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CARE PATHWAYS PRIOR TO FIRST DIAGNOSIS OF PSYCHOTIC DISORDER IN ADOLESCENTS AND YOUNG ADULTS

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Abstract

Objective—Describe patterns of health care use prior to first diagnosis of psychotic disorder in a population-based sample.

Methods—Electronic health records and insurance claims from five large integrated health systems were used to identify 624 patients aged 15 to 29 receiving a first diagnosis of psychotic disorder in any care setting and to describe health services received, diagnoses assigned, and medications dispensed during the previous 36 months. Patterns of utilization in those receiving first diagnoses of psychotic disorder were compared to utilization in matched samples of general health system members and members receiving first diagnoses of unipolar depression.

Results—During the year prior to first psychotic disorder diagnosis, 29% used mental health specialty outpatient care, 8% had mental health inpatient care, 24% had emergency department mental health care, 29% made a primary care visit with a mental health diagnosis, and 60% received at least one mental health or substance use disorder diagnosis. Compared to those receiving first diagnoses of unipolar depression, people with first diagnosis of psychotic disorder were modestly more likely to use all types of health services and specifically more likely to use mental health inpatient care (Odds Ratio 2.96, 95% CI 1.97–4.43) and mental health emergency department care (Rate Ratio 3.74, 95% CI 3.39–4.53).

Conclusions—Most people receiving a first diagnosis of psychotic disorder have had some indication of mental health need in the prior year. General use of primary care or mental health services, however, does not clearly distinguish people who later receive a diagnosis of psychotic disorder from those who later receive diagnoses of unipolar depression. Use of inpatient or emergency department mental health care is a more specific indicator of risk.

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Psychotic disorders carry a substantial public health burden, including high rates of disability or lost productivity and substantial excess mortality due to suicide, substance use, and higher rates of chronic medical illness [1–3].

Increasing evidence supports the benefits of early detection and intervention for first-episode psychosis in adolescents and young adults. In young people with schizophrenia-spectrum disorders, duration of untreated psychosis (i.e. delay in receipt of effective treatment) is consistently associated with poorer long-term outcome [4, 5]. The Recovery After an Initial Schizophrenia Episode-Early Treatment Program (RAISE-ETP) trial demonstrated that a comprehensive early intervention program (including psychotherapy, rehabilitation services, and pharmacotherapy) can reduce both clinical symptoms and functional impairment among young people with recent-onset psychotic disorders[6–8]. This research, however, also found an average delay of almost 18 months from onset of psychotic symptoms to receipt of effective care. Reducing delays in the pathway to effective treatment will require significant efforts to promote earlier recognition and expand the reach of early intervention programs.

Previous studies of early intervention programs, including RAISE-ETP [6–8] and others[9–11], have typically focused on patients treated in mental health specialty settings and community mental health centers. We recently reported[12] that a substantial minority of first psychotic disorder diagnoses occur in primary care and other general medical settings [12]. Including all care settings, incidence of first psychotic disorder diagnoses in adolescents and young adults approached 100 per 100,000 per year, substantially higher than most previous estimates. If generalizable, these findings suggest that early detection efforts must consider a larger population distributed across a wider range of care settings than previously expected.

The pathway from first onset of psychotic symptoms to receipt of effective care may include multiple care transitions, each of which can introduce delay or outright failure. Examining patterns of health care use along this pathway can help to identify, and eventually address, those points of delay or failure. Previous research has examined patterns of health care use prior to enrollment in early intervention programs in Canada[13–16], France [17], Singapore [18], and the United Kingdom [19, 20] and prior to first diagnosis of schizophrenia in Denmark[21]. No such data are available, however, regarding patterns of prior care in the US. Furthermore, pathways to care of patients who reach early intervention programs may not be representative of care pathways in the entire population of people experiencing first episodes of psychosis. Those who never reach appropriate care may differ from those who are only delayed.

Here we use data from a population-based sample of adolescents and young adults with first diagnoses of psychotic disorder to examine patterns of health care utilization prior to diagnosis. We also compare utilization patterns prior to psychotic disorder diagnosis to patterns in the general population and patterns prior to first diagnosis of unipolar depression. These data can address two questions relevant to early detection of psychotic disorders. First, examining the proportions of individuals receiving various types of care prior to diagnosis can address practical questions regarding potential sites for early detection efforts. For example, such data can indicate the proportion of all cases that could be identified by an early detection program limited to mental health specialty vs. a program also including

primary care. Second, comparing patterns of utilization in individuals with first diagnoses of psychotic disorder to patterns in appropriate comparison or control conditions could identify possible early indicators or signals of illness. Comparison to the unipolar depression group can help distinguish patterns of service use specific to a psychotic disorder diagnosis from patterns related to more generic psychological distress.

METHODS

Study Settings

The study was conducted in five healthcare systems participating in the National Institute of Mental Health-funded Mental Health Research Network: the Colorado, Northern California, Northwest, Southern California, and Washington regions of Kaiser Permanente. All five systems provide pre-paid comprehensive care (including general medical and specialty mental health care) to defined populations of members. Insured members are enrolled through employer-sponsored commercial insurance, individually purchased insurance, capitated Medicare programs, capitated Medicaid programs, and state- or federally - subsidized insurance for low-income residents. In each healthcare system, members are generally representative of service area populations in terms of age, sex, and race/ethnicity [22–24]. Dedicated specialty care or early intervention programs for first-episode psychosis were not available in these systems during the study period.

In each healthcare system, electronic medical records data (for services provided at healthcare system-operated facilities) and insurance claims data (for services provided by external providers and paid for by the healthcare system) are organized into a virtual data warehouse for research [25]. Identifiable data remain at each healthcare system, but common data specifications and formats facilitate multi-site research using pooled de-identified data. Responsible Institutional Review Boards for each healthcare system approved waivers of consent for use of de-identified health records data in this research.

Identification of Cases with First Diagnosis of Psychotic Disorder

Identification of first diagnoses of psychotic disorder in all health system members is described in detail elsewhere [12] and will be summarized here. During the study period of 1/1/2007 to 12/31/2013, billing or encounter diagnoses from all outpatient and inpatient encounters (including general medical, emergency department, and specialty mental health encounters) in each health system were used to identify all first-occurring diagnoses of any psychotic disorder (including schizophrenia-spectrum disorder, mood disorders with psychotic symptoms, and other psychotic disorders) among health plan members aged 15 through 59. Eligible International Classification of Disease, Ninth Edition, Clinical Modification (ICD9-CM) codes for first psychosis diagnoses included 295.0 through 295.9, 296.04, 296.14, 296.24, 296.34, 296.44, 296.54, 296.64, 297.1, 297.3, 298.8, or 298.9. Diagnoses of substance-induced psychotic symptoms were not included, but patients with diagnoses of substance use disorder or record of substance use accompanying an eligible psychotic disorder diagnosis were included.

A random sample of 1000 potential cases (200 at each healthcare system) was selected for detailed medical record review to confirm presence of psychotic symptoms and to exclude those with documentation of pre-existing psychotic disorder diagnosis. At each healthcare system, two or more experienced medical record abstractors reviewed full-text electronic medical records using a structured chart review protocol and data entry system.

First, abstractors reviewed full-text clinical notes from all encounters up to 60 days before and 60 days after the index diagnosis to identify any of the characteristic symptoms of psychosis as defined by Diagnostic and Statistical Manual, Fourth Edition (DSM-IV) Criterion A for diagnosis of schizophrenia: hallucinations, delusions, disorganized speech, and disorganized or catatonic behavior [26]. Abstractors rated each symptom category as present or absent, excluding symptoms that treating providers clearly attributed to a specific general medical condition (e.g. hallucinations clearly attributed to delirium related to acute medical illness). Given high rates of substance use among those experiencing first episode of psychosis [27–29], psychotic symptoms that occurred in the context of co-occurring use of alcohol or drugs were not discounted or excluded.

Second, abstractors reviewed all encounters more than 60 days prior to first diagnosis to identify documented prior diagnosis of psychotic disorder. Cases were not excluded for evidence of prior psychotic symptoms, only for documentation of prior diagnosis (e.g. clinical text noted hospitalization for psychotic disorder prior to enrollment in the participating health system).

Final criteria for confirmation as a true case of first psychotic disorder diagnosis included: clear documentation of at least one DSM-IV TR Criterion A symptom of schizophrenia (not clearly attributed to general medical disorder or adverse effect of prescribed medication) AND no documentation of psychotic disorder diagnosis more than 60 days prior to the index visit. This report is limited to cases aged 15 to 29 at time of first diagnosis.

Identification of Comparison Groups

For each confirmed case, health system records were used to select two sets of matched controls. Matched general population controls were selected from all health plan members enrolled and having at least one outpatient visit during the study period (2007 through 2013). Three general population controls were selected for each case, frequency matched by age (within two years of corresponding case), and date of any outpatient visit (within two years of diagnosis date for corresponding case). Unipolar depression controls were selected from all health system members receiving first diagnoses of unipolar major depressive disorder (ICD-9CM codes 296.2 or 296.3) during the study period. Three unipolar depression controls were selected for each case, frequency matched by age (within two years of corresponding case), and date of eligibility diagnosis (within two years of diagnosis date for corresponding case).

In order to accurately exclude prior diagnoses and accurately ascertain prior utilization, case and control groups were limited to those continuously enrolled in each health system for at least 12 months prior to the qualifying visit or diagnosis.

Measures of Health Service Utilization

Health system electronic health records, insurance claims, and pharmacy dispensing records were then used to identify all utilization of mental health services, filled prescriptions for psychiatric medications, and all psychiatric diagnoses recorded in the 36 months prior to the initial qualifying diagnosis. In order to exclude utilization directly related to the presenting diagnosis (e.g. emergency department visit leading to hospitalization in which psychotic symptoms were first diagnosed), utilization during the 7 days prior to the initial qualifying diagnosis was excluded.

Data Analysis

Analyses were organized according to the two questions described above. First, descriptive analyses limited to those with first diagnoses of psychotic disorder examined proportions (with 95% confidence limits[30]) of patient using different service types during different time periods prior to date of first diagnosis. Second, analyses compared those with first diagnosis of psychotic disorder to the two control groups. These analyses compared proportions using different service types and visit rates for different service types, both for different time periods prior to date of first diagnosis. Between-group comparisons of proportions included chi-square statistics and odds ratios with 95% confidence limits[30]. Visit rates were compared using negative binomial regression[31], yielding rate ratios estimating proportional differences. Analyses were conducted using SPSS Version 22. Analyses of utilization more than one year prior to diagnosis were limited to those enrolled in the participating health system throughout the relevant time interval. Because cases with first psychotic disorder diagnosis were selected within strata defined by age and site of presentation, sensitivity analyses were weighted by inverse probability of selection within each stratum. Results of weighted analyses were not meaningfully different from simpler unweighted analyses, so unweighted analyses are presented here.

RESULTS

As previously reported [12], the procedures described above identified 624 confirmed cases (of 868 records reviewed) with first diagnosis of psychotic disorder. First-occurring diagnoses of psychotic disorder in this sample included schizophrenia-spectrum psychosis in 105 (17%), mood disorder with psychosis in 78 (12%), and other psychotic disorders in 441 (71%).

Proportions of patients receiving specific services, diagnoses, and medications during the three years prior to first psychotic disorder diagnosis are shown in Table 1. Approximately one-fifth of cases made at least one outpatient specialty mental health visit in the 90 days prior to initial diagnosis of psychotic disorder, and almost 40% used outpatient mental health services in the three years prior. Approximately one sixth had an emergency department visit with a mental health diagnosis in the three months prior to first diagnosis, and approximately one third used emergency department mental health care in the three years prior. When all possible categories of mental health service (inpatient, emergency department, outpatient specialty, and mental health-related visits in primary care) were included, approximately half had some mental health contact in the prior three months and approximately three quarters

had some mental health contact in the prior year. The proportion seen only in general medical settings (i.e. no use of mental health specialty care) was 50% in the 3 months before diagnosis and 62% in the year prior to diagnosis. Among mental health diagnoses, depressive and anxiety disorders were most common. Approximately one in six received a diagnosis of substance use disorder in the prior year. Approximately 40 percent received at least one prescription for a psychiatric medication in the year prior to diagnoses, with antidepressants and benzodiazepines most prevalent. Approximately one in six filled at least one prescription for an antipsychotic medication, although, by definition, none had prior recorded diagnosis of psychotic disorder.

Table 2 displays proportions of patients receiving specific services over various periods prior to first diagnosis, comparing cases to matched control samples selected from the general population of health plan members and from those receiving first diagnoses of unipolar depression. Compared to the matched general population sample, people with first diagnosis of psychotic disorder were much more likely to receive all categories of mental health care, but these differences were less pronounced with increasing time prior to first psychotic disorder diagnosis. The strongest associations were seen for hospitalizations with mental health diagnosis and emergency department visits with mental health diagnosis. Compared to a matched sample of people receiving first diagnoses of unipolar depression, cases were modestly more likely to receive all categories of mental health care. Again, the strongest associations were seen for hospitalizations with mental health diagnosis and emergency department visits with mental health diagnosis. These associations did not appear to vary with length of time prior to diagnosis. The proportion using any outpatient health services (regardless of diagnosis) did not differ between the first psychotic disorder diagnosis cases and depression control group. In logistic models including the four independent categories of utilization simultaneously (inpatient mental health care, emergency department mental health care, specialty mental health visits, and primary care visits with mental health diagnoses), likelihood of utilization in all four categories differed significantly between the psychotic disorder group and either comparison group.

Table 3 displays visit rates for specific outpatient services over various periods prior to first diagnosis, comparing cases to matched control samples selected from the general population of health plan members and from those receiving first diagnoses of unipolar depression. Findings are similar to those described above for categorical analyses. Compared to general population controls, cases had much higher visit rates for all types of outpatient services, but these differences decreased with longer time prior to first diagnosis. Compared to those receiving first depression diagnoses, cases had much higher visit rates for emergency department mental health care and slightly higher rates for other types of outpatient mental health care. These differences appeared stable for up to three years prior to first diagnosis.

DISCUSSION

In this population-based sample of adolescents and young adults receiving first diagnoses of any psychotic disorder, approximately 30 percent had some contact with outpatient specialty mental health services in the prior year and approximately two thirds received some mental health care (including inpatient, emergency department, and primary care encounters with

mental health diagnoses). Rates for all categories of mental health services use, mental health diagnoses, and psychiatric medications in the year prior to first diagnosis of psychosis were markedly higher than background rates in the general population. But this general increase in utilization was not specific to people later diagnosed with psychotic disorder, a similar pattern was seen in those later diagnosed with unipolar depression. The psychotic disorder group was distinguished from the depression group by greater use of acute-care mental health services, including inpatient care or emergency department care for mental health diagnoses.

Findings in Context

Most previous reports regarding pathways to care for first-episode psychosis have included patients entering dedicated specialty care programs [14, 16–18]. Some of those reports have described lower rates of prior contact with outpatient mental health care than seen in this sample. Care pathways may differ between all those who receive a first diagnosis and those who successfully reach specialty care programs. Using methods similar to ours, Anderson and colleagues [13] described service use prior to diagnosis of psychotic disorder in a population-based sample of all people in Montreal aged 14 to 25 with a first diagnosis of psychosis. In that sample, approximately two-thirds had some health care contact for a mental health reason in the four years prior to first diagnosis – a rate similar to that observed in our sample over 12 months.

We should emphasize that our sample of cases probably differs from patients entering comprehensive specialty care programs for first-episode psychosis. Our sample included all patients receiving a first diagnosis of psychotic disorder, including those with prior diagnoses of mood disorder or substance use disorder. Similar to the community sample recently described by Schoenbaum and colleagues [32], most received nonspecific initial diagnoses of Other Psychotic Disorder. Only those with recorded diagnoses of substance-induced psychosis, and those for whom psychotic symptoms were clearly attributed to medical illness or prescribed medication were excluded from our case sample. This attempt to identify all initial presentations, regardless of duration of symptoms, likely identified a significant number of people with self-limited symptoms or symptoms that would resolve with cessation of substance use or treatment for mood disorder.

Nevertheless, we believe findings in this broad sample are relevant to the potential target population for early intervention programs. The RAISE trial found that benefits of comprehensive specialty care were greatest in those with shorter duration of psychotic symptoms prior to trial enrollment [6]. If early intervention efforts aim to engage people at the first evidence of psychotic symptoms, then those efforts will necessarily engage the full range of first presentations, including people with active substance use, people with co-occurring mood symptoms, and people whose symptoms might resolve without specific treatment. More specific diagnosis may be difficult at time of very first presentation. We should not assume, however, that established benefits of early intervention programs for younger people with specific diagnoses of schizophrenia-spectrum psychosis would apply to the wider population of people receiving first-ever diagnosis of psychotic disorder.

Similar to findings of Norgard and colleagues[21], our data show increased use of general medical services extending back several years prior to first diagnosis of psychotic disorder. These long-term increases in utilization were significantly larger for mental health care than for general medical care. However, this broad increase in general medical and mental health utilization is not specific to development of psychotic symptoms.

Comparison of first psychotic disorder diagnosis cases with a comparison group receiving a first diagnosis of unipolar depression showed both similarities and differences. Indicators of more general psychological distress (overall outpatient utilization, use of outpatient mental health care, primary care visits with mental health diagnoses) were common in both groups. These indicators were only moderately more common prior to first diagnosis of psychotic disorder than prior to first diagnosis of depressive disorder. In contrast, use of acute-care mental health services (inpatient and emergency department care) was approximately three times more likely prior to first diagnosis of psychotic disorder compared to the depressive disorder control group. Similarly, prior diagnosis of bipolar disorder was eight times more likely. None of these indicators alone are sufficiently accurate to select patients for prevention or early intervention programs. But combinations of multiple utilization indicators could be used to develop risk prediction models[33].

Limitations

We should emphasize that our methods identified the first diagnoses of psychotic disorder rather than the first occurrence of psychotic symptoms. Chart reviews excluded those with documentation of pre-existing psychotic disorder diagnosis, but did not exclude those who experienced prior psychotic symptoms that were not presented to or disclosed to health care providers. Patients in our sample could have first experienced symptoms of psychosis months, or even years, prior to first clinical presentation. Some of the previous utilization of mental health services seen among cases could have been prompted by psychotic symptoms, even if those symptoms were not disclosed. Prior antipsychotic prescriptions could indicate cases in which treating providers suspected psychotic disorder but were reluctant to initially record a more stigmatizing diagnosis. In such cases, provider education could increase the likelihood of effective early intervention. Alternatively, antipsychotic prescriptions prior to a diagnosis of psychotic disorder could simply reflect treatment for mood disorder. In US adults, the majority of antipsychotic medications are prescribed for treatment of mood disorders[34]. Of cases in this sample using antipsychotic medication prior to diagnosis, 46% received at least one diagnosis of bipolar disorder and an additional 37% received at least one diagnosis of depressive disorder. Additional work in progress will attempt to identify more subtle indicators of psychotic symptoms prior to any explicit clinical presentation.

These findings may not generalize to other health care systems or settings. All patients in these samples (cases and controls) had insurance coverage for both general medical and mental health care. And all received care in systems with established triage and appointing processes to facilitate initial access to outpatient specialty mental health care. Use of outpatient mental health services, rates of psychiatric diagnosis, and rates of treatment with psychiatric medications might all be lower in settings with greater financial or practical barriers to specialty care.

Potential Implications

These findings illustrate the promise and challenge of screening or systematic assessment in primary care or other general medical settings. Over 90% of cases made at least one outpatient visit in the year prior to diagnosis, so an accurate screening program across all health care settings could identify the vast majority of young people who later develop a psychotic disorder. But this rate of overall outpatient utilization was also over 90% prior to diagnosis of depression and 75% in the general population. Consequently, utilization of any outpatient care is certainly not a specific indicator of risk. The relatively low incidence of first psychotic disorder diagnoses, averaging less than one case per primary care practice per year [12, 19, 20], and the absence of a specific signal in primary care both pose challenges for early detection efforts in general medical settings.

In contrast, these findings support the potential utility of systematic assessment for psychosis risk in higher-risk populations receiving specialty mental health care[35, 36]. The strong and specific association between use of acute-care mental health services and subsequent presentation with psychotic symptoms suggests the potential value of assessment for prodromal or early psychotic symptoms in people receiving inpatient or emergency care for mental health concerns. Approximately half of all cases received either acute care mental health services or outpatient specialty mental health services in the year prior to diagnosis. Systematic assessment following emergency department or inpatient mental health care might hasten identification and engagement in appropriate specialty care.

Conclusions

Most people receiving a first diagnosis of psychotic disorder have had some indication of mental health need in the prior year. General use of primary care or mental health services, however, does not clearly distinguish people who later receive a diagnosis of psychotic disorder from those who later receive diagnoses of unipolar depression. Use of acute-care mental health services (inpatient or emergency department care) are more specific indicators of risk.

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Table 1

Services used, diagnoses recorded, and prescriptions filled to first diagnosis of psychotic disorder.

	Prior 3 Months (n=624)		Prior 12 Months (n=624)		Prior 24 Months (n=523)		Prior 36 Months (n=461)	
	Number (%)	95% CI for %	Number (%)	95% CI for %	Number (%)	95% CI for %	Number (%)	95% CI for %
Categories of Service Use								
Hospitalization with MH Diagnosis	23 (4%)	2%–5%	48 (8%)	6% – 10%	56 (11%)	8% – 14%	58 (13%)	10% – 16%
Emerg. Dept. Visit w/MH Diagnosis	87 (14%)	11% – 17%	149 (24%)	21% – 27%	158 (30%)	26% – 34%	153 (33%)	29% – 38%
Specialty MH Outpatient Visit	126 (20%)	17% – 23%	178 (29%)	25% – 32%	174 (33%)	29% – 37%	174 (38%)	33% – 42%
Primary Care Visit w/MH Diagnosis	103 (16%)	14% – 20%	177 (29%)	25% – 32%	181 (35%)	31% – 39%	166 (36%)	32% – 40%
Any of the Above	308 (49%)	45% – 53%	409 (65%)	62% – 69%	378 (72%)	68% – 76%	342 (74%)	70% – 78%
Any Outpatient Visit for any Diagnosis	437 (70%)	66% – 73%	564 (91%)	88% – 92%	511 (98%)	96% – 99%	456 (99%)	97% – 100%
Mental Health/Substance Use Diagnoses								
Depressive Disorder	169 (27%)	24% – 31%	237 (38%)	34% – 42%	228 (44%)	39% – 48%	216 (47%)	42% – 51%
Anxiety Disorder	130 (21%)	18% – 24%	187 (30%)	26% – 34%	179 (34%)	30% – 38%	171 (37%)	33% – 42%
Attention Deficit Disorder	52 (8%)	6% – 11%	77 (12%)	10% – 15%	76 (15%)	12% – 18%	84 (18%)	15% – 22%
Bipolar Disorder	50 (8%)	6% – 10%	65 (11%)	8% – 13%	61 (12%)	9% – 15%	54 (12%)	9% – 15%
Substance Use Disorder	57 (9%)	7% – 12%	105 (17%)	14% – 20%	108 (21%)	17% – 24%	114 (25%)	21% – 29%
Any Mental Health/Subst. Use Diagnosis	280 (45%)	41% – 49%	372 (60%)	56% – 63%	343 (66%)	61% – 70%	319 (69%)	65% – 73%
Prescriptions for Psychiatric Medications								
Antidepressant	151 (24%)	21% – 28%	199 (32%)	28% – 35%	195 (37%)	33% – 41%	187 (41%)	36% – 45%
Stimulant	28 (4%)	3% – 6%	41 (7%)	5% – 9%	46 (9%)	7% – 12%	53 (12%)	9% – 15%
Benzodiazepine	64 (10%)	8% – 13%	91 (15%)	12% – 18%	102 (20%)	16% – 23%	93 (20%)	17% – 24%
Antipsychotic	173 (12%)	24% – 31%	99 (16%)	13% – 19%	94 (18%)	15% – 21%	92 (20%)	17% – 24%
Any Psychiatric Medication	206 (33%)	29% – 37%	261 (42%)	38% – 46%	253 (48%)	44% – 53%	242 (53%)	48% – 57%

Table 2

Proportions of patients using specific service types prior to first diagnosis of psychotic disorder compared to matched controls selected from all health plan members and from those receiving first diagnoses of unipolar depression.

	Psychotic Disorder	**General Population**	**Psychotic Disorder vs. Gen. Population**		**Unipolar Depression**	**Psychotic Disorder vs. Depression**	
3 Months Prior to Diagnosis	n=624	n=1851	Odds Ratio	95% CI	n=1862	Odds Ratio	(95% CI)
Hospitalization with MH Diagnosis	23 (4%)	1 (<1%)	70.8	9.5 – 525	22 (1%)	3.20	1.77 – 5.78
Emerg. Dept. w/MH Diagnosis	87 (14%)	7 (<1%)	42.7	19.6 – 92.7	99 (5%)	2.89	2.13 – 3.91
Specialty MH Outpatient Visit	126 (20%)	25 (1%)	18.5	11.9 – 28.7	217 (12%)	1.92	1.51 – 2.44
Prim. Care Visit w/MH Diagnosis	103 (16%)	24 (1%)	15.1	9.6 – 23.7	212 (11%)	1.54	1.19 – 1.99
Any of the Above	308 (49%)	71 (4%)	24.4	18.4 – 32.5	618 (33%)	1.96	1.63 – 2.36
Any Outpatient Visit for any Diag.	437 (70%)	463 (25%)	7.01	5.37 – 8.56	1198 (64%)	1.29	1.07 – 1.58
12 Months Prior to Diagnosis	n=624	n=1851			n=1862		
Hospitalization with MH Diagnosis	48 (8%)	9 (1%)	17.1	8.4 – 35.1	51 (3%)	2.91	1.97 – 4.43
Emerg. Dept. w/MH Diagnosis	149 (24%)	34 (2%)	16.8	11.5 – 24.8	175 (9%)	3.02	2.37 – 3.84
Specialty MH Outpatient Visit	178 (29%)	57 (3%)	12.6	9.2 – 17.3	310 (17%)	2.00	1.61 – 2.47
Prim. Care Visit w/MH Diagnosis	177 (29%)	109 (6%)	6.36	4.90 – 8.25	383 (21%)	1.53	1.24 – 1.88
Any of the Above	409 (66%)	253 (14%)	12.1	9.8 – 15.0	1269 (49%)	2.18	1.82 – 2.57
Any Outpatient Visit for any Diag.	564 (91%)	1355 (73%)	3.57	2.67 – 4.76	1685 (91%)	0.97	0.71 – 1.33
24 Months Prior to Diagnosis	n=523	n=1471			n=1493		
Hospitalization with MH Diagnosis	56 (11%)	15 (1%)	11.6	6.5 – 20.8	54 (4%)	3.19	2.17 – 4.71
Emerg. Dept. w/MH Diagnosis	158 (30%)	50 (3%)	12.3	8.8 – 17.3	179 (12%)	3.18	2.49 – 4.05
Specialty MH Outpatient Visit	174 (33%)	90 (16%)	7.65	5.78 – 10.1	348 (23%)	1.64	1.32 – 2.04
Prim. Care Visit w/MH Diagnosis	181 (35%)	131 (9%)	5.41	4.20 – 6.98	374 (25%)	1.58	1.28 – 1.96
Any of the Above	378 (72%)	306 (21%)	9.93	7.89 – 12.5	917 (50%)	1.96	1.62 – 2.37
Any Outpatient Visit for any Diag.	511 (98%)	1341 (91%)	4.13	2.27 – 7.52	1451 (97%)	1.23	0.64 – 2.36
36 Months Prior to Diagnosis	n=461	n=1316			n=1318		
Hospitalization with MH Diagnosis	58 (13%)	18 (1%)	10.4	6.0 – 17.8	53 (4%)	3.43	2.33 – 5.07
Emerg. Dept. w/MH Diagnosis	153 (33%)	60 (5%)	10.4	7.5 – 14.4	166 (13%)	3.45	2.68 – 4.44
Specialty MH Outpatient Visit	174 (38%)	103 (8%)	7.14	5.40 – 9.40	335 (25%)	1.78	1.42 – 2.23
Prim. Care Visit w/MH Diagnosis	166 (36%)	138 (11%)	4.80	3.71 – 6.23	335 (25%)	1.78	1.42 – 2.23

	Psychotic Disorder	General Population	Psychotic Disorder vs. Gen. Population		Unipolar Depression	Psychotic Disorder vs. Depression	
Any of the Above	342 (74%)	326 (25%)	8.73	6.84 – 11.1	800 (61%)	1.86	1.47 – 2.36
Any Outpatient Visit for any Diag.	456 (99%)	1257 (96%)	4.28	1.71 – 10.7	1297 (98%)	1.48	0.55 – 3.94

Table 3

Visit rates for different service types prior to first clinical diagnosis of psychotic disorder compared to visit rates for matched controls selected from all health plan members and from those receiving first diagnoses of unipolar depression.

	Psychotic Disorder		General Population		Psychotic Disorder vs. Gen. Population		Unipolar Depression		Psychotic Disorder vs. Depression Rate Ratio (95% CI)	
3 Months Prior to Diagnosis	**Mean**	**St Dev**	**Mean**	**St Dev**	**Rate Ratio**	**95% CI**	**Mean**	**St Dev**	**Rate Ratio**	**95% CI**
3 Months Prior to Diagnosis	n=624		n=1851				n=1862			
Emerg. Dept. w/MH Diagnosis	0.24	0.89	0.004	0.07	54.6	26.6 – 112	0.07	0.32	3.49	2.69 – 4.48
Specialty MH Outpatient Visit	0.77	2.48	0.05	0.58	16.6	12.9 – 21.3	0.40	1.86	1.93	1.67 – 2.23
Prim. Care Visit w/MH Diagnosis	0.21	0.55	0.01	0.13	14.4	9.39 – 22.0	0.16	0.56	1.30	1.04 – 1.63
Any of the Above	2.13	4.44	0.10	0.78	20.5	17.1 – 24.5	0.99	2.62	2.14	1.92 – 2.41
Any Outpatient Visit for any Diag.	3.70	5.75	0.70	1.82	5.26	4.71 – 5.93	2.50	5.04	1.48	1.34 – 1.63
12 Months Prior to Diagnosis	n=624		n=1851				n=1862			
Emerg. Dept. w/MH Diagnosis	0.47	1.27	0.02	0.18	20.3	14.6 – 28.5	0.13	0.44	3.74	3.39 – 4.53
Specialty MH Outpatient Visit	1.82	5.00	0.14	1.34	12.8	10.9 – 15.0	0.94	4.03	1.95	1.73 – 2.18
Prim. Care Visit w/MH Diagnosis	0.54	1.18	0.08	0.40	6.42	5.21 – 7.92	0.37	1.05	1.45	1.23 – 1.70
Any of the Above	5.24	10.37	0.46	2.16	11.4	10.1 – 12.8	2.27	5.76	2.32	2.08 – 2.56
Any Outpatient Visit for any Diag.	10.9	15.5	3.75	5.62	2.89	2.64 – 3.19	7.60	10.2	1.43	1.30 – 1.57
24 Months Prior to Diagnosis	n=523		n=1471				n=1493			
Emerg. Dept. w/MH Diagnosis	0.68	1.76	0.05	0.28	14.7	11.1 – 19.5	0.18	0.57	3.90	3.22 – 4.66
Specialty MH Outpatient Visit	2.62	7.02	0.37	3.19	7.03	6.05 – 8.08	1.73	8.20	1.51	1.34 – 1.70
Prim. Care Visit w/MH Diagnosis	0.83	1.77	0.17	0.85	4.95	4.14 – 5.99	0.51	1.31	1.63	1.35 – 1.90
Any of the Above	7.85	16.0	1.10	5.86	7.17	6.36 – 8.00	3.78	10.8	2.08	1.86 – 2.32
Any Outpatient Visit for any Diag.	18.3	24.4	8.13	12.9	2.25	2.03 – 2.48	13.4	16.2	1.36	1.23 – 1.51
36 Months Prior to Diagnosis	n=461		n=1316				n=1318			
Emerg. Dept. w/MH Diagnosis	0.77	1.98	0.08	0.33	12.1	9.30 – 15.6	0.20	0.65	3.86	3.19 – 4.66
Specialty MH Outpatient Visit	3.46	8.84	0.46	3.51	7.54	6.62 – 8.76	2.15	9.80	1.62	1.42 – 1.80
Prim. Care Visit w/MH Diagnosis	0.97	2.08	0.20	0.92	4.85	4.06 – 5.87	0.58	1.47	1.65	1.40 – 1.93
Any of the Above	9.94	21.4	1.38	6.48	7.18	6.36 – 8.08	4.60	12.8	2.16	1.92 – 2.41
Any Outpatient Visit for any Diag.	23.8	31.7	11.2	15.4	2.14	1.92 – 2.39	17.4	9.9	1.36	1.22 – 1.52