

**Trends and Intervention Results for Unusual Antipsychotic Polypharmacy  
Prescribing Patterns for Florida Adult and Child Medicaid Population: 2007-2013**

(Running Title: “Unusual Florida Medicaid Antipsychotic Prescribing”)

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## **Trends and Intervention Results for Unusual Antipsychotic Polypharmacy Prescribing Patterns for Florida Adult and Child Medicaid Population: 2007-2013**

### **Abstract**

**Background:** The rapid growth in the use of antipsychotic medications has created challenges for Medicaid programs in many states. One area of particular concern has been and continues to be unusual antipsychotic polypharmacy prescribing patterns (UAPPPs) for adults and children. Our project has monitored 24 quarters of antipsychotic prescribing patterns for adults and children written by all Florida Medicaid prescribers over the July 2007 through June 2013 period and intervened with selected prescribers with UAPPPs patterns against a set of psychotherapeutic medication guidelines developed and updated in a series of meetings with national experts. This study reports our 6-year findings.

**Methods:** The Medicaid Drug Therapy Management Program for Behavioral Health (MDTMP) at the University of South Florida analyzed the Florida Medicaid prescription patterns for adult and child patients using three measures of UAPPP developed by our expert consensus panels: (1) two antipsychotics for 90 or more days (2AP90), (2) three antipsychotics for 60 days (3AP60), and (3) three antipsychotics for 90 days (3AP90). We report the trends for any prescriber for adult and child Medicaid patients that incurred a UAPPP as well as the results of 250 prescribers that received an intervention.

**Results:** In FY 2012/13, the number of unique adult-patient prescribers hitting one or more UAPPPs had risen to 10,822 prescribers; a 27.3% increase from six years earlier. For children, over the same period, Florida Medicaid prescribers that wrote at least one UAPPP script grew 4.8% to 3,025 prescribers. Overall, for prescribers that wrote one or more UAPPP scripts for both adult and child Medicaid patients, over the 6-year period, the number of scripts per patient and the number of scripts per provider declined ranging from -4.2% to -15.1%. While the group of adult-patient prescribers that wrote one or more UAPPPs showed mixed results on the three UAPPP measures, the group of child-patient prescribers that wrote one or more UAPPPs showed substantial declines in their numbers of patients, numbers of scripts, and number of scripts per prescriber ranging from -22.4% to -100% for each of these three measures. The 250 prescribers, who were among the highest adult- and child-patient prescribers, and experienced an intervention by MDTMP representatives, showed even greater declines in their UAPPP practice patterns and measures.

**Conclusions:** We found that over the six-year study period there were substantial declines in most UAPPP measures of child patients for any prescribers that had one or more UAPPPs and the declining trend was even more substantial when the prescribers were targeted for an intervention by the MDTMP program. For adult patients, the MDTMP interventions for prescribers that incurred an UAPPP also appeared successful for many measures, but for those prescribers that did not experience an intervention the results were mixed.

## Introduction

Antipsychotic prescribing patterns for patients are subject to considerable public and regulatory concern and scrutiny. While the premise of second generation antipsychotics (atypicals) rested in their ability to improve treatment of the most serious psychiatric conditions such as schizophrenia with lower propensity for adverse side-effects, notably less anticholinergic and extrapyramidal (EPS) side-effects, their efficacy has not been shown to be better than the traditional antipsychotics in the management of acute psychosis as part of schizophrenia. Antipsychotic drugs (both first and second-generation) carry significant side-effects on patients which influence compliance. Second-generation antipsychotics have also been accepted for their broader efficacy across a spectrum of conditions, higher responder rates, fewer extrapyramidal side-effects, efficiency in patients with refractory disease, lower risk of suicides, better functional capacity, and an improved quality of life.<sup>1</sup> However, these new agents have also been shown to have major mental and physical side-effects. Recent evidence has questioned the extent of the benefits and the degree to which their efficacy and tolerance are superior to the first generation of antipsychotics.<sup>2,3,4,5,6,7,8,9,10,11,12</sup>

Given the rapid growth in the use of antipsychotics and the high costs associated with antipsychotics,<sup>13</sup> one area of increasing concern has been the prescribing of concurrent antipsychotic medications.<sup>14</sup> It is becoming an increasingly common pattern of patient treatment for mental disorders to use concurrent antipsychotic medications.<sup>15,16,17,18</sup> In a study of data from Medicaid enrollees diagnosed with schizophrenia, for example, there was a four-fold increase from 3.3% to 13.7% in the percentage of patients receiving antipsychotic polypharmacy between 1999 and 2005.<sup>19</sup> Concurrent antipsychotic polypharmacy is also common in mood disorders.<sup>20</sup> In a study of patients with treatment-refractory mood disorders discharged from the US National Institute of Mental Health Biological Psychiatry Branch, the percentage taking three or more concurrent antipsychotic medications increased from 3.3% in 1974-1979 to 43.8% in 1990-1995.<sup>21</sup> Meanwhile, the majority of clinical support for the practice of prescribing concurrent antipsychotic medications is largely confined to case reports and open-label trials<sup>22,23</sup> rather than double-blind trials.<sup>24</sup>

Given the limited and sometimes conflicting research support associated with the concurrent use of antipsychotic prescriptions, there has been keen concern for both adults and children in the Florida Medicaid population regarding their use.<sup>25,26,27,28</sup> For the Florida Agency for Health Care Administration (AHCA), responsible for the administration of the Florida Medicaid program, this concern has resulted in questions about the extent of the concurrent antipsychotic drug use in the state of Florida and, for potential cases where concurrent drug use may be a problem, whether professional interventions can influence these types of prescribing patterns.

In this manuscript, we report on 24 quarters of antipsychotic prescribing patterns for adults and children for all Florida Medicaid prescribers that incurred a UAPPP during the July 2007 through June 2013 period. These UAPPPs were operationalized as potentially unusual by a set of guidelines established by a panel of medical professionals and refined annually in a series of meetings with national experts. In addition, our study documents the results of MDTMP interventions with selected prescribers that had concurrent use prescribing patterns that were deemed to be of concern.

We address two specific questions: (1) What are the trends in UAPPP use among Florida adult and child Medicaid patients over the 2007-2013 period? (2) What has been the impact of MDTMP and AHCA efforts to influence concurrent antipsychotic use among these patients?

### **Background: AHCA Concerns and Creation of MDTMP**

The Florida Medicaid Drug Therapy Management Program for Behavioral Health (MDTMP) was created by the Florida Legislature out of concerns for the increased use of antipsychotic in children. We have previously described the background and goals of the program in a previous paper.<sup>28</sup>

Briefly, the goals of the MDTMP as articulated in Chapter 409.912 Florida Statute were the following: (1) improve the quality of care and behavioral health drug prescribing practices based on best practices guidelines; (2) improve patient adherence; (3) reduce clinical risk; and (4) lower costs. Evidence-based psychotherapeutic guidelines for the treatment of major mental illnesses in adults and emotional disturbances in children were developed by MDTMP and updated every two years on a rotating basis. Based on these guidelines, a series of UAPPPs were identified and applied as filters to analyze Medicaid pharmacy claims.

The analyses identified 1) prescriptions that appeared inconsistent with the guidelines, and 2) the prescribers whose prescriptions frequently triggered the indicators. These professionals were then targeted for interventions designed to reduce the numbers of their prescriptions that triggered UAPPPs and monitored over time for possible follow-up actions.

At each panel, information from over 100 evidence-based monographs and other relevant treatment guidelines issued by national specialty societies were reviewed by the participants. An exhaustive literature search was done to ensure that the most up-to-date evidence was considered in the development of the guidelines. Following presentations by national experts, there was a systematic and structured panel

discussion led by an expert facilitator about the appropriate medication treatment of the disorders under consideration. Specific clinical questions were used to identify and guide the discussions. Topics of when to and when not to use medications, how to use medications, and how to monitor both the benefits and risks of medications were considered. Emphasis was placed on providing individualized, specifically-targeted psychotherapeutic medication treatment as part of a comprehensive treatment plan developed in the context of a therapeutic alliance. Medication guidelines were formulated for assessment and treatment of child and adolescent depression, attention-deficit hyperactivity disorder, bipolar disorder, severe tic disorders, and impulsive aggression in the context of other psychiatric disorders. Age-specific guidelines were developed as appropriate for children 0-5 years, 6-12 years, and 13-17 years old.

Similarly, guidelines were developed from panel discussions focused on adults for the treatment of schizophrenia, bipolar 1, and major depressive disorders. The first adult guidelines were developed in 2007, and reviewed and updated every 2 years with the most current update in 2013. The children's guidelines were first developed in 2008, also updated every 2 years with the most current update in 2014. The current versions of the guidelines can be found at <http://medicaidmentalhealth.org>. The guidelines are disseminated in a variety of ways including print and electronic versions.

### **Unusual Antipsychotic Polypharmacy Prescribing Patterns (UAPPPs)**

In addition to the formulation of evidence-based antipsychotic treatment guidelines the expert panels were asked to develop several "unusual antipsychotic medication indicators" derived from the guidelines. The UAPPPs are data screens that identify prescribing behaviors which are not supported by evidence and/or produce marginal benefits and/or increased risks, and therefore should be relatively rare and warrant greater scrutiny. Prescriptions that trigger these indicators represent potential opportunities for improving care. The six UAPPPs developed and used for single prescribers in this analysis of child and adult prescriptions are listed below:

1. Adults 18 & Older: Similar Class Pharmacotherapy - Concurrent use of 2 or more antipsychotics for 90 days
2. Adults 18 & Older: Similar Class Pharmacotherapy - Concurrent use of 3 or more antipsychotics for 60 days
3. Adults 18 & Older: Similar Class Pharmacotherapy - Concurrent use of 3 or more antipsychotics for 90 days
4. Children & Adolescents Ages 6 - 17: Similar Class Pharmacotherapy - Concurrent use of 2 or more antipsychotics for 90 days
5. Children & Adolescents Ages 6 - 17: Similar Class Pharmacotherapy - Concurrent use of 3 or more antipsychotics for 60 days
6. Children & Adolescents Ages 6 - 17: Similar Class Pharmacotherapy - Concurrent use of 3 or more antipsychotics for 90 days

## **Analytic Methods**

These UAPPPs were then used in the quarterly analysis of Medicaid pharmacy claims data to identify patients whose prescriptions triggered a UAPPP and their associated prescribing clinicians. Starting in the third quarter of 2007 and continuing through the second quarter of 2013, Medicaid claims data were analyzed to identify any patient whose prescriptions for antipsychotic medications triggered one or more UAPPPs as well as the characteristics of each patient. The clinician associated with each of these prescriptions was then recorded. The nature of each UAPPP triggered for each patient was determined as well as whether the UAPPP was the result of the actions of a single prescriber or the case that involved multiple prescribers. (e.g., two or more antipsychotics for greater than 60 days when one antipsychotic prescription was written by one prescriber and the other prescription was written by a different prescriber). Individual files were created for each clinician whose prescriptions triggered one or more UAPPPs that incorporated all prescriptions for antipsychotic medications written by that prescriber including those that did and those that did not trigger a UAPPP.

Clinicians were then grouped into two categories based on the median age of all their patients. Those whose total patient population had a median age of 17 or lower were classified as child prescribers and those with a patient median age of 18 or higher were categorized as adult prescribers. Finally, adult and child prescribers were ranked separately based on their number of prescriptions that triggered the indicators and tracked over subsequent quarters to assess any changes in their prescribing behavior.

Based on the UAPPP definitions defined above, we developed three categories of concurrent antipsychotic use for both adults and children derived from the numbers of patients and written prescriptions that were defined as potentially egregious:

- 2 antipsychotics for 90 days (2AP90),
- 3 antipsychotics for 60 days (3AP60), and
- 3 antipsychotics for 90 days (3AP90).

Then, approximately 250 of the potentially most egregious providers were identified by their high frequencies of 2AP90, 3AP60, and 3AP90 volumes and targeted for MDTMP interventions.

### **Interventions with Prescribers with UAPPP**

Based on a review of the literature, a series of interventions were used in efforts to influence prescribing patterns.<sup>29</sup> Prescribers whose prescriptions triggered the UAPPP received one or more interventions designed to make their prescribing patterns more consistent with the evidence-based guidelines. Listed below are the primary interventions ranked from low to high intensity.

1. Guideline dissemination to prescribers – broad-based educational events with medical societies and other stakeholders focusing on best practices.
2. Letters mailed to prescribers - letters with patient detail identifying the unusual antipsychotic medication indicators their prescriptions triggered and enclosing summaries of literature explaining why the practice is considered “unusual”. Examples of these summaries can be found at <http://medicaidmentalhealth.org>. The letter asks the prescriber to review the prescriptions in the light of the evidence based literature and to make changes as appropriate. If the prescriber has questions or finds that the patient-specific information is not accurate, a secured fax-back form is provided. The prescriber can also access a secured website and request a consultation with a consultant psychiatrist.
3. Academic detailing – face-to-face meetings between program pharmacists and individual prescribers reviewing the UAPPPs they triggered and the research suggesting the practice should be reconsidered. The goals of academic detailing are to provide the opportunity for face-to-face education and to increase the Program’s understanding of the prescriber’s practice.
4. Medical records review and visits by the Program’s Medical Consultants - prescribers who generated large numbers of prescriptions that triggered UAPPPs and did not show any change after several interventions over several quarters were visited by the MDTMP Consultant Psychiatrist.
5. Prior Authorization for Child Antipsychotics - concerns about the use of antipsychotics in children less than six years old resulted in the implementation of a prior-authorization process in July 2008 that provided expert review of proposals to prescribe antipsychotics to children younger than six years. A group of child psychiatrists representing academic medicine as well as psychiatrists working in private and group practice settings was convened by MDTMP under contract with the AHCA to formulate a Florida-specific prior authorization policy as well as processes for adjudicating requests to prescribe antipsychotic medications to children under age six.<sup>30</sup>

Prescribers whose patients rarely trigger UAPPPs receive only broad-based non-targeted interventions while those whose prescriptions frequently trigger UAPPPs continued to receive targeted interventions until their patterns changed. The analysis of pharmacy claims and the application of individualized prescriber interventions occurred every quarter and were based on the most recent prescribing patterns of the professionals involved.

## Results

There are many Medicaid antipsychotic prescribers in the State of Florida. In total, during our six-year study period, 27,759 unique adult prescribers and 8,743 unique child prescribers wrote at least one antipsychotic script for the Florida Medicaid program. As shown in Table 1, in FY 2012/13, of these adult and child prescribers, only 10,822 adult prescribers and 3,025 child prescribers wrote a UAPPP script, 39% and 35%, respectively of the Florida Medicaid adult and child prescribers. However, as also reported in Table 1, the trend in the number of Florida Medicaid prescribers writing scripts that hit a UAPPP grew substantially. In FY 2007/08, there were just 8,501 adult prescribers in our database that wrote at least one script that hit a UAPPP in the Florida Medicaid program. Six years later, in FY 2012/13 the number of unique adult

prescribers hitting one or more UAPPPs had risen to 10,822; a 27.3% increase. For child Medicaid prescribers in the State of Florida, there were 2,887 unique prescribers that wrote at least one UAPPP script in FY 2007/08 and by FY 2012/13 the number of child prescribers had grown to 3,025; a 4.8% increase.

For the adult UAPPP prescribers, Table 1 shows the number of patients they were writing scripts for had increased by 12.7% over the six-year period, while the number of scripts increased by 8%. In contrast, for the same period, the number of child patients fell by 3.9% while the number of scripts fell by 9.8%.

However, as Table 1 indicates, for both the adult and child Medicaid prescribers that had at least one UAPPP over the six-year period, the total number of scripts per patient and scripts per prescriber had fallen. For adults, over the six-year period, the number of scripts per patient and scripts per prescriber had declined by 4.2% and 15.1%, respectively, while for children the decline in the number of scripts per patient and scripts per prescriber was, 6.1% and 13.9%, respectively.



**Table 1: Six-Year Prescribing Patterns for Florida Medicaid Prescribers Incurring One of More Unusual Antipsychotic Polypharmacy Prescribing (UAPP) Patterns**

	FY 2007/08	FY 2008/09	FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13	6-Yr Total or Mean	6-Yr Chg.
<b>Adult Totals</b>								
Number of Patients	137,240	133,443	146,030	150,713	154,133	154,737	876,296	12.7%
Number of Scripts	354,422	342,525	364,393	371,206	375,820	382,901	2,191,267	8.0%
Number of Prescribers	8,501	9,241	9,912	9,931	11,143	10,822	59,550	27.3%
Number of Scripts/Patient	2.6	2.6	2.5	2.5	2.4	2.5	2.5	-4.2%
Number of Scripts/Prescriber	41.7	37.1	36.8	37.4	33.7	35.4	36.8	-15.1%
<b>Child Totals</b>								
Number of Patients	51,477	49,244	52,502	53,308	51,057	49,482	307,070	-3.9%
Number of Scripts	115,198	109,728	115,167	114,346	105,976	103,947	664,362	-9.8%
Number of Prescribers	2,887	2,867	2,983	3,086	3,302	3,025	18,150	4.8%
Number of Scripts/Patient	2.2	2.2	2.2	2.1	2.1	2.1	2.2	-6.1%
Number of Scripts/Prescriber	39.9	38.3	38.6	37.1	32.1	34.4	36.6	-13.9%
<b>Adult Prescribing Patterns for Prescribers Incurring UAPP</b>								
<b>2AP90</b>								
Number of Patients	5,265	5,381	5,270	5,134	5,179	5,284	31,513	0.4%
Number of Scripts	36,686	37,451	36,914	35,145	35,826	36,836	218,858	0.4%
Number of Scripts/Patient	7.0	7.0	7.0	6.8	6.9	7.0	6.9	0.0
Number of Scripts/Prescriber	48.1	48.6	50.0	46.2	43.9	45.1	46.9	-6.4%
<b>3AP60</b>								
Number of Patients	549	602	596	531	573	527	3,378	-4.0%
Number of Scripts	5,619	6,269	6,183	5,473	5,919	5,610	35,073	-0.2%
Number of Scripts/Patient	10.2	10.4	10.4	10.3	10.3	10.6	10.4	4.0%
Number of Scripts/Prescriber	38.0	37.8	41.8	41.5	43.5	38.2	40.0	0.5%
<b>3AP90</b>								
Number of Patients	350	389	367	343	395	357	2,201	2.0%
Number of Scripts	3,840	4,362	4,158	3,813	4,394	4,046	24,613	5.4%
Number of Scripts/Patient	11.0	11.2	11.3	11.1	11.1	11.3	11.2	3.3%
Number of Scripts/Prescriber	37.3	34.6	40.8	44.3	45.3	39.3	39.9	5.4%
<b>Child Prescribing Patterns for Prescribers Incurring UAPP</b>								
<b>2AP90</b>								
Number of Patients	640	569	579	438	350	289	2,865	-54.8%
Number of Scripts	4,286	3,907	4,011	2,966	2,333	1,962	19,465	-54.2%
Number of Scripts/Patient	6.7	6.9	6.9	6.8	6.7	6.8	6.8	1.4%
Number of Scripts/Prescriber	24.1	22.5	24.0	18.4	17.9	18.7	21.3	-22.4%
<b>3AP60</b>								
Number of Patients	27	29	39	20	9	4	128	-85.2%
Number of Scripts	263	325	408	194	89	33	1,312	-87.5%
Number of Scripts/Patient	9.7	11.2	10.5	9.7	9.9	8.3	9.9	-15.3%
Number of Scripts/Prescriber	32.9	36.1	25.5	17.6	11.1	11.0	23.9	-66.5%
<b>3AP90</b>								
Number of Patients	12	19	18	12	6	0	67	-100.0%
Number of Scripts	119	232	214	113	61	0	739	-100.0%
Number of Scripts/Patient	9.9	12.2	11.9	9.4	10.2	0.0	8.9	-100.0%
Number of Scripts/Prescriber	19.8	33.1	35.7	16.1	12.2	0.0	23.8	-100.0%

Focusing on the specific counts for the 2AP90, 3AP60, and 3AP90 UAPPPs, Table 1 indicates that for the adult prescribers that had at least one UAPPP, over 5,000 Medicaid adult patients had more than 35,000 scripts written each year that hit a 2AP90 UAPPP; while over 500 adult patients had 5,473 or more scripts written in each year that hit a 3AP60 UAPPP; and 343 or more patients in each year had 3,813 or more scripts that hit a 3AP90 UAPPP. In general, the six-year percentage changes related to the 2AP60 and 3AP60 show modest positive or negative changes over time for each of the respective prescribing patterns while the 3AP90 shows modest increases between 2.0% and 5.4% for each of the prescribing trends reported.

The child prescribing patterns in Table 1 for the 2AP90, 3AP60, and 3AP90 UAPPPs show a more consistent and pronounced trend of decline. For all three measures, during the six-year period, the numbers of patients and scripts all dropped by over 50% with the numbers of 3AP90 patients and scripts in FY 2012/13 being zero. Among the childhood measures, only the number of 2AP90 scripts per patient increased by 1.4%, although, as noted above, both the components of this measure - numbers of patients and scripts - declined by over 50%.

### **Prescribing Patterns for Prescribers Incurring UAPPP and MDTMP Intervention**

Table 2 reports the patients, scripts, and prescribers that wrote a UAPPP script for a patient and experienced one or more of the MDTMP interventions outlined above. It is important to note here the dramatic differences between Table 1 and Table 2 for adult and child Medicaid prescribers in our UAPPP dataset in the number of scripts per prescriber. In general, most Florida Medicaid prescribers that appeared in our UAPPP dataset had only a limited number of patients and prescriptions that hit a UAPPP. Of all the nearly 2.2 million antipsychotic polypharmacy prescriptions written by Florida prescribers for six years that were identified by our MDTMP process and included in our adult UAPPP database, 21% were written by approximately 125 prescribers. Similarly, for child Medicaid prescribers in the State of Florida, of the 664,362 scripts that were written over the six-year period and included in our study, 20.4% were written by approximately 100 prescribers. As shown in Table 2, approximately 250 adult and child Medicaid prescribers were targeted for intervention by the MDTMP project. When compared to the number of scripts per prescriber averages in Table 1, these adult prescribers targeted for intervention generally averaged between 13 times and 19 times more scripts per provider per year while child UAPPP prescribers targeted for intervention had typically written over four to seven times the number of scripts per provider each year as the usual Medicaid prescriber that experienced a UAPPP.

Table 2 indicates that for these prescribers undergoing an intervention their overall numbers of patients, prescriptions, scripts per patient and scripts per prescriber

all declined over the six-year period. For adult UAPPP prescribers subject to an intervention, for example, over the six-year period the decline in the numbers of patients and prescriptions was 45% while for child UAPPP prescribers experiencing an intervention the decline in the numbers of patients and prescriptions was 54% and 56%, respectively.

**Table 2: Prescribing Patterns for Florida Medicaid UAPP Prescribers that Incurred a MDTMP Intervention: 2007-2013**

	FY07/08	FY08/09	FY09/10	FY10/11	FY11/12	FY12/13	6-Yr Total or Mean	6-Yr Chg.
<b>Adults</b>								
Number of Patients	32,448	30,494	30,378	24,562	20,587	17,827	156,296	-45.1%
Number of Scripts	95,682	92,201	90,109	71,525	61,154	52,427	463,098	-45.2%
Number of Prescribers	129	129	129	124	122	112	745	-13.2%
Number of Scripts/Patient	2.9	3.0	3.0	2.9	3.0	2.9	3.0	-0.3%
Number of Scripts/Prescriber	741.7	714.7	698.5	576.8	501.3	468.1	621.6	-36.9%
<b>Children</b>								
Number of Patients	13,886	12,005	11,616	9,408	7,431	6,425	60,771	-53.7%
Number of Scripts	31,746	27,503	26,460	20,402	15,745	13,983	135,839	-56.0%
Number of Prescribers	110	109	102	100	92	93	606	-15.5%
Number of Scripts/Patient	2.3	2.3	2.3	2.2	2.1	2.2	2.2	-4.8%
Number of Scripts/Prescriber	288.6	252.3	259.4	204.0	171.1	150.4	224.2	-47.9%
<b>Adult Prescribing Patterns for Prescribers Incurring UAPP and MDTMP Intervention</b>								
<b>2AP90</b>								
Number of Patients	1,908	2,072	1,926	1,509	1,330	1,051	9,796	-44.9%
Number of Scripts	13,319	14,400	13,645	10,424	9,247	7,573	68,608	-43.1%
Number of Scripts/Patient	7.0	6.9	7.1	6.9	7.0	7.2	7.0	3.2%
Number of Scripts/Prescriber	154.9	163.6	156.8	128.7	132.1	116.5	143.8	-24.8%
<b>3AP60</b>								
Number of Patients	293	339	319	260	246	185	1,642	-36.9%
Number of Scripts	3,067	3,660	3,286	2,663	2,580	2,046	17,302	-33.3%
Number of Scripts/Patient	10.5	10.8	10.3	10.2	10.5	11.1	10.6	5.7%
Number of Scripts/Prescriber	78.6	71.8	84.3	85.9	122.9	81.8	84.0	4.1%
<b>3AP90</b>								
Number of Patients	199	231	210	184	175	129	1,128	-35.2%
Number of Scripts	2,260	2,672	2,332	1,986	1,959	1,545	12,754	-31.6%
Number of Scripts/Patient	11.4	11.6	11.1	10.8	11.2	12.0	11.3	5.5%
Number of Scripts/Prescriber	70.6	58.1	66.6	79.4	108.8	90.9	73.7	28.7%
<b>Child Prescribing Patterns for Prescribers Incurring UAPP and MDTMP Intervention</b>								
<b>2AP90</b>								
Number of Patients	248	184	160	83	69	66	810	-73.4%
Number of Scripts	1,689	1,294	1,130	582	497	459	5,651	-72.8%
Number of Scripts/Patient	6.8	7.0	7.1	7.0	7.2	7.0	7.0	2.1%
Number of Scripts/Prescriber	37.5	33.2	33.2	26.5	29.2	30.6	32.9	-18.5%

<b>3AP60</b>								
Number of Patients	18	22	22	8	4	2	76	-88.9%
Number of Scripts	177	260	232	70	32	15	786	-91.5%
Number of Scripts/Patient	9.8	11.8	10.5	8.8	8.0	7.5	9.4	-23.7%
Number of Scripts/Prescriber	44.3	65.0	38.7	17.5	8.0	7.5	32.8	-83.1%
<b>3AP90</b>								
Number of Patients	10	15	13	6	2	0	46	-100.0%
Number of Scripts	102	191	158	55	20	0	526	-100.0%
Number of Scripts/Patient	10.2	12.7	12.2	9.2	10.0	0.0	9.0	-100.0%
Number of Scripts/Prescriber	25.5	47.8	52.7	13.8	10.0	0.0	30.9	-100.0%

Substantial declines were also experienced for the numbers of patients and prescriptions for both adult and child prescribers across all the UAPPP measures – 2AP90, 3AP60, and 3AP90. These declines, as shown in Table 2, ranged from 31.6% for the number of 3AP90 scripts written by adult prescribers undergoing an MDTMP intervention to 100% for the numbers of 3AP90 patients and scripts for child prescribers subject to an intervention.

Although Table 2 generally shows sizable declines, the number of scripts per patient for all the adult prescribers experiencing an intervention increased for all UAPPP measures and one of the childhood measures – 2AP90. So, for instance, the number of scripts per patient increased by 2.1% for the child UAPPP prescribers and ranged to high of 5.7% for the number of scripts per patient for 3AP60 over the six-year period for the adult UAPPP prescribers.

Figure 1 shows the percentage of antipsychotic prescriptions written by Florida Medicaid prescribers who received an MDTMP intervention as a share of all Florida Medicaid prescribers who hit the specific UAPPPs over the six-year period Q3/2007 through Q2/2013. Figure 1 also includes, for comparison purposes, the trends for all the adult and child prescribers (allAP) that incurred a UAPPP.

**Figure 1: Percentage Shares of UAPPPs for Florida UAPPP Medicaid Prescribers Incurring a MDTMP Intervention Compared to All Florida UAPPP Medicaid Prescribers, 2007-2013.**

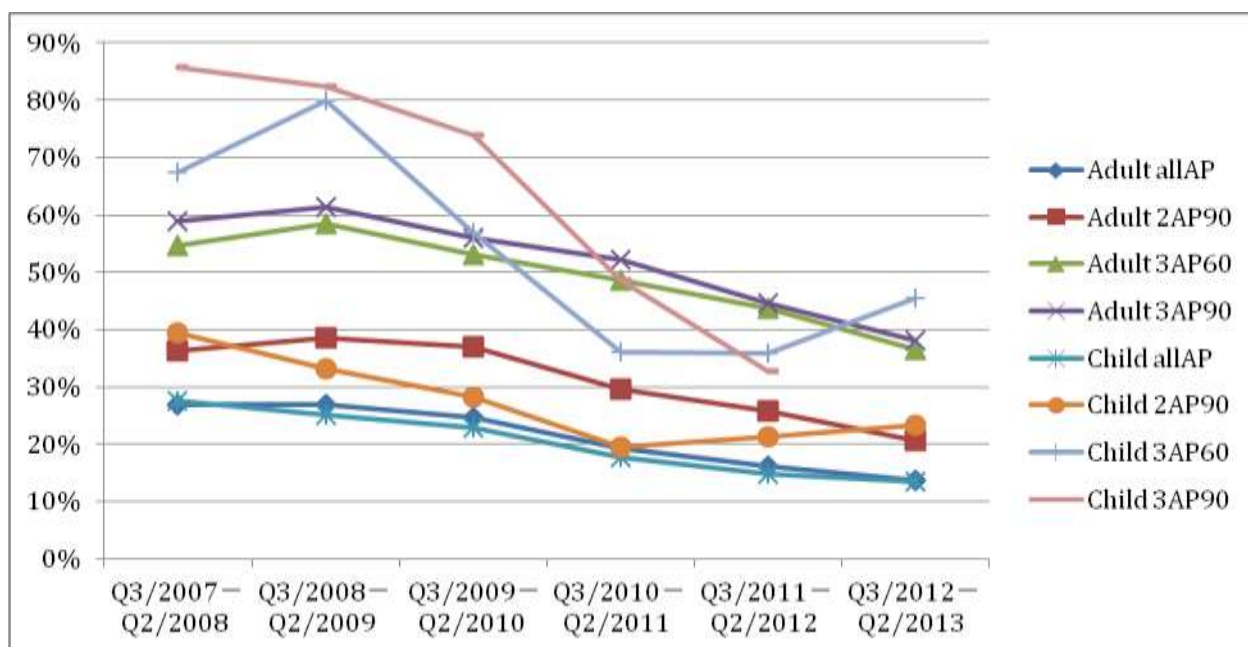


Figure 1 reveals that in FY 2007/08, the group of Florida Medicaid prescribers targeted for an MDTMP intervention represented approximately 85% of all 3AP90 prescriptions written for child patients in Florida. At the start of the study period, for example, Figure 1 shows the number of 3AP60 and 3AP90 prescriptions for both adult and child prescribers undergoing an intervention represented more than 50% of all the UAPPP antipsychotic prescriptions that were written.

After MDTMP interventions starting in the Q3/2008-Q2/2009 period, however, for the 3AP60 and 3AP90 UAPPPs there were sustained decreasing trends for the group of targeted prescribers for all measures to below 50% for the study period although the child 3AP60 in FY 2011/12 and FY 2012/13 appeared to be increasing. Figure 1 also shows graphically the extent of the six-year drop in the share of UAPPP measures represented by prescribers experiencing an MDTMP intervention compared to the overall (allAP) adult and child antipsychotic prescribing patterns for all prescribers that experienced one or more UAPPPs.

## Discussion

Matching the medical needs of behavioral patient with the optimal antipsychotic prescribing pattern has always been a challenge. However, recent advances in the development of antipsychotics and their rapid growth and associated costs have resulted in increased concerns about prescribing patterns that require the concurrent use of antipsychotic medications. It is becoming an increasingly common pattern of patient treatment for mental disorders to require concurrent antipsychotic medications. Using expert panel consensus to identify three potentially aberrant polypharmacy prescribing patterns, our study used the three measures – 2AP90, 3AP60, and 3AP90 - to analyze these UAPPPs and we employed a series of ‘state of the art’ prescriber interventions intervening with the most egregious Florida Medicaid adult and child UAPPP prescribers. Our findings show that over the six-year process there had been a number of changes in the Florida Medicaid UAPPP trends.

Overall, of the 27,758 adult prescribers in the State of Florida who had written a script for an antipsychotic only 39% had written a script in FY2012/13 that hit a UAPPP pattern and 35% for child prescribers who wrote UAPPP scripts. Among this group, however, there is a substantial disparity in the number of UAPPP patients they write scripts for.

We found that 50.9% of adult prescribers had just one UAPPP patient and 16.3% had just two UAPPP patients over the study period. For child prescribers, 74.3% had just one patient while 14.9% had two UAPPP patients. Consequently, this disparity would suggest that concerted efforts to optimize behavioral practice concentrate on those prescribers who most impact Medicaid’s behavioral population.

We also learned that for any adult and child prescribers who wrote a UAPPP script over the six-year period for the Florida Medicaid program, the average numbers of scripts per patient and scripts per prescriber had declined. This decline is in spite of a 27% increase in the number of adult prescribers and a 5% increase in the number of child prescribers writing a UAPPP script over the six-year period. However, for these prescribers that hit a UAPPP, the changes as evaluated by the three measures – 2AP90, 3AP60, and 3AP90 - are mixed for the adult prescribers while the child prescribers show considerable declines. For adult prescribers, while the number of scripts per prescriber declined for the 2AP90, and the number of patients and the number of scripts declined for the 3AP60 UAPPP, all the other measures had increases ranging up to 5.4% for the six-year period. While this might be accounted for by the growth in patients and scripts for the adult population, this trend will warrant further study especially as managed care plans start enrolling Florida Medicaid patients. For child prescribers that hit any UAPPPs as assessed by the three measures – 2AP90, 3AP60, and 3AP90, the trends were strongly negative over the six-year period. All three measures showed declines of over 50% to 100% for the numbers of patients and scripts, and substantial declines for the number of scripts per prescriber.

Particularly promising are the results for the prescribers that experienced an intervention from the MDTMP program. For UAPPP prescribers that experienced an intervention, we found substantial decreases in the numbers of patients and scripts for the UAPPP providers where intervention was undertaken in both their overall number of patients and scripts and those explicitly judged by the three UAPPP measures. While adult UAPPP prescribers that had an intervention showed declines in the numbers of patients and scripts ranging between 32% and 45% for the three UAPPP measures, child UAPPP prescribers experiencing an intervention showed declines ranging between 73% and 100% for these three UAPPP measures.

While there can be some satisfaction in these impacts on Florida Medicaid antipsychotic polypharmacy over our study period, we would also note the potential influence of other events that occurred during this time period. The use of concurrent antipsychotic prescriptions has been of particular concern in the Florida Medicaid population for both adults and children because of the lack of evidence regarding their use.<sup>31,32,33,34</sup> These concerns raised by the Florida Medicaid program were realized when the death of a child was linked to the concurrent antipsychotic prescriptions, an event that generated national headlines.<sup>35,36,37,38</sup> It is difficult to assess the impact of these types of events on the prescriber population but it is certainly not gone unnoticed. It also raises again prescribing concerns about the dire consequences of antipsychotic polypharmacy especially among children.

It is also important to acknowledge that most physicians practice wisely but prescribers who engage in resource-intensive and cost-intensive practices need to be scrutinized. As we continue to debate the nation's health care system and look for cost savings, it is important to analyze how practice patterns drive costs before we can effectively improve or reform the system. Moreover, as we search for ways to improve patient outcomes, high-volume practices that engage in unusual prescribing patterns need to be monitored and profiled. Although our results indicate that there had generally been declines in the numbers of prescriptions and patients that hit UAPPPs over the six-year period for children, for adults this pattern was mixed. Given the growing importance of monitoring and improving concurrent antipsychotic prescriptions for both adults and children, further research is needed to identify and implement effective interventional strategies. This scrutiny is important as, starting in 2014, the Florida Agency of Health Care Administration (AHCA), which manages the state's Medicaid program, has been transitioning to managed-care arrangements. An important challenge for managed-care pharmacy programs is identifying and monitoring prescribers with unusual antipsychotic polypharmacy prescribing patterns (UAPPPs) and tracking their utilization patterns.

## **Additional Information About This Article**

**Keywords:** antipsychotic polypharmacy, Florida Medicaid prescribing patterns, managed-care pharmacy, MDTMP

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## References

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- <sup>1</sup> Horacek, J., Bubenikova-Valeova, V., Kopecek, M., Palenicek, T., Dockery, C., Mohr, P. & Höschl, C. (2006) Mechanism of Action of Atypical Antipsychotic Drugs and the Neurobiology of Schizophrenia, *CNS Drugs* 20(5) 389-405
- <sup>2</sup> Buchanan, R. W., J. Kreyenbuhl, et al. "The 2009 Schizophrenia PORT Psychopharmacological Treatment Recommendations and Summary Statements." *Schizophrenia Bulletin* 36(1): 71-93.
- <sup>3</sup> Tandon R, MS Keshavan, HA Nasrallah, Schizophrenia, "just the facts" what we know in 2008. 2. Epidemiology and etiology. *Schizophr Res.* 2008 Jul;102 (1-3):1-18. Epub 2008 Jun 2.
- <sup>4</sup> Tandon R, Belmaker RH, Gattaz WF, Lopez-Ibor JJ Jr, Okasha A, Singh B, Stein DJ, Olie JP, Fleischhacker WW, Moeller HJ; Section of Pharmacopsychiatry, World Psychiatric Association. World Psychiatric Association Pharmacopsychiatry Section statement on comparative effectiveness of antipsychotics in the treatment of schizophrenia. *Schizophr Res.* 2008 Mar;100(1-3):20-38. Epub 2008 Feb 19.
- <sup>5</sup> TA Ketter, *A Handbook of Diagnosis and Treatment for Bipolar Disorder*, Washington, DC: American Psychiatric Publishing, 2010.
- <sup>6</sup> Allison, D.B., Newcomer, J.W., Dunn, A.L., Blumenthal, J.A., Fabricatore, A.N., Daumit, G.K., Cope, M.B., Riley, W.T., Vreeland, B., Hibbeln, J.R., Alpert, J.E. (2009). Obesity Among Those with Mental Disorders A National Institute of Mental Health Meeting Report. *Am J of Preventive Med.* Apr;36(4): 341-350.
- <sup>7</sup> Connolly, K. R. and M. E. Thase "If at First You Don't Succeed: A Review of the Evidence for Antidepressant Augmentation, Combination and Switching Strategies." *Drugs* 71(1): 43-64.
- <sup>8</sup> Fedorowicz VJ, Fombonne E, Metabolic side effects of atypical antipsychotics in children: a literature review. *J Psychopharmacol.* 2005 Sep;19(5):533-50.
- <sup>9</sup> Crystal, S., M. Olfson, et al. (2009). "Broadened Use Of Atypical Antipsychotics: Safety, Effectiveness, And Policy Challenges." *Health Affairs* 28(5): w770-w781.
- <sup>10</sup> Lewis, S. n. and J. Lieberman (2008). "CATIE and CUtLASS: can we handle the truth?" *The British Journal of Psychiatry* 192(3): 161-163.
- <sup>11</sup> J Clin Psychiatry. 2011;72 Suppl 1:4-8. doi: 10.4088/JCP.10075su1.01. Antipsychotics in the treatment of schizophrenia: an overview. Tandon R
- <sup>12</sup> A Systematic Review of Combination and High-Dose Atypical Antipsychotic Therapy in Patients with Schizophrenia [CADTH Optimal Use Report; Volume 1, Issue 1B]. Ottawa: Canadian Agency for Drugs and Technologies in Health; 2011. For more information on this project, visit <http://www.cadth.ca/en/products/op>
- <sup>13</sup> Stagnitti, M. N. *Trends in the Use and Expenditures for the Therapeutic Class Prescribed Psychotherapeutic Agents and All Subclasses, 1997 and 2004*. Statistical Brief #163. February 2007. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.meps.ahrq.gov/mepsweb/datafiles/publications/st163/stat163.shtml>

---

<sup>14</sup> Crowley, M. J., et al. (2014). "Prioritization of Research Addressing Antipsychotics for Adolescents and Young Adults With Bipolar Disorder." *Annals of Internal Medicine* 160(7): 492-498.

<sup>15</sup> Botts S, Hines H, Littrell R. Antipsychotic polypharmacy in the ambulatory care setting, 1993-2000. *Psychiatr Serv.* 2003;54(8):1086.

<sup>16</sup> Gilmer TP, Dolder CR, Folsom DP, Mastin W, Jeste DV. Antipsychotic polypharmacy trends among Medicaid beneficiaries with schizophrenia in San Diego County, 1999-2004. *Psychiatr Serv.* 2007;58(7):1007-1010.

<sup>17</sup> Stahl SM, Grady MM. A critical review of atypical antipsychotic utilization: comparing monotherapy with polypharmacy and augmentation. *Curr Med Chem.* 2004; 11(3):313-327.

<sup>18</sup> Stahl SM. Antipsychotic polypharmacy, part 1: therapeutic option or dirty little secret? *J Clin Psychiatry.* 1999;60(7):425-426.

Freudenreich O, Goff DC. Antipsychotic combination therapy in schizophrenia: a review of efficacy and risks of current combinations. *Acta Psychiatr Scand.* 2002; 106(5):323-330.

Honer WG, Thornton AE, Chen EY, Chan RC, Wong JO, Bergmann A, Falkai P, Pomarol-Clotet E, McKenna PJ, Stip E, Williams R, MacEwan GW, Wasan K, Procyshyn R; Clozapine and Risperidone Enhancement (CARE) Study Group. Clozapine alone versus clozapine and risperidone with refractory schizophrenia. *N Engl J Med.* 2006;354(5):472-482.

Suzuki T, Uchida H, Watanabe K, Nakajima S, Nomura K, Takeuchi H, Tanabe A, Yagi G, Kashima H. Effectiveness of antipsychotic polypharmacy for patients with treatment refractory schizophrenia: an open-label trial of olanzapine plus risperidone for those who failed to respond to a sequential treatment with olanzapine, quetiapine and risperidone. *Hum Psychopharmacol.* 2008;23(6):455-463.

Tranulis C, Skalli L, Lalonde P, Nicole L, Stip E. Benefits and risks of antipsychotic polypharmacy: an evidence-based review of the literature. *Drug Saf.* 2008; 31(1):7-20.

Clark RE, Bartels SJ, Mellman TA, Peacock WJ. Recent trends in antipsychotic combination therapy of schizophrenia and schizoaffective disorder: implications for state mental health policy. *Schizophr Bull.* 2002;28(1):75-84.

<sup>19</sup> Gilmer TP, Dolder CR, Folsom DP, Mastin W, Jeste DV. Antipsychotic polypharmacy trends among Medicaid beneficiaries with schizophrenia in San Diego County, 1999-2004. *Psychiatr Serv.* 2007;58(7):1007-1010.

<sup>20</sup> Frye MA, Ketter TA, Leverich GS, Huggins T, Lantz C, Denicoff KD, Post RM. The increasing use of polypharmacotherapy for refractory mood disorders: 22 years of study. *J Clin Psychiatry.* 2000;61(1):9-15.

McIntyre RS, Jerrell JM. Polypharmacy in children and adolescents treated for major depressive disorder: a claims database study. *J Clin Psychiatry.* 2009; 70(2):240-246.

Glezer A, Byatt N, Cook R Jr, Rothschild AJ. Polypharmacy prevalence rates in the treatment of unipolar depression in an outpatient clinic. *J Affect Disord.* 2009; 117(1-2):18-23.

Kotzan JA, Maclean R, Wade W, Martin BC, Lami H, Tadlock G, Gottlieb M. Prevalence and patterns of concomitant use of selective serotonin reuptake inhibitors and other antidepressants in a high-cost polypharmacy cohort. *Clin Ther.* 2002;24(2):237-248.

---

<sup>21</sup> Frye MA, Ketter TA, Leverich GS, Huggins T, Lantz C, Denicoff KD, Post RM. The increasing use of polypharmacotherapy for refractory mood disorders: 22 years of study. *J Clin Psychiatry*. 2000;61(1):9-15.

<sup>22</sup> Stahl SM, Grady MM. A critical review of atypical antipsychotic utilization: comparing monotherapy with polypharmacy and augmentation. *Curr Med Chem*. 2004; 11(3):313-327.

<sup>23</sup> Freudenreich O, Goff DC. Antipsychotic combination therapy in schizophrenia: a review of efficacy and risks of current combinations. *Acta Psychiatr Scand*. 2002; 106(5):323-330.

<sup>24</sup> Honer WG, Thornton AE, Chen EY, Chan RC, Wong JO, Bergmann A, Falkai P, Pomarol-Clotet E, McKenna PJ, Stip E, Williams R, MacEwan GW, Wasan K, Procyshyn R; Clozapine and Risperidone Enhancement (CARE) Study Group. Clozapine alone versus clozapine and risperidone with refractory schizophrenia. *N Engl J Med*. 2006;354(5):472-482.

<sup>25</sup> Constantine R, Tandon R. Changing Trends in Pediatric Antipsychotic Use in Florida's Medicaid Program. *Psychiatr Serv* 2008;59:1162-8.

Constantine R, Richard S, Surles R, et al: Optimizing pharmacotherapy of schizophrenia: tools for the psychiatrist. *Current Psychosis and Therapeutics Reports* 4:6–11, 2006

Tandon R, Dewan N, Constantine R, et al: Best pharmacologic treatment of schizophrenia: applying principles of evidence based medicine. *Current Psychosis and Therapeutic Reports* 3:53–60, 2005

<sup>26</sup> Constantine RJ, Tandon R, McPherson M, et al.: Early diagnoses and psychotherapeutic medication treatment experiences of a cohort of children under 6 years old who received antipsychotic treatment in Florida's Medicaid program. *J Child Adolesc Psychopharm* 2011; 21:79–84.

<sup>27</sup> Florida Statewide Advocacy Council, *Psychotropic Drug Use in Foster Care*, Red Item Report, July 2003, p. 3.

<sup>28</sup> Constantine, R, Boaz, T, Tandon, R. Antipsychotic Polypharmacy in the Treatment of Children and Adolescents in the Fee for Service Component of a Large State Medicaid Program. *Clinical Therapeutics*, 2010, 32:5, 949-959.

Constantine, R., Andel, R., Tandon, R. Trends in Antipsychotic Polypharmacy: Progress and Challenges in Florida's Medicaid Program. *Community Mental Health Journal* 2010, 46:523-530.

<sup>29</sup> Bero, L., & Rennie, D. (1995). The Cochrane Collaboration: Preparing, maintaining, and disseminating systematic reviews of the effects of health care. *Journal of the American Medical Association*, 274, 1935-1938.

Clark, N. M., Gong, M., Schork, M. A., Evans, D., Roloff, D., Hurwitz, M., et al. (1998). Impact of education for physicians on patient outcomes. *Pediatrics*, 101(5), 831-836.

Club, A. (1996). Systematic practice-based interventions are better than conferences for improving professional practice. *ACP Journal Club*, 124, 22.

Cohen, S. J. (1994). Changing physician behavior to improve disease prevention. *Preventive Medicine*, 23, 284-291.

Conrad, P. (2004). Prescribing more psychotropic medications for children: What does the increase mean? *Archives of Pediatrics & Adolescent Medicine*, 158, 829-830.

- 
- Elson, R. B., & Connelly, D. P. (1995). Computerized patient records in primary care: Their role in mediating guideline-driven physician behavior. *Archives of Family Medicine*, 4(8), 698-705.
- Farmer, A. P., Legare, F., Turcot, L., Grimshaw, J., Harvey, E., McGowan, J. L., et al. (2009). Printed educational materials: effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews* 2008(3).
- Finkelstein, J. A., Huang, S. S., Kleinman, K., Rifas-Shiman, S. L., Stille, C. J., Daniel, J., et al. (2008). Impact of a 16-community trial to promote judicious antibiotic use in Massachusetts. *Pediatrics*, 121(1), 15-23.
- Fraser, G. L., Wennberg, D. E., Dickens, J. D. J., & Lambrew, C. T. (1996). Changing physician behavior in ordering digoxin assays. *Annals of Pharmacotherapy*, 30(5), 449-454.
- Freemantle, N., Harvey, E., Wolf, F., Grimshaw, J., Grilli, R., & Bero, L. (1997). Printed educational materials: Effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews* 1997(2).
- Jamtvedt, G., Young, J. M., Kristofferson, D. T., O'Brien, M. A., & Oxman, A. (2006). Audit and feedback: Effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews* 2006(2).
- Kitson, A., Harvey, G., & McCormack, B. (1998). Enabling the implementation of evidence based practice: a conceptual framework. *Quality in Health care : QHC*, 7(3), 149-158.
- Kleijnen, J., & Chalmers, I. (1997). How to practice and teach evidence based medicine: Role of the Cochrane Collaboration. *Acta Anaesthesiologica Scandinavica Supplementum*, 41 (supplement 111)(1), 231-233.
- Koyanagi, C., Forquer, S., & Alfano, E. (2005). Medicaid policies to contain psychiatric drug costs. *Health Affairs*, 24(2), 536-544.
- Lundberg, G. D. (1998). Changing physician behavior in ordering diagnostic tests. *Journal of the American Medical Association*, 280, 2036-2037.
- Macfarlane, J., Holmes, W., Gard, P., Thornhill, D., Macfarlane, R., & Hubbard, R. (2002). Reducing antibiotic use for acute bronchitis in primary care: Blind, randomised controlled trial of patient information leaflet. *British Medical Journal* 324, 1-6.
- Morrato, E. H., Dodd, S., Oderda, G., Haxby, D. G., Allen, R., & Valuck, R. J. (2007). Prevalence, Utilization Patterns, and Predictors of Antipsychotic Polypharmacy: Experience in a Multistate Medicaid Population, 1998-2003. *Clinical Therapeutics: The International Peer-Reviewed Journal of Drug Therapy*, 29(1), 183-195.
- O'Brien, M. A., Freemantle, N., Oxman, A., Wolf, F., Davis, D., & Herrin, J. (2001). Continuing education meetings and workshops: effects on professional practice and health care *Cochrane Database of Systematic Reviews* (1).
- O'Brien, M. A., Rogers, S., Jamtvedt, G., Oxman, A., Odgaard-Jensen, J., Kristofferson, D. T., et al. (2007). Educational outreach visits: effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews*(4).
- Oxman, A. D., Thomson, M. A., Davis, D. A., & Haynes, R. B. (1995). No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. *Canadian Medical Association Journal*, 153(10), 1423-1431.

---

Pazirandeh, M. (2002). Does patient partnership in continuing medical education (CME) improve the outcome in osteoporosis management? *Journal of Continuing Education in the Health Professions*, 22, 142-151.

Solomon, D. H., Hashimoto, H., Daltroy, L., & Liang, M. H. (1998). Techniques to improve physicians' use of diagnostic tests: A new conceptual framework. *Journal of the American Medical Association*, 280(23), 2020-2027.

Sommers, L. S., Sholtz, R., Sheperd, R. M., & Starkweather, D. B. (1984). Physician involvement in quality assurance. *Medical Care*, 22(12), 1115-1138.

Soumerai, S. B., McLaughlin, T. J., & Avron, J. (1989). Improving drug prescribing in primary care: A critical analysis of the experimental literature. *The Milbank Quarterly*, 67(2), 268-317.

Soumerai, S. B., McLaughlin, T. J., Ross-Degnan, D., Casteris, C. S., & Bollini, P. (1994). Effects of limiting Medicaid drug-reimbursement benefits on the use of psychotropic agents and acute mental health services by patients with schizophrenia. *New England Journal of Medicine*, 331, 650-655.

Steiner, J. F. (2005). A series of evidence-based drug therapy letters improved prescribing behaviour. *Evidence Based Medicine*, 10, 91-97.

Sullivan, S. D., Lee, T. A., Blough, D. K., Finkelstein, J. A., Lozano, P., Inui, T. S., et al. (2005). A multisite randomized trial of the effects of physician education and organizational change in chronic asthma care: Cost-effectiveness analysis of the pediatric asthma care patient outcomes research team II (PAC-PORT II). *Archives of Pediatrics & Adolescent Medicine*, 159, 428-434.

Tu, K., & Davis, D. (2002). Can we alter physician behavior by educational methods? Lessons learned from studies of the management and follow-up of hypertension. *Journal of Continuing Education in the Health Professions*, 22, 11.

Weiss, K. B., Lozano, P., Finkelstein, J. A., Carey, V. J., Sullivan, S. D., Fuhlbrigge, A. L., et al. (2003). A randomized controlled clinical trial to improve asthma care for children through provider education and health systems change: A description of the pediatric asthma care patient outcome research team (PAC-PORT II) study design. *Health Services and Outcomes Research Methodology*, 4(4), 265-282.

<sup>30</sup> Constantine R, MA Bengtson, T Murphy, M McPherson, R Andel, ME Jones, C Donaldson-Guenther, (2012). "Impact of the Florida Medicaid Prior-Authorization Program on Use of Antipsychotics by Children Under Age Six." *Psychiatric Services* 63(12): 1257-1260.

<sup>31</sup> Constantine R, Tandon R. Changing Trends in Pediatric Antipsychotic Use in Florida's Medicaid Program. *Psychiatr Serv* 2008;59:1162-8.

Constantine R, Richard S, Surles R, et al: Optimizing pharmacotherapy of schizophrenia: tools for the psychiatrist. *Current Psychosis and Therapeutics Reports* 4:6–11, 2006

Tandon R, Dewan N, Constantine R, et al: Best pharmacologic treatment of schizophrenia: applying principles of evidence based medicine. *Current Psychosis and Therapeutic Reports* 3:53–60, 2005

<sup>32</sup> Constantine RJ, Tandon R, McPherson M, et al.: Early diagnoses and psychotherapeutic medication treatment experiences of a cohort of children under 6 years old who received antipsychotic treatment in Florida's Medicaid program. *J Child Adolesc Psychopharm* 2011; 21:79–84.

<sup>33</sup> Florida Statewide Advocacy Council, *Psychotropic Drug Use in Foster Care*, Red Item Report, July 2003, p. 3.

---

<sup>34</sup> Constantine, R, Boaz, T, Tandon, R. Antipsychotic Polypharmacy in the Treatment of Children and Adolescents in the Fee for Service Component of a Large State Medicaid Program. *Clinical Therapeutics*, 2010, 32:5, 949-959.

Constantine, R., Andel, R., Tandon, R. Trends in Antipsychotic Polypharmacy: Progress and Challenges in Florida's Medicaid Program. *Community Mental Health Journal* 2010, 46:523-530.

<sup>35</sup> CM Miller, Numerous red flags did not save Miami 12-year-old from prescription drug death, *The Palm Beach Post*, April 19, 2010.

<sup>36</sup> CM Miller, Lawsuit blames Miami psychiatrist in death of boy with autism, *The Palm Beach Post*, Wednesday, May 20, 2009

<sup>37</sup> K Kramer, Suicides of Young Persons in Florida Associated with Psychotropic Drugs – A Five-Year Study, Citizens Commission on Human Rights of Florida, February 2006.

<sup>38</sup> Citizens Commission on Human Rights of Florida, *The Psychotropic Drugging of Florida's Medicaid Children*, 2006.