Prevalence, Incidence, and Economic Burden of Schizophrenia among Medicaid Beneficiaries

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BACKGROUND

- Schizophrenia is a chronic, debilitating mental illness estimated to affect more than 21 million people worldwide[1] and approximately 2.9% of the US Medicaid population[2]
- Schizophrenia is associated with a significant economic burden to the healthcare system and payers; a 2013 analysis estimated the economic burden of the disease to be more than $155.7 billion annually[3]
- Medicaid patients were estimated to have an excess annual per-patient cost of $12,447 relative to matched controls without schizophrenia in 2013[3]
- Overall, Medicaid patients with schizophrenia have demonstrated a significant economic burden due to their disease; however, more recent data are lacking
- Lack of more recent data on the prevalence, incidence, and economic burden of schizophrenia has motivated analyses to update these estimates in Medicaid patients

OBJECTIVES

- To evaluate the prevalence and incidence of schizophrenia in the Medicaid population
- To evaluate the incremental healthcare resource utilization (HRU) and healthcare costs of Medicaid patients with schizophrenia versus controls without schizophrenia

METHODS

Data Source

- Medicaid data from 6 states – Iowa (Q1 1998 to Q1 2017), Kansas (Q1 2001 to Q1 2018), Mississippi (Q1 2006 to Q1 2018), Missouri (Q1 1997 to Q1 2018), New Jersey (Q1 1997 to Q1 2014), and Wisconsin (Q1 2004 to Q4 2013) – representing approximately 26.6 million eligible individuals and containing patient information on enrollment, demographics, medical visits, hospitalizations, long-term care services, prescription drugs, and other services reimbursed by Medicaid, were analyzed

Study Design

Prevalence and Incidence of Schizophrenia

- Prevalence and incidence of schizophrenia were evaluated using a cross-sectional design among adults during the period of 2012-2017
- Prevalent patients were defined as those with ≥2 claims for schizophrenia on different days during the calendar year of interest among all patients with continuous Medicaid enrollment during that year
- Incident patients were defined as those with ≥2 claims for schizophrenia on different days during the calendar year of interest and no claims for schizophrenia during the preceding year among all patients with continuous Medicaid enrollment during those 2 years

Economic Burden of Schizophrenia

- A retrospective matched cohort design was used to evaluate the economic burden of schizophrenia
- Patients with schizophrenia (SCZ cohort) were compared to matched controls without schizophrenia (non-SCZ cohort)
- The index date was defined as follows:
  - For the SCZ cohort, as the last observable claim with a diagnosis of schizophrenia with ≥12 months of continuous Medicaid enrollment before and after the claim
  - For the non-SCZ cohort, as the last observable claim with a diagnosis of schizophrenia with ≥12 months of continuous Medicaid enrollment before and after the claim
- Baseline characteristics were described for each cohort for the 12 months before the index date (baseline period); HRU and costs were described and compared during the 12 months after the index date (observation period)

Inclusion Criteria

- For the SCZ cohort:
  - ≥2 claims on different days with a diagnosis of schizophrenia (International Classification of Diseases, 9th Revision, Clinical Modification [ICD-9-CM] code: 295.XX; ICD-10-CM: F20.XX, F21, F25.XX)
  - ≥1 claim with a diagnosis of schizophrenia with ≥12 months of continuous Medicaid enrollment before and after the claim
- For the non-SCZ cohort:
  - No claims with a diagnosis of schizophrenia during the continuous Medicaid enrollment period
  - ≥1 service claim with ≥12 months of continuous Medicaid enrollment before and after the claim
- For all cohorts:
  - Aged ≥18 years as of the index date

Outcome Measures

- HRU and costs were reported during the 12 months of the observation period by the following categories:
  - Inpatient (stays, days, and costs)
  - Emergency department (ED; visits and costs)
  - Outpatient (visits and costs)
  - Long-term care (LTC; stays, days, and costs)
  - Mental health institute (MHI; stays, days, 1-day visits, and costs)
  - Home care (days with services, costs)
  - Other (days with services, costs)
- Pharmacy costs, medical costs (sum of inpatient, ED, outpatient, LTC, MHI, home care, and other costs), and total costs (sum of medical and pharmacy costs) were also reported
- Costs were adjusted for inflation using the medical care component of the US Consumer Price Index and were reported in 2018 US dollars

Statistical Analysis

- Patients in the SCZ cohort were matched 1:1 to patients in the non-SCZ cohort using exact matching factors (eg, age groups) and propensity scores generated based on sex, race, state, year of the index date, and insurance type (ie, capitated vs dual Medicaid/Medicare coverage)
- Balance of baseline characteristics between matched cohorts was assessed with standardized differences (<10% indicates balance)
- HRU was compared between matched cohorts using Poisson regression models to generate incidence rate ratios and nonparametric bootstrap procedures to generate 95% confidence intervals (CIs) and *P* values
- Costs were compared between matched cohorts using ordinary least squares regression models to generate mean differences and nonparametric bootstrap procedures to generate 95% CIs and *P* values

Subgroup Analysis

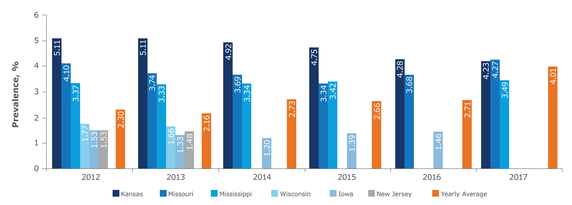
- A subset of the SCZ cohort with a recent relapse (≥1 schizophrenia-related hospitalization or ED visit during the 60 days prior to or on the index date) was selected
- Patients from the SCZ cohort with a recent relapse and their matched controls from the non-SCZ cohort were included in the analysis

RESULTS

Prevalence and Incidence of Schizophrenia

- Prevalence of schizophrenia ranged between an average of 2.30% in 2012 and 4.01% in 2017 (**Figure 1**)
  - Prevalence was the highest in Kansas, where it was between 5.11% in 2012 and 4.23% in 2017
  - Prevalence was the lowest in Iowa (1.53% in 2012 and 1.46% in 2016) and New Jersey (1.53% in 2012 and 1.48% in 2013)

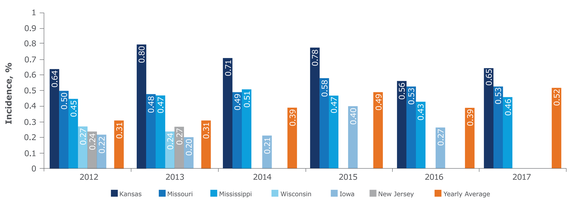
Figure 1. Prevalence of schizophrenia in the Medicaid population[a]



Data source: 6-state Medicaid database, 2012-2017 (Iowa, Q1 2012 to Q4 2016; Kansas, Q1 2012 to Q4 2017; Mississippi, Q1 2012 to Q4 2017; Missouri, Q1 2012 to Q4 2017; New Jersey, Q1 2012 to Q4 2013; Wisconsin, Q1 2012 to Q4 2013).
[a]Prevalent patients were defined as adults with ≥2 claims for schizophrenia on different days during the calendar year of interest among all adults with continuous Medicaid enrollment during that year.

- Incidence of schizophrenia ranged between an average of 0.31% in 2012 and 0.52% in 2017 (**Figure 2**)
  - Incidence was the highest in Kansas, where it was 0.64% in 2012 and 0.65% in 2017
  - Incidence was the lowest in Iowa, where it was 0.22% in 2012 and 0.27% in 2016

Figure 2. Incidence of schizophrenia in the Medicaid population[a]



Data source: 6-state Medicaid database, 2012-2017 (Iowa, Q1 2012 to Q4 2016; Kansas, Q1 2012 to Q4 2017; Mississippi, Q1 2012 to Q4 2017; Missouri, Q1 2012 to Q4 2017; New Jersey, Q1 2012 to Q4 2013; Wisconsin Q1 2012 to Q4 2013).
[a]Incident patients were defined as adults with ≥2 claims for schizophrenia on different days during the calendar year of interest and no claims for schizophrenia in the preceding year among all adults with continuous Medicaid enrollment during those 2 years.

Economic Burden of Schizophrenia

Baseline Characteristics

- A total of 158,763 patients were included in the SCZ cohort (mean age, 50.5 years; female, 49.0%; **Table 1**)
- The 2 cohorts were well balanced on demographic factors after matching
- In the SCZ cohort, 49.0% of patients used an antipsychotic medication during the baseline period, 10.6% had no claims with a schizophrenia diagnosis during the baseline period, and 11.8% had a recent relapse

Table 1. Baseline Characteristics in Matched Cohorts[a]

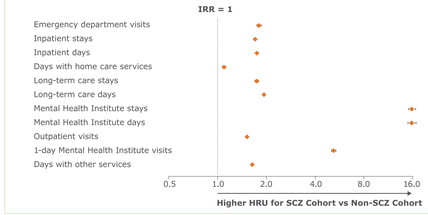
	SCZ Cohort n = 158,763	Non-SCZ Cohort n = 158,763	Standardized Difference, %
Age at index date, mean ± SD (median), years	50.5 ± 15.7 (50.8)	51.5 ± 17.7 (50.7)	5.6
Female, n (%)	77,765 (49.0)	73,058 (46.0)	5.9
Race, n (%)			
White	91,986 (57.9)	90,589 (57.1)	1.8
Black	44,796 (28.2)	45,979 (29.0)	1.6
Hispanic	1,088 (0.7)	1,165 (0.7)	0.6
Other	9,316 (5.9)	8,647 (5.4)	1.8
Unknown	11,577 (7.3)	12,383 (7.8)	1.9
State, n (%)			
Missouri	45,662 (28.8)	44,675 (28.1)	1.4
New Jersey	39,098 (24.6)	36,337 (22.9)	4.1
Wisconsin	22,635 (14.3)	25,337 (16.0)	4.8
Mississippi	19,254 (12.1)	20,343 (12.8)	2.1
Iowa	18,122 (11.4)	18,421 (11.6)	0.6
Kansas	13,992 (8.8)	13,650 (8.6)	0.8
Insurance eligibility, n (%)			
Capitated	34,276 (21.6)	37,391 (23.6)	4.7
Dual Medicaid/Medicare coverage	95,343 (60.1)	89,363 (56.3)	7.6
Year of index date, n (%)			
1998-2002	10,726 (6.8)	8,971 (5.7)	4.6
2003-2007	21,532 (13.6)	19,460 (12.3)	3.9
2008-2012	52,007 (32.8)	51,979 (32.7)	0.0
2013-2017	74,498 (46.9)	78,353 (49.4)	4.9
Quan-CCI, mean ± SD (median)	1.7 ± 2.2 (1.0)	1.7 ± 2.3 (1.0)	1.3
Unique mental health diagnoses, mean ± SD (median)	4.8 ± 4.1 (4.0)	1.2 ± 2.0 (0.0)	109.9
AP use, n (%)	77,733 (49.0)	9,500 (6.0)	109.8
Newly diagnosed, n (%)[b]	16,800 (10.6)	-	-
Recently relapsed, n (%)[c]	18,771 (11.8)	-	-
Total costs, mean ± SD (median), $US 2018	29,573 ± 45,262 (13,527)	17,938 ± 41,037 (2,821)	26.9
Pharmacy costs, mean ± SD (median), $US 2018	4,035 ± 8,483 (221)	2,062 ± 9,462 (32)	22.0
Medical costs, mean ± SD (median), $US 2018	25,538 ± 43,133 (9,556)	15,876 ± 39,096 (1,837)	23.5

AP, antipsychotic; CCI, Charlson comorbidity index; SCZ, schizophrenia; SD, standard deviation.
[a]Patients were matched 1:1 using exact matching factors (eg, age groups) and propensity scores generated based on sex, race, state, year of the index date, and insurance type (ie, capitated versus dual Medicaid/Medicare coverage).
[b]Patients with schizophrenia were considered newly diagnosed if there were no claims made during the baseline period with a diagnosis of schizophrenia.
[c]Patients with schizophrenia were considered to have had a recent relapse if there was ≥1 schizophrenia-related hospitalization or emergency department visit during the 60 days prior to or on the index date.

HRU and Costs

- Overall, patients in the SCZ cohort had higher HRU relative to the non-SCZ cohort during the observation period
  - The SCZ cohort had 51% more outpatient visits, 74% more inpatient stay days, 79% more ED visit days, 92% more LTC stay days, 5.2 times more 1-day MHI visit days, and 15.8 times more MHI stay days compared with the non-SCZ cohort (all *P* < 0.01; **Figure 3**)

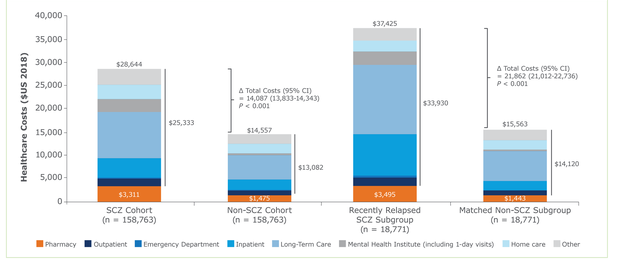
Figure 3. Healthcare resource utilization during the 12-month observation period in patients with schizophrenia relative to controls without schizophrenia[a]



CI, confidence interval; HRU, healthcare resource utilization; IRR, incidence rate ratio; SCZ, schizophrenia.
[a]HRU was compared between matched cohorts using Poisson regression models to generate IRRs and nonparametric bootstrap procedures to generate 95% CIs and *P* values.

- Patients in the SCZ cohort relative to the non-SCZ cohort had $14,087 higher total costs (mean: $28,644 vs $14,557; *P* < 0.001; **Figure 4**)
- The incremental total costs in the SCZ cohort were driven by LTC ($4,677), inpatient ($2,044), MHI stay ($1,990), and pharmacy costs ($1,836; all *P* < 0.001)

Figure 4. Healthcare costs during the 12-month observation period in patients with schizophrenia relative to controls without schizophrenia[a,b]



SCZ, schizophrenia.
[a]Costs were compared between matched cohorts using ordinary least squares regression models to generate mean differences and nonparametric bootstrap procedures to generate 95% CIs and *P* values.
[b]Includes a subgroup analysis in patients from the SCZ cohort with a recent relapse (≥1 schizophrenia-related hospitalization or emergency department visit during the 60 days prior to or on the index date) and their matched controls.

Subgroup Analysis

- A total of 18,771 patients with a recent relapse were included in the SCZ cohort (mean age, 50.5 years; female, 48.6%) (**Table 1**)
- Demographic characteristics between the subset of the SCZ cohort with a recent relapse and the matched pairs from the non-SCZ cohort were well balanced
- Patients in the SCZ cohort relative to the non-SCZ cohort had $21,862 higher total costs (mean, $37,424 vs $15,563; *P* < 0.001; **Figure 4**)
- The incremental total costs in the SCZ cohort were driven by LTC ($8,486), inpatient ($6,940), MHI stay ($2,225), and pharmacy costs ($2,052; all *P* < 0.001)

LIMITATIONS

- The findings are not generalizable to patients without health insurance or with non-Medicaid insurance plans
- As analyses were based upon data from 6 states, results may not be representative of the overall Medicaid population
- Results may be subject to residual confounding due to unmeasured confounders (ie, information not available in claims data)
- Analyses of administrative claims data depend on correct diagnosis, procedure, and drug codes, and coding inaccuracies may lead to case misidentification
- Because annual prevalence and incidence estimates were calculated using different populations with different inclusion criteria, they cannot be compared

CONCLUSIONS

- **In this 6-state Medicaid study, prevalence of schizophrenia ranged between an average of 2.30% and 4.01% and the incidence ranged between an average of 0.31% and 0.52% during 2012-2017**
- **Schizophrenia was associated with an incremental Medicaid spending of $14,087 per patient annually, predominantly driven by LTC, inpatient, MHI, and pharmacy costs**
- **In the subset of patients with schizophrenia and a recent relapse, the incremental Medicaid spending amounted to $21,862 per patient annually**

Acknowledgments

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Disclosures

CP, KJ, and DL are employees of Janssen Scientific Affairs, LLC, and hold stock in Johnson & Johnson. M-HL, DP, MZ, AC-S, KM, and PL are employees of Analysis Group, Inc., a consulting company that has provided paid consulting services to Janssen Scientific Affairs, LLC.

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