Prevalence of Drug-Related Problems and Cost-Savings Opportunities in Medicaid High Utilizers Identified by a Pharmacist-Run Drug Regimen Review Center

JOANNE LaFLEUR, PharmD, MSPH; CARRIEANN McBETH, PharmD; KAREN GUNNING, PharmD, BCPS; LYNDA ODERDA, PharmD; CARIN STEINVOORT, PharmD; and GARY M. ODERDA, PharmD, MPH

ABSTRACT

BACKGROUND: Despite numerous reports of state Medicaid drug utilization review (DUR) programs, little data are available about the prevalence of drug-related problems (DRPs) in Medicaid patients. A university-based, pharmacist-run DUR program for high utilizers was created as an alternative to imposition of a statutory limit of 7 medications per month in the Utah Medicaid program in 2002. The DUR program was designed to suggest ways that high-utilizing patients could decrease their total number of medications to 7 or fewer prior to imposition of the 7-medication limit at some time in the future.

OBJECTIVE: To describe the experience in 1 Medicaid DUR program and to report the prevalence of DRPs and cost-saving opportunities (CSOs) among a population of Medicaid recipients who were high utilizers of prescription drugs.

METHODS: DRPs were identified by 5 clinical pharmacists employed by the Drug Regimen Review Center (DRRC) in Salt Lake City. The purpose of the center was to provide drug therapy review services for a select number of Utah Medicaid recipients (200-300 per month) who exceeded a 7-medication limit during the review period. Of those exceeding the limit, the DRRC reviewed a total of 3,706 (21.9%) patients, representing the highest utilizers by volume of medication. The prevalence of DRPs considered clinically important in the review cohort was 79.7% of patients, including therapeutic duplications in 54.6% of patients, dose form optimization in 29.7%, and inappropriate uncoordinated care in 25.3%. The average pharmacy cost per month for patients with at least 1 DRP was $1,081; by contrast, the average pharmacy cost per month for all other patients receiving at least 1 prescription was $91.

CONCLUSIONS: Approximately 4% of Medicaid recipients exceeded the 7-medication monthly limit. Among the 22% highest utilizers in this group, 48% of nursing home residents and 87% of ambulatory recipients had at least 1 DRP, or an overall rate of 80% of high-use Medicaid recipients or as much as 3.2% of the Medicaid population.

KEYWORDS: Medicaid, Drug utilization review, Drug-related problems, Therapeutic duplications, Health policy

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States have been required to implement both prospective and retrospective drug utilization review (DUR) programs for ambulatory Medicaid recipients since 1993, as part of the changes required by the Omnibus Budget Reconciliation Act (OBRA) in 1990.1 Since that time, retrospective DUR programs have been conducted and evaluated in many states, including Texas, Connecticut, Washington, New York, and Wisconsin.2-8 Most of these evaluations address interventions surrounding a single specific recommendation or drug-related problem (DRP) and rarely address multiple DRPs in any intervention. Consequently, little data are available about the prevalence of DRPs among Medicaid populations.

One study evaluated whether the rate of DRPs changed among Medicaid patients in 6 states following the OBRA mandate, but the authors did not report the prevalence rates found in their analyses.7 Authors of an analysis conducted among Medicaid patients in Maryland, Iowa, Washington, and Georgia2-10 reported high rates of duplicative therapies, inappropriate dosages, inappropriate durations of therapy, and contraindications. However, these data were reported only for elderly patients (aged 265 years) and only with respect to 5 predetermined DRPs in 8 drug categories. Another study among New York State Medicaid patients evaluated antiretroviral therapy, finding that 44% of patients had suboptimal antiretroviral therapy according to best-practice guidelines.7

Previous studies that have examined DRPs have used various criteria for categorizing a patient's drug regimen as problematic. Two studies have used practice guidelines for specific disease states,3,11 and 2 have used criteria developed by experts from the University of Maryland and the Philadelphia College of Pharmacy and Science.9,10 Another study used criteria from a commercial DUR software program used by 6 state Medicaid programs.7 Many other investigators have created their own criteria on the basis of clinical judgment and literature review.2,3,11-13

In all of the prior evaluations, it appears that pharmacy claims were screened by the programming of queriable databases to identify patients who met the specific criteria established for each DRP. It is unclear whether the prevalence of DRPs identified in this manner would differ from the prevalence that would be found if the DRPs were identified by clinical pharmacists with access to a patient's entire drug regimen and diagnoses. The purpose of our study was to estimate the prevalence of DRPs among Medicaid high utilizers of pharmacy benefits as
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<table>
<thead>
<tr>
<th>Problem Category</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additive toxicity</td>
<td>The concomitant use of medications with similar pharmacodynamic actions that may produce excessive pharmacologic or toxic effects when given together. To minimize additive toxicity, a patient’s drug regimen may need to be adjusted to include a decreased number of medications that cause a given toxicity.</td>
<td>This patient received multiple medications with anticholinergic effects, including amitriptyline, hyoscyamine, diphenhydramine, and promethazine. This may result in an increased risk of anticholinergic toxicity (confusion, dry mucous membranes, blurred vision, urinary retention, or sedation.). This patient received multiple medications that may prolong the QT interval, including thioridazine, ziprasidone, amitriptyline, and erythromycin. Adverse cardiac effects (QT prolongation, torsades de pointes, cardiac arrest) could result.</td>
</tr>
<tr>
<td>Dose exceeds usual recommendations</td>
<td>The use of a medication above the recommended dosage range for a patient’s age or condition. Subtherapeutic dosing may lead to adverse effects such as hypokalemia and a rise in plasma cholesterol.</td>
<td>This patient received hydrochlorothiazide 30 mg daily to treat hypertension. Doses greater than 25 mg daily usually provide little additional antihypertensive effect yet significantly increase the incidence of adverse effects. This patient received verapamil extended-release at a dose of 450 mg daily. The maximum recommended daily dose for outpatients is 225 mg daily. Higher doses are associated with an increased risk of adverse effects such as hypotension.</td>
</tr>
<tr>
<td>Drug-disease interaction</td>
<td>The use of a medication that is contraindicated due to the patient’s age, gender, or disease state(s).</td>
<td>This patient received sumatriptan, a triptan migraine- abortive agent, and has a diagnosis of ischemic heart disease. Use of triptans in patients with ischemic heart disease is contraindicated due to increased risk of adverse cardiac events such as myocardial infarction. This patient has a seizure disorder and received bupropion. Of available antidepressants, bupropion has the greatest propensity to lower the seizure threshold and is not generally recommended for use in patients with a history of seizures.</td>
</tr>
<tr>
<td>Drug-drug interaction</td>
<td>Increased toxicity or decreased therapeutic activity of 1 or more medications due to the concomitant use of another drug that affects its activity. Drugs that induce or inhibit hepatic metabolism, drugs that are highly protein-bound, or drugs that affect the renal clearance of another are frequently involved in drug-drug interactions.</td>
<td>This patient received theophylline and ciprofloxacin. This could lead to increased theophylline serum levels and theophylline toxicity through inhibition of cytochrome p450 enzymes by ciprofloxacin. This patient received an epinephrine auto-injector and a nonsedative beta-blocker, propranolol. Use of nonsedative beta-blockers should be avoided in patients who are prescribed epinephrine for use in the case of an anaphylactic reaction. Nonsedative beta-blockade may cause resistance to epinephrine in anaphylaxis.</td>
</tr>
<tr>
<td>Duration of therapy exceeds usual recommendations</td>
<td>The use of a medication for longer than recommended for the patient’s age or condition. Excessive duration of therapy may lead to additional adverse effects and toxicity.</td>
<td>This patient received carisoprodol continuously for 3 months. Carisoprodol is a skeletal muscle relaxant indicated for short-term use in acute musculoskeletal conditions; long-term use may result in tolerance to muscle relaxant effects and physical or psychological dependence. This patient received monthly treatment with acyclovir ointment for 5 months. Acyclovir ointment is indicated only for the initial episode of genital herpes. Clinical trials have shown it to be ineffective in treating recurrent herpes outbreaks.</td>
</tr>
<tr>
<td>Inappropriate uncoordinated care</td>
<td>The prescribing of multiple medications for the same disease state by multiple providers. Uncoordinated care may result in insufficient monitoring of a patient’s disease states and could lead to other drug-related problems, such as drug-drug interactions, drug-disease interactions, and therapeutic duplications.</td>
<td>This patient received acetaminophen opioid analgesics from 2 prescribers at different practice sites. This patient received psychiatric medications, including paroxetine, quetiapine, and lithium, from 3 prescribers at different practice sites.</td>
</tr>
<tr>
<td>Dose form not optimized</td>
<td>The use of more tablets or capsules than necessary to achieve a desired dose or the receipt of separate dosage forms for 2 agents that are available in a combination product. Streamlining therapy could result in improved patient compliance and clinical outcomes.</td>
<td>This patient received separate dosage forms of albuterol and ipratropium for inhalation. These 2 medications are available in a combination product, albuterol/ipratropium (Combivent). This patient received sertraline 100 mg daily as 2 50 mg tablets. Sertraline is usually dosed once daily and could be given as one 100 mg tablet.</td>
</tr>
<tr>
<td>Subtherapeutic dose</td>
<td>The use of a medication below the recommended dosage range for the patient’s age or condition. Subtherapeutic dosing may cause patients to experience adverse effects without therapeutic benefit, or may require the addition of other medications to control a disease state that could be controlled by the use of a single medication at an appropriate dosage-level.</td>
<td>This patient received quetiapine 25 mg daily. The usual dosage range for schizophrenia or bipolar mania is 150 mg to 800 mg daily. This patient received acyclovir 200 mg daily for 7 months. The dose range for chronic suppression of genital herpes or herpes labialis is 400 mg to 1,000 mg daily.</td>
</tr>
<tr>
<td>Therapeutic duplication</td>
<td>The inappropriate use of multiple medications for the same indication.</td>
<td>This patient received 2 different selective serotonin reuptake inhibitors, including paroxetine and citalopram for more than 1 year. This patient received 2 statins, including atorvastatin and rosuvastatin for 3 months.</td>
</tr>
<tr>
<td>Treatment without an indication</td>
<td>The use of a medication without an apparent indication. Unnecessary exposure to medications may lead to increased risks of adverse events and toxicity.</td>
<td>This patient received a potassium supplement at a dose of 60 mEq daily but did not have a potassium-wasting diuretic or a diagnosis of hypokalemia.</td>
</tr>
<tr>
<td>Untreated indication</td>
<td>The absence of a medication that appears to be needed based on usual best practice or guidelines. Untreated indications could result in morbidity and mortality for a patient.</td>
<td>This patient has received 3 albuterol inhalers each month, exceeding the usual dosage recommendation of 1 inhaler every 25 days. This indicates uncontrolled asthma; however, the patient did not receive an inhaled corticosteroid as recommended for all patients with mild to severe asthma. This patient had a diagnosis of heart failure but did not receive a beta-blocker. Beta-blockers are generally recommended for patients with heart failure because they have been shown to reduce morbidity and mortality in this population.</td>
</tr>
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</table>

TABLE 1 DRPs Used to Trigger Intervention Letters to Prescribers
identified by clinically trained pharmacists reviewing monthly drug regimens of patients.

Methods

The Utah legislature in 2001 authorized a limit on the number of medications per Medicaid recipient per month. In early 2002, Medicaid recipients in Utah were subject to a maximum of 7 medications per month. Several classes of medications were categorized as exempt from this limit. Exempted drug classes included antibiotics, HIV antiviral agents, medications indicated for many chronic conditions such as diabetes and hypertension, among others.

Implementation of the 7-medication limit was short-lived, rescinded in the same month that it was implemented, in February 2002, due to outspoken concerns from patient advocates about the limit's potential to adversely impact the health of patients with multiple disease states. Instead, an agreement was reached between the Utah Department of Health and the University of Utah College of Pharmacy to have clinically trained pharmacists review the drug regimens of patients exceeding 7 nonexempt medications in any month.

All pharmacist reviewers hired for this task were licensed in the state of Utah and had completed a PharmD program in which they received broad training in a variety of clinical settings, including ambulatory care. Three pharmacists had additional residency or fellowship training, and 2 pharmacists had extensive (10-15 years) experience in geriatrics and long-term care. Pharmacist reviewers participated in ongoing discussions to achieve consistency in evaluations. They also voluntarily participated in an ongoing American College of Clinical Pharmacy continuing-education program. Therapeutic areas relevant to our patient population were selected and modules in each therapeutic area were reviewed, after which pharmacists participated in a discussion forum about the module and completed exams. All pharmacists are expected to work toward board certification.

Predetermined categories of DRPs for reviewers were defined before implementation of the program (Table 1). The primary goal of the program was to improve utilization of prescription drugs and to positively impact the health of Medicaid recipients. Consequently, most of the DRP categories included problems considered by reviewers to be clinically important. A secondary goal of the program was to reduce prescription drug expenditures and the number of nonexempt medications among the reviewed population. Therefore, other categories that focused on cost-savings opportunities (CSOs) were also established; they are summarized in Table 2. Reviewers also noted and addressed other drug-therapy concerns if identified.

Reviewers used their clinical judgment to determine whether a patient's therapeutic regimen appeared to be appropriate, based on age, medical conditions, and concurrent drug therapy. For example, if a patient had received 2 different selective serotonin reuptake inhibitors (SSRIs) within a given month, reviewers looked at prior months to determine if it represented duplicative therapy from one or more prescribers or if the patient was switching from one agent to another. Reviewers assessed information obtained from complete pharmacy claims data provided by the Utah State Department of Health Care Finance and Development as the entry point for the medication during the review period. This was used to determine the number of medications and to characterize the medications. The records were then loaded into a drug information database for review.

TABLE 2 Cost-Savings-Related Recommendations

<table>
<thead>
<tr>
<th>Drug-Related Problem Category</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand name dispensed</td>
<td>The use of a brand-name medication when a less costly bioequivalent alternative is available</td>
<td>This patient received the brand-name loratadine. This drug is now available as a generic and is covered by Medicaid. This patient received the brand-name sustained-release oxycodone. This drug is now available as a generic and is covered by Medicaid.</td>
</tr>
<tr>
<td>Consider alternative</td>
<td>The use of a medication with no bioequivalent generic but with a less costly alternative agent in the same class. For some medications, different agents within the same class are therapeutically interchangeable, and another drug can be selected without negatively impacting the patient's drug therapy.</td>
<td>This patient received escitalopram, a name-selective serotonin reuptake inhibitor. Generic citalopram is now available and has similar efficacy.</td>
</tr>
<tr>
<td>Drug available over the counter</td>
<td>The receipt of a medication by prescription when it is available over-the-counter (OTC). Although many OTC medications are clinically useful and less costly alternatives to prescription drugs, we ask providers to use their judgment as to whether or not patients can purchase the item themselves.</td>
<td>This patient received docusate and diphenhydramine by prescription. These are available at a minimal cost OTC.</td>
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during the month that the patient exceeded the 7-medication limit. Data from prior months (up to a year) were used, if available and, if needed, to clarify concerns about utilization in the month of the review, such as duplicative therapy. Claims data from prior months would, of course, not be available to reviewers if the patient was not eligible for Medicaid benefits prior to the month of the review.

Nursing home (NH) and non-NH patients were reviewed, starting in May 2002. Each month, all patients who exceeded the 7-medication limit were ranked by the number of pharmacy claims submitted in that month. Top utilizers among NH and non-NH patients were reviewed if they had not been reviewed in the previous 6 months. The initial contract with the state called for DUR evaluation of 200 patients per month. Toward the end of the period of our analysis, in mid-2004, the contract was modified to expand the review number to 300 per month. Letters were generated and mailed to prescribers that addressed each specific drug-therapy concern. Some patients were reviewed a second time if they remained in the top 200 to 300 patients after 6 months.

Data from reviews conducted for patients who had exceeded the 7-medication limit in 2003-2004 were collated. If patients were reviewed multiple times during the 2-year period, data from subsequent reviews were excluded from analysis so that each patient was counted only once. The prevalence of clinically important DRPs and CSOs identified in each first review were calculated for NH and non-NH patients.

Results
A total of 391,890 Medicaid recipients were eligible for prescription benefits for at least 1 month during the calendar years 2003 and 2004. Of these, 242,411 (61.9%) had at least 1 pharmacy claim, and 16,958 (4.3%) exceeded the 7-medication limit. Among those exceeding the limit, we conducted a total of 4,563 reviews for 3,706 patients (21.9% of patients who exceeded the 7-medication limit), including 671 NH patients and 3,035 non-NH patients. A flowchart describing how patients were included for review is shown in Figure 1. Reviewed patients accounted for 1.5% of Medicaid eligible patients who filled prescriptions during the time period and 17.6% of total prescription drug costs during the time period. Demographics of reviewed patients are shown in Table 3. The mean age of reviewed patients was 53.5 years: 71.7 years for NH patients and 49.4 years for non-NH patients. Patients in both groups were predominantly female, including 71.2% of NH and 80.0% of non-NH patients.

Figure 2 shows the distribution of patients who had DRPs and CSOs. Of the reviewed patients, at least 1 DRP category was identified in 2,952 patients (79.7%), including 325 NH patients (48.4%) and 2,627 non-NH patients (86.6%). Multiple DRPs were identified in 2,080 patients (56.1%). Table 4 shows the numbers of patients who had each DRP category identified.

The most common categories identified included therapeutic duplications in 2,024 patients (54.6%), dose form optimization in 1,102 patients (29.7%), and inappropriate uncoordinated care in 939 patients (25.3%). The average pharmacy cost per month for patients with at least 1 DRP was $1,081. To put this number into perspective, the average pharmacy cost per month for all other patients receiving at least 1 prescription (including high- and low-utilizers) was $91.

Figure 3 shows the top 10 primary indications for drugs implicated in DRPs. The most common therapeutic category was pain and inflammation, which was implicated in 29.1% of all DRP categories identified. Other common categories included drugs used for anxiety or sleep (13.6%), antidepressants (11.6%), drugs for cardiovascular diseases (6.7%), drugs for psychotic disorders (6.4%), and cough and cold preparations (6.4%).
At least 1 CSO was also identified for 2,945 patients (79.5%), including 380 NH patients (56.6%) and 2,565 non-NH patients (84.5%). Table 5 shows the numbers of patients who had each CSO category identified. Multiple CSO categories were identified in 1,905 patients (51.4%). Reviewed patients with at least 1 CSO identified had an average drug cost of $1,109.60 during the review month. The most common CSO category identified was the recommendation to consider a therapeutic alternative to a prescribed drug, occurring in 2,695 reviews (72.7%).

The proportion of patients for whom a generic alternative was recommended was low in our analysis (3.7%). This is primarily because Utah’s DUR Board required mandatory switching of brand-name medications to generics midway through 2003. Fischer et al. evaluated this end point in 49 states in the year 2000 and found that an average of 6.1% of patients had been switched to generics.

We made the recommendation to consider a drug therapy alternative in a high proportion (77%) of ambulatory patients. Breaking this number down, more than one third of these (34%) consisted of recommendations to switch from a name-brand prescription proton pump inhibitor to over-the-counter (OTC) omeprazole, also covered by Medicaid. We also recommended switching between statins to less expensive agents with similar efficacy in low-density lipoprotein cholesterol reduction (14%) and to switch from a prescription non-sedating antihistamine to loratadine OTC (8%), also covered by Medicaid.

The difference between NH and non-NH patients with respect to the prevalence of DRPs is not surprising when one considers the practice model for these patient groups. NH patients tend to have a single physician prescribing and a single pharmacy dispensing medications; they also have the benefit of a federally mandated monthly drug regimen review by a pharmacist, which would result in lower rates of problems associated with uncoordinated care. Not a single case of uncoordinated care was identified in our NH patients within the 2-year evaluation period. However, among non-NH patients, the largely fee-for-service reimbursement model in Utah creates an environment where ambulatory patients frequently receive care for the same disease state from multiple providers at different practice sites. It has been our observation that therapeutic duplications, our most common DRP category, are often associated with patients who receive care from multiple clinicians. In fact, 35% of our patients with a therapeutic duplication had an associated recommendation to coordinate care compared with only 13% of patients without therapeutic duplications (data not shown).

This finding suggests that some of the elements of the NH practice model could have a dramatic impact on the rate of DRPs in ambulatory patients if those elements could be applied to the ambulatory care setting. For example, the mandated monthly pharmacist reviews for NH patients, while a critical part of NH care, results in a disparity of care for non-NH patients. Greater pharmacist involvement in evaluating the drug regimens of non-NH patients may be warranted across the board. Similarly, these results provide a rationale for applying the single physician and pharmacy provider model to the ambulatory care setting, such as increasing enrollment in managed plans that require a gatekeeper provider. The state of Utah maintains a fee-for-service plan because it is not feasible to require patients in rural settings to join managed plans. This is due to concerns about potentially limiting access to health care providers. However, the fee-for-service model may, in fact, result in more DRPs, higher costs, and potentially greater harm to patients.

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total drug expenditures (more than $228 million for all states) could have been saved in 2000 by using generics.

We were surprised to observe that 78% of our reviewed patients but only 55% of Medicaid enrollees in our state were female, suggesting that women are higher utilizers of prescription drugs. Other research has shown that women do, in fact, utilize health care resources more than men. While all of the reasons for this are unclear, theories include gender differences in the perception of illness and the likelihood of seeking treatment for illness, higher morbidity rates in women, and health differences associated with the reproductive system.16 In addition, the proportion of female NH patients might also be expected to be higher due to the differences in life expectancy between the genders.17

Some of the DRP categories may be best assessed when ICD-9 codes from medical claims are available, including drug-disease interaction, treatment without an indication, and untreated indication. However, ICD-9 codes were not available for some patients, including those enrolled in managed Medicaid plans and any dual eligibles for whom a coinsurance claim was not submitted. In addition, when we made recommendations based on ICD-9 codes, we occasionally received feedback from clinicians indicating that some of the ICD-9 codes were incorrect and that, in fact, some patients did not have a diagnosis that was indicated on a medical claim. Thus, we also used information from prescription claims as a surrogate for diagnosis where it was possible to do so. For example, if a patient received blood glucose testing supplies on a monthly basis, we felt

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### TABLE 4 Frequency and Prevalence of Drug-Related Problems Considered Clinically Important

<table>
<thead>
<tr>
<th>Drug-Related Problem Category</th>
<th>NH (N = 671)</th>
<th>Non-NH (N = 3,035)</th>
<th>Total (N = 3,706)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapeutic duplication</td>
<td>140 (20.9%)</td>
<td>1,884 (62.1%)</td>
<td>2,024 (54.6%)</td>
</tr>
<tr>
<td>Dose form not optimized</td>
<td>171 (25.5%)</td>
<td>931 (30.7%)</td>
<td>1,102 (29.7%)</td>
</tr>
<tr>
<td>Coordinate care</td>
<td>0 (0.0%)</td>
<td>939 (30.9%)</td>
<td>939 (25.3%)</td>
</tr>
<tr>
<td>Untreated indication</td>
<td>0 (0.0%)</td>
<td>298 (9.8%)</td>
<td>298 (8.0%)</td>
</tr>
<tr>
<td>Duration exceeds usual</td>
<td>15 (2.2%)</td>
<td>279 (9.2%)</td>
<td>294 (7.9%)</td>
</tr>
<tr>
<td>Drug-drug interactions</td>
<td>9 (1.3%)</td>
<td>284 (9.4%)</td>
<td>293 (7.9%)</td>
</tr>
<tr>
<td>Additive toxicity</td>
<td>2 (0.3%)</td>
<td>207 (6.8%)</td>
<td>209 (5.6%)</td>
</tr>
<tr>
<td>Drug-disease interactions</td>
<td>25 (3.7%)</td>
<td>181 (6.0%)</td>
<td>206 (5.6%)</td>
</tr>
<tr>
<td>Dose exceeds usual</td>
<td>32 (4.8%)</td>
<td>143 (4.7%)</td>
<td>175 (4.7%)</td>
</tr>
<tr>
<td>Treatment without an indication</td>
<td>32 (4.8%)</td>
<td>77 (2.5%)</td>
<td>109 (2.9%)</td>
</tr>
<tr>
<td>Subtherapeutic dose</td>
<td>2 (0.3%)</td>
<td>62 (2.0%)</td>
<td>64 (1.7%)</td>
</tr>
<tr>
<td>Any DRP category*</td>
<td>325 (48.4%)</td>
<td>2,627 (86.6%)</td>
<td>2,952 (79.7%)</td>
</tr>
</tbody>
</table>

* Prevalence of DRP recommendations, regardless of DRP type.

DRP = drug-related problem; NH = nursing home patients.

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### FIGURE 3 Incidence of Top 10 Primary Indications for Drugs Implicated in DRPs

- Anxiety or Sleep (13.6%)
- Depression (11.6%)
- Cardiovascular Diseases (6.7%)
- Psychotic Disorders (6.4%)
- Cough, Cold, or Allergy (6.4%)
- Asthma or COPD (5.0%)
- Other GI Disorders (4.8%)
- Infectious Diseases (4.0%)
- Seizure Disorders (2.5%)
- Pain or Inflammation (29.1%)

COPD = chronic obstructive pulmonary disease; DRP = drug-related problem; GI = gastrointestinal.
comfortable assuming the patient had diabetes, regardless of whether the patient had a diagnosis code in medical or facility claims. However, it should be noted that the limited information we had for some patients may have resulted in an underestimate of the true prevalence of these DRP categories in our patient sample.

The recommendation to optimize a dosage form included 2 separate types of recommendations: (1) to decrease the total number of tablets or capsules for certain medications or (2) to switch to a combination product from 2 separate dosage forms. In the first case, for example, a patient who received a total of 60 olanzapine 5 mg tablets as a 30-day supply would trigger the suggestion to use 10 mg olanzapine tablets since it is usually dosed once daily. Another scenario might be to suggest tablet-splitting, if appropriate. For example, if a patient was receiving sertraline 50 mg daily, use of the 100 mg tablets might be suggested since these tablets are scored and have nearly an identical cost per tablet. These types of dose form optimization strategies have been successfully implemented in other Medicaid programs.\(^4\)

In the second case, the use of combination products is recommended when it would save costs, which is not always the case. For example, based on reimbursement amounts, the combination of simvastatin/ezetimibe was less costly than the 2 dosage forms used separately during the period of analysis, so the use of the combination product was recommended if patients were already taking both agents separately. However, we did not make the recommendation to switch to a combination product if the combination product was more expensive than the 2 dosage forms separately, such as with diclofenac/misoprostol. We did not consider OBRA-mandated rebate amounts in our assessment of the costs of drug therapy for 2 reasons: (1) we did not have ready access to the rebate amounts by drug and (2) although we could have pursued the reporting of rebate amounts for our program, we did not want to create a situation where our recommendations might change periodically, as often as quarterly, based on rebate amounts. Therefore, the recommendations for therapy selection were independent of rebate amounts that were required by statute and varied somewhat during the 2-year period of this intervention.

Our recommendation to have the patient purchase a drug out-of-pocket if it was available OTC was less frequently used after initial implementation of our program. Although we reported a relatively high prevalence (30% of reviewed patients), for this DRP, this recommendation was discontinued midway through 2003. In part, the recommendation was discontinued due to concerns about restricting the use of effective and beneficial OTC agents, which may result in increased costs and decreased health among Medicaid patients.\(^9\) The recommendation was used initially because there was genuine concern that the 7-medication limit was going to be implemented at the pharmacy level after a period of review, so a goal of our program was to help patients identify the best way to cut their number of prescriptions down to 7. The spirit of the recommendation was to help identify the least expensive agents for patients to purchase out-of-pocket, if needed. However, as it became clear that most high utilizers were very ill patients with multiple disease states, many of whom required at least 7 medications for appropriate management, concerns that the 7-medication limit would be implemented soon dissipated, and we discontinued use of this recommendation.

To the best of our knowledge, our program is unique in that pharmacists identify specific DRP categories in patients rather than the alternative approach of applying programmed algorithms to large datasets and producing generic interventions for large numbers of patients. Based on our anecdotal experience reviewing thousands of patients on a case-by-case basis, patients are unique in attributes related to medical history and comorbidities. Frequently, recommendations that we make in one patient do not apply to another. Thus, it is difficult to make direct comparisons to other studies. Additionally, other interventions have frequently addressed only single specific recommendations or DRPs, such as identifying inappropriate usage of drugs in the elderly\(^9,10\) or assessing the appropriateness of HIV treatment,\(^4\) whereas Drug Regimen Review Center (DRRC) reviewers in the present study attempted to address each patient’s entire history of diseases and drug utilization.
Prevalence of Drug-Related Problems and Cost-Savings Opportunities in Medicaid High Utilizers Identified by a Pharmacist-Run Drug Regimen Review Center

Limitations
Some critics may cite the lack of a standardized, evidence-based protocol for defining DRPs and CSOs as a principal limitation of the analysis. DRP and CSO categories were defined by consensus among a group of 5 pharmacists with varying clinical backgrounds prior to implementation of the DRRC. The categories were created for the sole purpose of quantifying the types of problems that we identified and to assist us in making recommendations to clinicians. Individual patients have diverse and specific issues related to their drug therapy that are difficult to capture using a few broad categories. Our specific recommendations within each category were tailored for each patient using evidence-based guidelines where they exist for the different therapeutic areas. For example, we use the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7) as a basis to recommend that patients with hypertension receive a low-dose thiazide diuretic as a first-line agent for blood-pressure lowering. We also use evidence-based guidelines for recommendations in other disease states, including diabetes, asthma, heart failure, and treatment of symptoms of menopause.

Another limitation is that we did not systematically evaluate the impact of our program on costs or outcomes in this descriptive analysis. Since the goal of our program is to ensure appropriate pharmacotherapy among as many Medicaid patients as possible, we conducted reviews systematically on patients who exceeded the threshold of 7 medications per month. Consequently, we do not have a control group similar in demographics and comorbidities for comparison, and we have not employed an experimental design to permit the evaluation of outcomes. However, we have tracked pharmacy costs for reviewed patients over time in an effort to quantify what happened with drug costs for reviewed patients in the months following a review. These trends are reported in our annual report, which is available online. We made 3 estimates from the most conservative (drug costs in the reviewed cohorts would have remained constant for the year following the review) to the most probable (drug costs in the reviewed cohorts would have increased at a rate of 15%, similar to the rate of increase seen across all Medicaid patients). Using these 3 scenarios, we projected 1-year savings ranging from $4.6 to $8.1 million in our reviewed patients alone.

Another limitation is that the identification of DRPs is subjective and is based on the clinical experience and judgment of our reviewers. Thus, a similar program conducted by a different group of pharmacists might result in different prevalence rates of DRPs. While we feel confident that our method of identifying DRPs is clinically sound, in that we can incorporate into our consideration a number of variables that automated programs may not be able to evaluate, we have implemented strategies aimed at reducing variability between pharmacists in these assessments. A future research goal is to evaluate pharmacist uniformity in recommendation categories and rates before and after implementation of these quality-assurance efforts.

An additional limitation to the external generalizability of our analysis is that the rates of DRPs and CSOs are largely dependent on the policies of the Utah Medicaid program. For example, states that do not mandate use of generics are likely to find a higher rate of brand-name use. Other policies that might impact the rates of problems identified include prior-authorization requirements, preferred drug lists, fail-first requirements, class restrictions, and quantity limitations. The state of Utah uses several cost-saving measures, including patient copays for the first 5 prescriptions; fail-first and prior-authorization requirements for certain classes (e.g., nonsedating antihistamines); quantity limits for several therapeutic classes, including proton pump inhibitors and benzodiazepines; and no reimbursement for drug efficacy study implementation (DESI)-class drugs considered to have marginal benefit. The state of Utah has considered but has not yet implemented a preferred-drug list.

Finally, a limitation of all evaluations of pharmacy claims data is the lack of information about the use of physician office samples in patients. This limitation might lead us to identify a higher rate of untreated indications if many patients were receiving samples instead of filling prescriptions in the pharmacy. We think it is unlikely that many Medicaid patients receive samples on a long-term basis since patients have a minimal or no copay for medications covered by Medicaid, and our Medicaid program generously pays for most drugs with few restrictions. However, we have no data to support the assumption that physicians do not frequently give samples to patients in the Utah Medicaid program.

One area for future research in our program is to try to determine whether there is a difference in DRPs and CSOs among fee-for-service versus managed care plans. Because Utah is considered a frontier state, based on population density, it is not feasible to require all Medicaid recipients to enroll in managed care plans. Consequently the state of Utah has many Medicaid recipients in managed care and fee-for-service plan types. Our center reviews patients from both plan types, but we have not compared DRP and CSO prevalence rates between managed Medicaid and fee-for-service care. Since we have observed a high correlation between therapeutic duplications and uncoordinated care, it might be interesting to determine if patients in managed care plans have better coordinated care and fewer DRPs. The current study did not assess this relationship.

Conclusions
One or more drug-related problems occurred in 48% of nursing home residents who received 7 or more medications per month and in 87% of nonresidents of nursing homes, for an overall prevalence of 80% of high-utilizing Medicaid recipients. Therapeutic duplication was the most common problem identified among Medicaid recipients. At least 1 CSO was found...
for 57% of the nursing home residents and 85% of the ambulatory recipients, yielding an overall prevalence of 80% of high-utilizing Medicaid recipients; 54.1% of patients had 2 or more CSOs. Future research is needed to determine if managed care plans have lower rates of drug-related problems compared with fee-for-service plans.

DISCLOSURES

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