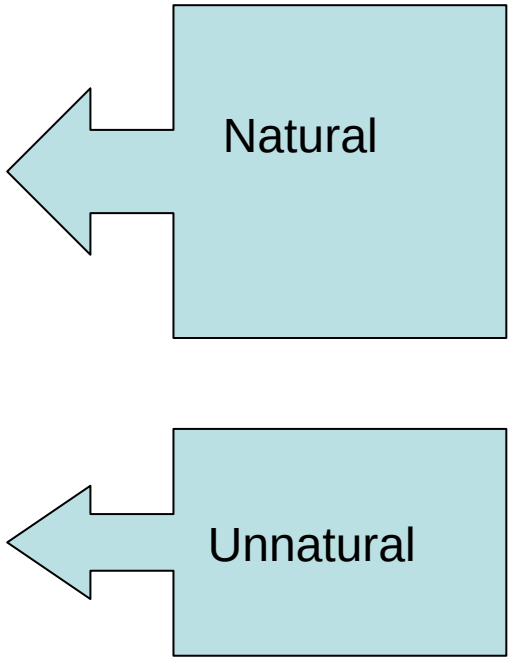
- Number of deaths from each cause of interest was counted up

Causes of death explored:

- Cardiovascular
- Cancer (excluding lung)
- Lung cancer
- Respiratory
- Endocrine
- Nervous system
- Infectious disease

- Accidental
- Suicide/undetermined
- Homicide

- Other



Expected deaths

- Person-years at risk approach which took account of each individual's time at risk while in different age and calendar year categories

Year	2000	2001	2002	2003	Years at risk
Persons					
1		----	---------	--x	2.0
2	----------	----------	-x		2.2
3	----------	----------	----------	----------	4.0
4	----	----------	----------	---x	3.2
Total	2.8	3.8	3.2	1.6	11.4

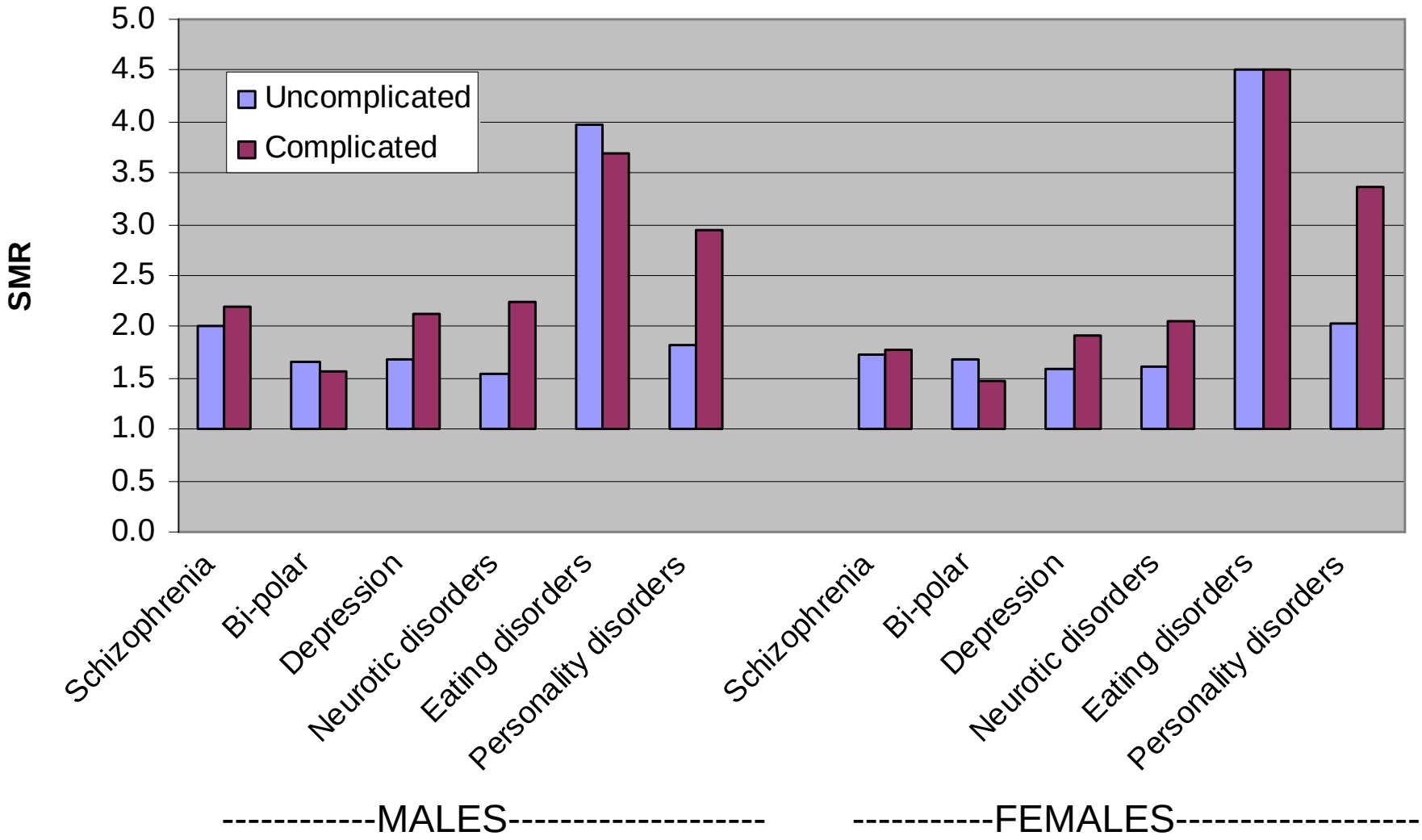
Expected deaths (simplistic)

Year	2000	2001	2002	2003
Person-years at risk	2.8	3.8	3.2	1.6
National deaths from cause X	500	502	507	497
National population denominator	3000	3100	3200	3300
Expected deaths from cause X	0.46	0.62	0.51	0.24

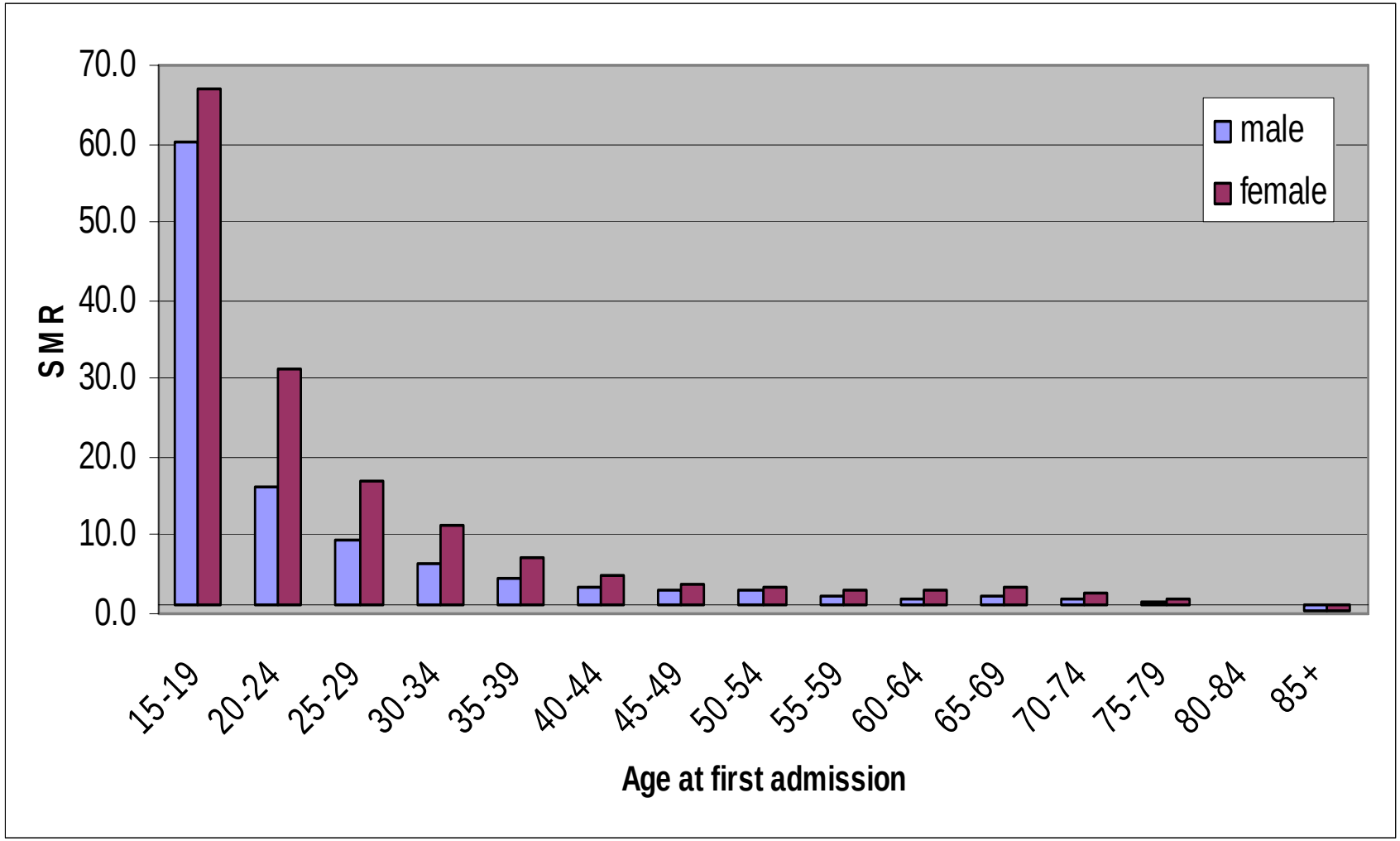
$$\text{SMR} = \frac{\text{Number of deaths from cause X observed}}{\text{Number of deaths from cause X expected}} = \frac{3}{1.83} = 1.64$$

So, compared to the general population, those in the cohort are 1.64 times more likely to die from cause X.

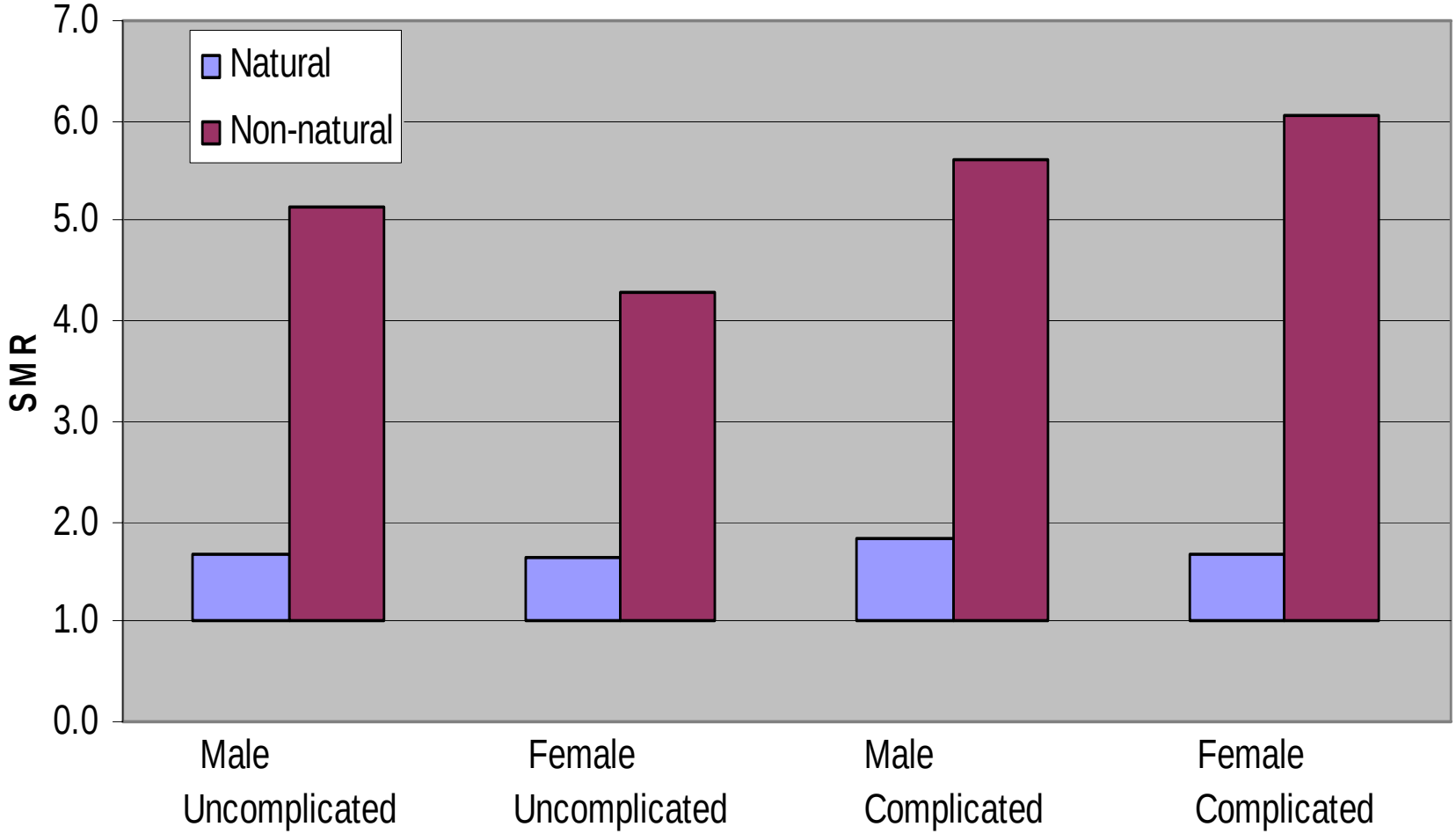
Excess mortality in SEMi cohort



Excess mortality by age and sex



Excess mortality by type of death



SMRs by cause of death (Males)

Conditions	Complicated	CVD	Cancer	Respiratory	Accidents	Suicide	Drug-related	Alcohol-related
Schizophrenia	Yes	1.9	1.4	2.5	2.6	7.5	3.5	1.9
	No	1.7	0.8	2.8	2.5	7.7	6.2	5.0
Bi-polar	Yes	1.7	1.4	1.9	0.9	9.7	4.1	1.7
	No	1.4	0.8	2.1	2.2	9.7	5.0	2.2
Depression	Yes	1.6	1.3	1.9	1.6	11.9	4.3	1.4
	No	1.7	1.0	2.4	2.6	10.8	8.7	6.0
Neurotic disorders	Yes	1.7	1.1	2.5	1.3	4.8	0.5	1.0
	No	1.6	1.1	2.3	2.5	6.9	5.9	9.7
Eating disorders	Yes	1.3	0.0	7.3	0.0	8.8	15.2	0.0
	No	0.0	10.5	0.0	0.0	0.0	0.0	34.8
Personality disorders	Yes	1.3	1.2	1.7	3.7	7.1	3.8	3.0
	No	2.1	1.3	2.9	3.1	8.4	8.4	6.6

SMRs by cause of death (Females)

Conditions	Complicated	CVD	Cancer	Respiratory	Accidents	Suicide	Drug-related	Alcohol-related
Schizophrenia	No	1.6	1.2	2.1	2.5	10.9	7.8	1.3
	Yes	1.7	1.4	2.2	3.0	9.7	6.6	0.9
Bi-polar	No	1.6	1.4	1.8	1.8	15.7	7.6	1.7
	Yes	1.6	1.5	2.2	1.8	9.7	2.2	0.8
Depression	No	2.7	3.6	6.1	2.0	13.4	10.5	0.0
	Yes	2.1	1.1	2.9	2.7	15.6	9.7	2.1
Neurotic disorders	No	1.5	0.9	2.3	2.5	15.6	11.5	4.6
	Yes	1.4	0.9	2.0	1.6	14.8	13.2	2.4
Eating disorders	No	1.6	1.0	2.2	2.7	18.5	17.1	11.6
	Yes	1.7	1.5	2.7	1.9	9.4	9.0	10.7
Personality disorders	No	2.0	0.0	3.3	0.0	25.6	19.0	19.2
	Yes	2.1	1.3	4.0	5.3	21.7	22.8	23.3

Conclusions

- This national cohort of individuals discharged from psychiatric hospitals in Scotland between 1986 and 2010 has been shown to die earlier than the general population.
- The excess mortality is higher in the younger patients.
- The excess mortality is generally higher for patients with complicated (multifactorial) diagnoses.
- The excess mortality is particularly linked to non-natural deaths (in particular, suicide and drugs).