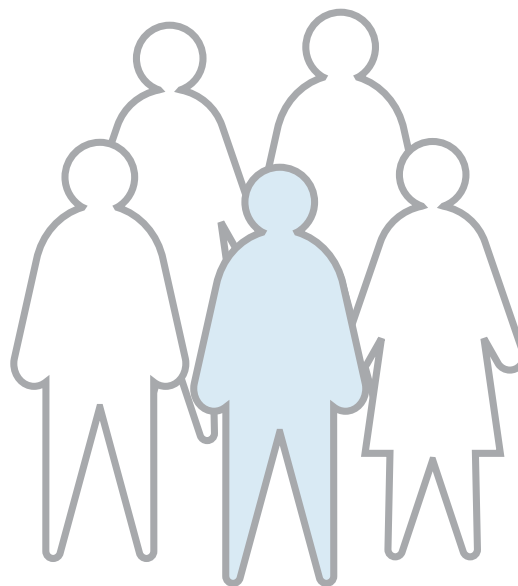


Chapter 9

Diabetes and Mental Health Disorders in Alberta



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DIABETES AND MENTAL HEALTH DISORDERS IN ALBERTA

KEY MESSAGES

- Mental health disorders are more prevalent in people with diabetes compared to people without diabetes.
- Age- and sex-adjusted rates of non-organic psychoses in people with diabetes have consistently increased but have remained constant in people without diabetes since 1995.
- Affective disorders, anxiety disorders and substance use disorders are more prevalent in younger adults with diabetes.
- The South zone has the highest rates of affective disorders, non-organic psychoses and substance use disorders, with greater risks for people living with diabetes compared to those without diabetes.

BACKGROUND

Mental health disorders such as depression, bipolar disorder, anxiety disorder and schizophrenia are chronic medical conditions associated with considerable morbidity.⁽¹⁻⁴⁾ Not only are they debilitating due to their associated signs and symptoms, research is increasingly demonstrating a relationship between mental health disorders and diabetes. Presence of depressive symptoms or major depressive disorder has been associated with type 2 diabetes in a number of publications.^(5,6) Research has also demonstrated an increased prevalence of diabetes in people with schizophrenia, where schizophrenia is considered a risk factor for type 2 diabetes in the *2008 Canadian Diabetes Association Clinical Practice Guidelines*.⁽⁷⁻⁹⁾ In addition, literature has linked bipolar disorder and anxiety disorder with diabetes.^(10,11)

The mechanisms behind these relationships are likely multifactorial. There is some evidence that treatment for mental health disorders may increase the risk of diabetes, particularly when atypical antipsychotic agents are used to treat a number of mental health disorders.⁽¹²⁻¹⁶⁾ Biochemical changes due to mental health disorders is also a postulated mechanism.^(17,18) Lastly, lifestyle changes and symptoms of mental health disorders likely also contribute to the relationship between diabetes and mental health disorders.^(18,19)

The relationship between diabetes and comorbid mental health disorders is very important. Compared to those with diabetes only, individuals with diabetes and mental health disorders have decreased medication adherence and adherence to diabetes self care, increased functional impairment, increased risk of complications associated with diabetes, increased healthcare costs and an increased risk of mortality.⁽²⁰⁻²⁴⁾

The objective of this chapter is to compare prevalence of diagnosed mental health disorders in people with and without diabetes in Alberta from 1995-2007. The mental health disorders evaluated in this chapter include affective disorders (e.g. depression), anxiety disorders (e.g. post-traumatic stress disorder), non-organic (e.g. schizophrenia) and organic psychoses (e.g. drug psychoses), and substance use disorders.

METHODS

Data from Alberta Health and Wellness Physician Claims databases were utilized for these analyses. This dataset captures demographic information and mental health disorder diagnoses for Alberta residents (see appendix for a listing of all physician claim codes of the mental health disorders reported in this chapter). Any mental health disorder diagnosis that was present in any of the three diagnostic fields from the physician files were captured. All residents of Alberta aged 20 years and older were included in these analyses.

From these data, rates of affective disorders, anxiety disorders, non-organic and organic psychoses, and substance use disorders for those with and without diabetes were calculated. For people with and without diabetes, the number of people with the mental health disorder diagnosis of interest (numerator) was divided by the number of people in the province or zone (denominator), respectively.

Trends over time (1995–2007) and age-specific rates for each of the mental health disorder diagnostic categories were calculated and compared between the diabetic and non-diabetic populations. Rates of mental health disorders in 2007 were also calculated by Alberta health zone. Persons with diabetes were identified as described in the “Background and Methods” chapter.

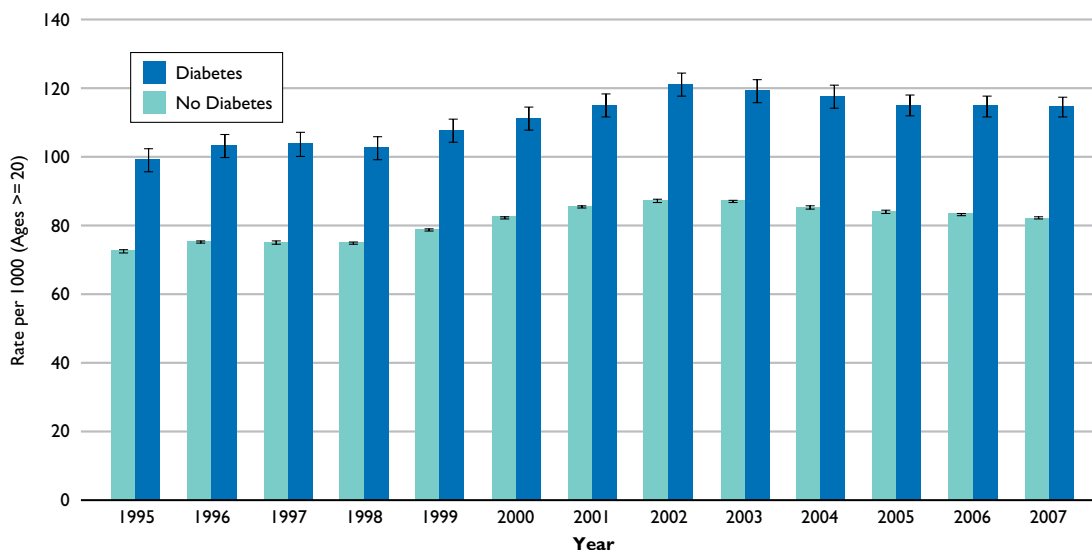
As with other rates in the *Atlas*, direct standardization was used to adjust rates by age and sex for comparisons across time, using the Alberta population according to the 2001 Canadian Census.

FINDINGS

Age- and sex-adjusted rates of mental health disorders were greater in individuals with diabetes compared to those without diabetes. This trend was consistent over the 13-year time period examined (1995–2007) for all of the mental health disorders that were evaluated in the analyses.

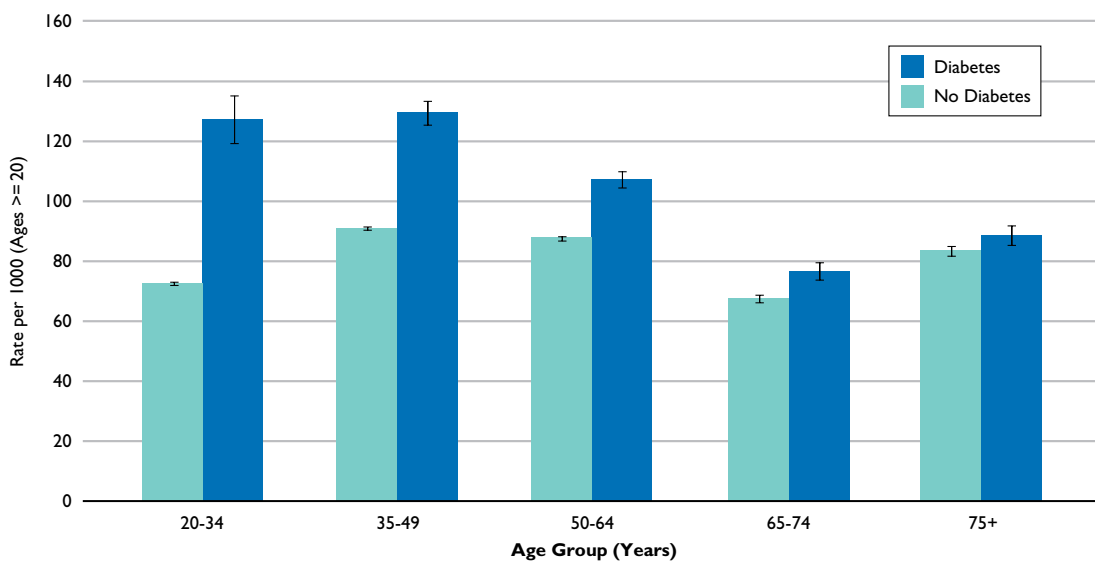
The age- and sex-adjusted rates of affective disorders were higher in people with diabetes over the 13-year time period (Figure 9.1). Rates of affective disorders increased until 2002 and then slightly decreased in people with and without diabetes. Overall, rates of affective disorders increased slightly more in the diabetes group compared to people without diabetes, increasing from 99.2 per 1000 in 1995 to 114.7 per 1000 in 2007 among people with diabetes, and from 72.7 per 1000 in 1995 to 82.3 per 1000 in 2007 among the non-diabetes group. In general, the ratio of affective disorders for people with and without diabetes was similar across the five health zones (data not shown).

Figure 9.1 Age- and Sex-Adjusted Rates of Affective Disorder, 1995-2007



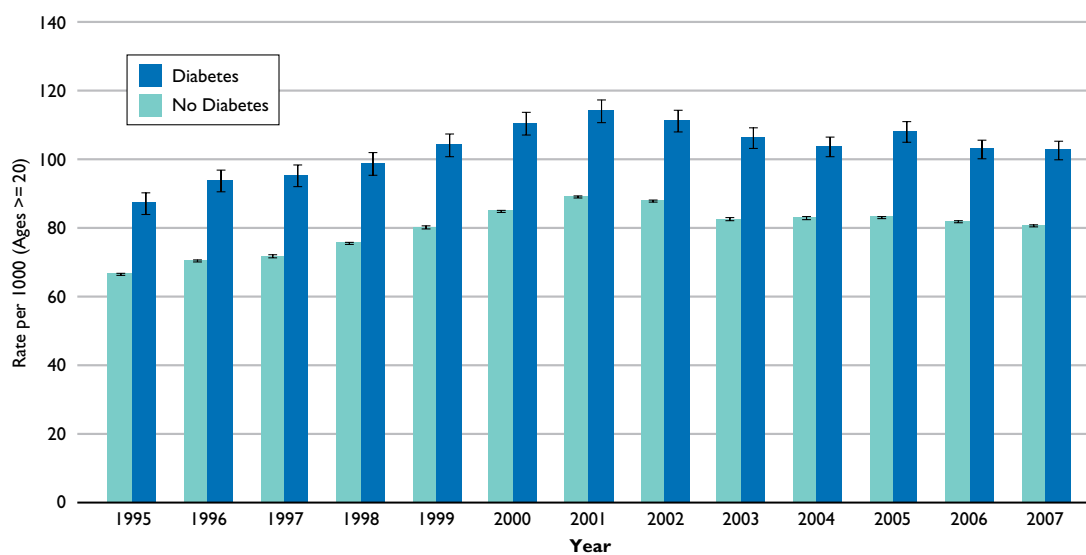
When looking at age-specific rates, the largest discrepancy between people with and without diabetes occurred in the 20-34-year age group, and the difference between people with and without diabetes was minimal in the older age groups (Figure 9.2).

Figure 9.2 Age-Specific Rates of Affective Disorder, 2007



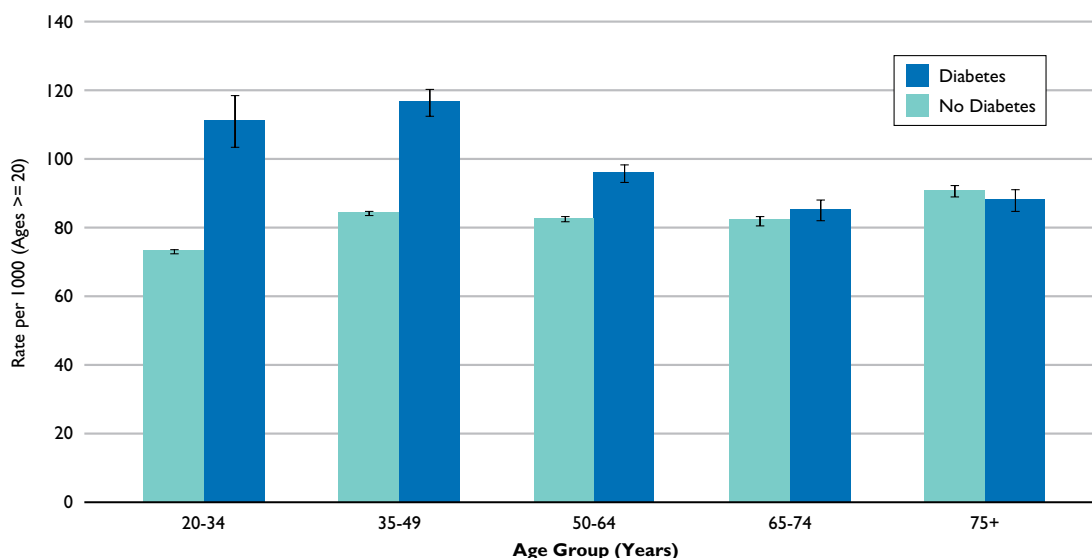
Trends for the association between anxiety disorders and diabetes were found to be similar to affective disorders and diabetes. Individuals with diabetes consistently demonstrated higher rates of anxiety disorders over the 13-year time period compared to people without diabetes (Figure 9.3).

Figure 9.3 Age- and Sex-Adjusted Rates of Anxiety Disorders, 1995-2007



Age-specific rates of anxiety disorders also demonstrated a similar trend to affective disorders in people with and without diabetes (Figure 9.4). Higher rates of anxiety disorders were seen in individuals with diabetes who were less than 65 years old, whereas little difference was seen in people with and without diabetes 65 years of age and older.

Figure 9.4 Age-Specific Rates of Anxiety Disorders, 2007



In recent years, individuals with diabetes had more than double the rates of non-organic psychosis compared to people without diabetes (Figure 9.5). The difference in rates of non-organic psychoses in people with and without diabetes increased from 4.8 per 1000 in 1995 to 9.8 per 1000 in 2007. This was the result of a large increase in the rates of non-organic psychoses in people with diabetes (from 10.9 per 1000 in 1995 to 16.4 per 1000 in 2007); the rates of non-organic psychoses in the non-diabetes group remained consistent over the study period (ranging from 6.1 per 1000 to 6.9 per 1000). The South and Edmonton zones had the highest rates of non-organic psychosis among individuals with and without diabetes (Figure 9.6).

Figure 9.5 Age- and Sex-Adjusted Rates of Non-Organic Psychoses, 1995-2007

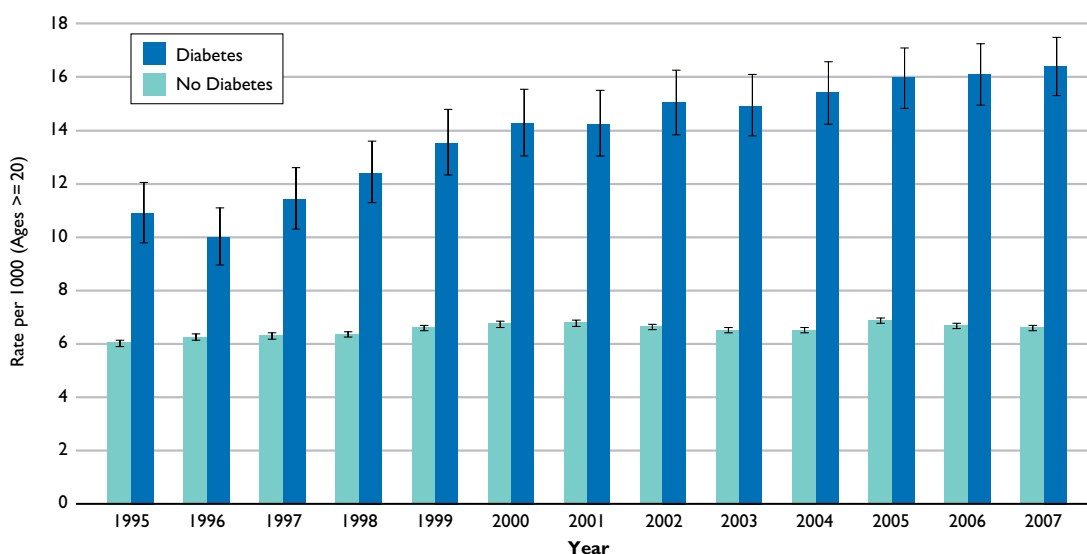
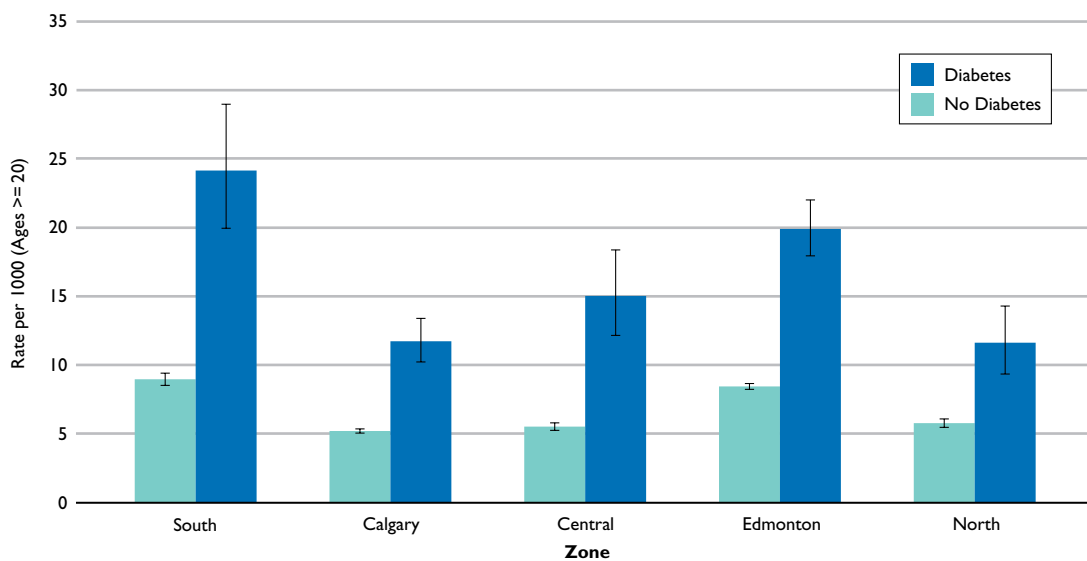
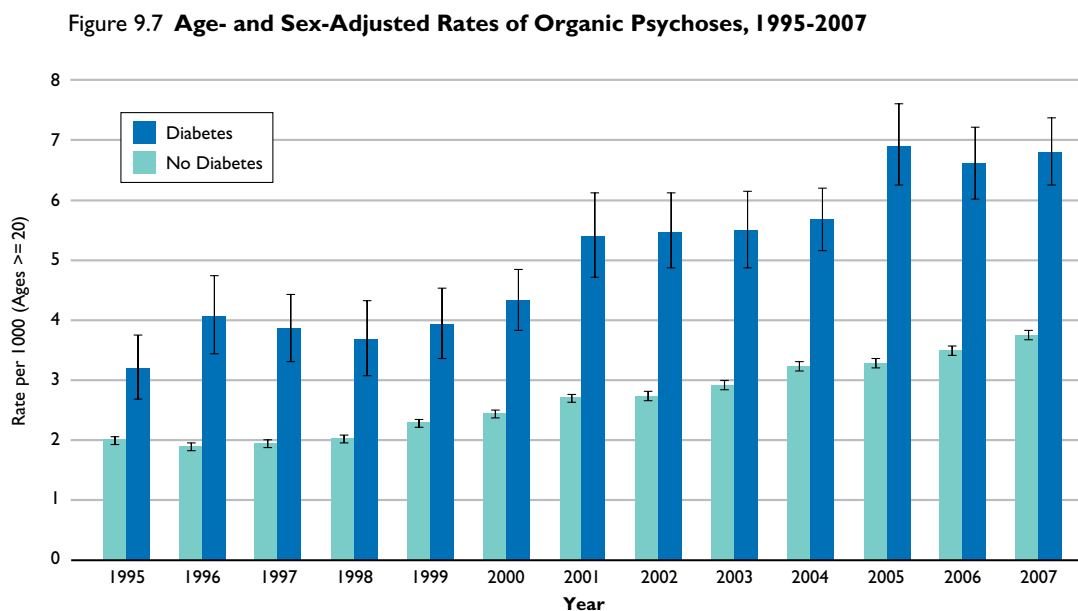


Figure 9.6 Age-Adjusted Rates of Non-Organic Psychoses by Zone, 2007

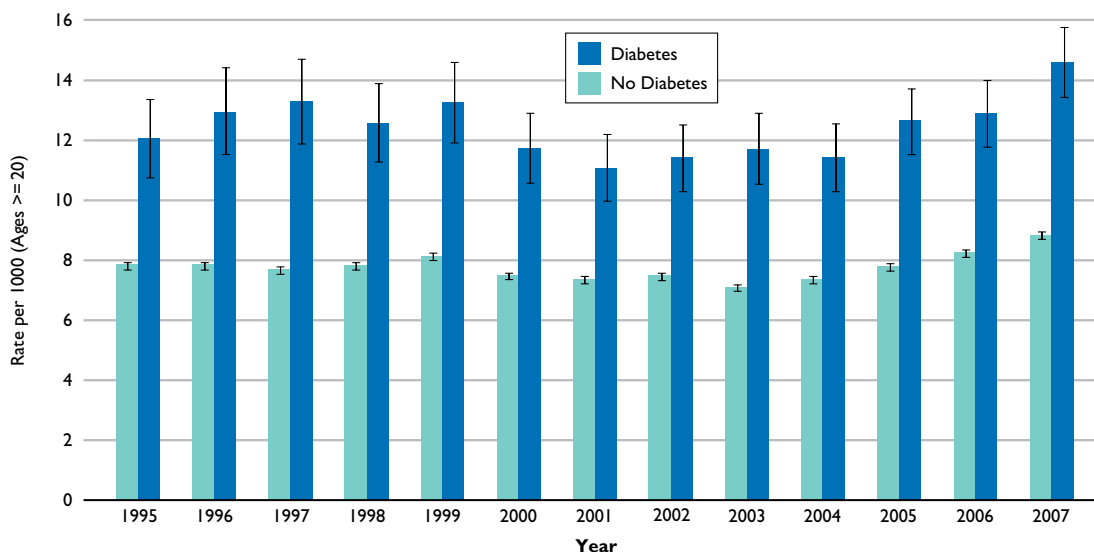


Rates of organic psychoses in people with and without diabetes were lower compared to non-organic psychosis, but a clear difference still existed between people with and without diabetes. Individuals with diabetes had much higher rates of organic psychoses compared to people who did not have diabetes (Figure 9.7).



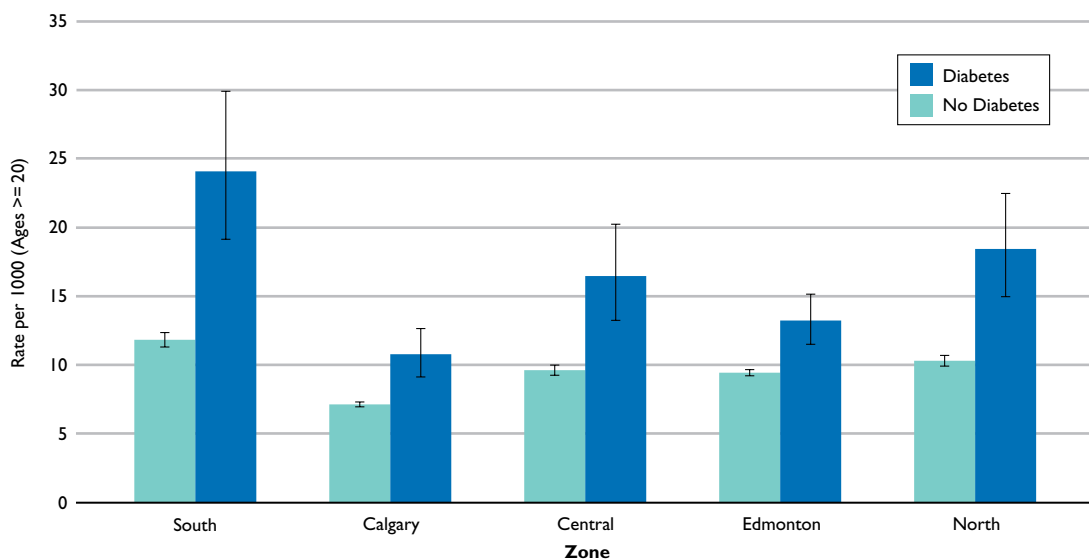
Substance use rates were also consistently higher in people with diabetes, but rates of substance use disorders remained relatively consistent over the 13-year analysis period (Figure 9.8). Figure 9.8 displays the relationship of substance use disorders in people with and without diabetes, regardless of whether they had a comorbid mental health disorder.

Figure 9.8 Age- and Sex-Adjusted Rates of Substance Use Disorders, 1995-2007



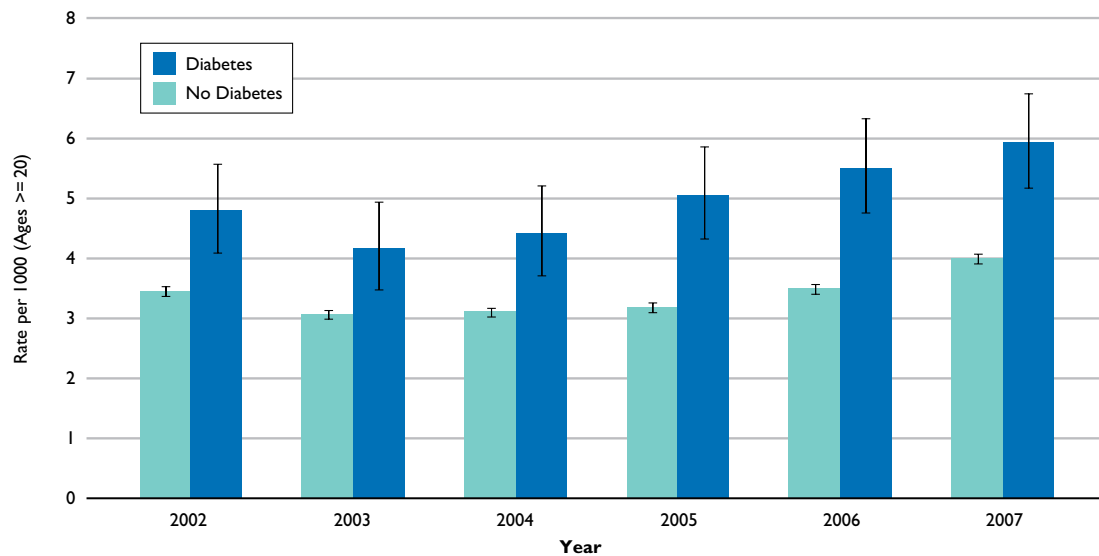
Individuals with diabetes in the South, Central and Northern zones had the highest rates of substance use disorders in Alberta. The rate in the South zone was highest at 24.1 per 1000 for people with diabetes, which was more than double the rate in the non-diabetic population (11.8 per 1000 people) (Figure 9.9).

Figure 9.9 Age-Adjusted Rates of Substance Use Disorders by Zone, 2007



Given the likelihood of high overlap between other mental health disorders and substance use disorders, we evaluated whether this relationship remained after removing individuals with a comorbid alternative mental health disorder from the analysis. Figure 9.10 demonstrates the relationship of substance use and diabetes diagnosis in those without a comorbid mental health disorder. The rates of substance use disorder are lower than in Figure 9.8, but a difference still exists between those with and without diabetes.

Figure 9.10 **Age- and Sex-Adjusted Rates of Substance Use Disorders, without Comorbidity, 2002-2007**



DISCUSSION

As was previously reported in the *Alberta Diabetes Atlas 2007*, individuals with diabetes had higher rates of mental health disorders compared to those without diabetes.⁽²⁵⁾ These results are consistent with the published research evaluating the relationship between diabetes and mental health disorders.

Individuals with diabetes had higher rates of affective disorders and anxiety disorders, but this difference was mainly contained in the younger age groups. In terms of affective disorders, this is consistent with previously published literature based on data from Saskatchewan.⁽⁶⁾ As mentioned previously, comorbid affective disorders and diabetes are associated with an increased risk of diabetes complications, healthcare costs and mortality in comparison to those solely with diabetes.⁽²⁰⁻²⁴⁾

The rates of non-organic psychoses were more than double the rates in people with diabetes compared to those without diabetes. Based on the rate increase from 1995–2007 in the diabetes group, rates of non-organic psychoses do not seem to be plateauing, which could indicate further increases in non-organic psychoses rates in people with diabetes in the coming years. This could be reflective of the increasing use of atypical antipsychotic agents in the last 13 years. Use of atypical antipsychotic agents to treat illnesses like schizophrenia has been associated with weight gain, type 2 diabetes, dyslipidemia and metabolic syndrome.⁽¹³⁻¹⁶⁾

Substance use disorders were more common in people with diabetes compared to people without diabetes, and this relationship, although weaker, remained after excluding people with other mental health disorders from the analysis. We did not evaluate the relationship between substance use and Status Aboriginal individuals or insurance subsidy level, both of which could have an impact on the relationship between substance use disorder and diabetes. For example, Status Aboriginal individuals are at a higher risk of developing diabetes and also have higher reported substance use disorder rates compared to the general population.^(9,26) The issue of comorbid substance use and diabetes is a topic requiring further research.

In summary, individuals with diabetes had higher rates of affective disorders, anxiety disorders, organic and non-organic psychoses, and substance use disorders compared to the non-diabetes population. Given the increased prevalence of mental health disorders in people with diabetes, research and healthcare interventions should focus on strategies to minimize complications, morbidity and mortality in this population.

APPENDIX

Alberta Physician Claims Data

Diagnosis	ICD-9-CM	Description
Affective disorders	296.XX	Affective psychoses
	300.4	Neurotic depression
	301.1X	Affective personality disorder
	309.0	Brief depressive reaction
	309.1	Prolonged depressive reaction
	311	Depressive disorder; not elsewhere classified
Anxiety disorders	300.XX	Neurotic disorders (exclude 300.4- Neurotic depression)
	309.8	Other specified adjustment reaction
	309.81	Prolonged post-traumatic stress disorder
	309.82	Adjustment reaction with physical symptoms
	309.83	Adjustment reaction with withdrawal
	309.89	Other
		Exclusion criteria for Anxiety disorders
	300.14	Multiple Personality (Dissociative identity disorder)
	300.15	Dissociative disorder or reaction, unspecified
	300.16	Factitious illness with psychological symptoms (compensation neurosis; Ganser's syndrome, hysterical)
	300.19	Other and unspecified factitious illness
	300.4	Neurotic depression
	300.8	Other neurotic disorders
300.81	Somatization disorder	
300.82	Undifferentiated somatoform disorder	
300.89	Other (Occupational neurosis, including writers' cramp, psychasthenia, psychasthenic neurosis)	
Non-organic Psychoses	295.XX	Schizophrenia
	297.XX	Paranoid states (Delusional disorders)
	298.XX	Other non-organic psychoses
Organic Psychoses	291.XX	Alcohol psychoses
	292.XX	Drug psychoses
	293.XX	Transient organic psychotic conditions
	294.XX	Other organic psychotic conditions (Chronic)
Substance Use Disorders	303.XX	Alcohol dependence syndrome
	305.2-305.9	Non-dependent abuse of drugs
	304.XX	Drug dependence

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