

# Mortality in schizophrenia and schizoaffective disorder: An Olmsted County, Minnesota cohort: 1950–2005

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Received 7 September 2007; received in revised form 10 October 2007; accepted 11 October 2007

Available online 26 November 2007

## Abstract

**Introduction:** Increased mortality in people with schizophrenia, compared to the general population, has been consistently reported worldwide. This mortality has been attributed predominantly to “unnatural” deaths—suicide, accidents, and homicide. Recent studies have shown an increase in natural causes of death. Our objective is to compare the mortality of schizophrenic and schizoaffective subjects to the general US population.

**Methods:** 319 Olmsted County residents meeting DSM-IV-TR criteria for schizophrenia or schizoaffective disorder seen at the Mayo Clinic between 1950 and 1980 were followed until February 2005 for a median of 23.5 years.

**Results:** At the end of follow-up, 44% of patients were deceased. Mortality was significantly ( $p < 0.001$ ) increased compared to the Caucasian population in the US for persons of like age, gender, and calendar year of birth. The median survival following diagnosis was 36.2 years. Death certificate cited cause of death was cardiac (29%), cancer — including lung (19%), and pulmonary disease (17%). Concerningly, there was no association with the year of diagnosis to survival.

**Conclusions:** Tsuang and colleagues showed in 1975 that mortality in schizophrenics and later, those with schizoaffective disorder was significantly increased compared to the US general population. Thirty years later, with a demographically similar population, we have found the same pattern of increased mortality. In light of continued improvements in the general population's lifespan, the survival gap in schizophrenia/schizoaffective disorder appears to be increasing.

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**Keywords:** Schizophrenia; Mortality; Suicide; Cardiac; Pulmonary; Smoking

## 1. Introduction

An October 2006 report by the National Association of State Mental Health Program Directors reports that

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people with serious mental illness die 25 years earlier than the general population (Parks et al., 2006). They also describe worsening survival over time. Previous research shows significantly increased mortality in schizophrenia and schizoaffective disorder, with individuals dying earlier and at higher rates than people without schizophrenia (Tsuang et al., 1980; Brown et al., 2000). This increased mortality has been attributed to

both “natural” and “unnatural” (suicide, homicide, and accidents) causes of death (Hiroeh et al., 2001). Recent studies show “natural” causes of death might play a larger role in schizophrenic mortality, including neoplastic, cardiovascular, and respiratory diseases (Brown et al., 2000; Sims, 2001). Although it is accepted that individuals with schizophrenia have shorter life expectancies than the general population, the impact of specific causes is debated in the literature.

Tsuang and colleagues in Iowa demonstrated a significantly increased mortality in their landmark 1975 United States 40-year follow-up study of 200 individuals with schizophrenia (Tsuang et al., 1980). As a group, male patients, with a diagnosis of schizophrenia, lives were shortened by an average of ten years and female patients by nine years. They concluded that decreased survival was primarily caused by suicide, accidents, and infectious diseases.

Many early studies addressing suicide mortality in people with schizophrenia used proportionate mortality (Tsuang, 1978) to determine relative risk (Sims, 2001; Goldacre, 1993). Whereas only 8 (4%) of the 200 deaths in Tsuang’s sample were classified as suicides, lifetime suicide risk was estimated at 10%. For decades this figure was quoted as the suicide rate in schizophrenia, until Palmer and Bostwick in a 2005 meta-analysis recalculated an actual lifetime risk of completed suicide as 5.6% (Palmer et al., 2005).

Because suicide accounts for only a portion of mortality, medical illness must also impact survival. The high rates of smoking in persons with schizophrenia (de Leon and Diaz, 2005) would suggest a higher rate of cancer and cardiovascular disease incidence. Recent research shows overall increased mortality from natural causes in schizophrenic subjects (Brown et al., 2000; Joukamaa et al., 2001). Joukamaa and colleagues in examining a nationally representative sample of 8000 adult Finns found mental illness associated with increased mortality, with schizophrenic patients having 10 times the relative risk of dying from respiratory disease and an elevated risk of cancer death (Joukamaa et al., 2001).

Early data did not show a significant increase in cancer deaths, and it was argued that schizophrenia was cancer protective (Craig and Lin, 1981). Brown and colleagues, in a United Kingdom sample, showed smoking-related fatal disease was prominent after only 13 years of follow-up in a group of 370 patients with schizophrenia (Brown et al., 2000). Other samples have shown a decreased incidence of cancer in schizophrenia (Barak et al., 2005) or no change in cancer rates compared with the general population (Mortensen and Juel, 1990; Oksbjerg Dalton et al., 2003). Integrating

these disparate findings, a highly powered national registry study (Lichtermann et al., 2001) in Finland defined a cohort of 26996 individuals treated for schizophrenia and tracked them over an extended period by using record linkage with the Finnish Cancer registry. This study (Lichtermann et al., 2001), observing a total of 446653 subject-years, found an above expected overall cancer risk. Notably, half of the excess cases were secondary to lung cancer. However, the cancer incidence expected in the nonpsychotic siblings and parents of those diagnosed with schizophrenia were lower than the general population. They (Lichtermann et al., 2001) postulate that lifestyle factors account for increased cancer risk in those diagnosed with schizophrenia, but there may be a genetic risk factor for schizophrenia in unaffected family members which confers decreased cancer risk.

The risk of coronary heart disease is significantly increased in patients with a diagnosis of schizophrenia compared with controls (Goff et al., 2005) and it has been argued that cardiovascular disease is the primary cause of increased natural mortality in schizophrenia (Hennekens et al., 2005; Lawrence et al., 2003).

Estimated life expectancy at birth in the United States has increased throughout the 20th century (Anderson, 1998; U.S. Department of Health and Human Services), but schizophrenia and schizoaffective disorder survival in the United States has not been assessed recently to our knowledge. We sought to compare current day survival of a schizophrenic/schizoaffective disorder sample (diagnosed between 1950 and 1980) and followed until 2005 to the Minnesota and United States general population in the same fashion as Tsuang.

## 2. Methods

### 2.1. Subjects

This study was approved by both the Mayo Clinic and Olmsted County Institutional Review Boards (Mayo IRB #2383-03, OMC IRB #016-OMC-04). Subjects were identified using the resources of the Rochester Epidemiology Project (REP). The REP is a medical records linkage system containing complete information on medical care for residents of Olmsted County, Minnesota, for the last 80 years (Melton, 1996). It has been used in epidemiologic and outcome studies of cancer, neurologic, cardiovascular, and psychiatric diseases and has formed the basis of over 1500 publications since 1966 (Korndorfer et al., 2003; Kurland and Brian, 1978; Beard et al., 2000; Jess et al., 2006; Roger et al., 2002).

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