

# Prevalence and Costs Associated with Treating Depression with Painful Physical Symptoms in a Canadian Administrative Services Database

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## Abstract

**Background:** Recent evidence has shown that the economic costs of depression increase greatly when depression is present with painful physical symptoms (PPS).  
**Objectives:** The objectives of this study were to identify depressed patients who have comorbid conditions with PPS and to provide a descriptive analysis, including demographics and health care utilization, for depressed patients with painful symptom diagnoses.  
**Methods:** We identified patients with an index diagnosis of major depressive disorder (MDD) (ICD-9 codes 296, 309, or 311) between January 1, 1996, and December 31, 1998. After excluding patients with comorbid psychosis, certain patients with schizophrenia, and patients who received mood stabilizer monotherapy and had no diagnosis of epilepsy, a pain algorithm was applied to classify depressed patients with and without pain. Demographics, health care utilization, and costs were compared between the PPS status groups.  
**Results:** We identified 3,611 (13%) with PPS. PPS patients had an average of 10 depression-related services and 51 non-depression-related services for all types of services compared to 8 depression-related and 27 non-depression-related services for non-PPS patients. The median cost for non-depression-related prescription records was CAD\$212 for PPS patients and CAD\$50 for non-PPS patients.  
**Conclusions:** Depressed patients with PPS consume significantly more health care resources and therefore have higher medical costs than depressed patients without PPS.

**Conflict of Interest**  
 Eli Lilly and Company employees and RTI Health Solutions employees contributed significantly to the design and analysis plan for this study. Analysis was conducted by employees of RTI Health Solutions, a nonprofit research organization. The study was funded by Eli Lilly and Company.

## Background

- Patients with MDD have 2 to 3 times higher health care costs than non-depressed patients (Lepine et al., 1997).
- The true prevalence of depressed patients with comorbid PPS is difficult to assess because depression is often masked by physical illness.
- Prevalence estimates of pain among depressed patients range from 15% to 100% (Bair et al., 2003).
- Recent evidence has shown that the economic costs of depression increase greatly when depression is present with PPS (Sheehan, 2002; Greenberg et al., 2003).

## Objectives

- Estimate the prevalence of patients with MDD who have comorbid conditions with PPS
- Describe demographic characteristics of MDD patients with and without PPS
- Describe patterns of health care utilization for MDD patients with and without PPS

## Methods [1]

### Data Source—Saskatchewan Health Databases

- Population Registry
- Hospital Services Data
- Prescription Drug Data
- Physician Services Data

Figure 1. Saskatchewan, Canada

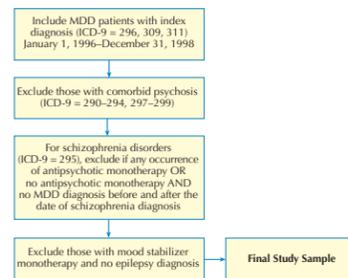


## Methods [2]

### Sample Selection

- A total of 36,611 patients had an index diagnosis of MDD and depression-related disorders (Figure 2). After excluding patients with comorbid psychoses and treatments, the final study sample was 27,317 patients.

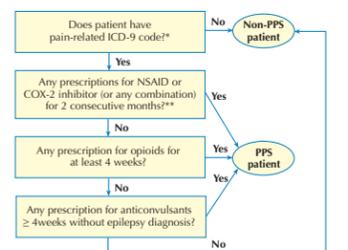
Figure 2. Identifying the Study Sample: Defining MDD Patients With and Without PPS



## Methods [3]

### Painful Symptom Status

Figure 3. Algorithm to Determine Painful Symptoms Status in Depressed Patients



\*Based on hospital and outpatient diagnoses at any time up to 1 year before or after the index depression diagnosis date  
 \*\*Prescription records up to 1 year before or after the index depression diagnosis date

## Methods [4]

### Determination of Resource Utilization and Costs

- Hospitalization Costs:** Estimated by multiplying the resource intensity weight (RIW) by an estimated cost per weighted case (Downey et al., 2000).
  - RIW is assigned by Saskatchewan Health to each hospital separation based on the discharge diagnosis and procedures performed in the hospital (Downey et al., 2000).
  - Estimated cost per weighted case = available acute care funding for a given year/total number of weighted cases for that year.
  - Average length of hospital stay = total hospital days/number of admissions.
  - Costs were converted into year 2000/2001 Canadian dollars (CAD).

## Methods [5]

### Determination of Resource Utilization and Costs (cont.)

- Physician Services Costs:** The amount paid (year 2000 CAD) multiplied by the appropriate Canadian Consumer Price Index (CPI) factor.
- Prescription Costs:** The total prescription cost (year 2000 CAD) multiplied by the appropriate CPI factor.
- Statistical Methods**
  - Chi-square tests were used to assess statistical significance of categorical variables.
  - Wilcoxon rank sum tests were used to assess statistical significance of continuous variables.

## Results [1]

### Prevalence

- 80% of the 27,317 MDD patients included in the study sample had at least one diagnosis consistent with neuropathic, non-neuropathic, or non-inflammatory somatic pain.
- 3,611 (13%) had comorbidities and prescription usage indicative of a pattern of PPS.

Figure 4. Percent of PPS Patients (n = 3,611) with ICD-9 Codes Used to Screen for PPS 1 Year Before and After the Index Date

ICD-9 Code	Condition	Category	Percent*
300	Neurotic disorders	Mental Disorders	36%
724	Other and unspecified disorders of back	Musculoskel/Connective	30%
729	Other disorders of soft tissues	Musculoskel/Connective	26%
786	Symptoms involving respiratory system and other chest symptoms	Symptoms/Signs	25%
719	Other and unspecified disorders of joint	Musculoskel/Connective	21%
716	Other and unspecified arthropathies	Musculoskel/Connective	21%
780	General symptoms	Symptoms/Signs	21%
715	Osteoarthritis and allied disorders	Musculoskel/Connective	18%
784	Symptoms involving head and neck	Symptoms/Signs	17%
726	Peripheral enthesopathies and allied syndromes	Musculoskel/Connective	13%
782	Symptoms involving skin and other integumentary tissue	Symptoms/Signs	12%
847	Sprains and strains of other and unspecified parts of back	Injury/Poisoning	12%
346	Migraine	Nervous System/Sense Org	11%
625	Pain and other symptoms associated with female genital organs	Genitourinary System	10%
727	Other disorders of synovium, tendon, and bursa	Musculoskel/Connective	9%
722	Intervertebral disc disorders	Musculoskel/Connective	8%
627	Menopausal and postmenopausal disorders	Genitourinary System	8%
250	Diabetes mellitus	Endocrine/Metabolic	7%
723	Other disorders of cervical region	Musculoskel/Connective	7%
564	Functional digestive disorders, not elsewhere classified	Digestive System	7%
728	Disorders of muscle, ligament, and fascia	Musculoskel/Connective	7%
789	Other symptoms involving abdomen and pelvis	Symptoms/Signs	6%
733	Other disorders of bone and cartilage	Musculoskel/Connective	5%
845	Sprains and strains of ankle and foot	Injury/Poisoning	5%

PPS = painful physical symptoms  
 \*The percent is calculated by dividing the count of patients with a given ICD-9 code by the total number of PPS patients. Individual patients may have more than one code.  
 †Neurotic disorders and musculoskeletal and connective tissue disease were most common ICD-9 pain-related diagnosis codes among PPS patients.

## Results [2]

### Demographic Comparison

Figure 5. Demographic Characteristics for Depressed Patients with PPS and Non-PPS

Demographic Characteristic	Painful Symptom Status			
	PPS N = 3,611 n (%)	Non-PPS N = 23,706 n (%)	Total N = 27,317 n (%)	
Age	18-34	890 (25)	8,335 (35)	9,225 (34)
	35-44	800 (22)	5,912 (25)	6,712 (25)
	45-54	664 (18)	3,989 (17)	4,653 (17)
	55-64	468 (13)	2,273 (10)	2,741 (10)
	65+	789 (22)	3,197 (13)	3,986 (15)
Gender	Male	1,290 (36)	8,163 (34)	9,453 (35)
	Female	2,321 (64)	15,543 (66)	17,864 (65)
Marital Status*	Never Married	570 (16)	4,984 (21)	5,554 (20)
	Married	1,968 (55)	13,120 (55)	15,088 (55)
	Divorced/Separated/Widowed	1,073 (30)	5,597 (24)	6,670 (24)
	Residential†	Rural	1,380 (38)	9,029 (38)
Urban	2,231 (62)	14,677 (62)	16,908 (62)	

PPS = painful physical symptoms  
 \*Missing marital status for 5 patients  
 †Urban was defined as any person living in a Saskatchewan city; all others were classified as rural. In Saskatchewan, the minimum population required to be designated a city is 5,000.  
 ‡Gender distribution was generally comparable between PPS and non-PPS patients. However, PPS patients were older and more were divorced, separated, or widowed compared to non-PPS patients.

## Results [3]

### Health Care Utilization and Costs

Figure 6. Health Care Utilization by Painful Symptom Status

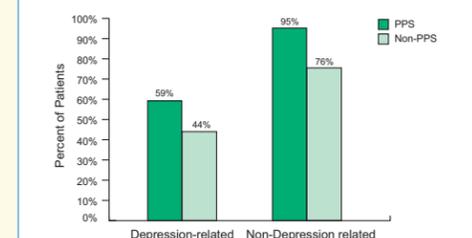
Type of Service	PPS Status	Percent Hospitalized (Inpatient and Day Surgery)	Mean Number Physician Claims per Patient	Mean Number Prescription Records per Patient
Depression-related	PPS	3%	6	4
	Non-PPS	2%	6	2
Non-depression-related	PPS	26%	32	18
	Non-PPS	12%	19	7

- During the first year of follow-up, a significantly higher number of PPS patients compared to non-PPS patients had at least one non-depression-related hospitalization (p<.0001) or at least one non-depression-related physician claim (p<.0001).
- The average number of depression-related hospitalizations and depression-related physician claims did not differ between PPS and non-PPS patients.
- On average, depressed patients with PPS had two more depression-related prescriptions (p<.0001) and 11 more non-depression-related prescriptions than non-PPS patients (p<.0001).
- The median total cost for hospital, physician and prescriptions for both depression-related (140 CAD\$ vs 112 CAD\$) and non-depression-related services (1161 CAD\$ vs 438 CAD\$) was significantly higher for PPS patients compared to non-PPS patients (p<.0001).

## Results [4]

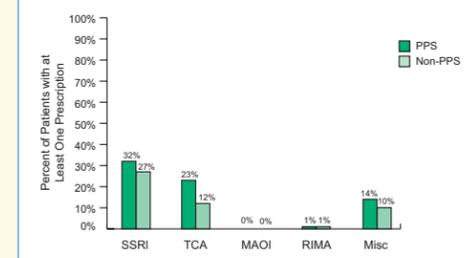
### Antidepressant Use

Figure 7. Percent of Patients with at Least One Prescription Record



- A higher number of PPS patients had at least one depression-related (59% versus 44%, p<.0001) and non-depression-related (95% versus 76%, p<.0001) prescription record than non-PPS patients.
- Forty-one percent of PPS patients and 66% of non-PPS patients did not have a depression-related prescription record (thus these patients were untreated for MDD).

### Figure 8. Frequency of Antidepressant Use by Class



**Abbreviations**  
 SSRI = selective serotonin uptake inhibitor  
 TCA = tricyclic and tetracyclic antidepressants  
 MAOI = monoamine oxidase inhibitor  
 RIMA = reversible inhibitor of monoamine oxidase-type A  
 Misc = miscellaneous

- SSRIs were the most commonly dispensed antidepressant class prescribed to PPS and non-PPS patients.
- PPS patients were more likely to have been prescribed a tricyclic or tetracyclic antidepressant (23% versus 12%, p<.0001) and other miscellaneous antidepressants (14% versus 10%, p<.0001) compared to non-PPS patients.

## Conclusions

- This study utilized a large population-based administrative health services database to identify 13% (3,611) of depressed patients who also had neuropathic, non-neuropathic, or non-inflammatory somatic pain.
- The lower prevalence of PPS identified in this study compared to previous studies (Bair et al., 2003) could be explained by the strict criteria used to identify pain and the focus on specific types of pain.
- PPS patients tend to be somewhat older than depressed patients without PPS, which may explain some of the higher health care resource use described here.
- Although only 13% of MDD patients were identified as PPS patients, their costs represent 25% of the total depression- and non-depression-related costs associated with treating all MDD patients.
- A better understanding of the relationship between pain and depression is critical to the effective management of both conditions.
- MDD patients with PPS represent an unmet need for medications to treat both depression and pain.

## Limitations

- Comparisons shown are not adjusted for characteristics that may differ between patients with and without PPS (e.g., age, duration of disease).
- Only 3-digit ICD-9 codes are available in the physician services file, and 4-digit ICD-9 codes are available in the hospital files. This may lead to misclassification in any of the 4- or 5-digit ICD-9 codes used to identify PPS.
- Only 1 ICD-9 code is recorded per physician visit, possibly resulting in under-ascertainment of depression and of PPS.
- Services for non-physician health care professionals (e.g., psychologists, clinical social workers) are not included in the Saskatchewan Health dataset compiled for this study.

## References

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