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Cause-specific life years lost among persons with mental disorders: a national register-based cohort study
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7 Research Unit, Mental Health Centre Copenhagen, Copenhagen, Denmark
8 Institute of Clinical Medicine, University of Copenhagen, Denmark
9 Max-Planck Odense Center on the Biodemography of Aging, Epidemiology, Biostatistics and Biodemography, University of Southern Denmark, Denmark

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Conflict of interest disclosures: none.
ABSTRACT

IMPORTANCE People with mental disorders have higher mortality rates than the general population and updated findings are needed. Studying cause-specific mortality differences over time is complex but demographic measures, such as life years lost allow quantification of differences and provide an overview.

OBJECTIVE The aim was to quantify the life years lost with respect to cause of death and differences over time between people with and without mental disorders.

DESIGN, SETTING, AND PARTICIPANTS A cohort design was applied to nationwide register data on all persons aged 15-94 years living in Denmark during 1995-2014 (N=6,107,234).

MAIN OUTCOME AND MEASURES Cause-specific mortality was examined using rate ratios, and average life years lost.

RESULTS Cause-specific mortality rates were higher for people with mental disorders than for those without. For men with and without mental disorders, the number of life years lost between age 15-94 were 26.3 and 16.1 life, respectively; a difference of 10.2 excess life years lost for those with mental disorders. The corresponding figures for women were 19.6 and 12.3 life years lost; implying 7.3 excess life years lost. Among people with mental disorders, most life years lost were due to cancers (men: 5.0 years; women: 4.8 years) and heart diseases (men: 5.7 years; women: 4.6 years). Over calendar time, the overall excess in life years lost between those with and without mental disorders did not change. However, an increase was noted for cancers (men: 0.7 years; women: 0.4 years), heart diseases (men: 1.2 years; women: 0.3 years), and respiratory diseases (men: 0.3 years; women: 0.2 years) while a decrease was noted for suicide (men: -0.7 years; women: -0.5 years) and accidents (men: -0.9 years; women: -0.5 years).

CONCLUSION AND RELEVANCE A novel approach was applied for calculating average life years lost. We noted a shift from external causes of deaths to deaths related to medical diseases and
conditions over recent years. Hence, future efforts might hinge upon improving healthier life styles, better detection and treatment of medical diseases and conditions as well as reducing side effect of medication among people with mental disorders.
Cause-specific life years lost among persons with mental disorders: a national register-based cohort study

Introduction

People with mental disorders have 3 to 4-fold higher mortality rates than people without mental disorders.¹ This is a serious public health problem and the WHO calls for national targets to reduce the excess mortality among people with mental disorders.²,³ Yet, the quality of future efforts hinge upon updated knowledge of current mortality trends.

The excess mortality among people with mental disorders relates not only to external causes of death, such as suicides, accidents, and homicides,¹,⁴,⁵ but also to medical diseases and conditions, such as cardiovascular disease, malignant neoplasms, respiratory diseases, as well as endocrine and metabolic conditions.¹,⁵-⁸ Previous studies have suggested that people with severe mental disorders on average live 10-20 years shorter than the general population.⁸,⁹ However, it is not entirely clear whether the mortality gap has grown over recent years; findings for schizophrenia support this notion,¹⁰,¹¹ while others indicate it might have decreased.⁸,⁹ So far, only few studies have investigated mortality trends related to mental disorders in national samples and the evidence base is limited by selected samples and short follow-up periods.⁵,¹²-¹⁷

Assessing mortality differences over time is complex as it varies by age and cause of death. Also, calculating the life expectancy, e.g. at age 15, may not reflect the situation adequately as this implies assuming that all persons with a mental disorder were diagnosed at this age.¹⁷-²⁰
lost’ is a demographic measure, which describes the difference between average life expectancy and a given upper life limit. Life years lost allows for comparison of mortality across groups.

The aim of this study was 1) to quantify the contribution by specific causes of death to the excess life years lost among people with mental disorders when compared to those without mental disorders and 2) to assess whether the excess has decreased during recent years. Danish national longitudinal registers offer a unique possibility for investigating mortality patterns with respect to diagnosed mental disorders.

**Data and method**

Using a cohort design, population data from the Danish Civil Registration Register were linked to information on hospital contacts from the Psychiatric Central Research Register and deaths from the Danish Cause of Death register. Data were linked on an individual-level using the unique personal registration number.

**Study population**

All persons aged between 15 and 94 years who were registered as living in Denmark at some point during January 1st, 1995 through December, 31st 2014 were observed. Persons who during follow-up fulfilled the age criterion or migrated into the country were included on the date of their 15th birthday or date of entry, respectively. The study period lasted until date of: 95th birthday, emigration, death, or December, 31st 2014, which ever occurred first.

**Measures**
People were considered as exposed from the date of a psychiatric diagnosis. All fulltime or part-time patients have been recorded in the Psychiatric Central Research Register since 1969. From 1995 onwards, also outpatient and emergency department (ED) patients were included in the registry. All hospital contacts, except ED contacts, and all types of diagnoses, registered according to the International Classification of diseases (ICD), were screened to identify persons with a mental disorder. Contacts for an organic or symptomatic mental disorder (ICD-8: 290.09, 290.10, 290.11, 290.18, 290.19, 292.x9, 293.x9, 294.x9, 309.x9; ICD-10: F00-F09), intellectual disability (ICD-8: 311.xx, 312.xx, 313.xx, 314.xx, 315.xx; ICD-10: F70-F79), and contacts exclusively for exams and observations (ICD-8: Y01-Y19; ICD-10: Z00-Z99) were not considered. Historical data dating back to 1969 were assessed.

Outcomes

Causes of death were identified using the primary cause listed in the Registry on Causes of Death where date of death also is recorded. Deaths were categorized according to the ICD-10 as: infectious diseases (ICD-10: A00-A09, A20-A99, B00-B89, B91-B99), neoplasms (ICD-10: C00-D09), diabetes mellitus (ICD-10: E10-E14), heart diseases (ICD-10: F03.9, I00-I25, I27, I30-52, I60-I99, R54), respiratory diseases (ICD-10: J00-J99), digestive diseases (ICD-10: K00-K93), alcohol misuse (ICD-10: F10, I85, K70), suicide (ICD-10: X60-X84, Y87.0), accidents (ICD-10: V01-X59, Y10-Y86, Y87.2, Y88-Y89), and other causes of death (all remaining ICD-10 codes).

Analysis

Life years lost is a population measure, which complements life expectancy. It denotes the number of years between death and a desired upper limit of life span (=upper limit minus life expectancy).
Life years lost describes the number of years that the population lost due to death and it is used for analyzing differences in mortality between subpopulations. In our case, life years lost is used to obtain the excess life years lost (=life years lost for people with mental disorders minus life years lost for people without mental disorders). The specific calculations of life years lost are described in this section.

Cause-specific death rates were calculated for persons with and without mental disorders by single age increments and over 5-year periods. Age- and period-standardized mortality rate ratios (MRR) were obtained using direct standardization. Survival curves were calculated for persons aged 40 years. Average life expectancy at diagnosis was calculated as follows: let $e(a_1, \tau)$ denote life expectancy between age $a_1$ and the age $\tau > a_1$, for those diagnosed with mental disorders at age $a_1$. Life expectancies were calculated for every onset age, $a_{1i}$ from age 15 until an upper limit set at age $\tau = 94$; i.e. well above the life expectancy for the Danish population. These were combined into an average life expectancy at diagnosis until age 94 considering all the $n$ individuals with mental disorders, as $\frac{1}{n} \sum_{i=1}^{n} e(a_{1i}, \tau)$. Similarly, the average life expectancy was obtained for an age-matched comparison group consisting of all persons without mental disorders.

Let $\alpha(a_1, \tau)$ denote the number of life years lost between the age of onset $a_1$ and the upper limit, $\tau > a_1$. This measure complements the average life expectancy by adding to the total possible number of years between the two ages, $a_1$ and $\tau$, as $(\tau - a_1) = e(a_1, \tau) + \alpha(a_1, \tau)$. Life years lost were, further separated into changes attributable to specific causes of death, as $\alpha(a_1, \tau) = \sum_{j=1}^{m} \alpha_j(a_1, \tau)$, where $m$ are the causes of death and $\alpha_j(a_1, \tau)$ the number of life years lost ‘due to cause $j$’. Similar calculations were conducted for people without mental disorders, denoted as
\( \tilde{\sigma}_j^* (a_{1i}, \tau) \), and the excess life years lost among those with mental disorders were calculated as the difference between the two,

\[
\text{Excess life years lost} = \Sigma_{j=1}^m \left[ \frac{1}{n} \Sigma_{i=1}^n \left( \tilde{\sigma}_j^* (a_{1i}, \tau) - \sigma_j (a_{1i}, \tau) \right) \right].
\]

Details of the applied approach are found in the eMethods of the Online-Only Supplements.

The analysis was conducted using SAS version 9.4 and the R software. The project was approved by the Danish Data Protection Agency.

**Results**

A total of 6,107,234 individuals (men: 3,026,132; women: 3,081,102) aged 15-94 years were living in Denmark during 1995-2014. The study population was observed over 89,216,177 person-years (men: 43,914,948; women 45,301,229).

Until 2014, in all 589,327 persons (men: 262,005; women: 327,322) had been diagnosed with a mental disorder. People with mental disorders were observed for a total of 5,999,290 person-years (men: n [%] 2,582,871 [5.9]; women: n [%] 3,416,420 [7.5]), equivalent to 6.7% of all person-years.

During the 20 years of study, 1,072,158 persons (men: 539,262; women: 532,896) died. Of these, 134,150 persons (men: n [%] 61,855 [11.5]; women: n [%] 72,295 [13.6]) had been diagnosed with a mental disorder, accounting for 12.5% of all deaths. As seen in Table 1, the MRR between
persons with and without mental disorders was highest for suicide (men: MRR: 10.7, CI-95%: 10.4-11.0; women: MRR: 18.7, CI-95%: 17.9-19.5) and alcohol misuse (men: MRR: 8.3, CI-95%: 8.1-8.5; women: MRR: 8.9, CI-95%: 8.6-9.2). Nevertheless, an elevated rate ratio was noted across all causes of death for persons with mental disorders.

A lower probability of survival was found for people diagnosed with mental disorders at age 40 as seen in Figure 1. Combining similar calculations for each single age revealed that the average life expectancy at diagnosis until age 94 for men with mental disorders was 29.3 years while age-matched men without mental disorders on average lived 39.5 years. Assuming an upper limit of 94 years, 26.3 and 16.1 life years lost were estimated for men with and without mental disorders, respectively. The difference in life years lost, i.e. the excess life years lost were 10.2 years. For women, the average life expectancies were 34.6 and 41.9 years for those with and without mental disorders, respectively, corresponding to 19.6 and 12.3 life years lost; resulting in 7.3 years of excess life years lost.

**Contribution by causes of death**

The excess in life years lost for men with mental disorders was accounted for by alcohol misuse (2.8 years, 27.8%), other causes (1.9 years, 18.3%), accidents (1.7 years, 16.9%), and suicide (1.7 years, 16.2%) (Table 2). Also, respiratory diseases (0.8 years, 8.3%) and heart diseases (0.5 years, 5.0%) accounted for the major shares of excess life years lost. Men without mental disorders were losing more life years to cancers than those with mental disorders (0.2 years, 2.1%) and additional analysis revealed that men with mental disorders to a larger extent had died ahead of those ages where cancer rates peaked (table not shown). Among women, other causes (1.4 years, 19.4%), respiratory diseases (1.2 years, 16.9%), and alcohol misuses (1.1 years, 15.3%) were responsible for
the major shares of excess life years lost while heart diseases and suicide each accounted for 0.9 years (11.9%).

Change over calendar time

The number of life years lost between ages 15-94 decreased from 27.8 in 1995-1999 to 24.5 in 2010-2014 for men with mental disorders. Men without mental disorders experienced a decline from 17.7 to 14.4 life years lost. The excess, or difference, in life years lost for the two groups were of similar magnitude over calendar time, i.e. 3.2 and 3.3 years respectively. The same was observed for women where a decrease from 20.4 to 18.3 was noted for those with mental disorder while life years lost declined from 13.1 to 11.1 years for those without mental disorders.

Figure 2 illustrate the distribution of life years lost by causes of death. Cancers accounted for an increasing share of life years lost; it rose for men with mental disorders from 4.8 (17.2%) to 5.2 (21.2%) and among women from 4.5 (22.2%) to 4.8 (26.4%). For heart diseases, improvements over time were noted for both groups, albeit more pronounced among people without mental disorders. The number of life years lost due to respiratory diseases increased from 1.0 (11.1%) to 1.3 (13.7%) year for women with mental disorders over time. A decline in life years lost due to suicide from 2.3 (8.4%) to 1.6 (6.5%) was observed for men and from 1.2 (6.1%) to 0.7 (3.9%) for women with mental disorders between 1995-1999 and 2010-2014 while only a marginal difference was noted for people without mental disorders. Life years lost to accidents decreased from 2.8 (10.0%) to 1.7 (6.8%) for men and 1.4 (7.0%) to 0.7 (4.0%) for women.

In Figure 3, where ‘zero’ indicated no excess life years lost, the negative numbers revealed that men with mental disorders experienced fewer life years lost due to cancers (-0.5) than those without
mental disorders during 1995-1999. This figure rose to 0.1 in 2010-2014. Women also experienced an increase in excess life years lost due to cancers over time; from 0.2 to 0.6 years when comparing changes from 1995-1999 to 2010-2014. Similarly, increases in excess life years lost were observed for heart diseases (men: 1.2; women 0.3) and respiratory diseases (men: 0.3; women: 0.2).

Seemingly, no changes were achieved for digestive disorders (men: -0.1; women: 0.0) and alcohol misuse (men: 0.1; women: 0.0); the latter accounted for 2.5 excess life years lost among men with mental disorders over the examined period. A decrease in excess life years lost by external causes of death, such as suicide (men: -0.7; women: -0.5) and accidents (men: -0.9; women: -0.5), was noted. Still, the absolute difference remained at a relatively high level, particularly for men where suicide and accidents each accounted for 1.4 and 1.3 life years lost, respectively, in 2010-2014. See eTable in the Online-Only Supplements for additional information.

Discussion

This is, to our knowledge, the first nationwide study to quantify which causes of death contributed to the excess in life years lost among people with mental disorders when compared to those without mental disorders. We find that the excess life years lost among people with mental disorders was predominantly related to respiratory diseases (for women), alcohol misuse, suicide and accidents (for men). Overall, the excess life years lost changed little over time for people with mental disorders. However, death related to medical diseases and conditions became more significant over time.

Causes of death
Cancers, heart diseases, and also respiratory diseases accounted for the major shares of life years lost among people with mental disorders. Heart diseases might partly be explained through links to mental disorders, e.g. between myocardial infarction and depression.\textsuperscript{35} Deaths due to respiratory diseases, including COPD, accounted for 1.2 out of 7.3 (17\%) of the excess life years lost among women with mental disorders. Smoking is frequent among people with mental disorders and might possibly affect women more adversely.\textsuperscript{36,37} Other unhealthy life-style habits are prevalent among people with mental disorders and might explain the large impact by cancers and digestive disorders.\textsuperscript{38,39} In addition, studies suggest that physical disorders might be detected later and given less than optimal treatment among patients with mental disorders when compared to those without.\textsuperscript{40,41}

As shown previously, an excess number of life years lost was related to suicides, accidents, and alcohol misuse.\textsuperscript{1,42,43} Alcohol misuse accounts for a large share of excess life years lost. Substance misuse is a frequent comorbid disorder among people with mental disorders.\textsuperscript{44,45} The excess life years lost related to accidents might to some extent be related to misuse disorders.\textsuperscript{39}

\textit{Change over calendar time}

Although a decrease in life years lost was observed among people with mental disorders, a similar reduction was observed for those without mental disorders.

Fewer life years were lost due to cancers among men with mental disorders than those without although an increase was noted over time. Men with mental disorders experienced more life years lost due to causes of death that were prevalent during younger ages, such as accidents and suicides, and were, thus, not exposed to the risk of developing cancers at more mature ages; i.e. competing
risks. The same phenomenon applies to heart diseases, which also have a relatively late onset. The increasing percentage over time of life years lost due to cancers, heart diseases and respiratory diseases could indicate that people with mental disorders now to a larger extent are living longer and, consequently, are exposed to risks of dying by diseases with a later onset.

As seen from the findings of this study, people with mental disorders experienced fewer life years lost to suicide over the examined period (men: -0.7 years, women: -0.5 years) while the number of life years lost for those without mental disorders didn’t change (men: -0.1 years, women: 0 years). The overall suicide rate has declined in Denmark\(^{46}\) and our findings indicate that this is chiefly attributable to a decline among people with mental disorders. Means restrictions are likely to have had an impact on the suicide rate of people with mental disorders who might be more impulsive or have preference for specific methods.\(^{47,48}\) Furthermore, medical treatment and psychosocial therapy for people at risk of suicide might be beneficial.\(^{49-51}\)

**Strengths and limitations**

Nationwide register data were collected on a uniform basis for the entire study population without loss to follow-up. By including historical and complete data on psychiatric hospital contacts dating back to 1969, we were able to identify a comprehensive share of the population with mental disorders; thus, minimizing any selection bias. The long follow-up period improved the consistency in the findings. Furthermore, the Danish registration of causes of death has been evaluated to be reliable.\(^{27}\) The current study presented an average life expectancy and life years lost based on the age at diagnosis. Furthermore, life years lost is an easily conveyable measure allowing for
presentation of complex scenarios, e.g. with the purpose of informing healthcare staff and policymakers.

Limitations should be acknowledged. Psychiatric diagnosis during hospital contact served as a proxy for severe mental disorders; while it is reasonable to assume that the most severe cases of mental disorders will be seen at hospital, less severe cases might be missed. Also, it is possible that we did not capture first onset of all persons with mental disorders, leading to conservative estimates. Lastly, we applied a restrictive approach for identifying deaths due to alcohol misuse, thus, possibly underestimating its impact. People with mental disorders constitute a heterogeneous group, hence limiting the interpretation of findings; future studies addressing specific mental disorders are encouraged.

Clinical implications

The findings underline the importance of attention towards risks of suicide and accidents among patients with mental disorders. It has been suggested that people with severe mental disorders are underserved with respect to certain medical procedures, such as cardiovascular diseases. This has led to calls for better physical exams during hospital contact for mental disorders. However, people with mental disorder spend only a fragment of their life in hospitals and, consequently, detection and treatment of physical disorders should not be limited to these periods; follow-up visits with GP could prove to have an important role through routine screening.

Improving healthy habits, in terms of nutrition and exercise, are promising measures, which only to some extent have been explored. Also, effective interventions aimed at substance misuse seem indicated.
Conclusion

Excess mortality among people with mental disorders was quantified using innovative demographic measures. Alcohol misuse, suicide and accidents accounted for most of the excess life years lost among people with mental disorders, followed by heart diseases and respiratory diseases. Overall, the excess life years lost among people with mental disorders did not improve over the studied period. However, cause-specific analysis revealed a shift in which causes of death were responsible for excess life years lost; people with mental disorders experienced an increasing number of excess life years lost by cancers, heart diseases, and respiratory diseases while decreasing numbers were noted for suicide and accidents over recent years.
**Key points:**

**QUESTION:** What causes of death account for excess life years lost among people with mental disorders and are there changes over time?

**FINDING:** This nationwide cohort study finds that suicide, accidents, and alcohol misuse continue to account for the major share of excess life years lost. While the overall trend showed little improvement over time, less life years lost were noted for suicide and accidents while more life years lost were noted for heart diseases, respiratory diseases, and cancers.

**MEANING:** A shift from external causes to deaths related to medical diseases and conditions has occurred; suggesting that more attention towards physical conditions of people with mental disorders is needed.
References


Table 1. Number of deaths and rates by cause of death among persons aged 15-94 years with and without mental disorders in Denmark, 1995-2014.

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Mental disorders</th>
<th></th>
<th>Without mental disorders</th>
<th></th>
<th>Mortality Rate Ratio [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>Rate per 1,000 person-years*</td>
<td>n (%)</td>
<td>Rate per 1,000 person-years*</td>
<td></td>
</tr>
<tr>
<td><strong>MEN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>889 (1.4%)</td>
<td>0.4</td>
<td>5,134 (1.1%)</td>
<td>0.1</td>
<td>3.1 [2.9 - 3.3]</td>
</tr>
<tr>
<td>Neoplasms</td>
<td>11,780 (19.0%)</td>
<td>5.1</td>
<td>143,433 (30.0%)</td>
<td>3.4</td>
<td>1.5 [1.4 - 1.5]</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1,679 (2.7%)</td>
<td>0.7</td>
<td>11,671 (2.4%)</td>
<td>0.3</td>
<td>2.5 [2.4 - 2.7]</td>
</tr>
<tr>
<td>Heart diseases</td>
<td>14,957 (24.2%)</td>
<td>7.2</td>
<td>162,090 (34.0%)</td>
<td>3.9</td>
<td>1.9 [1.8 - 1.9]</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>5,924 (9.6%)</td>
<td>2.8</td>
<td>45,327 (9.5%)</td>
<td>1.1</td>
<td>2.6 [2.5 - 2.7]</td>
</tr>
<tr>
<td>Digestive diseases</td>
<td>2,172 (3.5%)</td>
<td>0.9</td>
<td>14,313 (3.0%)</td>
<td>0.3</td>
<td>2.7 [2.6 - 2.8]</td>
</tr>
<tr>
<td>Alcohol misuse</td>
<td>6,904 (11.2%)</td>
<td>2.5</td>
<td>12,243 (2.6%)</td>
<td>0.3</td>
<td>8.3 [8.1 - 8.5]</td>
</tr>
<tr>
<td>Suicide</td>
<td>3,809 (6.2%)</td>
<td>1.6</td>
<td>6,023 (1.3%)</td>
<td>0.1</td>
<td>10.7 [10.4 - 11]</td>
</tr>
<tr>
<td>Accidents</td>
<td>4,597 (7.4%)</td>
<td>2.0</td>
<td>16,297 (3.4%)</td>
<td>0.4</td>
<td>5.0 [4.9 - 5.2]</td>
</tr>
<tr>
<td>Other causes of death</td>
<td>9,144 (14.8%)</td>
<td>4.0</td>
<td>60,876 (12.8%)</td>
<td>1.5</td>
<td>2.7 [2.7 - 2.8]</td>
</tr>
<tr>
<td>Total</td>
<td>61,855 (100.0%)</td>
<td>27.1</td>
<td>477,407 (100.0%)</td>
<td>11.4</td>
<td>2.4 [2.4 - 2.4]</td>
</tr>
<tr>
<td>Category</td>
<td>Women</td>
<td>Men</td>
<td>Rate (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>993 (1.4%)</td>
<td>5,494 (1.2%)</td>
<td>0.1</td>
<td>2.2 [2 - 2.3]</td>
<td></td>
</tr>
<tr>
<td>Neoplasms</td>
<td>14,988 (20.7%)</td>
<td>132,379 (28.7%)</td>
<td>3.2</td>
<td>1.3 [1.3 - 1.4]</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>1,602 (2.2%)</td>
<td>9,559 (2.1%)</td>
<td>0.2</td>
<td>2.0 [1.9 - 2.1]</td>
<td></td>
</tr>
<tr>
<td>Heart diseases</td>
<td>21,930 (30.3%)</td>
<td>166,852 (36.2%)</td>
<td>4.0</td>
<td>1.7 [1.7 - 1.7]</td>
<td></td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>9,471 (13.1%)</td>
<td>46,108 (10.0%)</td>
<td>1.1</td>
<td>2.5 [2.4 - 2.5]</td>
<td></td>
</tr>
<tr>
<td>Digestive diseases</td>
<td>3,004 (4.2%)</td>
<td>18,159 (3.9%)</td>
<td>0.4</td>
<td>2.0 [2 - 2.1]</td>
<td></td>
</tr>
<tr>
<td>Alcohol misuse</td>
<td>3,114 (4.3%)</td>
<td>3,947 (0.9%)</td>
<td>0.1</td>
<td>8.9 [8.6 - 9.2]</td>
<td></td>
</tr>
<tr>
<td>Suicide</td>
<td>2,279 (3.2%)</td>
<td>1,538 (0.3%)</td>
<td>0.0</td>
<td>18.7 [17.9 - 19.5]</td>
<td></td>
</tr>
<tr>
<td>Accidents</td>
<td>3,318 (4.6%)</td>
<td>12,741 (2.8%)</td>
<td>0.3</td>
<td>3.3 [3.2 - 3.5]</td>
<td></td>
</tr>
<tr>
<td>Other causes of death</td>
<td>11,596 (16.0%)</td>
<td>63,824 (13.9%)</td>
<td>1.5</td>
<td>2.2 [2.2 - 2.3]</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>72,295 (100.0%)</td>
<td>460,601 (100.0%)</td>
<td>11.0</td>
<td>1.9 [1.9 - 1.9]</td>
<td></td>
</tr>
</tbody>
</table>

* Age and period standardized rate per 1,000 person-years.
Table 2. Excess life years lost by cause of death between persons with and without mental disorders in Denmark, 1995-2014.

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Life years lost</th>
<th>Excess life years lost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mental disorders</td>
<td>No mental disorders</td>
</tr>
<tr>
<td></td>
<td>(A)</td>
<td>(B)</td>
</tr>
<tr>
<td><strong>MEN</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>0.38</td>
<td>0.17</td>
</tr>
<tr>
<td>Neoplasm</td>
<td>5.04</td>
<td>5.25</td>
</tr>
<tr>
<td>Diabetes</td>
<td>0.72</td>
<td>0.41</td>
</tr>
<tr>
<td>Heart diseases</td>
<td>5.68</td>
<td>5.17</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>2.27</td>
<td>1.42</td>
</tr>
<tr>
<td>Digestive diseases</td>
<td>0.94</td>
<td>0.47</td>
</tr>
<tr>
<td>Alcohol misuse</td>
<td>3.35</td>
<td>0.51</td>
</tr>
<tr>
<td>Suicide</td>
<td>1.87</td>
<td>0.22</td>
</tr>
<tr>
<td>Accidents</td>
<td>2.22</td>
<td>0.51</td>
</tr>
<tr>
<td>Other causes</td>
<td>3.89</td>
<td>2.02</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26.35</strong></td>
<td><strong>16.15</strong></td>
</tr>
<tr>
<td><strong>WOMEN</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>0.26</td>
<td>0.13</td>
</tr>
<tr>
<td>Neoplasm</td>
<td>4.75</td>
<td>4.38</td>
</tr>
<tr>
<td>Diabetes</td>
<td>0.44</td>
<td>0.26</td>
</tr>
<tr>
<td>Heart diseases</td>
<td>4.61</td>
<td>3.73</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>2.46</td>
<td>1.22</td>
</tr>
<tr>
<td>Digestive diseases</td>
<td>0.81</td>
<td>0.46</td>
</tr>
<tr>
<td>Alcohol misuse</td>
<td>1.28</td>
<td>0.16</td>
</tr>
<tr>
<td>Suicide</td>
<td>0.93</td>
<td>0.05</td>
</tr>
<tr>
<td>Accidents</td>
<td>1.07</td>
<td>0.30</td>
</tr>
<tr>
<td>Other causes</td>
<td>3.03</td>
<td>1.61</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19.64</strong></td>
<td><strong>12.30</strong></td>
</tr>
</tbody>
</table>

Note: Excess life years lost denotes the difference in life years lost between those with mental disorders and those without. Differences with positive (negative) values indicate that persons with mental disorders have lost more (fewer) life years than persons without mental disorders.
Figure 1. Distribution of life years lost for people with and without mental disorders by causes of death at age 40.
Figure 2. Distribution of life years lost for people with and without mental disorders by causes of death and period.

- **Men without mental disorders**
- **Men with mental disorders**
- **Women without mental disorders**
- **Women with mental disorders**

**Years**
- 1995 – 1999
- 2000 – 2004
- 2005 – 2009
- 2010 – 2014

**Causes**
- Neoplasm
- Heart disease
- Respiratory diseases
- Digestive diseases
- Alcohol misuse
- Suicide
- Accidents
- Other causes
Figure 3. Excess life years lost among people with mental disorders in comparison to those without.