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Clinical Setting and Management Approach Matters: Metabolic Testing Rates in Antipsychotic-Treated Youth and Adults

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Abstract

Background—Guidelines recommend increased metabolic monitoring in antipsychotic-treated patients. State and federal agencies are striving to address under-screening.

Methods—Rates of glucose and lipid testing among antipsychotic-treated youth and adults in Missouri Medicaid (N=9,473) in Community Mental Health Centers (CMHCs), with and without case management, versus other care settings were evaluated. Multivariable logistic regressions determined which characteristics were independently associated with metabolic testing.

Results—Rates of glucose and lipid testing were 37.0% and 17.3% in youth and 68.7% and 34.9% in adults, respectively. Adjusted odds of glucose and lipid testing were higher in patients receiving care in a CMHC with case management [youth: AOR=1.68 (95% CI=1.37-2.04), 2.40(1.91-3.02); adults: 1.43(1.18-1.74), 1.97(1.64-2.36)], or without [youth: 1.89(1.61-2.22), 2.35(1.94-2.85); adults: 1.44(1.22-1.70), 1.48(1.27-1.74)] versus other settings.

Conclusions—Within Missouri Medicaid, receiving care at a CMHC was associated with higher rates of metabolic testing, possibly reflecting state efforts to promote health homes in these settings.

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Disclosures

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Introduction

Cardiovascular disease is one of the leading causes of mortality in persons with severe mental illnesses [1,2]. Those receiving second-generation antipsychotics (referred to as antipsychotics from here on) are at greater risk for the development of obesity, leading to elevated cardiometabolic risk in general [3]. Concurrent with the 2004 FDA warning about hyperglycemia and metabolic dysregulation related to antipsychotic treatment, recommendations for increased metabolic monitoring were jointly developed by the American Diabetes Association (ADA) Consensus Development Conference in 2004 [4]. However, metabolic testing did not significantly increase after the warning [5] with the lowest rates of monitoring found in youth under the age of 18 [6].

In the state of Missouri (MO), following the FDA warning and consensus guideline development, the Department of Mental Health (DMH) and MO HealthNet (Medicaid) made efforts to improve the quality of medical care for individuals with mental illness. These included a multisite educational intervention to improve glucose monitoring rates, [7] CME events targeting physicians [8] and Community Mental Health Center (CMHC) administrators [9] on how to implement best practice screening and monitoring procedures, a pilot initiative to enroll patients with psychiatric and comorbid medical diagnoses into an enhanced care coordination program, [10] and providing hand-held devices to CMHCs allowing for fingerstick testing of lipids, glucose and glycated hemoglobin (Hgb A1c). Finally, MO Medicaid instituted a registry to track metabolic screening and monitoring rates within the CMHC setting [11].

Although several studies have evaluated testing rates in Medicaid populations, there has been little to no study of what impact, if any, care setting contributes to testing practices. In the state of Missouri, Federally Qualified Health Care Homes offer co-located behavioral health and primary care, which may occur within a CMHC setting. In such settings, increased care coordination and advocacy for adopting new best practices is enhanced.[12] Given the state's focus on improving metabolic testing in community clinics for persons with mental illness, we hypothesized that receipt of medical care within a CMHC would enhance the odds of metabolic testing in general.

Methods

This naturalistic retrospective cohort study evaluated individuals enrolled in the fee-for-service Medicaid program in the state of Missouri from August 2008 to April 2011. Administrative healthcare claims data were obtained for individuals receiving an oral antipsychotic during this time frame (N=110,406). All medical and pharmacy claims during the study period were identified using a single unique identifier for each participant. The Colorado Multiple Institution Review Board and Washington University Institutional Review Board approved this study.

A new user cohort (n=20,982) was identified as patients who filled their first oral antipsychotic claim from August 2009 thru April 2010 (index prescription). New use was defined as not having received oral antipsychotic medication in the year before the index

prescription. Antipsychotics included were: aripiprazole, asenapine, clozapine, iloperidone, lurasidone, olanzapine, paliperidone, quetiapine, risperidone and ziprasidone. Patients were excluded if they were not Medicaid eligible for 12 months before and after their index prescription (n=5281) or were Medicare dual-eligible (n=6226). Patients were divided into two cohorts for analysis based on their age at the time of the index prescription: youth (ages 0-18 years, n=4271) and adult (ages 19 and up, n=5202).

Metabolic testing was defined as any Current Procedural Terminology, 4th revision (CPT) code or International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code for any glucose or lipid test, including non-fasting tests (see **Supplement** for coding details), in the 11-months following the month of index prescription (31 days to 365 days from baseline).

The primary independent variable of interest was having received any care at a CMHC during the study period, defined by claims data indicating location of provider. To evaluate whether type of care (case management or not) or setting of care (CMHC or not) impacted testing rates, we created a three-level "Care Environment" variable. There was no requirement of follow-up medical care for inclusion in the analysis. Known demographic variables included age, sex and race. Medical comorbidity, health care utilization, and medication use were ascertained from the medical and pharmacy claims data for the 12-months preceding the index prescription. Days supplied were calculated for each patient using all oral SGA prescriptions. See **Supplement** for coding definitions.

Descriptive statistics were computed for each cohort overall as well as for patients with a glucose test and patients with a lipid test. Multivariable logistic regression was used to determine which characteristics were independently associated with metabolic testing. Variables with sparse distributions or those highly correlated with key variables were not entered into the model. Testing rates were adjusted for care environment, sex, age, race, cardiovascular disease risk condition (including diabetes, dyslipidemia, hypertension or heart disease for adults, and hypertension and heart disease only for youth as the proportion of youth with diabetes or dyslipidemia was <2%), psychiatric diagnoses, concurrent psychotropic drug use, length of antipsychotic treatment (< 120 days, 120-239 days and ≥ 240 days) and health care utilization, as previously described. [12] Analyses were run with and without individuals who did not have a claim with a primary psychiatric diagnosis during the study period (151 youth or 4% of the total youth population, and 299 adults or 6% of the total adult population).

Results

Table 1 summarizes the characteristics of the study cohort and reports glucose and lipid testing by age (youth and adults) and care environment. The overall sample was 45% youth; CMHC users made up 36.0% of the youth sample and 36.4% of the adult sample. Testing rates were lower in youth than in adults. Youth and adults who received care within a CMHC setting were more likely to receive glucose and lipid testing; case management did not appear to impact testing rates, with the exception of lipid testing for adults which was eight percent higher among those with case management. These results did not notably

change when individuals without a primary psychiatric diagnosis were removed from the analysis.

Because the composition of the patient population may differ in the CMHC versus non-CMHC settings, we adjusted for differences in patient demographics, clinical conditions and overall healthcare utilization. After this adjustment, the odds of youth with case management in addition to care at a CMHC (relative to youth with no case management and no care at a CMHC) receiving a glucose or lipid test were 1.68 (CI=1.37-2.04) and 2.40 (1.91-3.02); the odds of glucose and lipid testing for youth treated in a CMHC setting without case management were 1.89 (1.61-2.22) and 2.35 (1.94-2.85), respectively. The adjusted odds for an adult with case management and care in a CMHC setting, relative to an adult with no case management and no care at a CMHC, receiving a glucose test was 1.43 (1.18-1.74) and for lipid testing was 1.97 (1.64-2.36). The odds of glucose and lipid testing for adults treated in a CMHC setting without case management (relative to adults with no case management and no care at a CMHC) were 1.44 (1.22-1.70) and 1.48 (1.27-1.74), respectively.

Among both youth and adults, the odds of glucose and lipid testing increased with increasing age, though not always statistically significantly. The odds of testing also increased with increasing length of antipsychotic treatment.

Conclusions

We found that receiving care in a CMHC setting was associated with increased odds of metabolic testing in both youth and adults. There is good news overall, too, in that rates of testing were higher than those reported for an earlier time period. [513] Nonetheless, it is important to note that significant under-testing remains, particularly among youth, despite a decade since the first drug warnings and consensus recommendations were published. These results should be interpreted with caution. Specifically, adjustment for care setting and type of care received cannot fully eliminate the bias that individuals may be more likely to participate in follow up appointments and testing when they receive care in a CMHC setting. To fully address the question of whether care setting and type of care impacts testing rates, further randomized controlled study is necessary.

The increased odds of metabolic testing observed within the CMHC setting suggest an increased awareness for the need to test, which may be associated with greater organizational emphasis placed on screening by the Missouri Department of Mental Health and state Medicaid. In 2012 (after the study period), the state implemented a “Health Homes” initiative for Missourians who are Medicaid eligible participants with chronic diseases, including mental illness. Care managers use data analytic tracking to find and address care gaps, such as in metabolic testing. Preliminary data (unpublished state quality improvement data) suggest improvements in not only testing rates, but also in improved clinical indicators and laboratory values; outcomes related to these specific initiatives are the subject of further investigation.

These results are subject to limitations. We defined follow-up testing as being performed within the 11 months following the initiation month of antipsychotic treatment. This could have included testing done for reasons other than for antipsychotic treatment screening. Increased testing rates for glucose in particular could have been affected by the recommendation to use hgb A1c as a diabetes-screening tool during the period of study. Since fasting was not a requirement for inclusion in the present study, it must be noted that these rates do not reflect diabetes screening, which warrants further specific study. Medicaid claims data can miss testing done as part of contracted bundled services, as well as finger-stick testing done by handheld devices in the office setting; additionally human error can result in missed results. Finally, the cohort studied was limited to individuals with 12 months of Medicaid eligibility before and after their index antipsychotic prescription, and individuals with dual Medicaid and Medicare eligibility were excluded from analysis, which could limit the generalizability of results.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. Colton CW, Manderscheid RW. Congruencies in increased mortality rates, years of potential life lost, and causes of death among public mental health clients in eight states. Prev Chronic Dis. Apr. 2006 3(2):A42. [PubMed: 16539783]
2. Druss BG, Zhao L, Von Esenwein S, Morrato EH, Marcus SC. Understanding excess mortality in persons with mental illness: 17-year follow up of a nationally representative US survey. Medical care. Jun; 2011 49(6):599–604. [PubMed: 21577183]
3. Newcomer JW, Haupt D, Flavin KS, et al. Atypical antipsychotic treatment effects on metabolic outcome. Schizophr Bull. Apr.2005 31(2):566. 2005.
4. Consensus development conference on antipsychotic drugs and obesity and diabetes. Diabetes Care. Feb; 2004 27(2):596–601. [PubMed: 14747245]
5. Morrato EH, Druss B, Hartung DM, et al. Metabolic testing rates in 3 state Medicaid programs after FDA warnings and ADA/APA recommendations for second-generation antipsychotic drugs. Arch Gen Psych. 2010; 67(1):17–24.
6. Haupt DW, Rosenblatt LC, Kim E, Baker RA, Whitehead R, Newcomer JW. Prevalence and predictors of lipid and glucose monitoring in commercially insured patients treated with second-generation antipsychotic agents. Am J Psychiatry. Mar; 2009 166(3):345–353. [PubMed: 19147694]

7. Nicol GE, Morrato EH, Johnson MC, et al. Best practices: implementation of a glucose screening program based on diffusion of innovation theory methods. Psychiatric services. Jan; 2011 62(1):12–14. [PubMed: 21209293]

8. Parks, J.; Nicol, G.; Newcomer, J. Improving Metabolic Screening for Patients on Antipsychotic Therapy (Medscape CME Activity). 2011. http://www.medscape.org/viewarticle/751957http://www.medscape.org/viewarticle/751957

9. Parks, J.; Nicol, G.; Newcomer, J. Clinic Management and Leadership to Improve Treatment With Antipsychotics (Medscape CME Activity). 2011. http://www.medscape.org/viewarticle/751859http://www.medscape.org/viewarticle/751859

10. Missouri Department of Mental Health. Disease Management 3700. http://dmh.mo.gov/mentalillness/provider/dm3700.htmhttp://dmh.mo.gov/mentalillness/provider/dm3700.htm

11. Missouri Department of Social Services. CyberAccess, Electronic Health Record Program for MO HealthNet. http://dss.mo.gov/mhd/cs/medprecert/pages/cyberaccess.htmhttp://dss.mo.gov/mhd/cs/medprecert/pages/cyberaccess.htm

12. Morrato EH, Druss BG, Hartung DM, et al. Small area variation and geographic and patient-specific determinants of metabolic testing in antipsychotic users. Pharmacoepidemiol Drug Saf. Jan; 2011 20(1):66–75. [PubMed: 21182154]

13. Morrato EH, Nicol GE, Maahs D, et al. Metabolic screening in children receiving antipsychotic drug treatment. Archives of pediatrics & adolescent medicine. Apr; 2010 164(4):344–351. [PubMed: 20368487]

Table 1

Glucose and lipid testing rates, days 31 to 365 post Index, and adjusted odds of testing

			Glucose Test		Lipid Test		Glucose Test		Lipid Test	
	N	**Column-%**	**N**	**Row-%**	**N**	**Row-%**	**AOR**	**95% CI**	**AOR**	**95% CI**
Youth	4271	100.0	1582	37.0	741	17.3				
Care Environment[a]										
CMHC plus Case Management	578	13.5	270	46.7	165	28.5	1.68	1.37-2.04	2.40	1.91-3.02
CMHC Only	961	22.5	472	49.1	260	27.1	1.89	1.61-2.22	2.35	1.94-2.85
Neither	2,732	64.0	840	30.7	316	11.6	Reference		Reference	
Female	1,665	39.0	713	42.8	306	18.4	1.33	1.15-1.52	1.13	.94-1.34
Age at Index										
<6	497	11.6	153	30.8	63	12.7	Reference		Reference	
6-12	1,758	41.2	560	31.9	315	17.9	1.04	.83-1.31	1.35	.99-1.84
13-18	2,016	47.2	869	43.1	363	18.0	1.80	1.42-2.28	1.58	1.15-2.19
Race										
White	3,263	76.4	1,260	38.6	557	17.1	1.19	1.01-1.40	.78	.64-.95
Other/Unknown	1,008	23.6	322	31.9	184	18.3	Reference		Reference	
Mental health diagnoses[b]										
0	442	10.3	123	27.8	47	10.6	Reference		Reference	
1	1,154	27.0	377	32.7	152	13.2	.99	.76-1.27	.94	.66-1.36
2	1,146	26.8	434	37.9	194	16.9	1.00	.77-1.29	1.04	.73-1.51
3 or more	1,529	35.8	648	42.4	348	22.8	0.88	.67-1.15	1.21	.84-1.76
Diabetes	83	1.9	54	65.1	28	33.7	NA		NA	
Dyslipidemia	31	0.7	20	64.5	13	41.9	NA		NA	
Hypertension	661	15.5	258	39.0	127	19.2	1.08	.90-1.30	1.07	.85-1.34
Heart disease	369	8.6	182	49.3	74	20.1	1.34	1.06-1.70	1.14	.85-1.53
Antipsychotic Days Supplied										
< 120 days	1648	38.6	450	27.3	126	7.6	Reference		Reference	
120-239 days	943	22.1	366	38.8	169	17.9	1.78	1.49-2.13	2.60	2.02-3.35
240 or more days	1680	39.3	766	45.6	446	26.5	2.55	2.18-3.00	4.28	3.44-5.37

			Glucose Test		Lipid Test		Glucose Test		Lipid Test	
	N	**Column-%**	**N**	**Row-%**	**N**	**Row-%**	**AOR**	**95% CI**	**AOR**	**95% CI**
Emergency department claims										
0	2,020	47.3	683	33.8	356	17.6	Reference		Reference	
1-3	1,216	28.5	454	37.3	213	17.5	1.11	.95-1.30	1.01	.83-1.23
4 or more	1,035	24.2	445	43.0	172	16.6	1.18	.99-1.40	.88	.70-1.09
Outpatient claims										
0	994	23.3	305	30.7	160	16.1	Reference		Reference	
1-3	1,641	38.4	575	35.0	284	17.3	1.16	.97-1.39	1.06	.85-1.34
4 or more	1,636	38.3	702	42.9	297	18.2	1.52	1.27-1.83	1.12	.88-1.41
Inpatient claim	1,230	28.8	585	47.6	283	23.0	1.63	1.39-1.92	1.29	1.05-1.57
Antidepressant claim	1,283	30.0	552	43.0	267	20.8	1.01	.86-1.17	1.11	.91-1.34
Mood stabilizer claim	629	14.7	317	50.4	142	22.6	1.50	1.24-1.80	1.15	.92-1.44
Benzodiazepine claim	168	3.9	78	46.4	20	11.9	NA		NA	
Psychotropic claim	65	1.5	32	49.2	12	18.5	NA		NA	
Adults	5202	100.0	3572	68.7	1817	34.9				
Care Environment[a]										
CMHC plus Case Management	781	15.0	592	75.8	377	48.3	1.43	1.18-1.74	1.97	1.64-2.36
CMHC Only	1,113	21.4	832	74.8	444	39.9	1.44	1.22-1.70	1.48	1.27-1.74
Neither	3,308	63.6	2,148	64.9	996	30.1	Reference		Reference	
Female	3,758	72.2	2,568	68.3	1,262	33.6	1.09	.93-1.26	.98	.84-1.13
Age at Index										
19-29	1,772	34.1	1,046	59.0	337	19.0	Reference		Reference	
30-39	1,378	26.5	887	64.4	456	33.1	1.06	.91-1.25	1.59	1.33-1.90
40-49	1,164	22.4	911	78.3	555	47.7	1.69	1.40-2.05	2.09	1.73-2.53
50 and older	888	17.1	728	82.0	469	52.8	1.85	1.46-2.34	2.11	1.70-2.61
Race										
White	4,103	78.9	2,827	68.9	1,393	34.0	1.09	.93-1.29	0.85	.73-1.00
Other/Unknown	1,099	21.1	745	67.8	424	38.6	Reference		Reference	
Mental health diagnoses[b]										
0	486	9.3	281	57.8	120	24.7	Reference		Reference	

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			Glucose Test		Lipid Test		Glucose Test		Lipid Test	
	N	Column-%	N	Row-%	N	Row-%	AOR	95% CI	AOR	95% CI
1	1,220	23.5	800	65.6	423	34.7	1.05	.83-1.33	1.21	.93-1.58
2	1,570	30.2	1,058	67.4	561	35.7	.99	.78-1.25	1.23	.95-1.61
3 or more	1,926	37.0	1,433	74.4	713	37.0	1.17	.91-1.50	1.27	.97-1.66
Diabetes	1,001	19.2	840	83.9	551	55.0	1.51	1.23-1.85	1.42	1.20-1.68
Dyslipidemia	1,285	24.7	1,064	82.8	786	61.2	1.41	1.17-1.71	2.58	2.20-3.02
Hypertension	2,192	42.1	1,736	79.2	1,060	48.4	1.30	1.12-1.52	1.44	1.24-1.67
Heart disease	1,867	35.9	1,474	79.0	795	42.6	1.25	1.07-1.47	1.06	.91-1.24
Antipsychotic Days Supplied										
< 120 days	2,639	50.7	1,598	60.6	679	25.7	Reference		Reference	
120-239 days	1,081	20.8	772	71.4	397	36.7	1.56	1.33-1.84	1.56	1.32-1.84
240 or more days	1,482	28.5	1,202	81.1	741	50.0	2.52	2.15-2.97	2.44	2.11-2.83
Emergency department claims										
0	1,434	27.6	927	64.6	539	37.6	Reference		Reference	
1-4	1,483	28.5	939	63.3	465	31.4	.97	.83-1.15	.85	.71-1.01
5-9	1,076	20.7	755	70.2	380	35.3	1.26	1.04-1.52	1.01	.83-1.22
10 or more	1,209	23.2	951	78.7	433	35.8	1.68	1.36-2.07	.96	.78-1.18
Outpatient encounter										
0	831	16.0	466	56.1	227	27.3	Reference		Reference	
1-4	1,754	33.7	1,126	64.2	535	30.5	1.30	1.09-1.56	1.09	.89-1.33
5-9	1,312	25.2	945	72.0	500	38.1	1.66	1.35-2.04	1.35	1.09-1.68
10 or more	1,305	25.1	1035	79.3	555	42.5	1.89	1.51-2.38	1.31	1.04-1.65
Inpatient claims										
0	3,147	60.5	2,059	65.4	1,100	35.0	Reference		Reference	
1	1,233	23.7	863	70.0	411	33.3	1.11	.95-1.30	.92	.78-1.09
2 or more	822	15.8	650	79.1	306	37.2	1.26	1.02-1.57	.80	.65-0.98
Antidepressant claim	3,627	69.7	2,595	71.5	1,364	37.6	1.01	.87-1.18	.98	.83-1.14
Mood stabilizer claim	1,187	22.8	873	73.5	467	39.3	1.17	1.00-1.37	1.12	.96-1.31
Benzodiazepine claim	2,498	48.0	1,792	71.7	917	36.7	.81	.70-0.94	.80	.69-.92
Psychotropic claim	546	10.5	405	74.2	225	41.2	.96	.77-1.20	1.03	.84-1.27

CMHC = Community Mental Health Center; AOR = Adjusted Odds Ratio; CL = Confidence Interval; NA = Not Applicable, variable distribution is too sparse to be included in multivariable model.

[a] Definitions for Case Management can be found in the Supplement.

[b] Number of unique mental health categories defined by the Clinical Classifications Software can be found in the Supplement.