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Twelve-Month Health Care Use and Mortality in Commercially Insured Young People With Incident Psychosis in the United States

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Objective: **To assess 12-month mortality and patterns of outpatient and inpatient treatment among young people experiencing an incident episode of psychosis in the United States.** ***Method:*** **Prospective observational analysis of a population-based cohort of commercially insured individuals aged 16–30 receiving a first observed (index) diagnosis of psychosis in 2008–2009. Data come from the US Department of Health and Human Services' Multi-Payer Claims Database Pilot. Outcomes are all-cause mortality identified via the Social Security Administration's full Death Master File; and inpatient, outpatient, and psychopharmacologic treatment based on health insurance claims data. Outcomes are assessed for the year after the index diagnosis.** ***Results:*** **Twelve-month mortality after the index psychosis diagnosis was 1968 per 100 000 under our most conservative assumptions, some 24 times greater than in the general US population aged 16–30; and up to 7372 per 100 000, some 89 times the corresponding general population rate. In the year after index, 61% of the cohort filled no antipsychotic prescriptions and 41% received no individual psychotherapy. Nearly two-thirds (62%) of the cohort had at least one hospitalization and/or one emergency department visit during the initial year of care.** ***Conclusions:*** **The hugely elevated mortality observed here underscores that young people experiencing psychosis warrant intensive clinical attention—yet we found low rates of pharmacotherapy and limited use of psychosocial treatment. These patterns reinforce the importance of providing coordinated, proactive treatment for young people with psychosis in US community settings.**

Key words: psychosis/mortality/quality of care

Introduction

Schizophrenia affects approximately 1% of adults in the United States, around 2.5 million individuals.[1] Onset typically occurs in late adolescence or early adulthood, with recurrent episodes of psychosis and impaired functioning over time. Alarmingly, Americans diagnosed with mental disorders such as schizophrenia die about a decade earlier than the general population, largely due to co-occurring medical problems like diabetes and heart disease and to suicide.[2–4] The national economic burden of schizophrenia alone is conservatively estimated at tens of billions of dollars annually.[5]

Reducing the burdens of schizophrenia and related disorders depends on early and effective intervention. Evidence from clinical trials suggests that intervention close to the onset of psychosis improves patient outcomes, and at least one longitudinal cohort study has observed lower suicide risk among first-episode psychosis (FEP) patients enrolled in early intervention programs.[6–11] Several countries have implemented comprehensive treatment programs for young people with psychosis via low-dose antipsychotic medications, cognitive behavioral psychotherapy, family education and support, and vocational recovery services.[12,13] The United States has been slower to focus on early intervention, so little is known about how young people with FEP or other incident psychosis utilize pharmacologic, psychotherapeutic, and supportive interventions available here, or how many receive care consistent with established guidelines.[14]

This study examines longitudinal patterns of outpatient and inpatient treatment, emergency department visits, and all-cause mortality, respectively, in a national cohort of young persons with incident psychosis. We focus on patients with health insurance at the time of the index diagnosis, since being uninsured is an obvious barrier to psychosis treatment.[15] Data from the Multi-Payer Claims Database (MPCD) Pilot were analyzed to explore patterns in mental health care within the year following an

incident psychosis diagnosis. The MPCD includes linked information from the Social Security Administration's full Death Master File (DMF, https://www.ssa.gov/data-exchange/request_dmf.html), allowing documentation of all-cause mortality associated with FEP or other incident psychosis in young people, a noted gap in the literature.[16] Prior research from Europe and Australia has found elevated mortality associated with the first episode of psychosis, but under different social, economic, and clinical conditions than prevail in the United States.[11,17–25]

Methods

Data

The MPCD Pilot was sponsored and tested by the US Department of Health and Human Services and developed under contract by OptumInsight with funds from the American Recovery and Reinvestment Act of 2009.[26,27] The MPCD includes insurance enrollment information and healthcare claims from OptumInsight's Normative Health Information database covering utilization from 2007 to 2010, which included 63.4 million commercially insured individuals. MPCD also covers samples from fee-for-service Medicare from 2007 to 2010 (7.64 million individuals) and Medicaid from 2007 and 2008 (9.35 million individuals). For individuals who transition between different participating commercial plans, and/or between commercial and public insurance, MPCD data can be linked at the individual level across types of coverage. Individuals without health insurance are outside the scope of MPCD.

For each individual in the dataset, the MPCD includes basic demographic information; insurance enrollment; and institutional, professional, and pharmacy healthcare claims, including Current Procedure Terminology (CPT), International Classification of Disease (ICD-9), and National Drug Code (NDC) codes. The MPCD includes information on fact (i.e., date) of death from the DMF, linked using Social Security number, name, sex, state of residence and date of birth by OptumInsight for people with commercial insurance and by CMS for Medicare and Medicaid. The DMF does not contain information on cause or manner of death, and the MPCD was not linked to the only national source for such data, the National Center for Health Statistics' National Death Index (NDI; http://www.cdc.gov/nchs/ndi.htm). The research team accessed the MPCD as an approved beta tester; the National Institutes of Health Office of Human Subjects Research Protections determined that this study was exempt from Institutional Review Board review.

Study Cohorts

Health Care Service Utilization. Following prior claims-based studies of FEP or newly diagnosed schizophrenia, we identified all (N = 154322) individuals in the MPCD with any inpatient, emergency department (ED), or outpatient claim with an ICD-9 diagnosis for schizophrenia (295.xx), brief psychotic disorder (298.8), or psychotic disorder NOS (298.9); and who were aged 16–30, the typical age of onset of these disorders, at the initial diagnosis.[28–30] To focus on incident psychosis—and possibly FEP, especially at younger ages—we limited the sample to persons with ≥12 months of continuous insurance coverage prior to the first observed psychosis diagnosis, which we refer to as the "index" diagnosis (N = 14910); and then to those with commercial (vs public, eg, Medicaid/CHIP/Medicare) insurance at the index event (N = 5488). Because developing a psychosis disorder often leads to public insurance coverage, we excluded individuals with public coverage at index out of particular concern that they might have a prior psychosis history we could not observe due to left censoring. Finally, to increase confidence that individuals experienced psychosis, we restricted the sample to persons with at least one additional psychosis-related ICD-9 diagnosis in the year after the index diagnosis (N = 1973); and then, to avoid censored utilization data, to those with continuous insurance coverage in the year after index (N = 1357). Both the index and subsequent psychosis diagnoses could be recorded by general medical or mental health specialty providers. Details about each sample selection step are shown in figure 1.

Mortality. For mortality, we focused on individuals with an index psychosis diagnosis while aged 16–30, and continuous insurance coverage for 12 months before and commercial insurance at the time of the index diagnosis; among these, mortality cases were those who died within 12 months after index (N = 108). Out of concern for right-censoring (ie, a shorter period of observation due to death), we did not require mortality cases to have a second psychosis diagnosis, nor continuous insurance coverage, after the index diagnosis; correspondingly, our primary mortality analyses also do not require these criteria of survivors (N = 5380; figure 1). These criteria were modified in sensitivity analyses, as described below.

Period of Analysis

MPCD covers at most 4 years of observation on any given individual, 2007–2010, and fewer depending on the timing of insurance coverage, age, and the index psychosis diagnosis. Based on these factors, and our cohort inclusion criteria, we examine mortality and health care service use over the 12 months after the index psychosis diagnosis.

Measures

Pharmacotherapy. Following a recent report on prescription practices for early psychosis observed in US community mental health clinics, we focus on filled prescriptions within 4 categories of psychotropic

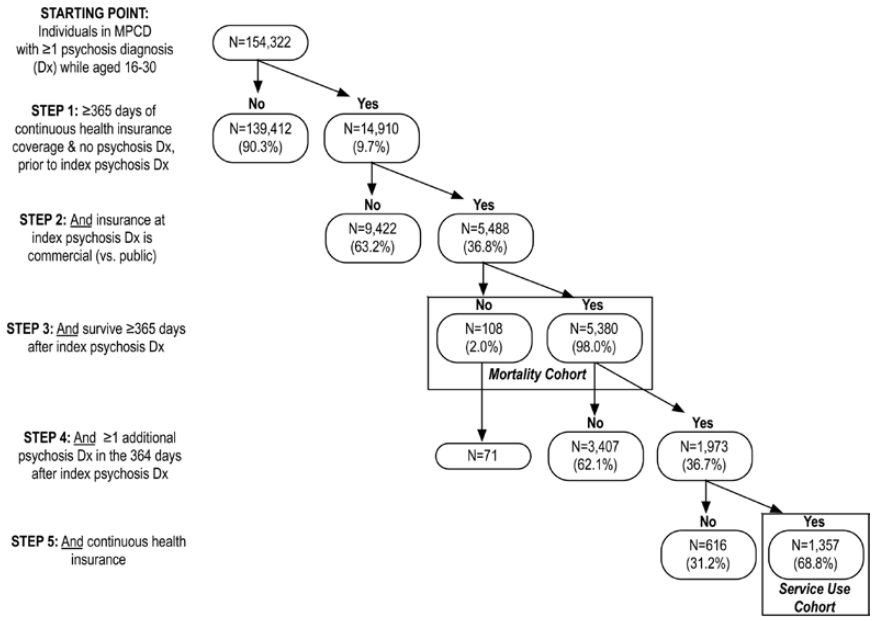

Fig. 1. Study cohort inclusion criteria.

medications: antipsychotics, mood stabilizers (including anti-convulsants), antidepressants, and anxiolytics.[31] The primary pharmacotherapy outcome is proportion of days covered (PDC), calculated as the number of prescription-days of filled prescriptions in the respective drug categories in a given analysis period, divided by the number of days in the period. We count each prescription regardless of potential overlap. Potential gaps in pharmacotherapy occur during inpatient hospitalizations or other institutionalizations where separate pharmacy claims are not generated.

Outpatient, Inpatient, and Emergency Care. Health services use is based on institutional and professional claims from the index psychosis diagnosis through the subsequent 12 months. Inpatient care assessed by the number of hospitalizations (medical and psychiatric combined) and number of inpatient days. Hospitalizations exceeding the 12-month follow-up period are truncated to 365 days. We count the number of ED visits; and mental health outpatient evaluation and management visits, categorized via CPT code into psychiatric medical management, individual psychotherapy, family therapy, and group psychotherapy visits.

Results

The primary study cohort includes the 1357 individuals who meet inclusion criteria for an index psychosis diagnosis while aged 16–30; commercial insurance at the index diagnosis; continuous insurance coverage for 12 months before and 12 months following the index diagnosis; and a second psychosis-related diagnosis during the follow-up period (figure 1). For primary mortality analyses, we use the 5488 individuals who meet all these criteria except the last two. Table 1 presents demographic and diagnostic information obtained at the index episode, and insurance status over time. In the primary study cohort, approximately 84% of patients were ≤25 years old at the time of the index diagnosis; 61% were male. The modal diagnosis was psychotic disorder not otherwise specified (63%), followed by schizoaffective disorder (15%), paranoid schizophrenia (6%), unspecified schizophrenia (5%), and other psychosis-spectrum disorders (all < 5%). Less than 2% of the cohort switched from commercial to Medicaid/Medicare insurance coverage during the 12-month follow-up period.

All-Cause Mortality

Table 2 reports 12-month mortality for the psychosis cohort and the US general population in corresponding age and gender categories. Twelve-month mortality for the entire psychosis cohort was 2.0% [1968 per 100 000 people; 108/(5380 + 108)]; 12-month mortality in the corresponding general population is <0.1% (89 per 100 000 people).

Mortality varied significantly by age, with rates an order of magnitude higher in those with incident psychosis after age 25 compared with those with an incident diagnosis between ages 16 and 20. Even so, mortality in the youngest group was 531 per 100 000 [15/(2808 + 15)]; by comparison, 12-month mortality in the corresponding general population aged 16–20 is only 66 per 100 000.[32,33] For persons in the psychosis cohort aged 26–30, mortality was 5263 per 100 000 [61/(1098 + 61)], compared to 97 per 100 000 in the corresponding general population. Mortality in the psychosis cohort is 8 times the general

Table 1. Summary of Characteristics of the Psychosis Study Cohort[a]

Participant Category		Service Use Cohort		Mortality Cohort	
		N	%	*N*	%
All		1357	100	5488	
Male		831	61	2994	54.6
Female		426	31	2494	45.4
Age 16–20		715	53	2823	51.4
Male		453	63	1618	57.3
Female		262	37	1205	42.7
Age 21–25		419	31	1506	27.4
Male		274	65	841	55.8
Female		145	35	665	44.2
Age 26–30		223	16	1159	21.1
Male		104	47	535	46.2
Female		119	53	624	53.8
ICD-9 diagnostic code					
295.0x—simple type schizophrenia		7	<1	41	<1
295.1x—disorganized type schizophrenia		5	<1	16	<1
295.2x—catatonic type schizophrenia		11	<1	34	<1
295.3x—paranoid type schizophrenia		76	5.6	192	3.5
295.4x—schizophreniform disorder		31	2.2	62	<1
295.5x—latent schizophrenia		7	<1	26	<1
295.6x—schizophrenic disorder, residual type		10	<1	16	<1
295.7x—schizoaffective disorder		208	15.3	454	8.3
295.8—other specified types of schizophrenia		11	<1	39	<1
295.9—unspecified schizophrenia		73	5.3	234	4.3
298.8—other and unspecified reactive psychosis		60	4.4	363	6.6
298.9—unspecified psychosis		858	63.2	4011	73.1
Insurance at Index Diagnosis	**Insurance at 12 Months**				
Commercial	Commercial	1336	98.5		
Commercial	Medicare	11	0.8		
Commercial	Commercial + Medicare	10	0.7		

[a]Age and sex for decedents (*N* = 108) is reported in Table 2. Per MPCD privacy rules, we are unable to report the distribution of index diagnosis among decedents due to small cell counts.

Table 2. All-Cause Mortality in the 12 Months Following Index Psychosis Diagnosis

Participant Category	*N*, Who Survive 12 Months	*N*, Who Die ≤12 Months	Annual Mortality Rate per 100 000		Standardized Mortality Ratio
			FEP Cohort	US General Population[a]	
All[b]	5380	108	1968	83	24
Male[b]	2924	70	2338	108	22
Female[b]	2456	38	1524	43	35
Age 16–20[b]	2808	15	531	66	8
Male	1606	12	742	85	9
Female	1202	3	249	33	8
Age 21–25[b]	1474	32	2125	102	21
Male	817	24	2854	131	22
Female	657	8	1203	47	26
Age 26–30[b]	1098	61	5263	97	54
Male	501	34	6355	137	46
Female	597	27	4327	59	73

[a]Calculated by the authors, based on US population data for 2010 from CDC WONDER (http://wonder.cdc.gov).
[b]US general population is weighted to reflect distribution of age group and/or gender of FEP cohort.

population rate for people aged 16–20, 21 times the rate for ages 21–25, and 54 times the rate for ages 26–30. In absolute terms, mortality rates were lower for females than males within each age category, in both the psychosis cohort and the general population; in the 2 older age categories, however, the gender differential was smaller

in the psychosis cohort than in the general population, so standardized mortality ratios were actually higher for females than males in those categories.

We conducted several sensitivity analyses of mortality. To estimate an upper bound on mortality, we required that survivors—but not decedents, due to right censoring—have a second psychosis diagnosis and continuous insurance coverage after the index diagnosis (N = 1357, ie, the service use cohort); this yields 12-month mortality of 7.4% [108/(1357 + 108)], some 89 times the corresponding general population rate. From there, requiring that mortality cases also have at least one observed psychosis diagnosis after the index event (ie, between index and death), the number of deaths drops by 34% (N = 71), yielding 12-month mortality of 5.0% [71/(1357 + 71)]. Lifting the requirement of continuous commercial insurance after index for survivors yielded 12-month mortality of 3.7% [71/(1973 + 71)].

Although information on cause of death was not available for this study, we examined the medical diagnoses received in the 12 months prior to the index psychosis diagnosis by the decedents (N = 108) in our mortality cohort. We identified 25 who had medical conditions that are associated with substantial near-term mortality: 15 with cancer, 9 with end-stage renal disease, and 1 with cystic fibrosis. As a final sensitivity analysis, we excluded these from the mortality cohort, which yields 12-month mortality of 1.5% [83/(5380 + 83)], still 18 times higher than mortality in the corresponding general population. Details are reported in supplemental table 1.

Health Care Service Utilization

Pharmacotherapy. Members of the health care service utilization cohort (N = 1357) filled a total of 19 061 prescriptions during the 12-month follow-up, across all drug classes. Of these, 58.5% were for these types of psychotropic medications: antipsychotics (23.2%), antidepressants (14.5%), mood stabilizers and anti-convulsant medications (12.2%), and anxiolytics (5.9%). Remaining prescriptions (41.5%) were mainly for nonpsychotropic drugs, plus a small amount of ADHD drugs.

Table 3 reports receipt of psychotropic medications, overall and by quarter. Overall, 39% of the cohort filled at least one antipsychotic prescription in the year after index; on average, filled prescriptions for antipsychotic medications covered just 20% of the follow-up year. The fraction of patients receiving other psychotropic medications was lower: 27% filled at least one prescription for an antidepressant, 21% for a mood stabilizer, and 14% for an anxiolytic. Mean PDC for medications other than antipsychotics ranged from 5% (anxiolytics) to 13% (antidepressants). The proportion of the cohort receiving any prescription in a given class did not vary significantly by age or gender for any of the 4 psychotropic classes. Women had higher PDC than men for mood stabilizers and anti-convulsants (F[1, N = 1355] = 17.64, P < .01), while age was positively associated with higher PDC for anxiolytics (F[2, N = 1354] = 7.42, P < .01).

Only 36% of the cohort had any medication management visits with a psychiatrist or other mental health specialty prescriber in the year following index psychosis diagnosis (Table 4). On average, those with any medication management visits had 4.5 (SD = 5.1) such sessions during the year. Patterns of medication management did not vary significantly by age or gender.

Outpatient Mental Health Services. Table 4 reports on outpatient mental health treatment, overall and by quarter. Overall, 69% of the cohort had at least one visit with a mental health specialty provider for medication management and/or psychotherapy during the follow-up year; on average these individuals had approximately one outpatient contact per month. The modal type of specialty visit was individual psychotherapy, with nearly 60% of the cohort having at least one such session. Those with any individual psychotherapy had an average of 12.2 (SD = 13.9) such visits over the year. Patterns of individual psychotherapy did not vary substantially by age or gender. In contrast, use of family therapy, while very low overall (13%), was more common among younger patients (χ^2[2, N = 1357] = 12.79, P < .01). Mean number of family therapy sessions differed significantly among age groups (F[2, N = 1354] = 6.72, P < .01), with the youngest patients receiving more services than older members of the cohort. Participation in group psychotherapy was exceedingly rare (2%), with no significant differences by age or gender.

Inpatient and Emergency Department Care. Per Table 5, 23% of the health care service utilization cohort was hospitalized in the year after the index diagnosis, including 106 members of the cohort (7.8%) whose index psychosis diagnosis occurred while hospitalized; the mean number of hospitalizations was 1.3 among those hospitalized at least once, covering an average of 32 inpatient days during the year. Intensity of inpatient use did not differ by gender, but those with an index diagnosis after age 25 were substantially less likely to be hospitalized than younger patients (χ^2[2, N = 1357] = 9.3, P < .01). More than half (55%) of individuals in this cohort had at least one ED visit in the year following the index diagnosis; those with any ED contact averaged 2.2 visits during the year. Overall, nearly two-thirds (62%) of psychosis patients had at least one hospitalization and/or at least one ED visit in the year after index diagnosis.

Health Care Service Use Among Psychosis Decedents. We examined health care utilization for the cases (N = 108) who died within 12 months of the index psychosis diagnosis. We imputed "annualized" use by rescaling observed use using the fraction of the year each decedent survived.

Table 3. Psychotropic Drug Receipt in 12 Months Following Index Psychosis Diagnosis[a]

		Medication Category							
		Antipsychotic		Mood Stabilizer/Anti-convulsant		Antidepressant		Anxiolytic	
Participant Category	*N*	% With Any Rx	Mean % of Days Covered[a]	% With Any Rx	Mean % of Days Covered[a]	% With Any Rx	Mean % of Days Covered[a]	% With Any Rx	Mean % of Days Covered[a]
All	1357	39.2	19.9	20.9	10.7	26.5	12.6	14.1	4.7
Q1		39.2		19.1		24.1		13.7	
Q2		32.9		17.0		21.3		10.0	
Q3		28.4		16.6		20.3		9.7	
Q4		26.2		15.3		18.9		9.8	
Age									
16–20	715	41.0	20.2	21.3	10.4	25.6	12.5	10.5	3.5
Q1		41.0		18.9		23.8		10.2	
Q2		33.7		17.1		21.5		7.7	
Q3		28.5		16.5		19.7		8.5	
Q4		25.7		15.8		17.9		7.6	
21–25	419	41.8	21.2	22.7	11.7	28.9	12.9	17.2	5.7
Q1		40.1		20.5		24.6		17.7	
Q2		34.4		18.4		21.5		11.7	
Q3		30.1		17.4		21.0		9.8	
Q4		28.9		16.0		21.2		11.5	
26–30	223	32.3	16.5	16.1	9.5	24.7	12.0	20.2	7.1
Q1		31.8		17.0		24.2		17.5	
Q2		27.8		14.3		20.2		14.3	
Q3		25.1		15.2		20.6		13.5	
Q4		22.9		12.6		17.9		13.0	
Gender									
Male	831	39.0	19.8	17.6	8.5	24.9	11.7	12.0	4.1
Q1		39.0		16.0		22.1		11.9	
Q2		31.8		13.6		19.1		8.4	
Q3		28.0		13.6		19.3		8.4	
Q4		26.4		11.9		18.2		8.3	
Female	526	40.3	20.0	26.0	14.1	28.9	14.0	17.5	5.8
Q1		39.5		24.0		27.2		16.5	
Q2		34.8		22.4		24.7		12.5	
Q3		29.1		21.3		21.9		11.8	
Q4		26.0		20.7		20.2		12.2	

[a]Calculated as a ratio of the sum of prescription-days in the drug class divided by 365. Prescriptions are summed regardless of whether they are concurrent, overlapping, or consecutive.

Table 4. Outpatient Mental Health Service Use in 12 Months Following Index Psychosis Diagnosis

		Outpatient Service Category									
		Treatment in Any Category		Medication Management[a]		Individual Psychotherapy[b]		Family Psychotherapy[c]		Group Psychotherapy[d]	
Participant Category	*N*	% With Any Mental Health Outpatient Service	Mean (SD) Among Those With Any Mental Health Outpatient Service	% With Any Medication Management	Mean (SD) Among Those With Any Medication Management	% With Any Individual Psychotherapy	Mean (SD) Among Those With Any Individual Psychotherapy	% With Any Family Psychotherapy	Mean (SD) Among Those With Any Family Psychotherapy	% With Any Group Psychotherapy	Mean (SD) Among Those With Any Group Psychotherapy
All	1357	69.1	13.9 (16.1)	36.3	4.5 (5.1)	58.8	12.2 (13.9)	12.5	3.9 (6.0)	2.2	12.5 (15.5)
Q1			4.6 (5.7)		1.5 (2.4)		4.0 (4.8)		1.2 (2.3)		3.4 (7.4)
Q2			3.5 (5.0)		1.2 (1.7)		3.1 (4.3)		0.9 (1.9)		3.8 (7.0)
Q3			2.9 (4.5)		0.9 (1.5)		2.6 (4.1)		0.8 (1.8)		2.6 (4.1)
Q4			2.7 (4.5)		0.8 (1.3)		2.3 (4.0)		0.9 (1.9)		2.5 (4.9)
Age											
16–20	715	69.7	13.3 (14.3)	37.3	4.2 (5.2)	59.9	11.2 (11.5)	14.7	4.9 (6.9)	2.2	11.6 (18.8)
Q1			4.5 (5.6)		1.5 (2.9)		3.8 (4.2)		1.4 (2.6)		3.1 (9.0)
Q2			3.3 (4.8)		1.1 (1.6)		2.7 (3.7)		1.1 (2.3)		4.5 (9.0)
Q3			2.7 (4.1)		0.8 (1.4)		2.4 (3.6)		1.1 (2.2)		1.7 (3.0)
Q4			2.6 (4.0)		0.7 (1.2)		2.2 (3.5)		1.1 (2.3)		2.2 (4.4)
21–25	419	71.1	15.3 (19.7)	38.9	4.4 (4.8)	59.4	14.2 (17.5)	11.5	2.5 (3.9)	3.1	13.0 (11.5)
Q1			4.9 (6.5)		1.4 (1.5)		4.5 (5.9)		1.0 (2.0)		4.1 (5.4)
Q2			4.0 (5.6)		1.2 (1.7)		3.7 (5.2)		0.6 (1.1)		3.3 (3.9)
Q3			3.4 (5.5)		0.9 (1.5)		3.1 (5.0)		0.3 (0.8)		3.9 (5.1)
Q4			2.8 (5.2)		0.8 (1.4)		2.7 (4.8)		0.5 (1.2)		1.6 (2.7)
26–30	223	63.2	12.8 (13.0)	28.3	5.8 (5.0)	54.3	11.5 (12.8)	7.2	1.8 (2.7)	0.4	20 (NA)
Q1			4.3 (4.5)		1.5 (1.9)		4.1 (4.4)		0.8 (1.1)		NA
Q2			3.3 (4.3)		1.7 (1.9)		2.8 (4.2)		0.4 (1.0)		NA
Q3			2.6 (3.5)		1.2 (1.5)		2.3 (3.5)		0.4 (0.9)		NA
Q4			2.5 (4.6)		1.2 (1.4)		2.0 (3.9)		0.3 (0.4)		NA
Gender											
Male	831	69.1	13.7 (16.1)	34.7	4.4 (5.6)	59.2	12.0 (14.3)	13.1	4.1 (5.5)	2.5	12.1 (9.9)
Q1			4.2 (5.4)		1.3 (2.7)		3.8 (4.7)		1.1 (1.8)		2.7 (4.6)
Q2			3.5 (4.8)		1.2 (1.7)		3.1 (4.4)		0.9 (1.7)		3.1 (4.1)
Q3			3.1 (4.8)		0.9 (1.6)		2.7 (4.4)		0.9 (1.9)		2.9 (4.6)
Q4			2.7 (4.7)		0.8 (1.2)		2.3 (4.1)		1.0 (2.2)		3.2 (5.7)
Female	526	69.0	14.0 (16.0)	39.0	4.6 (4.2)	58.2	12.4 (13.2)	11.4	3.7 (6.7)	1.7	13.3 (25.0)
Q1			5.1 (6.3)		1.7 (1.8)		4.4 (4.9)		1.5 (3.1)		5.1 (12.0)
Q2			3.5 (5.4)		1.2 (1.5)		3.0 (4.2)		0.8 (2.2)		5.4 (11.5)
Q3			2.7 (4.1)		0.8 (1.3)		2.4 (3.7)		0.7 (1.7)		1.8 (2.7)
Q4			2.5 (4.1)		0.8 (1.4)		2.3 (3.9)		0.6 (1.4)		0.8 (1.3)

[a]Psychiatric Medical Management CPT codes: 90862, 90865, 90867, 90868, 90870, 90885.
[b]Individual Psychotherapy CPT codes: 90804, 90805, 90806, 90807, 90809, 90810, 90811, 90812, 90813, 90814, 90815, 90845, 90875, 90876, 90880.
[c]Family Therapy CPT codes: 90846, 90847, 90849, 90887.
[d]Group Psychotherapy CPT codes: 90853, 90857.

Table 5. Inpatient Episodes and Emergency Department Visits in 12 Months Following Index Psychosis Diagnosis

		Acute Hospital Episodes				Emergency Department (ED) Visits	
Participant Category	*N*	% With Any Hospital Episode	Mean (SD) Episodes, Among Those With Any Hospital Episode	Mean (SD) Total Days, Among Those With Any Hospital Episode	Mean (SD) Days per Hospital Stay	% With Any ED Visit	Mean (SD) ED Visits Among Those With Any ED Visit
All	1357	23.1	1.3 (0.8)	32.3 (73.3)	24.0 (98.2)	54.8	2.2 (2.2)
Age							
16–20	715	23.6	1.4 (0.9)	36.3 (77.7)	25.1 (93.5)	56.5	2.2 (1.9)
21–25	419	26.3	1.2 (0.6)	29.8 (69.2)	24.5 (98.8)	52.5	2.3 (2.9)
26–30	223	15.7	1.3 (0.7)	21.2 (63.1)	16.5 (114.2)	53.8	2.2 (1.8)
Gender							
Male	831	22.9	1.3 (0.7)	33.1 (71.6)	24.7 (106.7)	54.8	1.9 (1.6)
Female	526	23.6	1.4 (0.9)	31.2 (76.1)	23.0 (91.7)	54.9	2.7 (2.9)

On an annualized basis, decedents had more hospitalizations than survivors (mean of 4.3 vs 1.3, respectively; $P < .01$), and more ED visits (mean of 4.2 vs 2.2; $P < .01$); while they had lower medication use in all psychotropic categories, as well as lower use of all types of psychotherapy.

Discussion

Our findings raise substantial concerns about conditions for young people experiencing psychosis in the United States. Most strikingly, we found 12-month mortality among young people after an incident psychosis diagnosis that was at least 24 times higher than the age-matched general population. In the general population, only individuals over 70 years of age have all-cause 12-month mortality approaching the rates we observed among young psychosis patients here.[32] No sensitivity analysis lowered our overall findings of excess mortality below an order of magnitude (although standardized mortality ratios were somewhat below 10 for the youngest group, ages 16–20, in our most conservative analyses). Moreover, mortality in this cohort is substantially higher than the rates associated with serious mental illness (SMI) overall—perhaps because the period and population assessed here only partially overlaps with studies of SMI mortality.[2–4]

The high death rate for this cohort argues strongly for intensive clinical intervention in the early stages of psychotic illness.[11] Yet the patterns of treatment we observed were far from intensive, with surprisingly low rates of medical oversight and only modest involvement by psychosocial treatment providers. Moreover, the individuals who proved to be most vulnerable—those who died within 12 months of the index diagnosis—received even less outpatient treatment, and relied more heavily on intermittent hospital and emergency care. These findings stand in stark contrast to recent recommendations for multi-modal, coordinated, and proactive outpatient treatment programs for FEP and other incident psychosis in US community settings, ie, coordinated specialty care programs.[14,34]

This study has several limitations. First, the MPCD was not constructed to be representative of the general population. However, we can think of no reason why the cohort studied here should be disproportionately disadvantaged relative to psychosis cases outside the MPCD; indeed, it represents a kind of best-case scenario regarding access to treatment, since inclusion required continuous health insurance coverage both before and after the index psychosis diagnosis.[35,36] Second, our methods for identifying psychosis cases lack the diagnostic precision found in prospective studies of early psychosis, including that some index diagnoses, particularly of unspecified psychosis (ICD-9 298.9), might be attributable to medical illness and/or medical treatment; and we lacked the information on patient history necessary to identify FEP definitively.

However, sensitivity analyses using both stricter and less strict cohort inclusion criteria did not alter the principal findings substantially. Third, the claims data used here do not support assessment of whether any given patients' care was appropriate or not; this would require review of clinical records, which we leave to future research. Fourth, the absolute size of the study cohort is small, which could reduce the precision of our findings. However, any such effect should be most substantial for generally rare outcomes such as mortality in adolescents and young adults. In practice, we observe so many deaths in the study sample—identified via the full DMF, an authoritative data source on mortality—that we are very confident in our conclusions regarding excess premature death. At the same time, the sample is clinically heterogeneous, with respect to initial and subsequent psychosis diagnosis as well as to comorbidity, which the scale and scope of the current data do not enable us to examine in detail.

Fifth, the MPCD restricted access to data on cause and manner of death. Intervention efforts will likely benefit from knowing whether young people with psychosis die principally from the same unnatural causes—substance-related and other accidents, and suicides—that are most common in the corresponding general population, albeit at much higher rates, as prior studies from other countries suggest may be the case;[11,18,21–25] and/or from the cardiometabolic disorders and cancers that underlie much of the excess mortality in older people with psychosis.[37] Substance use problems commonly co-occur with psychosis disorders, including in the study cohort; for instance, 43 of the 108 decedents in this study had a substance use disorder diagnosis (ICD-9 303.X, 304.X, or 305.X) in the 30 days prior to the index psychosis diagnosis, and 20 of the decedents had such a diagnosis on the date of death.

Finally, MPCD data do not permit evaluation of possible causal links between low rates of treatment, the quality of services, and high mortality or manner of death among psychosis patients.[38,39] However, it is very hard for us to imagine that the low intensity and quality of care observed here is unrelated to excess mortality, particularly considering evidence of multiple crises (ie, ED visits and inpatient episodes) experienced by many patients in the year following index diagnosis.

In light of these limitations, and given relatively little published evidence on the healthcare trajectories and mortality patterns of young people with FEP or other incident psychosis in the United States, replication of all analyses reported here is important. Ideally, such analyses would use population-based data covering a truly national/representative cohort of young persons with FEP; follow them beyond the first year after psychosis onset; and include precise instruments for defining FEP caseness, the quality of pharmacologic and psychosocial treatments, key clinical and functional outcomes, and timing, cause and manner of death for decedents.

Notwithstanding these limitations, the current findings are consistent with other studies describing deficiencies in the quality of early psychosis care provided in US communities. Recent reports suggest unacceptably long delays in the initiation of psychosis treatment after the onset of symptoms, questionable psychotropic prescription practices in approximately 40% of cases, and elevated cardiometabolic risk factors and abnormalities among FEP patients that go largely untreated.[31,40,41] Taken together, these findings provide a strong rationale for initiatives to improve early identification and integrated treatment for psychotic disorders in US treatment settings. Such efforts are already underway, supported by recent actions by the US Congress, the Substance Abuse and Mental Health Services Administration, the Centers for Medicare and Medicaid Services, and the National Institute of Mental Health that are accelerating implementation of evidence-based treatments for FEP.[34,42–44] Given accumulating evidence associating timely FEP treatment with positive clinical, social, and employment outcomes, the present findings reinforce the need for widely available coordinated specialty care programs, and strategies to provide them as early in after psychosis onset as possible.[6,8] Such programs are needed to improve outcomes for people experiencing FEP, and might help mitigate the extraordinarily high rates of mortality observed in this vulnerable population.

Supplementary Material

Supplementary data are available at *Schizophrenia Bulletin* online.

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