

Impact Of The 2015 CMS Inpatient Psychiatric Facility Quality Reporting (IPFQR) Rule On  
Tobacco Treatment

By

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Submitted to the graduate degree program in Clinical Research and the Graduate Faculty of the  
University of Kansas in partial fulfillment of the requirements for the degree of Master of  
Science.

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Date approved: 5/10/2016

## Abstract

**Objective:** In its fiscal year (FY) 2015 final rule, the Centers for Medicare & Medicaid (CMS) required reporting of tobacco treatment quality measures as part of the Inpatient Psychiatric Facilities Prospective Payment System (IPF PPS). This study evaluates the impact of that policy at a large academic medical center that opted to improve performance as it implemented reporting measures.

**Methods:** Electronic medical record data were collected retrospectively for all inpatient psychiatric admissions one year prior to and following implementation of the rule (Jan 1<sup>st</sup> 2014 to December 31<sup>st</sup> 2015). Data from admissions (2014=292; 2015=338) were analyzed to determine changes in the provision of tobacco treatment including the proportions of patients screened for tobacco use, receiving tobacco cessation counseling, and receiving tobacco cessation medication(s).

**Results:** Compared to the year before the CMS rule, screening for admissions increased significantly (85% vs 97%;  $p < .001$ ). Even greater pre-post rule increases were found for referral to cessation counseling (4.3% vs. 73.8%;  $p < .001$ ), receipt of counseling (7.8% vs. 67.1%;  $p < .001$ ) and referral for cessation medication (32% vs. 68.4%;  $p < .001$ ). Even though statistically non-significant, the number of tobacco users who actually received medications increased markedly between 2014 and 2015 (24.3% vs. 34.9%;  $p = 0.064$ ). Gains in screening, referral, and treatment did not differ by psychiatric diagnosis.

**Conclusions:** The IPFQR Program resulted in dramatic changes in tobacco-related screening, documentation, and cessation treatment for psychiatric inpatients. Should CMS link prospective payment to performance, it could have a major impact on quality of care for tobacco dependence.

## Acknowledgments

I would like to thank my mentor Dr. Kimber Richter for her guidance and support of my thesis project. Working with Dr. Richter has been an amazing experience and I feel extremely fortunate to have worked with such a gifted and dedicated researcher.

I would also like to thank my thesis committee for all of their assistance over the past year. I would like to thank all those associated with Frontiers: The Heartland Institute for Clinical and Translational Research, especially Dr. Richard Barohn and Dr. Lauren Aaronson. I would like to thank everyone in the Department of Preventive Medicine and Public Health in particular Dr. Ed Ellerbeck and Dr. Won Choi for their leadership. I would also like to thank Beth Kerling for her support of the MS-CR program and students, as well as Dr. Dianne Durham for her support and insights over the last year. I would like everyone in the Organizational Improvement Office especially Eric Howser for his technical support. I would like to thank Melinda Laxson and the UkanQuit team for their dedication and tireless efforts to provide and continually improve tobacco treatment for our patients with mental illness.

Finally, I would like to thank my lovely wife Lindsey, son Oliver, my parents and siblings for their continued support, inspiration and love.

This work was supported by a CTSA grant from NCATS awarded to the University of Kansas Medical Center for Frontiers: The Heartland Institute for Clinical and Translational Research #TL1TR000120. The contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH or NCATS.

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## Introduction

Tobacco use continues to be one of the leading causes of preventable death in the United States with an estimated 480,000 annual deaths attributable to smoking.(1) Overall, patients with mental illness account for 44.3% of the annual tobacco-consumption in the U.S. (2) As a result, nearly half of the annual deaths attributable to smoking occur in patients with mental illness (3) and life expectancy for patients receiving public mental health treatment is 25 years below that of the general population, with heart disease as the leading cause of death.(4) An estimated \$168 billion dollars are spent annually in direct care for smoking-related illnesses, half of which is paid through Medicare and Medicaid (5), which are the principle sources of health care coverage for people with severe mental illness (SMI) (6, 7)

The prevalence of smoking in the United States continues to decrease annually—in 2014 the estimated prevalence rate was 16.8% compared to 20.9% in 2005. (8) This is in part due to increasing rates of cessation, however, among patients with mental illness prevalence rates have remained stagnant.(9, 10) Compared to the general population, patients with mental illness have 2.7 times the odds of smoking, up to 5.3 times in patients with schizophrenia.(2, 11) Smoking rates differ between psychiatric diagnoses and can vary from 34.9% for patients with anxiety disorders to 59.1% for patients with schizophrenia, and upwards of 71-92% in patients with substance abuse disorders.(12-15) Despite the high prevalence of tobacco use among people with SMI, the high rates of morbidity and mortality, and the high health care costs for treating tobacco-related illnesses, tobacco use remains ignored or even encouraged in mental health settings. (16)

Tobacco use interferes with the clinical management of psychiatric illness. Polycyclic aromatic hydrocarbons found in cigarette smoke alter the pharmacokinetics of psychotropic



medications via induction of cytochrome P450 enzymes, reducing plasma concentrations of tricyclic anti-depressants and antipsychotics. (17-19) Patients' tobacco use is typically poorly addressed during psychiatric inpatient care.(20, 21) However, patients who receive tobacco treatment during psychiatric hospitalization have been shown to have a lower likelihood of being discharged against medical advice and have a lower likelihood for rehospitalization when treatment is continued post discharge. (20, 22)

The history of tobacco use in patients with mental illness is complicated by a myriad of stakeholders. Tobacco marketing efforts routinely targeted homeless populations and patients with mental illness through discounted promotions, cigarette donations to hospitals and shelters, as well as financial grants to organizations that served these populations. (23) The tobacco industry was also complicit in subverting efforts of researchers and health organizations to warn the public about the effects of tobacco use.(24-27) The tobacco industry also rallied allies to oppose the introduction of tobacco-use disorder as a diagnosis in the Diagnostic Statistical Manual (DSM-III). (28) This was the first time that nicotine dependence was classified as a medical condition, changing the paradigm of smoking and smoking cessation from being viewed solely as an issue of self-will.

State and local ordinances combined with healthcare policy changes, have changed the smoking culture in the U.S. Cigarette use has been all but removed from public spaces with only Southern states still lacking in comprehensive indoor smoking bans.(29) A 2006 study utilizing NHANES data found that public health initiatives in the U.S. led to a 70% reduction in serum cotinine levels among non-smokers between 1988 and 2002.(30)

The Joint Commission (JC) has been instrumental in implementing changes in healthcare to address tobacco-use and treatment. In 1992 the JC banned indoor smoking for all accredited

hospitals. This was the first industry-wide workplace smoking ban aimed at reducing smoking in hospital employees and resulted in increased smoking cessation rates for workers employed by accredited hospitals. (31) Despite the Joint Commissions efforts, indoor smoking policy did not extend to psychiatric facilities/units. In response to public outcry over banning smoking in psychiatric units, with advocates citing patient rights, the JC policy exempted psychiatric units from the indoor smoking ban. (32, 33)

The Joint Commission additionally established performance measures aimed at improving tobacco treatment for hospitalized patients. In 2012 updated JC measures improved upon those initially set in 2004 which impacted only patients hospitalized due to myocardial infarction, congested heart failure or pneumonia, a rather select subpopulation, and did not require hospitals to provide evidence based tobacco-use counseling or cessation medications. (34) Reported smoking cessation advice/counseling rates under the 2004 measures varied vastly between public, non-profit and private hospitals, with minority groups and Medicaid patients being less likely to receive cessation advice or counseling.(35)

Hospitalization is a significant life event for patients and has been shown to be a unique opportunity for health care providers to engage smokers in cessation treatment. Cessation counseling initiated during hospitalization, combined with one month of support post-discharge, has been shown to increase the odds of quitting by as much as 65%. (36)

Smoking cessation treatment in patients with mental illness has lagged in comparison to the general population due to issues beyond that of patient rights. Tobacco use as a form of harm reduction is a view that has perpetuated the smoking norm in the behavioral health field. (37) Mental health staff have been apprehensive about implementing smoking bans due to concerns that such bans would only exacerbate psychiatric symptoms, and adversely affect the therapeutic

relationship between staff and patients as cigarettes have been used to reinforce behaviors and build rapport with patients. (38-40) State psychiatric facilities have made progress in implementing smoking policies with 83% of state facilities prohibiting smoking as of 2011 compared to 48% in 2008. (41) Contrary to initial concerns, implementation of smoke free policies in psychiatric facilities has shown to decrease the number of behavioral incidents related to smoking and improve interactions between staff and patients. (42-44)

As part of the Inpatient Psychiatric Facilities Quality Reporting (IPFQR) Program, in 2015 the Centers for Medicare & Medicaid Services (CMS) implemented new quality reporting measures targeting tobacco use screening and tobacco use treatment for all inpatient psychiatric facilities receiving Medicare funds. Tobacco-use screening (TOB-1) assesses the number of patients screened within three days of admission for reported tobacco use in the last 30 days.(45) TOB-2 assesses the proportion of tobacco users who, within 3 days of admission, received or refused tobacco cessation counseling, and received or refused FDA approved cessation medications.(45) TOB-2 is, in effect, a measure of whether tobacco treatment was offered. TOB-2a measures the proportion of all identified tobacco users who actually received cessation counseling and/or medications. (45)

These tobacco measures were implemented in an effort to address the health disparity that exists in the mentally ill population, and to provide consumers with the information needed to make an informed decision on where to seek care. (46) Psychiatric facilities that fail to report required measures face a 2% decrease in annual payment updates. With an estimated 1,626 inpatient psychiatric facilities nationwide participating in the IPFQR program, and an estimated total of 904,056 cases reported on each year, this policy has potential to make a substantial impact on tobacco treatment among patients with mental illness. (46) At present, however,

funding penalties are tied solely to whether or not a given facility reports these quality measures, *not* to how the facility performs on the measures.

Although not required by the rule change, the University of Kansas Hospital (KUMed) also opted to enact a number of policy and practice changes designed to enhance not only reporting but also *performance* on the tobacco measures. These included brief trainings on the CMS tobacco measures with all psychiatric residents at the beginning of their hospital rotation, daily monitoring of tobacco screening and treatment delivery for all new admissions increased coordination with unit staff to ensure tobacco measures were met within the specified time period. Within the electronic medical record (EMR), a link from the nursing flow sheet was created to initiate an automatic referral to UKanQuit, KUMed's tobacco treatment service.

The purpose of this study is to examine the impact of new CMS tobacco reporting measures on the screening and provision of tobacco cessation counseling and cessation medications for inpatient psychiatric smokers. The study takes place in an academic medical center that opted to enhance performance on the measures as it created mechanisms for better reporting. Hence, this study describes the changes in documentation made in order to capture the new measures, changes in clinical practice in order to improve performance on these measures, and the resultant changes in screening and service delivery. As such, this represents an analysis of a hospital that moved beyond the letter to the spirit of the new rule. By doing so, the hospital, and this report, foreshadows the potential improvements in treatment quality that could be gained should CMS make funding updates contingent on treatment performance.

## **Methods**

### **Overview**

The reporting period for the new tobacco measures began on January 1, 2015. In order to evaluate its impact on hospital practices, we retrospectively abstracted electronic health record data on all admissions to KUMed's psychiatric unit the year prior to and the year immediately following policy implementation (January 1<sup>st</sup> 2014-December 31<sup>st</sup> 2015). We cleaned the data set, imported it to SAS, and examined pre- and post-policy changes in the rates of screening, referral, and delivery of cessation counseling and cessation medications for tobacco users. We also described differences by diagnosis. This study was approved by the University of Kansas Human Subjects Committee.

### **Setting**

KUMed is a 550 bed academic center with a 32-bed inpatient psychiatric unit. KUMed has a dedicated tobacco treatment service, UKanQuit, which provides evidence-based tobacco treatment for referred patients. UKanQuit treatment consists of bedside smoking cessation counseling, recommendations for cessation medications both inpatient and on discharge, and referral to the state quitline for post-discharge counseling.

### **Participants**

The study population consisted of patients admitted between January 1<sup>st</sup> 2014 and December 31<sup>st</sup> 2015 who were at least 18 years of age, and had a length of stay between 3 and 120 days. These inclusion criteria conformed to CMS population parameters for TOB-1, TOB-2, and TOB-2a.(45) For patients with multiple admissions within a given study year, the last treatment episode was selected for inclusion in the study. Treatment episodes that spanned the two study years (began in 2013 and ended in 2014) were excluded from analysis.

## Measures

Study data was obtained from the hospital EMR and the UKanQuit service database. EMR data included age, gender, ethnicity, race, primary language, health insurance type, length of stay, discharge diagnosis, inpatient medication administration record, tobacco-use history, smokeless tobacco use history, documented referral for cessation counseling, and documented referral for cessation medication.

UKanQuit data included average number of cigarettes smoked per day, whether patient routinely smokes within 30 minutes of waking, years of tobacco use, interest in quitting (0-10 scale, 10 equals high interest), use of smoking cessation medication in the hospital, interest in starting or changing cessation medication, acceptance of offer for quitline referral, and acceptance of offer for referral to the National Cancer Institute's free text to quit service SmokeFreeTXT. (47)

### **Main outcome measures: TOB-1, TOB-2, TOB-2a.**

Concurrent with the January 1, 2015 implementation of the CMS measures, KUMed created a number of reports and new fields within the EMR to better capture tobacco use screening and referral for tobacco-related counseling and medication. These reports and fields were not, however, in place prior to the rule—in 2014. In order to avoid reporting bias, we abstracted data for TOB-1, TOB-2, and TOB-2a in exactly the same manner, from the same fields, in 2014 and 2015.

For TOB-1 (screening for tobacco use), documentation was inconsistent in 2014, prior to measure implementation. Hence, for 2014 and 2015 we counted all smokers with any evidence in the EMR of screening, tobacco use, or tobacco treatment as having been “screened.” This included any documentation of tobacco use or treatment in the social history, any evidence of

cessation counseling received, and any evidence of cessation medication received. Patients with missing documentation were counted as not being screened, and were also counted as non-smokers.

Likewise, for TOB-2 (refused or received counseling/medication), documentation was inconsistent in 2014, prior to CMS measure implementation. There was, specifically, no field created until the latter part of 2014, which indicated whether a patient had been offered or refused counseling or medication. Hence, for 2014 and 2015 we defined TOB-2 as any evidence in any field of the EMR that a patient had been referred and/or received cessation counseling and/or cessation medications. Due to the inability to accurately assess whether bupropion was prescribed for cessation treatment or psychiatric treatment, bupropion was not counted as a cessation medication. Finally, we defined TOB-2a as any evidence in any field in the EMR that cessation counseling and/or that cessation medications had been received.

### **Psychiatric Diagnoses**

We grouped cases by psychiatric diagnosis, which were typically the primary discharge diagnosis for each case. In the rare case in which the primary discharge diagnosis was not a psychiatric illness, we used the first secondary diagnosis listed for the patient that qualified as a psychiatric illness.

### **Data Analysis**

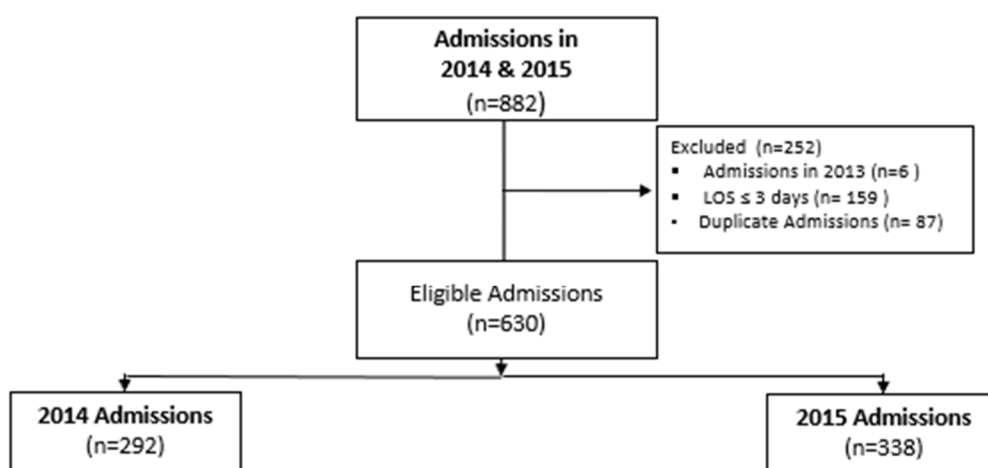
Patient characteristics and primary outcome measures were summarized using descriptive and inferential statistics. Categorical variables were summarized using frequencies, and continuous variables summarized using means and standard deviations. Tests for significance included the two-sample t-test for differences between means and Chi Square test for differences in proportions. Cochran-Mantel-Haenszel (48) test was used to analyze the relationship between

cohort years and outcome measures after controlling for diagnoses. Breslow-Day (48) test was used to analyze odds ratio homogeneity between diagnostic groups. We used Version 9.4 of the SAS System for Windows (49) for all analyses.

## Results

### Study Population and Prevalence of Smoking

There were a total of 882 admissions for the two cohort years: 292 in 2014 and 338 in 2015. Across both years, 252 admissions were omitted based on exclusion criteria: 6 admissions were excluded because they began December 2013 with length of stay spanning into 2014, 159 admissions had a length of stay  $\leq 3$  days, and 87 were duplicate admissions (Figure 1).



**Figure 1: Study Flow Diagram**

At baseline, sex, race, and insurance status were the only characteristics found to be statistically different between cohort years (Table 1). There was a larger proportion of African-Americans hospitalized in 2015, and females were more predominant in 2014. There was a higher proportion of patients with Medicare and self-pay insurance status in 2015, while private



insurance status was proportionately higher in 2014. Depressive disorders and schizophrenia spectrum disorders were the predominant diagnoses in both years at 72.6% versus 77.9% in 2014 and 2015, respectively.

**Table 1: Baseline Characteristics Of All Patients Admitted to the Hospital Psychiatric Unit, pre-post CMS rule.**

	2014 N=292		2015 N=338	
	n	%	n	%
Demographics				
Mean age (SD), years	44.4	16.53	42.7	14.9
Sex <sup>a</sup>				
Male	122	41.78	168	49.7
Female	170	58.22	170	50.3
Ethnicity				
Non-Hispanic, Latino or Spanish Origin	275	94.18	324	95.86
Hispanic, Latino or Spanish Origin	16	5.48	11	3.25
Declined	1	0.34	3	0.89
Race <sup>b</sup>				
White or Caucasian	222	76.03	227	67.16
Black or African-American	43	14.73	71	21.01
Asian	3	1.03	7	2.07
American Indian or Alaskan Native	0	0	4	1.18
Declined	1	0.34	4	1.18
Other	23	7.87	25	7.40
Primary language				
English	281	96.23	325	96.15
Spanish	5	1.71	3	0.89
Other	6	2.5	10	2.95
Primary Psychiatric Diagnosis				
Depressive Disorders	122	41.78	164	48.52
Schizophrenia Spectrum & Other Psychotic Disorders	90	30.82	98	28.99
Bipolar and Related Disorders	28	9.59	35	10.36
Substance-Related and Addictive Disorders	22	7.53	18	5.33
Trauma-and-Stress-or-Related Disorders	11	3.77	10	2.96
Other	19	6.51	13	3.85
Mean Length of stay (SD), days	9.7	9.07	9.8	8.16
Insurance Status <sup>c</sup> , n (%)				
Medicare	94	32.19	124	36.69
Private	93	31.85	75	22.19
Medicaid	64	21.92	75	22.19
Self-Pay	35	11.99	59	17.46
Other	6	2.05	5	1.48

<sup>a</sup> $\chi^2 = 3.96$ , df=1, p=.0466

<sup>b</sup> $\chi^2 = 11.12$ , df=5, p=.0491

<sup>c</sup> $\chi^2 = 22.07$ , df=4, p<.001

### **Tobacco Screening (TOB-1) and Identification of Tobacco Use**

In 2015, there was a statistically significant increase in the proportion of patients screened for tobacco use; 328 (97%) compared to 247 (84.6%) in 2014,  $\chi^2 (1, N = 630) = 30.49, p < .001$ . (Table 2). Similarly, there was an increase in the number of admissions that screened positive for tobacco use: 149 (44%) in 2015 versus 115 (39%) in 2014, however this was not statistically significant,  $\chi^2 = 1.41, df = 1, p = .235$ . Among tobacco users, 5 admissions in 2014 and 25 admissions in 2015 reported using smokeless tobacco products.

Notably, admissions that lacked any documentation of smoking status decreased from 45 (15.4%) in 2014 to 10 (3%) in 2015,  $\chi^2 = 29.2, df = 1, p < .001$  (Table 2). However, the more complete documentation was accompanied by the emergence of contradictory information on smoking status. In 2015, 7 (2%) admissions had one location in the EMR (such as a documentation flow sheet) which indicated the patient used tobacco but another field in the same treatment episode (such as social history) indicated the patient was a non-smoker. No admissions had contradictory information on smoking status in 2014.

### **Referral and Receipt of Counseling and Medications (TOB-2 and TOB-2a)**

Compared to 2014, in 2015 there was a statistically significant increase in the number of patients referred for cessation counseling: 5 (4.3%) in 2014 and 110 (73.8%) in 2015;  $\chi^2 (1, N = 264) = 127.44, p < .001$  (Table 2). The proportion of all identified tobacco users who actually received counseling was 9 (7.8%) tobacco users in 2014 and 100 (67.1%) tobacco users in 2015;  $\chi^2 (1, N = 264) = 94.12, p < .001$ .

In 2015 there was also a statistically significant increase in the number of tobacco users referred for cessation medications. Over half (102; 68.4%) of tobacco users in 2015 were referred for cessation medications compared to 37 (32%) of tobacco users in 2014;  $\chi^2 (1, N =$

264) = 34.27,  $p < .001$  (Table 2). However, while the proportion of tobacco users who actually received cessation medications increased from 28 (24.3%) in 2014 to 52 (34.9%) in 2015, this increase only approached statistical significance;  $\chi^2 (1, N = 264) = 3.42, p = 0.064$ .

In both years nicotine replacement therapy (NRT) was the only form of cessation medication prescribed for tobacco users while inpatients (not shown). There were several patients prescribed combination bupropion and NRT, but it was not possible to determine if bupropion was used in combination for cessation purposes, to treat primary psychiatric symptoms, or both.

**Table 2: Screening, Documentation, and Treatment Pre- and Post-CMS Rule**

	2014		2015	
	N=292		N=338	
<b>Documentation, Screening, and Identification</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
TOB-1 <sup>a</sup> : Screened**	247	84.6	328	97
Not screened	45	15.4	10	3
Tobacco-use among all admissions				
Yes	115	39.4	149	44.1
Smokeless Tobacco use	5		25	
No	132	45.2	172	50.9
Missing**	45	15.4	10	3
Contradictory information on tobacco status	0	0	7	2
<b>Tobacco Users</b>	<b>N=115</b>		<b>N=149</b>	
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Cessation Counseling				
TOB-2 <sup>b</sup> : Referred for counseling**	5	4.3	110	73.8
Not referred for counseling	54	47	22	14.8
Missing documentation on referral**	56	48.7	17	11.4
TOB-2a <sup>c</sup> : Prop. of <i>all tobacco users</i> receiving counseling**	9	7.8	100	67.1
Prop. <i>referred</i> who received counseling	9	180	100	90.9
Cessation Medications				
TOB-2 <sup>b</sup> : Referred for medications**	37	32	102	68.4
Not referred for medications	22	19	28	18.8
Missing documentation on referral**	56	49	19	12.8
TOB-2a <sup>c</sup> : Prop of <i>all tobacco users</i> receiving medication	28	24.3	52	34.9
Prop. <i>referred</i> who received medication*	28	75.7	52	51

<sup>a</sup> Tobacco-1 measure: tobacco use screening

<sup>b</sup> Tobacco-2 measure: tobacco users offered counseling/medication

<sup>c</sup> Tobacco-3 measure: tobacco users provided counseling/medication

\*  $p < .01$ , \*\*  $p < .001$

### Tobacco Use Characteristics and Counseling Details Among Treated Tobacco Users

Among tobacco users that completed cessation counseling, patients referred for counseling in 2014 tended to smoke more cigarettes per day, have a higher degree of nicotine dependence, and to have smoked for more years than patients referred in 2015 (Table 3). In both years patients were on average interested in quitting smoking, although patients in 2014 reported a higher interest in quitting, with a mean score of 8.11 on a scale of 0 (no interest) to 10 (highly interested). A higher proportion of patients in 2014 were interested in cessation medications at discharge, 5 (55.56%) vs. 44 (44.44%) in 2015 (Table 3). Patients in 2014 were also more interested in a referral to the state quitline, 4 (44.44%) vs. 30 (30.61%), however few in either year accepted a referral to the text messaging service SmokeFreeTXT(47); 0 (0%) in 2014 vs. 4 (4.08%) in 2015 (Table 3).

**Table 3: Tobacco Use Characteristics and Treatment Received Among Inpatients Referred for Counseling/Medication pre-post CMS rule.**

		2014		2015	
		n	%	n	%
Smoking characteristics					
Avg number of cigarettes /day (Mean± SD)	n=9; n=98	20.56	±16.77	15.19	±12.47
Use tobacco within 30 min waking	n=9; n=97	8	88.9	70	72.2
Use other types of tobacco products	n=9; n=96	0	0	20	20.8
Years of tobacco use, (Mean±SD)	n=9; n=89	27.78	±16.05	20.29	±12.92
Interested in quitting; (0-10=Low-High) (Mean±SD)	n=9; n=94	8.11	±2.76	6.22	±3.97
Cessation Medication					
Currently prescribed in hospital	n=9; n=99	6	66.7	49	49.5
Interested in inpatient medication /med change	n=9; n=99	4	44.4	41	41.4
Interested in medication at discharge	n=9; n=99	5	55.6	44	44.4
Quitline referral	n=9; n=98				
Accepted		4	44.4	30	30.6
Smoke Free Text	n=9; n=98				
Accepted		0	0	4	4.1

## Screening and Treatment by Psychiatric Diagnosis

The Cochran-Mantel-Haenszel test was used to analyze pre-post CMS rule changes in our primary tobacco measures after controlling for psychiatric diagnosis. In 2015, all admissions experienced increased odds of being screened for tobacco use (odds ratio [OR] =5.19.  $p<.0001$ ). Similarly, in 2015, tobacco users experienced increased odds of being referred for counseling (odds ratio [OR] =7.26.  $p<.0001$ ), receiving counseling (odds ratio [OR] =22.99.  $p<.0001$ ), and being referred for medications (odds ratio [OR] =6.29.  $p<.0001$ ). (Table 5). However, in 2015, tobacco users were as likely to receive medications as users in 2014 (odds ratio [OR] =1.59.  $p=.0978$ ). The Breslow-Day test which analyzes the odds ratio homogeneity between diagnostic groups, did not reach the level of significance for any outcome measures. Thus, there were no statistically significant differences in the odds ratios for the main outcome measures between diagnostic groups.

**Table 4: Screening, Tobacco Use and Tobacco Treatment by Psychiatric Diagnosis.**

		Depressive Disorders		Schizophrenia Spectrum & Other Psychotic Disorders		Bipolar & Related Disorders		Substance-Related & Addictive Disorders		Trauma & Stress or Related Disorders		Other	
		2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
<b>Sreened</b>	<b>N</b>	110	160	70	93	24	34	20	18	7	10	16	13
	<b>%</b>	90.1	97.5	77.7	94.8	85.7	97.1	90.9	100	63.6	100	84.2	100
<b>Tobacco Use</b>	<b>N</b>	55	63	35	44	10	19	12	13	1	5	2	5
	<b>%</b>	46.6	53.3	44.3	55.6	34.4	65.5	48.0	52.0	16.6	83.3	28.5	71.4
<b>Counselling Referred</b>	<b>N</b>	30	55	18	39	5	18	6	12	0	5	0	3
	<b>%</b>	54.5	87.3	51.4	88.6	50	94.7	50	92.3	0	100	0	60
<b>Counsleing Received</b>	<b>N</b>	4	40	1	30	2	15	2	8	0	5	0	3
	<b>%</b>	7.2	63.4	2.8	68.1	20	78.9	16.6	61.5	0	100	0	60
<b>Medication Referred</b>	<b>N</b>	30	54	18	38	5	18	6	12	0	5	0	5
	<b>%</b>	54.5	85.7	51.4	86.3	50	94.7	50	92.3	0	100	0	100
<b>Medication Received</b>	<b>N</b>	13	25	7	10	2	8	4	4	1	3	1	2
	<b>%</b>	23.6	39.6	20	22.7	20	42.1	33.3	30.7	100	60	50	40

**Table 5: Tobacco Measures Outcomes Post-CMS Rule: Controlling for Psychiatric Diagnosis.**

	<b>OR</b>	<b>95% CI</b>	<b>p</b>
<b>Screened</b>	5.19	2.64-10.18	<.0001
<b>Counseling referred</b>	7.26	3.78-13.91	<.0001
<b>Counseling received</b>	22.99	10.53-50.19	<.0001
<b>Medications referred</b>	6.29	3.35-11.79	<.0001
<b>Medications received</b>	1.59	0.913-2.78	0.0782

\*Cochran-Mantel-Haenszel Test Controlling for Psychiatric Diagnosis

## Discussion

Implementation of the CMS tobacco measures was associated with statistically significant increases in screening for tobacco use, referrals for cessation counseling and medications, and receipt of cessation counseling. However, the proportional increase observed in tobacco users receiving cessation medications, was not statistically significant. Gains in screening and treatment did not differ across psychiatric diagnoses. The proportion of psychiatric inpatients that received cessation medications increased marginally from 2014 to 2015, but the proportion of inpatients receiving cessation counseling in the hospital increased 10-fold.

It appears that, compared to patients receiving treatment in 2015, the 9 psychiatric inpatients who received treatment in 2014 were more dependent smokers with a longer smoking history and greater motivation to quit. It is possible that patients who received cessation counseling in 2014, were referred because these patients experienced high levels of withdrawal symptoms.

It is important to note that the tobacco treatment that patients received from UKanQuit in 2015 appears less successful than the treatment received in 2014. For example, more tobacco users in 2014 were interested in cessation medications at discharge, as well as a referral to the state quitline than patients receiving the same counseling in 2015. These percentages, however,

mask the overall impact. Because the psychiatric unit adopted a population-based approach to tobacco treatment, the absolute number of patients receiving counseling was 10-times greater in 2015 compared to 2014, and this translated to a much greater absolute number of patients receiving prescriptions for medications at discharge and referral to the state tobacco quitline. This illustrates the power of the proactive approach to tobacco cessation treatment that was adopted in 2015, compared to the reactive approach used in 2014. Instead of addressing tobacco cessation only among highly dependent, motivated patients, engaging all tobacco users upon admission increased the number of patients who actually received cessation treatment.

The automatic referral process implemented in 2015—in which all identified tobacco users were referred to the hospital tobacco treatment service UKanQuit, appears to have been more effective in increasing cessation counseling than cessation medications. This may also have been due to proactive dispensing of cessation medication to all hospitalized tobacco users. This practice was instituted in 2006 when the hospital campus went tobacco free and psychiatric inpatients were no longer allowed to step outside for smoke breaks.

The increases in treatment delivery observed in our psychiatric unit may support the use of an automatic referral system to better engage patients in treatment. An automatic referral system results in the actual offer for cessation treatment taking place apart from the intake process which can be taxing to patients, especially to patients experiencing psychiatric symptoms, 2/3 of whom are admitted from the emergency department several hours after first coming in.

Similar to other studies, we found that psychiatric inpatients were interested in quitting tobacco.(50, 51). After the CMS rule went into effect and large proportions of patients were receiving tobacco treatment, 44% expressed an interest in continuing cessation medications at

discharge, and nearly one in three (31%) accepted a referral to the state tobacco quitline. This was similar to findings by Stocking et al., (2014), who observed a 27.9% quitline participation rate among psychiatric smokers offered services post discharge.(52)

There were several limitations to our study. First, we could not ascertain whether patients who were not referred for cessation medications had a medical contraindication or another reason for not being referred. Similarly, we could not determine the cause of the discrepancy between the high numbers of referrals for cessation medications and the small number of tobacco users who received cessation medications in 2015. We obtained anecdotal reports that patients with lower levels of nicotine dependence often decline cessation medications at delivery, however, we could not verify such reports through documentation in the EMR.

Because we used only EMR fields and reports that were available across both years of the study, we also could not identify when screening actually occurred for patients. That is, we do not report whether screening and treatment occurred within the 36-hour window set by CMS or even within the present treatment encounter. In 2015, documentation of smoking status changed to include the use of a documentation flowsheet within the EMR, complete with date and time “stamps” which had not been utilized by the psychiatric unit in 2014. Thus, for some patients in 2014, information regarding smoking history came solely from the social history section of the EMR which could have been entered at a previous treatment encounter. If we had been able to obtain the date that smoking history was entered into the social history, our screening rates for 2014 would have most likely been lower, while 2015 screening rates would have remained relatively unchanged.

Despite the high prevalence and overwhelming health impacts of tobacco use in patients with mental illness, little has been done in the past to provide tobacco cessation treatment during



psychiatric hospitalization. (20) Individual performance on IPFQR measures are publicly available for consumers to compare quality of care given at various psychiatric facilities. This increased transparency allows consumers an opportunity to make informed decisions regarding where to seek care.

Psychiatric hospitalization, similar to hospitalization for other medical conditions such as CHF, AMI, COPD and pneumonia, which currently have performance penalties associated with their treatment outcomes, is often needed on an emergent basis and hampers the ability of consumers to adequately compare health care facilities prior to seeking care. Hospitals participating in public reporting and pay for performance have been shown to achieve greater improvements in quality than hospitals participating in public reporting alone. (53)

Our study exemplifies the impact these new reporting measures can have when psychiatric facilities move beyond letter of the policy, to continually assess organizational performance and implement changes to improve treatment delivery. With an estimated 1,626 inpatient psychiatric facilities nationwide participating in the IPFQR program (46), assessing financial penalties based on performance, in addition to reporting, could markedly increase tobacco treatment in the inpatient psychiatric population.

## References

1. National Center for Chronic Disease P, Health Promotion Office on S, Health: Reports of the Surgeon General; in *The Health Consequences of Smoking-50 Years of Progress: A Report of the Surgeon General*. Atlanta (GA): Centers for Disease Control and Prevention (US), 2014
2. Lasser K, Boyd JW, Woolhandler S, et al.: Smoking and mental illness: A population-based prevalence study. *Jama* 284:2606-10, 2000
3. Schroeder SA, Morris CD: Confronting a neglected epidemic: tobacco cessation for persons with mental illnesses and substance abuse problems. *Annual review of public health* 31:297-314 1p following 2010
4. 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. *Preventing chronic disease* 3:A42, 2006
5. Xu X, Bishop EE, Kennedy SM, et al.: Annual healthcare spending attributable to cigarette smoking: an update. *American journal of preventive medicine* 48:326-33, 2015
6. Garfield RL, Zuvekas SH, Lave JR, et al.: The impact of national health care reform on adults with severe mental disorders. *The American journal of psychiatry* 168:486-94, 2011
7. Rowan K, McAlpine DD, Blewett LA: Access and cost barriers to mental health care, by insurance status, 1999-2010. *Health affairs (Project Hope)* 32:1723-30, 2013
8. Jamal A, Homa DM, O'Connor E, et al.: Current cigarette smoking among adults - United States, 2005-2014. *MMWR Morbidity and mortality weekly report* 64:1233-40, 2015
9. Cook BL, Wayne GF, Kafali EN, et al.: Trends in smoking among adults with mental illness and association between mental health treatment and smoking cessation. *Jama* 311:172-82, 2014
10. Lawrence D, Williams JM: Trends in Smoking Rates by Level of Psychological Distress-Time Series Analysis of US National Health Interview Survey Data 1997-2014. *Nicotine & tobacco research : official journal of the Society for Research on Nicotine and Tobacco*, 2015
11. De Leon J, Diaz FJ: A meta-analysis of worldwide studies demonstrates an association between schizophrenia and tobacco smoking behaviors. *Schizophrenia Research* 76:135-57, 2005
12. McClave AK, McKnight-Eily LR, Davis SP, et al.: Smoking characteristics of adults with selected lifetime mental illnesses: results from the 2007 National Health Interview Survey. *American journal of public health* 100:2464-72, 2010
13. Richter KP, Gibson CA, Ahluwalia JS, et al.: Tobacco use and quit attempts among methadone maintenance clients. *American journal of public health* 91:296-9, 2001
14. Sutherland R, Sindich N, Entwistle G, et al.: Tobacco and e-cigarette use amongst illicit drug users in Australia. *Drug and Alcohol Dependence* 159:35-41, 2016
15. Richter KP, Ahluwalia HK, Mosier MC, et al.: A population-based study of cigarette smoking among illicit drug users in the United States. *Addiction (Abingdon, England)* 97:861-9, 2002
16. Crockford D, Kerfoot K, Currie S: The impact of opening a smoking room on psychiatric inpatient behavior following implementation of a hospital-wide smoking ban. *Journal of the American Psychiatric Nurses Association* 15:393-400, 2009
17. Desai HD, Seabolt J, Jann MW: Smoking in patients receiving psychotropic medications: a pharmacokinetic perspective. *CNS drugs* 15:469-94, 2001
18. Haslemo T, Eikeseth PH, Tanum L, et al.: The effect of variable cigarette consumption on the interaction with clozapine and olanzapine. *European journal of clinical pharmacology* 62:1049-53, 2006
19. Wu TH, Chiu CC, Shen WW, et al.: Pharmacokinetics of olanzapine in Chinese male schizophrenic patients with various smoking behaviors. *Progress in neuro-psychopharmacology & biological psychiatry* 32:1889-93, 2008

20. Prochaska JJ, Gill P, Hall SM: Treatment of tobacco use in an inpatient psychiatric setting. *Psychiatric services (Washington, DC)* 55:1265-70, 2004
21. Lane JGM WM, Schacht L, Ortiz G, Parks J: Smoking policies and practices in state psychiatric facilities: Survey results from 2008. Alexandria, VA: National Association of State Mental Health Program Directors Research Institute, Inc. (NRI), 2009
22. Prochaska JJ, Hall SE, Delucchi K, et al.: Efficacy of initiating tobacco dependence treatment in inpatient psychiatry: a randomized controlled trial. *American journal of public health* 104:1557-65, 2014
23. Apollonio DE, Malone RE: Marketing to the marginalised: tobacco industry targeting of the homeless and mentally ill. *Tobacco control* 14:409-15, 2005
24. Tong EK, England L, Glantz SA: Changing conclusions on secondhand smoke in a sudden infant death syndrome review funded by the tobacco industry. *Pediatrics* 115:e356-66, 2005
25. Tong EK, Glantz SA: Tobacco industry efforts undermining evidence linking secondhand smoke with cardiovascular disease. *Circulation* 116:1845-54, 2007
26. Muggli ME, Hurt RD, Becker LB: Turning free speech into corporate speech: Philip Morris' efforts to influence U.S. and European journalists regarding the U.S. EPA report on secondhand smoke. *Preventive medicine* 39:568-80, 2004
27. Hiilamo H, Kahl U, Lambe M: The Philip Morris Nordic journalist program: strategies, implementation and outcomes. *Health policy (Amsterdam, Netherlands)* 89:84-96, 2009
28. Hirshbein LD: Politics, profit, and psychiatric diagnosis: a case study of tobacco use disorder. *American journal of public health* 104:2076-84, 2014
29. State smoke-free laws for worksites, restaurants, and bars--United States, 2000-2010. *MMWR Morbidity and mortality weekly report* 60:472-5, 2011
30. Pirkle JL, Bernert JT, Caudill SP, et al.: Trends in the exposure of nonsmokers in the U.S. population to secondhand smoke: 1988-2002. *Environmental health perspectives* 114:853-8, 2006
31. Longo DR, Brownson RC, Johnson JC, et al.: Hospital smoking bans and employee smoking behavior: Results of a national survey. *Jama* 275:1252-7, 1996
32. Foderaro L: Battling Demons, and Nicotine; Hospitals' Smoking Bans are New Anxiety for Mentally Ill; in *The New York Times* 1995
33. Miller MW: Mental Patients Fight to Smoke In the Hospital in *The Wall Street Journal* 1994
34. Fiore MC, Goplerud E, Schroeder SA: The Joint Commission's new tobacco-cessation measures--will hospitals do the right thing? *The New England journal of medicine* 366:1172-4, 2012
35. Levy DE, Kang R, Vogeli CS, et al.: Smoking cessation advice rates in US hospitals. *Archives of internal medicine* 171:1682-4, 2011
36. Rigotti NA, Munafo MR, Stead LF: Interventions for smoking cessation in hospitalised patients. *The Cochrane database of systematic reviews*:Cd001837, 2007
37. Prochaska JJ: Failure to treat tobacco use in mental health and addiction treatment settings: a form of harm reduction? *Drug Alcohol Depend* 110:177-82, 2010
38. Ratschen E, Britton J, Doody GA, et al.: Tobacco dependence, treatment and smoke-free policies: a survey of mental health professionals' knowledge and attitudes. *General hospital psychiatry* 31:576-82, 2009
39. Lawn SJ: Systemic barriers to quitting smoking among institutionalised public mental health service populations: a comparison of two Australian sites. *The International journal of social psychiatry* 50:204-15, 2004
40. McNally L, Oyefeso A, Annan J, et al.: A survey of staff attitudes to smoking-related policy and intervention in psychiatric and general health care settings. *Journal of public health (Oxford, England)* 28:192-6, 2006
41. Ortiz G, Schacht L, Lane GM: Smoking cessation care in state-operated or state-supported psychiatric hospitals: from policy to practice. *Psychiatric services (Washington, DC)* 64:666-71, 2013

42. Hollen V, Ortiz G, Schacht L, et al.: Effects of adopting a smoke-free policy in state psychiatric hospitals. *Psychiatric services (Washington, DC)* 61:899-904, 2010
43. El-Guebaly N, Cathcart J, Currie S, et al.: Public health and therapeutic aspects of smoking bans in mental health and addiction settings. *Psychiatric services (Washington, DC)* 53:1617-22, 2002
44. Lawn S, Pols R: Smoking bans in psychiatric inpatient settings? A review of the research. *The Australian and New Zealand journal of psychiatry* 39:866-85, 2005
45. Inpatient Psychiatric Facility Quality Reporting Program Manual Edited by Services CfMM, 2015
46. Medicare program; inpatient psychiatric facilities prospective payment system--update for fiscal year beginning October 1, 2014 (FY 2015). Final rule. *Federal register* 79:45937-6009, 2014
47. National Cancer Institute: *SmokefreeTXT*, 2016
48. Wayne Daniel CC: *Biostatistics A Foundation for Analysis in the Health Sciences*. Hoboken, NJ: John Wiley & Sons, Inc., 2013
49. SAS Institute Inc.; in SAS 94. Cary, NC: SAS Institute Inc., 2011
50. Siru R, Hulse GK, Tait RJ: Assessing motivation to quit smoking in people with mental illness: a review. *Addiction (Abingdon, England)* 104:719-33, 2009
51. Siru R, Hulse GK, Khan RJ, et al.: Motivation to quit smoking among hospitalised individuals with and without mental health disorders. *The Australian and New Zealand journal of psychiatry* 44:640-7, 2010
52. Stockings EA, Bowman JA, Baker AL, et al.: Impact of a postdischarge smoking cessation intervention for smokers admitted to an inpatient psychiatric facility: a randomized controlled trial. *Nicotine & tobacco research : official journal of the Society for Research on Nicotine and Tobacco* 16:1417-28, 2014
53. Lindenauer PK, Remus D, Roman S, et al.: Public reporting and pay for performance in hospital quality improvement. *The New England journal of medicine* 356:486-96, 2007