Abstracts from the Professional Poster Presentations at AMCP’s 2001 Educational Conference

The following poster presentations are to be presented at the Academy of Managed Care Pharmacy’s 2001 Educational Conference, October 17–20, in Dallas, Texas.

For more information about the studies described below, please contact the corresponding author, indicated by an asterisk (*), whose address is listed in full. The names of individuals who are scheduled to present at the meeting are underlined.

A retrospective cohort analysis of the clinical effectiveness of a physician-pharmacist collaborative drug therapy management diabetes clinic

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OBJECTIVE: To evaluate the intermediate health outcomes of diabetic patients receiving care while enrolled in a pharmacist-managed diabetes clinic (under physician-approved protocol) within the Texas Department of Criminal Justice (TDCJ).

METHODS: Retrospective cohort analysis of 172 patients, 1,500 patient-visits occurring between October 1997 and June 2000. Exposure was defined as enrollment within a pharmacist-managed diabetes clinic. A group of unexposed patients enrolled in traditional diabetes clinics within the TDCJ system managed by nonpharmacists were randomly selected from several TDCJ facilities in West Texas to serve as a control group.

RESULTS: Data were collected for 87 patients enrolled in a pharmacist-managed diabetes clinic and 85 patients enrolled in non-pharmacist-managed clinics. Patient demographics were similar upon comparison of the two groups, with the exception of hemoglobin A1c (HgA1c) levels that were found to be higher in the control group (9.5 mg/dl to 8.2 mg/dl, p=0.004). Twenty-one percent of patients enrolled in the control group, compared to 57% of patients enrolled in pharmacist-managed clinics, attained goal HgA1c levels of 7 mg/dl or less (p=0.005). Controlling for between-clinic demographic differences, we found that the odds of a patient enrolled in a pharmacist-managed clinic achieving a HgA1c of less than 7% was 5.8 times that of a patient enrolled in the control group (OR CI 95%=20.0–16.8). Patients enrolled in pharmacist-managed clinics averaged 15.1 months (CI 95%=12.41–17.71 months) to reach HgA1c goal versus 27.0 months (CI 95%=24.5–29.5 months) for patients enrolled in the control group (p=0.005).

CONCLUSION: Pharmacist-managed clinics can affect the intermediate outcomes of diabetes treatment.

LEARNING OBJECTIVES: Audience participants will:
1. describe obtainable outcomes for a pharmacist-managed diabetes clinic;
2. apply the research and outcome parameters of this study to everyday practice; and
3. recognize common monitoring parameters related to diabetes.

A comparison of patient compliance with a weekly contraceptive patch (ORTHO EVRA) versus oral contraceptives

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INTRODUCTION: Patient compliance with a weekly transdermal dosing regimen was compared with daily oral contraceptive (OC) dosing in two clinical trials. Compliance was further analyzed by patient age category.

METHODS: Women were randomized to 10-cm2, 15-cm2, or 20-cm2 (ORTHO EVRA) patch sizes (n=460) (three consecutive 7-day patches [21 days] followed by one patch-free week/cycle) or ORTHO-CYCLEN (n=150) in Study 1, and to ORTHO EVRA (n=812) or Triphasil (n=605) in Study 2. For all treatments, perfect compliance was defined as 21 consecutive days of drug (no patch worn for more than 7 days), followed by a 7-day drug-free period.

RESULTS: In Study 1, the percentage of cycles with perfect compliance was significantly higher for each patch regimen than ORTHO-CYCLEN (all p<0.0001, t-test). Perfect compliance rates were comparable across the three patch sizes and age categories (90.7%–100%), but lower in younger subjects receiving ORTHO-CYCLEN (41.7% in subjects younger than 20 years, 73.1% in subjects 20–24 years, 77.7%–81.0% in older subjects). In Study 2, the percentage of cycles with perfect compliance was 88.7% with ORTHO EVRA and 79.2% with Triphasil (p<0.001, t-test). Perfect compliance rates were similar across all age groups with ORTHO EVRA (87.7%–91.6%), but lower in younger subjects receiving Triphasil (67.7% in subjects younger than 20 years, 74.4% in subjects 20–24 years, 79.8%–85.2% in older subjects).

CONCLUSIONS: Compliance with the ORTHO EVRA dosing regimen is significantly better than compliance with OCs. Compliance with ORTHO EVRA is unaffected by age; compli-
**LEARNING OBJECTIVES:** Audience participants will:
1. recognize the differences in dosing schedule between the weekly contraceptive patch (ORTHO EVRA) and oral contraceptives (OCs);
2. describe the differences in compliance between women using the weekly contraceptive patch (ORTHO EVRA) and women taking OCs; and
3. recognize that compliance is consistent across all age groups with the weekly contraceptive patch (ORTHO EVRA), whereas compliance varies by age with OCs.

**Economic opportunities for oral chemotherapy in oncologic managed care settings**

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**INTRODUCTION:** Reimbursement practices for intravenous (IV) versus oral chemotherapies were surveyed in managed care oncology settings and potential drivers of chemotherapy selection and opportunities for cost efficiency were explored.

**METHODS:** This research identified factors that drive managed care oncologists to administer IV chemotherapy agents for breast cancer even though oral agents demonstrate favorable outcomes. Patterns of oncology services in managed care settings were revealed using a blinded telephone survey methodology. The survey was administered to medical and pharmacy directors, oncologists, and support staff in 11 staff and independent practice association-model managed care organizations (MCOs) throughout the United States. The knowledge of reimbursement standards and the reimbursable rates for IV and oral chemotherapies were identified. A cost analysis of competing routes of chemotherapy administration was also performed based on actual reimbursement practices.

**RESULTS:** Only 6 of 11 oncologists (55%) were aware that Medicare provided reimbursement for oral oncology agents. Lack of reimbursement was generally considered a barrier, as was the administrative burden of dispensing from the office. Reimbursement for IV chemotherapies ranged from average wholesale price (AWP) +10% to AWP +120%. For example, a three-week regimen of continuous infusion 5-FU 250mg/m2 was reimbursed $1,093 in Medicare and $2,250 in commercial plans. These costs included nursing visits, pump maintenance, and tubing. A three-week cycle of oral capecitabine 2,500 mg/m2/day was reimbursed $855.

**CONCLUSION:** Reimbursement incentives currently exist for oncologists to recognize and utilize intravenous chemotherapy. Oral capecitabine offers MCOs potential cost-saving opportunities of 22%–62% while preserving clinical outcomes and patient-convenience benefits. Further research is needed.

**Economic evaluation of formoterol dry-powder capsules versus salmeterol in the treatment of reversible obstructive airway disease**

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**PURPOSE:** To evaluate the economic benefits of formoterol versus salmeterol in the treatment of reversible obstructive airway disease (ROAD) patients in a randomized, parallel, open-label clinical trial.

**METHODS:** Patients (n=527) aged 18–75 years with moderate to moderately severe ROAD requiring concomitant inhaled corticosteroids and regular or rescue use of short-acting beta-agonists were randomized to treatment with formoterol (12 µg BID using the Aerolizer inhaler device) or salmeterol (50 µg BID as Serevent Diskus). Information on medical resource utilization was collected over a six-month study period and characterized as "asthma-related," "other respiratory-related," or "nonrespiratory-related" depending on recorded diagnoses/reasons for seeking care. Descriptive statistics were estimated, and differences in mean values were tested using an appropriate parametric (Student's t) or non-parametric (Wilcoxon rank-sum) statistic.

**RESULTS:** Formoterol-treated subjects achieved significantly better improvement in post-dose morning peak expiratory flow (PEF) versus subjects receiving salmeterol (393.4 versus 371.7; p<0.001), and required fewer daily actuations of rescue medication. Formoterol-treated subjects also had more episode-free days over the 24-week study period (14.1 versus 12.2; p<0.03). Costs of all respiratory care (i.e., the sum of asthma-related and other respiratory care) were significantly lower among formoterol-treated subjects ($508 versus $606, p<0.02), with the biggest savings resulting from lower costs of rescue, asthma, and other respiratory medications.

**CONCLUSIONS:** Patients receiving formoterol versus salmeterol had significantly better improvement in post-dose morning PEF, reduced need for asthma rescue medication, and more episode-free days. Treatment with formoterol also led to lower costs of asthma rescue medication, all respiratory conditions, and total respiratory care costs than those receiving salmeterol.

**LEARNING OBJECTIVES:** Audience participants will:
1. understand how the clinical benefits of formoterol dry-powder capsules versus salmeterol observed in this clinical trial were translated into economic benefits (i.e., lower costs); and
2. recognize the magnitude of potential cost savings to managed care plans.
INTRODUCTION: The purpose of this study was to evaluate the clinical and economic impact of a formulary conversion from all other HMG-CoA reductase inhibitors (statins) to either cerivastatin or simvastatin at Tripler Army Medical Center (TAMC).

METHODS: A retrospective, longitudinal, pre- versus post-conversion analysis of NCEP/ADA goal attainment, lipid parameters (LDL-C, TC, HDL-C, and TG), and pharmacy costs of patients converted from any other statin to cerivastatin was conducted.

RESULTS: Patients were converted from atorvastatin (37.9%), lovastatin (36.9%), pravastatin (24.7%), and fluvastatin or simvastatin (0.2%) to cerivastatin (n=556). Overall, conversion to cerivastatin resulted in a significantly higher proportion of patients attaining National Cholesterol Education Program (NCEP)/American Diabetes Association (ADA) goal (70.7% versus 65.9%, \( p = 0.031 \), McNemar X2) and significantly decreased mean LDL-C (106.7 versus 109.4 mg/dL, \( p = 0.026 \), paired t-test). When patients were stratified by NCEP/ADA risk categories (secondary prevention, primary prevention: with diabetes, two or more risk factors (RF), and fewer than two RFs), conversion to cerivastatin resulted in more diabetic patients (n=96) attaining ADA goal (54.1% vs. 40.8%, \( p = 0.020 \), McNemar X2; mean LDL-C: 102.7 versus 105.7 mg/dL, \( p > 0.05 \), paired t-test). NCEP goal attainment was comparable pre- versus post-conversion in secondary prevention (n=201), and in both patients with two or more RFs (n=105) and fewer than two RFs (n=162). Conversion to cerivastatin resulted in a estimated annual pharmacy savings of $460.86 per patient attaining NCEP/ADA goal.

CONCLUSION: Formulary conversion to cerivastatin improved and/or maintained NCEP/ADA goal and LDL-C levels at a substantially lower pharmacy cost relative to pre-conversion statins.

LEARNING OBJECTIVES: Audience participants will:
1. describe NCEP LDL-C treatment goals;
2. describe ADA treatment decisions based on LDL-C level in adults with diabetes;
3. understand statin use and associated outcomes; and
4. discuss how the mandatory DoD statin conversion has affected patient outcomes as measured by attainment or nonattainment of NCEP/ADA goals.

Outcome analysis of incorporating a call center into a clinical review area

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PURPOSE: To merge an out-source call center and clinical review area into a uniform clinical review call center, thereby reducing cost, overhead, and time for the managed care company, reducing frustration and time of the practitioner, and increasing the trust between the practitioner and the managed care company.

METHODS: After evaluation of staffing requirements and anticipated reduction of daily encounters, the first of two call center specialist groups were hired and put through a two-week training session. Training included company and basic pharmacy orientation, clinical criteria explanation, and computer training.

Review by medical directors was implemented after legal compliance, and peer-to-peer issues were resolved. Changes were incorporated two to three times each week as the call center evolved to modify all operation procedures.

RESULTS: Through the combination of the call center and the clinical review area, staffing was reduced from 49 to 29 with a cost savings of $732,000 per year. Instituting a phone menu allowed us to transfer member calls to the appropriate customer service center, which showed a decrease in calls of around 28% and made pharmacists more available for physician interaction. Through clinical interaction with the pharmacy and therapeutics committee, we showed the benefit of decreasing criteria restrictions on COX II therapy, further reducing calls.

CONCLUSIONS: The merger of an out-source call center with clinical pharmacy review yielded a cost reduction of $7 per call, averaging $126,000 per month. While increasing physician satisfaction, we've captured the information during the initial contact, thus eliminating a second contact. Closer interaction with the clinical strategy team allows for more criteria adjustments based on clinical feedback from the call center.

LEARNING OBJECTIVES: Audience participants will:
1. consider cost and clinical outcomes of merging an out-source call center with a clinical review department;
2. recognize the benefits of a clinical call center's impact on the pharmacy and therapeutic committees criteria;
3. explain ways to enhance pharmacist/physician interaction throughout the prior authorization process; and
4. understand legal compliance issues regarding response time, peer-to-peer, and medical director review.
Factors in decision making for prophylactic use of rHuG-CSF

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OBJECTIVE: To determine sources of information and the importance of patients' quality-of-life outcomes in oncologists' decisions to use colony-stimulation factors (CSF) in prophylaxis with chemotherapy patients. Guidelines suggest using CSF prophylaxis only if risk for febrile neutropenia (FN) is 40% or greater, but clinical data documenting FN risk are unclear.

METHODS: A survey was conducted among a geographically diverse sample of oncologists to measure the importance of factors in making treatment and patient management decisions. The responses were measured on a 5-point Likert scale or ranked by order of importance. Results were compiled for all respondents and separated into rural versus urban respondents.

RESULTS: Twenty-four of 28 clinical oncologists responded; 25% were from rural areas. Personal and colleague experience ranked highest in importance for estimating patient risk for FN. Treatment guidelines and experience were important in deciding not to use prophylaxis. Utilization review was unimportant. Patient outcomes ranked highest; were physical well-being and overall health-related quality of life. Maintaining chemotherapy dose levels was extremely important and dose intervals and avoiding FN were very important in deciding when to use CSF prophylaxis. Rural oncologists considered patient education, social support, functional status, and distance from the center more important than urban oncologists did. Overall, costs were not taken into account but patient-centered outcomes were very important in making decisions for prophylaxis treatment.

CONCLUSIONS: Decision algorithms including measures of patient-centered outcomes and more definitive reporting of risk factors in clinical literature may help guide oncologists managing chemotherapy patients.

LEARNING OBJECTIVES: Audience participants will:
1. learn the basis of CSF guidelines and problems faced by oncologists in estimating risk of FN in chemotherapy patients;
2. understand the importance of patient-centered outcomes in chemotherapy; and
3. learn how patient-centered outcomes can be incorporated into guidelines and the treatment decision-making process.

Impact of adherence to National Cholesterol Education Program (NCEP) Guidelines in a physician group practice

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INTRODUCTION: In an effort to implement a quality-improvement program in a physician office, pre- and post-data analyses with a clinical intervention were conducted. Clinical impact of adherence to National Cholesterol Education Program (NCEP) guidelines by a physician group was determined using benchmarks for quality improvement.

METHODS: Pre- and post-analyses and a clinical intervention were conducted in a physician office. Patients were randomly selected from a database of International Classification of Diseases Ninth Revision codes positive for a coronary event and a retrospective medical chart review was completed. Baseline results were reported to the physician group; physicians were advised to implement a clinical intervention at their discretion. One year after the intervention, a second retrospective chart review was performed. Preliminary results comparing the baseline data to the post-intervention data were achieved.

RESULTS: Preliminary results revealed that after the intervention, average low-density lipoprotein, total cholesterol, and triglyceride values decreased from 116.7 to 103.6 mg/dL, 197.4 to 182.7 mg/dL, and 209.2 to 170.1 mg/dL, respectively. The utilization of HMG-CoA reductase inhibitors to lower lipid levels increased markedly from 24.3% to 69.0%.

CONCLUSIONS: This study demonstrates that a quality-improvement program in a physician group to encourage adherence to national guidelines improves the clinical outcomes of patients with secondary hypercholesterolemia.

LEARNING OBJECTIVES: Audience participants will:
1. recognize the clinical impact of quality-improvement programs in a physician practice site;
2. recognize the value of the quality-improvement programs in meeting the National Committee for Quality Assurance (NCQA) accreditation and Health Employer Data and Information Set (HEDIS) guidelines;
3. understand the content of the National Cholesterol Education Program (NCEP) Guideline and the importance of treatment for patients with hypercholesterolemia; and
4. recognize ways to improve current rates of physician compliance with the NCEP guidelines.

Impact of a point-of-sale (POS) intervention program

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INTRODUCTION: The Point-of-Sale (POS) Intervention Program addresses the potential disruption of patients' therapy embedded in the prevailing prior-authorization program. Such a goal is accomplished via a 30-day grace period override while paperwork is completed. The program serves as a mechanism to achieve optimum therapeutic outcome while containing prescription drug cost. The POS process is streamlined with continuous clinical and process improvement.

METHOD: The POS Intervention Program was implemented for 360,000 members. Two drug classes—proton-pump inhibitors and migraine therapy—were targeted. The POS Intervention Program is
triggered when a specific prescribed drug exceeds the recommended dosage, duration of therapy, or number of refills. A community pharmacist is alerted by a computer message and directed to call our Pharmacy Services Center for a one-time, 30-day grace period override while paperwork is being processed by the physician’s office and our pharmacy service specialists. The utilization and cost savings data were collected, analyzed, and benchmarked against a control group between January 1, 2000, and December 31, 2000.

RESULTS: The program has achieved reductions in utilization for the two drug classes, while adhering to clinical guidelines. For instance, in the POS Intervention Program’s second year (January 1, 2000, to December 31, 2000), total days per user were reduced by 84 days for proton pump inhibitors and by 30 days for migraine therapy. This translates into a total annual ingredient cost savings of $1.7 million. In addition, our continuous clinical and process improvements enhance physician and provider satisfaction.

CONCLUSION: The POS Intervention Program was effective in decreasing drug utilization and cost while ensuring optimum therapeutic outcome.

LEARNING OBJECTIVES: Audience participants will:
1. understand the importance of a one-time, 30-day grace period override in the POS process;
2. understand the importance of the clinical and process improvements made and their impact on the efficiency of the process; and
3. report the clinical and financial benefit of the program.

Health-related quality of life in rheumatoid arthritis: Impact of leflunomide treatment

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OBJECTIVES: To compare baseline rheumatoid arthritis (RA) health-related quality-of-life (HRQoL) data with the general population and patients with other disease states and to determine the effect of leflunomide (LEF) treatment on HRQoL of patients with active RA.

METHODS: In a double-blind, parallel-group, controlled trial with LEF, SF-36 domains scores, and Physical (PCS) and Mental (MCS) Component Summary Scores were assessed at baseline, 6, 12, and 24 months; or early exit. Baseline SF-36 scores were compared with U.S. age- and gender-matched norms and patient populations with hypertension (HTN) or type-2 diabetes.

RESULTS: In comparison to U.S. norms and patients with HTN or type-2 diabetes, patients with active RA had lowest baseline scores in all SF-36 domains and summary scores. Specifically, greater decrements in all domains of HRQoL were reported by RA patients compared with those with diabetes or HTN. PCS values reflected the most disparity (RA, 30.9; U.S. norms, 50; diabetes, 41.5; and HTN, 44.3). Following treatment with LEF over 12 and 24 months, SF-36 domain, and summary scores improved significantly and approached U.S. norms.

CONCLUSIONS: RA has a substantial impact on HRQoL in patients with active disease, in comparison not only to U.S. normative values but also to patients with HTN or type-2 diabetes. LEF therapy over 12 and 24 months in patients with active RA improves HRQoL and approaches levels of the U.S. age- and gender-matched population.

LEARNING OBJECTIVES: Audience participants will:
1. understand the impact of RA on HRQoL;
2. compare the HRQoL of RA patients with U.S. norms and patients with HTN and diabetes; and
3. understand the impact of leflunomide treatment on HRQoL in patients with active RA.

The economic impact of prior authorization within a three-tier pharmacy benefit design

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INTRODUCTION: In a three-tier pharmacy benefit design, there is no system to manage inappropriate use of nonformulary agents since members have access to these agents at the highest copayment. The purpose of this study is to measure the economic impact of limited prior authorization for high cost therapeutic classes in a three-tier pharmacy benefit.

METHODS: Pharmacy claims adjudicated for members who had a two-tier or three-tier pharmacy benefit in calendar year 2000 were analyzed. The top five high-cost therapeutic classes were identified as prior-authorization-required agents for the purpose of this analysis. The financial impact of these therapeutic classes was compared between a prior authorization system (two-tier) and a system without prior authorization (three-tier). We hypothesized that when prior authorization is required, formulary compliance will be higher and the net cost to the plan will be lower compared to when a prior authorization is not required.

RESULTS: Those top five high-cost therapeutic classes accounted for 30% of all drugs requested for prior authorization and 17% of the total net cost. The net cost per prescription for the prior-authorization group was lower than the non-prior authorization group ($51.72 versus $56.13, p=<0.00001), and the formulary compliance rate was higher (77.28% versus 51.04%, p<0.001). The estimated per member per month (PMPM) savings attributable to prior authorization in three-tier pharmacy benefit was $0.44.

CONCLUSION: Prior authorization within a three-tier pharmacy benefit design appears to be an effective method of controlling overall pharmacy costs in a three-tier pharmacy benefit design.

LEARNING OBJECTIVES: Audience participants will:
1. understand the advantages and disadvantages of a three-tier pharmacy benefit structure;
2. understand the prior authorization process; and
3. understand the role of prior authorization within a three-tier pharmacy benefit design.
Implementation and initial results of a patient-centered-care support program

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INTRODUCTION: A patient-centered-care support program offered to asthma, congestive heart failure, and diabetes patients identified and stratified risk using medical claims, pharmacy claims, and telephone assessment and led to positive clinical, economic, and satisfaction outcomes.

METHODS: Medical and pharmacy claims data from 155 patients enrolled in the First Health Care Support programs for asthma, congestive heart failure, or diabetes were analyzed in a one group pre-test/post-test design. Pharmacy and medical charges were calculated for five months pre-intervention and five months post-intervention. In addition, a patient-satisfaction survey was mailed to all patients enrolled for three or more months in these programs.

RESULTS: The population was 61% female and the average age was 65.4 years. Twenty-nine percent of patients were in multiple protocols. Comparing pre- to post-, medical charges decreased by 13%, while pharmacy charges increased by 10%, yielding a net decrease of 12%, or $877 per patient. The survey achieved a 33% response rate. Findings include increased use of self-management tools by patients and improved compliance with medication. Patients reported high levels of satisfaction with the overall program and with individual case managers. Over 80% of those survey respondents reported that they would recommend the program to a friend in need.

CONCLUSIONS: This patient-centered program directs care according to patient need at all levels of risk. Data triggers are combined with nurse assessment to provide patients one point of contact regardless of risk, disease state, or comorbidities. The program has gained favorable response from clients and their members who have entered the program and has demonstrated improved clinical quality and cost effectiveness.

LEARNING OBJECTIVES: Audience participants will:
1. understand differences between a patient-centered versus disease-centered approach to patient-care strategies;
2. describe the key elements necessary for successful development and implementation of a disease-management program; and
3. discuss disease management as part of an overall patient-care support strategy.

Evaluation of generic warfarin utilization in Scott and White Health Plan patients

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INTRODUCTION: Warfarin, a narrow therapeutic index drug, requires careful dose titration and blood-level monitoring. Content uniformity standards set by Dupont Pharmaceuticals are more stringent than those required by the Food and Drug Administration for generic manufacturers. This is a concern for the health plan because suppliers are unable to guarantee that they will consistently carry a specific manufacturer’s generic product.

METHODS: Pharmacy claims and medical records were analyzed to determine whether the rate of therapeutic International Normalized Ratio (INR), as well as hemorrhagic and thromboembolic outcomes, is different in patients switched from brand-name Coumadin to generic warfarin. Patients with a prescription for Coumadin or generic warfarin from first quarter 1999 through third quarter 2000 were identified. Patients switched from Coumadin to a generic equivalent were included in the study group. Two matched control subjects were randomly selected for each study subject. Control patients were matched for age (within five years), gender, indication, and target INR.

RESULTS: Ten (50%) of the 20 study patients were in therapeutic INR range after switching to generic warfarin compared with 25 (62.5%) of the 40 control patients remaining on Coumadin (odds ratio 0.6, 95% confidence interval 0.2 to 2.0). No major thromboembolic or hemorrhagic events were reported during the study period.

CONCLUSIONS: No statistically significant differences were seen between study and control patients in control rates or clinical outcomes. While patients on Coumadin had higher rates of control versus those on generic warfarin, studies involving more patients switching to the generic product are needed.

LEARNING OBJECTIVES: Audience participants will:
1. understand the significance of a narrow therapeutic index drug such as warfarin and the impact of such drugs on health plan decisions;
2. evaluate the outcomes of generic substitution from the brand-name product Coumadin to a generic warfarin product in health plan patients; and
3. determine whether or not there is a risk associated with switching between warfarin products.

Comprehensive communication program to facilitate therapeutic interchange: Experience with proton-pump inhibitors

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INTRODUCTION: A solid therapeutic-interchange target was identified and a successful interchange process was designed and implemented.

METHODS: Increased proton-pump inhibitor (PPI) use, and Food and Drug Administration approval of rabeprazole (Aciphex) resulted in Security Health Plan’s (SHP) review of PPIs. Consultation with gastroenterologists and a literature review deemed rabeprazole clinically equivalent to formulary-
listed PPIs, with favorable pharmacokinetics and pharmacodynamics. After evaluation of PPIs for efficacy, safety, and cost, rabeprazole was selected as the formulary PPI. In June 2000, 365 omeprazole prescribers (1,228 patients), and in August 2000, 303 lansoprazole prescribers (763 patients), were notified of the Prescription Switch Program (PSP). Each physician received a fax-back form to facilitate the switch. SHP informed physicians that new prescriptions for lansoprazole or omeprazole would not be covered after August 1, 2000, for members with closed formularies. Likewise, existing SHP coverage of omeprazole and lansoprazole ceased on November 1, 2000, without documented medical necessity.

RESULTS: Within four months, 71% of omeprazole-treated patients (870/1228), and 57% of lansoprazole-treated patients (432/763), were switched to rabeprazole. PPI days for rabeprazole increased from 13.7% in April 2000 to 58.3% in December 2000. Rabeprazoles prescription market share increased from 13.9% to 55.4% in that time period. Fewer rabeprazole-treated patients required b.i.d dosing (less than 7%) than patients treated with other agents (12% to 14%). The PSP yielded ingredient cost savings of $74,418.80 (May through December 2000).

CONCLUSION: In an effectively designed therapeutic interchange, the high percentage of switches from omeprazole or lansoprazole to rabeprazole demonstrates physician and patient acceptance of the PSP.

LEARNING OBJECTIVES: Audience participants will:
1. identify factors important in selecting target drugs and drug classes for successful switch programs;
2. list key elements in the design and implementation of an effective and efficient PSP; and
3. discuss the potential financial impact observed with one such program in a health plan.

Correlation of chronic disease management to pharmacy utilization indicators in a staff-model correctional managed health care organization

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INTRODUCTION: Managed Health Care Pharmacy Services provides a prescription benefits program in support of approximately 31,000 offenders in the West Texas sector of the Texas Department of Criminal Justice (TDCJ). Pharmacy utilization indicators have increased at a rate greater than the increase in offender census and the acquisition cost of drugs. These increases have been attributed to a unique patient population that is subjectively considered to be increasingly “sicker.” An objective patient-acuity rating system to confirm this assessment does not exist. The Texas Tech University Health Sciences Center Regional Pharmacy and Therapeutics Committee authorized a quality-improvement study to determine the relationship of chronic disease management to pharmacy utilization indicators.

METHODS: The total number of chronic-care patient clinic visits per month was collected over a six-month period from five similar TDCJ facilities, each of approximately 1,300 medium-security beds. Data were correlated to aggregate and per-facility pharmacy utilization indicators using the SPSS statistical software and stepwise multiple regression correlation modeling.

RESULTS: Chronic-care clinic visits per month is not predictive of pharmacy utilization indicators. The rate of non-formulary prescribing (B=0.939, p<0.0005) and total offender days per month (B=0.164, p<0.0005) are strongly predictive of drug costs (R=0.981 for model, p<0.0005). A seasonal trend was observed, with higher drug costs in winter months.

CONCLUSIONS: Available data suggest that drug cost is driven by the rate of non-formulary prescribing and variations in offender census. Seasonal trends may be associated. Additional data collection and analysis are needed to elucidate the importance of these findings.

LEARNING OBJECTIVES: Audience participants will:
1. identify pharmacy utilization indicators that may be influenced by chronic disease management;
2. describe the relative contribution of chronic disease management to pharmacy utilization; and
3. apply the results of this study to monitoring the contribution of chronic disease management to drug costs in similar staff-model managed care organizations.

Direct costs and treatment patterns associated with overactive bladder

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INTRODUCTION: The objective was to compare direct costs and treatment patterns among patients with overactive bladder (OAB) through retrospective analysis of pharmacy and medical claims.

METHODS: Patients 18–64 years of age with a diagnosis indicative of OAB or medication for OAB, including tolterodine, oxybutynin IR, and oxybutynin XL, were identified between April 1, 1998, and March 31, 1999. Length of therapy and adherence to OAB medication were measured using a medication possession ratio (MPR). Log-adjusted direct costs were compared by medication in a multivariate regression analysis controlling for age, gender, stress incontinence, conditions related to OAB, prior use of OAB medication, baseline costs, provider specialty, and health plan location.

RESULTS: 20,477 (1.3%) patients had a diagnosis indicative of OAB or a pharmacy claim for OAB medication between April 1, 1998, and March 31, 1999. Patients received a median of two OAB medication prescriptions during the study. Adherence to
OAB therapy ranged from 13% among oxybutynin IR patients to 17.8% among tolterodine patients. Log-adjusted pharmacy costs were significantly higher for tolterodine and oxybutynin XL patients compared to oxybutynin IR patients. Medical costs were significantly higher for oxybutynin IR patients compared to patients with no OAB medication. Despite differences in pharmacy costs, total costs were not significantly different between tolterodine, oxybutynin IR, or oxybutynin XL patients.

CONCLUSIONS: While the choice of OAB medication did not significantly affect total direct costs, it remains that the majority of patients treated for OAB did not remain on therapy. Further study of continuously treated subjects would help validate the cost findings.

LEARNING OBJECTIVES: Audience participants will:
1. identify variables that may independently affect the relationship between choice of OAB medication and total direct health care costs;
2. describe patients’ average adherence to or length of OAB therapy and hypothesize why this pattern of treatment behavior is common; and
3. discuss the impact of each OAB medication on log-adjusted total costs and how further research methods could be used to determine if cost findings remain similar.

Use of regression analysis to predict benefit tiers and resulting cost savings

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INTRODUCTION: Pharmacy benefit designs employ a tiered approach, in an effort to change member behavior. However, these tiers are often determined empirically.

METHODS: We hypothesized that a model using pharmacy claims could determine minimum tier differences required to change member behavior, as well as propose cost-effective designs based upon those changes in member behavior. This study was performed at a 1.4 million-life plan in the Mid-Atlantic Region. Fixed inputs included number of claims and members, retail and mail pricing, and annual pharmacy inflation and utilization trends; variable inputs were retail and mail copayment, coinsurance, and deductible. Multiple regression analysis was used to determine significant predictors. Predictors resulting in p<0.05 were deemed significant.

RESULTS: Fifty-one benefit designs were used to create the model (45% of the total drug spend). A minimum spread of $26–$32; proposed benefits were associated with a $1.76–$11.86 reduction in PMPM. A multiple regression model is capable of predicting the differences required in benefit tiers to change member behavior, as well as the reductions in PMPM that will occur from new benefit designs.

CONCLUSION: A multiple regression model is capable of predicting the differences required in benefit tiers to change member behavior, as well as the reductions in PMPM that will occur from new benefit designs.

LEARNING OBJECTIVES: Audience participants will:
1. know the significant levels in changing member behavior with respect to pharmacy benefit management;
2. create benefit designs based upon health plan specific data rather than intuition; and
3. understand the assumptions and limitations of model-based pharmacy benefit design.

Economic comparison of SSRI use and expenditures among clients in the Texas Medicaid program

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INTRODUCTION: This study describes the prescription utilization patterns and the economic impact of citalopram compared to other selective serotonin reuptake inhibitor (SSRI) and SSRI-related study agents (fluoxetine, sertraline, paroxetine, venlafaxine immediate-release [IR], and venlafaxine extended release [XR]) within the Texas Medicaid program.

METHODS: A retrospective claims-based analysis was conducted from July 1998 through December 1999. Statistical comparisons were made between cohorts of claims grouped by study agent. Drug expenditures were calculated based on payments to pharmacies.

RESULTS: A total of 724,162 SSRI prescription claims were analyzed for 130,630 Texas Medicaid clients during the study period. The calculated cost per day for citalopram clients (x=2.04, ±0.98, n=37,590) was significantly lower (p=0.002) than other study agent groups, except venlafaxine IR (x=2.04, ±0.98, n=37,590, p=0.112). Mean number of days of continuous treatment for newly started citalopram clients (x=124.0, ±123.9, n=7,298) was not significantly different from any other study agent groups, except venlafaxine IR (x=105.9, ±115.5, n=2,884, p=0.002). A comparison of mean compliance rates (prescription possession days/days in period) showed citalopram clients (68.1/120) with significantly higher rates of compliance than paroxetine (65.3/120, n=17,337) and venlafaxine IR (61.8/120) clients, with no significant differences between other study groups.

CONCLUSION: Texas Medicaid clients prescribed citalopram showed equally or longer mean continuous treatment days and compliance rates, when compared to other SSRI agents. Furthermore, clients prescribed citalopram showed significantly lower or equal mean prescription costs per day, providing positive economic impact to the Texas Medicaid program.
LEARNING OBJECTIVES: Audience participants will:
1. understand the patterns of use of SSRIs, with regard to demographic factors, within the Texas Medicaid program;
2. understand the trends in expenditures, both on a cost per day and total cost basis, for selected SSRI agents within a publicly funded prescription benefit program;
3. compare the treatment lengths for newly started patients on selected SSRI agents within the Texas Medicaid client population; and
4. compare the rates of compliance for newly started patients on selected SSRI agents within the Texas Medicaid client population.

Physician attitudes toward multi-health plan universal formulary guide

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OBJECTIVE: Evaluate physician response to a multi-health plan formulary resource.

METHODS: A universal formulary guide (UFG) reflecting the coverage of 21 major classes of medications for eight St. Louis area health plans was compiled and distributed in October 2000 to physicians in the metro area. The goal of the project was to decrease prescribing hassles by creating one reference as opposed to individual health plan formularies. Based upon unsolicited positive comments, a survey was enclosed with the second edition of the UFG to obtain a broader opinion base. The UFG survey was returned by 405 of the 7,741 (5%) physicians to whom it was distributed.

RESULTS: 46/405 (11%) of physicians indicated that they used the formulary guide with each prescription written. When comparing the UFG to individual plan formulary guides on a scale of one (much less useful) through five (much more useful), 305/405 (75%) of physicians rated the UFG as a four or five. When asked to rate the reduction of time and effort exerted in prescription writing since obtaining the UFG, 264/405 (65%) of physicians responded with a four or five on a scale of one (not at all) to five (significantly). In addition, 80% of physicians indicated that most of the medications they prescribe are included in the UFG.

CONCLUSION: Physician response to the UFG for St. Louis Area Health Plans was positive. User-friendly formulary grids developed collaboratively by health plans may be key in decreasing administrative time and potentially improving preferred drug-list compliance.

LEARNING OBJECTIVES: Audience participants will:
1. understand the format associated with creation of a multi-health plan formulary guide;
2. learn about the potential improved physician attitude associated with collaboration among health plans; and
3. recognize the potential impact of a user-friendly resource in aiding prescribing compliance.

Prevalence and cost analysis of overactive bladder in a managed care organization

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INTRODUCTION: Comparison of drug therapy compliance, treatment persistence, total health care cost and utilization in patients newly started on tolterodine or oxybutynin for overactive bladder or urinary incontinence (OAB/UI) was observed for 180 days.

METHODS: This is a retrospective database analysis of pharmacy and medical claims. Patients were included if their data included International Classification of Diseases Ninth Revision-Clinical Modification codes consistent with OAB/UI and initiated tolterodine or oxybutynin during the period January 1, 1999, to June 30, 1999. Data were collected for 180 days prior to and 180 days after the first prescription fill date in an intent-to-treat analysis. Compliance was defined as the total days supply of medication in the follow-up period divided by the observational period. Duration of treatment was analyzed by Cox regression.

RESULTS: Seventy-seven patients were initiated on tolterodine and 359 on oxybutynin. There were no significant differences in demographics between the cohorts. In a Cox regression analysis, tolterodine was shown to significantly reduce the risk of drug discontinuation as compared to oxybutynin (p=0.0005). Tolterodine users were 43% less likely to discontinue drug use (HR=0.57, 95% CL=0.41,0.78). Mean total prescription costs for oxybutynin and tolterodine patients were $567 and $794 (p=0.0138). Oxybutynin patients incurred hospital costs of $3,126 versus $1,600 for tolterodine (p=0.1183). Tolterodine patients incurred physician costs of $2,217 versus $1,464 for oxybutynin (p=0.1812). An analysis of covariance model was conducted to compare the index drugs with the log transformed total cost as the dependent variable. The difference in adjusted means was not significant (p=0.0684).

CONCLUSION: Although OAB/UI is a chronic condition, almost half of patients initiated on oxybutynin fail to have their prescription refilled. Patients show significantly enhanced compliance and persistence on tolterodine. Those patients started on generic oxybutynin incurred significantly lower prescription costs versus patients started on tolterodine. Despite this difference, there was not a statistically significant difference between generic oxybutynin and tolterodine in total health care costs.

LEARNING OBJECTIVES: Audience participants will:
1. describe the average health care utilization profile of an OAB/UI patient;
2. identify the techniques in analysis of covariance to determine adjusted mean cost; and
3. describe the demographic profile of a typical OAB/UI patient.
Cox-II inhibitor prior-authorization process: The untold story
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INTRODUCTION: Retrospective data from multiple databases were integrated into a model to analyze and describe the ultimate outcome of point-of-sale prior-authorization rejects for Cox-II inhibitors on Humana membership processed on the AdvancePCS platform.

METHODS: It is often implied that when a drug/class is placed on prior authorization (PA) that the point-of-sale rejects will result in contact with the clinical review hotline. All Cox-II inhibitor PA rejects for March 2000 were analyzed. PA claim rejections, Humana Clinical Hotline (HCH) records, system-authorization records, and paid-claim records were all used to complete the analysis. HCH calls were linked to PA rejects. Analysis was then conducted on the HCH data. Additional analysis was conducted on those records referred by the HCH to Humana (Clinical Pharmacy Review). Analysis was also done on those rejections that did not result in a call to the HCH. A complete process-flow diagram was constructed to better understand the complexity of this process.

RESULTS: Of the 20,306 system PA rejects for Cox-II inhibitors in March 2000, 13,080 were unique member/drug situations (1.5 rejects/situation). Of these situations, 4,052 resulted in contact with the HCH (7,690 actual calls or 1.7 calls per situation). The remaining 9,028 did not have contact with the HCH (69.0% of total situations). Those without a call into the HCH resulted in 82.4% receiving no drug therapy (defined as no Cox-II or NSAID claim seven days post-reject) and 17.6% receiving drug therapy. Of the 4,052 situations that had contact with the HCH, 2,335 were referred to the Humana Clinical Pharmacy Review (CPR). Overall, 2,252 of the 13,080 members eventually received a Cox-II inhibitor (17.2%), 1,774 members eventually received an NSAID (13.6%) and 9,053 members received no drug therapy (69.2%).

CONCLUSIONS: Although 13,080 members visited a pharmacy with the intent of receiving a prescription for a Cox-II inhibitor, only 17.2% of those members eventually did receive one. Almost 70% of all members did not have any claim, including a possible substitute of a NSAID. As interesting and eye opening as these results are, the data are unique to this situation and cannot necessarily be generalized to other drug classes or PA programs.

LEARNING OBJECTIVES: Audience participants will learn about:
1. the PA process used by Humana for the Cox-II inhibitor class; 2. the process of analysis undertaken to determine the ultimate outcome of this PA process; and 3. the results of the analysis on outcomes from the PA process on Cox-II inhibitors.

Resource-utilization patterns of patients during pre-dialysis
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INTRODUCTION: There is limited information about the health care resource use of predialysis patients. This study, a retrospective analysis of integrated medical and pharmacy claims from November 1997 through December 1999, was conducted using a large managed care database (Protocare Sciences).

METHODS: The 12-month period prior to dialysis initiation was evaluated for 1,936 incident dialysis patients.

RESULTS: The mean patient age was 66.8 years; 46% were female. On average, patients had eight comorbid medical conditions, of which hypertension (79%), diabetes mellitus (53%), and congestive heart failure (49%) were the most common non-renal comorbidities.

Inpatient hospitalization accounted for 73.2% of the facility charges. Sixty-two percent of patients were hospitalized during the year prior to dialysis. Patients averaged 1.3 admissions per year ($14,818/admission with average length-of-stay of 7.8 days). Routine laboratory tests such as blood chemistry, CBC, and lipid profile were obtained in 55%, 53%, and 30% of patients respectively and accounted for less than 1% of the total charges. Despite the fact that all study patients had impaired renal function, 24.9% received propoxyphene, and 17.1% received nonsteroidal anti-inflammatory drugs. A minority of patients filled medications to address chronic renal insufficiency: phosphate binders (7.5%), erythropoietin (10.5%), ACE inhibitors (36%), B-complex combinations (4.1%), and vitamins with iron (2.6%).

CONCLUSION: Although patients consumed significant amounts of health care resources during the 12 months prior to dialysis initiation, many did not receive appropriate monitoring or expected medications for treatment of late chronic renal insufficiency. Additional analyses will evaluate monthly costs and utilization trends for relevant services and medications.

LEARNING OBJECTIVES: Audience participants will:
1. learn more about an opportunity for managed care pharmacy to provide appropriate care for patients during a predialysis period; 2. examine the resource-utilization pattern of predialysis patients in managed care plans; 3. learn that patients consume significant amounts of health care resources during the 12 months prior to dialysis initiation; and 4. recognize that patients do not receive appropriate monitoring or expected medications for the treatment of late chronic renal insufficiency.
Impact of changing copayment on utilization and cost

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INTRODUCTION: The impact of changing copayment on drug utilization and cost was determined by analyzing claims data from a large employer group.

METHODS: Member copayments are frequently analyzed and changed in an attempt to decrease plan-sponsor cost, but few studies have been done to determine what effect that has on member utilization. We hypothesized that plan-sponsor costs would decrease, but that member utilization might also decline in the presence of a net increase in patient copayment amounts. Data from continuously eligible members for a two-year period in predefined pharmacotherapeutic categories were analyzed using logistic regression.

RESULTS: Almost 50% of members who had a change in copayment switched from a brand-named medication to a less expensive generic medication. Additionally, there was minimum variability across drug-pairs. Net per member per month drug costs declined for both the plan sponsor and the member in both the analysis and the control group. Out-of-pocket expenses increased for the analysis group, but decreased in the control group. And, unexpectedly, utilization increased in the analysis group (not significantly), but decreased in the control group.

CONCLUSIONS: Increasing generic utilization is one of the best methods to achieve real cost savings without increasing cost-share to the member. Our findings support this theory for select pharmacotherapeutic agents without significantly decreasing utilization. Future studies are necessary to determine how changing the copayment influences different member populations, and to examine what magnitude of effect might be observed when changing copayments across other types of drug categories (those with greater/lesser degrees of elasticity).

LEARNING OBJECTIVES: Audience participants will:
1. list economic and quality-of-life issues surrounding ADHD drug therapy;
2. describe methods that may be used to assess ADHD therapy with a prescription database; and
3. demonstrate how to use patient population data to help guide a formulary decision.

Evaluation of a campaign to improve antibiotic prescribing for common respiratory infections

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INTRODUCTION: Currently the Centers for Disease Control (CDC) encourages community efforts to reduce antibiotic therapy for infections with a typical viral origin, including acute bronchitis, pharyngitis, and the common cold. For a medium-size health plan, the success of a campaign to reduce inappropriate antibiotic prescribing for these conditions was evaluated through retrospective review of claims.

METHODS: Using an explicit set of assumptions, a baseline analysis was conducted that linked antibiotics from pharmacy claims to respiratory episodes of care identified from medical service claims for the period July 1, 1998, through June 30, 1999. An educational campaign followed in late 1999 with a mailing to the top 215 plan physicians (based on respiratory infection case-load) that included (1) an individualized prescribing performance report with performance targets, (2) CDC guidelines, and (3) distributable “cold kits” for patients. Additionally, educational articles appeared in quarterly member and physician newsletters. Plan performance during a six-month post-intervention period following the campaign (January 1, 2000–June 30, 2000) was compared with the same six-month period prior to the intervention (January 1, 1999–June 30, 1999).

RESULTS: Antibiotic prescribing rates declined for each of the
Impact of on-site clinical pharmacists in internal medicine departments, for a multi-specialty group practice (MSGP), on prescribing behavior and satisfaction with care

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**PurposE:** Enhance cost-effective prescribing and provide pharmaceutical care and formulary management support to internal medicine (IM) departments of an MGSP.

**Method:** The clinical pharmacy program for an MSGP, serving 277,000 patients, expanded to include on-site clinical pharmacists at each of their 14 practice sites. In addition to two existing clinical pharmacy coordinators and an analyst, four on-site clinical pharmacists were recruited to the program. Prior to the program's expansion, intervention materials were developed by the clinical pharmacy coordinators and presented to site pharmacy chiefs and IM department chiefs. The chiefs were then responsible for the implementation of each initiative at their own sites. With the expansion, on-site clinical pharmacists tailored all developed materials to meet the needs of individual sites. They also attended IM staff meetings to promote targeted interventions, detailed clinicians by scheduled appointments, educated site pharmacists, nurses, and other personnel about these interventions, identified unique cost-saving prescribing on individual patients, provided drug information, and helped clinicians to manage multiple formularies.

**Results:** The implementation of the on-site clinical pharmacy program began in September 1999 and was completed in November 2000. The cost savings achieved on four targeted drug interventions (H₂ blockers, PPI, HMG, and SSRI) and individual patient drug consultations resulted in an estimated annual savings of $540,000. This estimate is conservative because data are currently unavailable for other drug interventions.

The results of a confidential IM department clinician survey conducted in December 2000 overwhelmingly supported the inclusion of an on-site clinical pharmacist (more than 90% of survey respondents responded positively to all questions relating to services provided).

**Conclusions:** The on-site clinical pharmacists have tailored the means of communicating initiatives to an MGSP, which generated significant cost savings and enhanced clinician satisfaction with the clinical pharmacy program. Further expansion of the program is expected in the near future.

**Learning Objectives:** Audience participants will:
1. understand the reasons to expand the Harvard Vanguard Medical Associates Clinical Pharmacy Program;
2. learn about the methods used by the on-site clinical pharmacists to enhance drug interventions and supports to IM clinicians at a 14-site multi-specialty group practice; and
3. discuss the financial impact associated with the expanded clinical pharmacy program.

Assessment of the impact of drug samples on physician prescribing behavior

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**Introduction:** The impact of manufacturer and generic sampling in drug product selection and subsequent overall drug costs was determined through a retrospective claims review to assess changes in prescribing patterns by physicians after removal of clinic drug samples.

**Methods:** Eight Scott and White clinics participated and were divided into three groups: (1) clinics where drug samples remained, (2) clinics where only brand samples were removed, and (3) clinics where both brand and generic samples were removed. Data were retrieved from the Scott and White Health Plan (SWHP) claims database for the third quarters of 1999 and 2000. For all three groups, the following medication classes were evaluated: HMG CoA reductase inhibitors (HMGs), selective serotonin reuptake inhibitors (SSRIs), nonsedating antihistamines (NSAs), nasal corticosteroids, nonsteroidal anti-inflammatory drugs (NSAIDs), and antibiotics. Primary outcomes measured were formulary compliance, generic utilization, prescriptions per utilizing member, and SWHP cost per utilizing member per month (PMPM).

**Results:** Overall SWHP cost PMPM decreased between third quarters of 1999 and 2000, $59.18 versus $58.12, respectively. However, prescriptions PMPM rose from 1.39 to 1.44. Nonformulary utilization decreased from 4.81% to 4.73%. Antibiotic generic utilization increased 5.4% when only brand-name samples were removed. Cost PMPM for HMGs, SSRIs,
and NSAIDs increased in clinics where the samples remained. For NSAs, antibiotics, and nasal corticosteroids, cost PMPM decreased when samples were retained.

CONCLUSIONS: Brand and generic sampling had varied effects on physician prescribing. Other factors likely contribute to physician prescribing patterns. Using drug samples to encourage compliance with treatment algorithms or formulary drug usage may be beneficial.

LEARNING OBJECTIVES: Audience participants will:
1. estimate the potential and current cost savings realized from the removal of samples from primary care offices;
2. evaluate changes in prescribing patterns after the removal of drug samples; and
3. understand the significance of sampling on formulary compliance and generic utilization.

Impact of individual “Target Drug Prescribing Profile” reports with academic detailing
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PURPOSE: To measure the impact of individual prescribing reports coupled with one-on-one academic detailing by a clinical pharmacist on prescribing of preferred agents within target drug classes.

METHODS: Prior reporting of prescribing to internal medicine (IM) clinicians occurred via a quarterly 26-page report mailed to each IM chief; this system had not been effective in changing prescribing patterns. A simplified three-page Prescribing Profile “report card” was developed for four drug classes (HMG CoA reductase inhibitors, \( H_2 \) antagonists, proton pump inhibitors, and SSRI antidepressants), including graphs that ranked clinician prescribing from highest to lowest percentage of prescriptions written for preferred drugs. IM prescribing goals were established with all IM department chiefs for each drug class. An on-site clinical pharmacist program was launched that placed a clinical pharmacist at each clinic one day per week. The clinical pharmacists presented information on each target drug at IM staff meetings followed by distribution of prescribing profiles during individual 15-minute face-to-face meetings with each clinician to discuss his or her prescribing practices each fiscal quarter. Clinical pharmacists also provided information about patients who had been prescribed nonpreferred drugs and suggestions for switching therapy to preferred agents.

RESULTS: Eight quarters’ data have been distributed to clinicians using the new format; Q1 and Q2 1999 were distributed mostly by interoffice mail to each clinician, and subsequent quarters were distributed primarily via individual clinician-pharmacist appointments. Comparing Q1 1999 data (preintervention) with Q4 2000, the percent of money spent on preferred agents within each category changed as follows: \( H_2 \) antagonists: 71% to 88%, HMG CoA reductase inhibitors: 84% to 82%, proton pump inhibitors: 72% to 76%, and SSRI antidepressants: 72% to 77%.

CONCLUSIONS: Simple, focused prescribing reports are effective in influencing drug utilization patterns of clinicians, in conjunction with face-to-face review of data with clinical pharmacists. The new report format and distribution system have shown considerable improvement in prescribing patterns for most target drug classes and are well received by clinicians. (Note that percent of dollars spent on preferred HMG CoA reductase inhibitors did not improve; this was primarily due to a half-tablet initiative launched in Q4 1999 that significantly reduced spending on preferred agents.)

LEARNING OBJECTIVES: Audience participants will:
1. describe the issues involved in providing meaningful and useful prescribing data to clinicians in a group practice;
2. discuss the benefits of a prescriber-specific target drug report with peer-prescriber comparison graphs; and
3. quantify the impact on preferred drug prescribing of clinical pharmacist academic detailing and direct distribution of prescribing data to individual clinicians in a specific patient sample.

Financial impact analysis of a pilot program: Electronic prescribing at a large medical group—a California health plan’s experience
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PURPOSE: The main objective of this study is to determine the potential financial impact of electronic prescribing (e-prescribing) by physicians in a large 120-physician medical group: first, to determine whether use of the e-prescribing system had an impact on prescribing patterns and, second, to determine whether e-prescribing had an impact on the total number of prescriptions written.

METHODS: An e-prescribing system was implemented at a large medical group in fall 1999. An analysis of the pharmacy claims database was performed to compare the group before and after implementation of the technology and the group’s performance compared to other medical groups.

RESULTS: The group demonstrated significant improvement in pharmacy utilization. The ingredient cost per prescription, which had increased by 8.2% annually before implementation, only increased by 7% afterwards. The pharmacy cost trend had been increasing by 29% annually; however, after implementation it was increasing by 9.7%. Finally, the prescription utilization trend, which had been increasing by 20%, increased by only 4.8%. Both generic and formulary compliance have been measured. However, there were concurrent benefit changes that may have also influenced the results. Despite this, prescription utilization has improved at this medical group when compared
to the network average utilization at the health plan.

**CONCLUSION:** The preliminary results demonstrate the potential benefit of e-prescribing in the cost-effective selection of prescription drug therapy. Further monitoring will continue to measure the effects of this e-prescribing system.

**LEARNING OBJECTIVES:** Audience participants will:
1. understand how to measure the effectiveness of an e-prescribing system; and
2. describe the functions of an e-prescribing system.

**Cost-benefit model for cost avoidance associated with prior authorizations in a mail-order pharmacy program**

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**INTRODUCTION:** The authors developed a model to analyze cost avoidance associated with prior authorizations (PA) in the Department of Defense (DoD) National Mail Order Pharmacy (NMOP).

**METHODS:** For each drug subject to PA, the model calculates cost avoidance based on a theoretical cohort of 1,000 new prescriptions submitted to the NMOP over a one-year period. Cost avoidance is defined as the difference between the cost in the presence of the PA (drug costs for first fill and projected refills, estimated cost of alternative therapy for prescriptions not filled, and administrative charges for the PA) and theoretical cost in the absence of the PA (drug costs for first fills and projected refills for all 1,000 new prescriptions).

**RESULTS:** Results are calculated on a quarterly basis to coincide with meetings of the DoD pharmacy and therapeutics (P&T) committee. For the last three quarters of calendar year 2000, the cost avoidance per new prescription submitted per quarter ranged from $13.60–$26.46 for sildenafil, $10.95–$18.56 for proton-pump inhibitors (PPIs), and $7.89–$327.20 for COX-2 inhibitors.

**CONCLUSIONS:** This model has proved useful to the DoD P&T committee in evaluating the costs versus benefits of the NMOP prior-authorization program. The model does not account for the possibility that fewer prescriptions will be submitted because patients and prescribers are aware of the existence of the PA (the “sentinel” or “halo” effect). The model also does not account for the humanistic impact of the PA on patients and providers.

**LEARNING OBJECTIVES:** Audience participants will:
1. understand the parameters used in this model to analyze cost avoidance due to a prior-authorization program; and
2. recognize the importance of providing decision makers with adequate information to make decisions about continuing or discontinuing prior authorization.

**Impact of an ulcer/GERD disease-state-management program on drug utilization**

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**INTRODUCTION:** The financial impact from a pharmacy benefit manager's (PBM) perspective of an ulcer/gastroesophageal reflux disease (GERD) patient education/physician intervention program was determined through retrospective analysis of prescription claims data.

**METHODS:** Ulcer/GERD medications alone or in combination with other medications (proton-pump inhibitors [PPIs], histamine receptor antagonists [H2RAs]) are often over-utilized and/or mismanaged. A group of active and retired members of a northeastern-based industrial group were identified based on their gastrointestinal drug utilization. A population of 2,815 patients was identified as eligible. Of those patients, 401 chose to enroll by responding to a questionnaire. These patients received educational materials and their physicians received intervention letters regarding proper drug utilization based on patients’ current drug therapy and diagnosis. Data were assessed for the period from July 2000 to December 2000 for positive responses to intervention letters. All identified patients were reviewed for concurrent use of PPIs or H2RAs and non-steroidal anti-inflammatory drugs (NSAIDs) or selective cyclooxygenase-2 inhibitor (COX-2).

**RESULTS:** As of December 31, 2000, 907 intervention letters were sent. One hundred and one positive responses were assessed for savings on a per intervention basis. The average cost savings per intervention per month was $83.92 due to positive physician response per intervention. Total savings per month for all positive interventions totaled $9,556.28 for this group. Savings from interventions began about two months into the program. The majority of savings were the result of improved utilization of PPIs.

**CONCLUSION:** Though only a small percentage of patients enrolled (14.2%) of the total identified, a cost savings attributable to an increase in proper utilization was seen.

**LEARNING OBJECTIVES:** Audience participants will:
1. describe issues that may result in increased GI medication cost; and
2. identify possible interventions to alleviate drug therapy cost; and
3. discuss the financial impact associated with a proper GI drug utilization program.

**Direct six-month costs of treating depression with citalopram, fluoxetine, paroxetine, sertraline, and venlafaxine in managed care**

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**INTRODUCTION:** The purpose of this analysis was to com-
compare the direct costs of treating depression over a six-month period with citalopram, fluoxetine, paroxetine, sertraline, and venlafaxine in managed care patients, from the perspective of the third-party payer.

**METHODS:** Symmetry Health Data Systems’ Episode Treatment Group methodology was applied to the PharMetrics Integrated Outcomes Database to identify adult subjects (ages 18 years and older) diagnosed with depressive disorder between January 1 and June 30, 1999. Subjects who received one of the study medications within one month of index diagnosis were included. Depression-related medical charges were assessed for a period of six months following the index diagnosis, by cumulating all charges (paid claims) associated with depression diagnosis codes. The primary outcome was the direct cost of treating depression for six months for a third-party payer, based on the initial anti-depressant drug selected.

**RESULTS:** 3,698 patients met the inclusion criteria. Mean direct six-month depression-related treatment charges were $637 for citalopram patients, $725 for paroxetine patients, $795 for sertraline patients, $863 for venlafaxine patients, and $886 for fluoxetine patients.

After adjusting for differences in treatment cohorts using multivariate log-linear regression, citalopram patients had 29% lower charges than fluoxetine patients (p<0.0001), 14% lower charges than venlafaxine patients (p=0.0236), and slightly (but statistically nonsignificant) lower charges than paroxetine and sertraline patients.

**CONCLUSIONS:** Citalopram patients had the lowest direct, six-month depression-related treatment charges, in terms of both total and pharmacy-specific costs. Managed care organizations may achieve cost savings by making citalopram a first-line option on their formularies.

**LEARNING OBJECTIVES:** Audience participants will:
1. describe patterns of newer antidepressant drug selection in a large managed care outcomes database;
2. recognize differences in the direct cost of treating depression with newer agents; and
3. understand how retrospective administrative claims databases can be used to answer pharmacoeconomic questions related to the treatment of depression.

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**Prostamides versus prostaglandins for glaucoma treatment:**

**Effectiveness and cost considerations**

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**PURPOSE:** Prostamides have recently been introduced to treat glaucoma patients. The purpose of the study was to compare estimated effectiveness and costs between a prostamide and a representative of another fairly new class of anti-glaucoma medications, the prostaglandins.
METHODS: A three-month randomized controlled efficacy trial was conducted comparing Lumigan (bimatoprost 0.03%, a new synthetic prostamide) versus latanoprost 0.005% (a prostaglandin). The clinical trial evaluated the percent of patients achieving various target intraocular pressures (IOPs) and the cost of treatment to achieve target. Total annual treatment costs included direct costs of both medications and ophthalmology visits.

RESULTS: Twenty-nine percent of patients reached a target IOP of 15 mm Hg or less with bimatoprost (N=119) versus 14% with latanoprost (N=113; p<0.05). Average expected annual treatment cost, including cost of treatment success and failure (requiring additional medications and office visits) was $972 versus $1,009 for bimatoprost versus latanoprost, respectively. Cost-effectiveness (calculated as medication cost/expected effectiveness based on patients achieving a target IOP at three months of 15 mm Hg or less) was $517 versus $1,071 for bimatoprost versus latanoprost, respectively.

CONCLUSION: Annual expected treatment costs for prostamides and prostaglandins are similar. However, when cost-effectiveness is considered, due to a greater percentage of glaucoma patients achieving ideal target treatment goals with prostamides, the prostamides are both more clinically effective and economically more cost-effective.

LEARNING OBJECTIVES: Audience participants will:
1. understand how to evaluate efficacy and cost-effectiveness for glaucoma medications;
2. recognize the role newer treatment therapies play in the prevention of glaucoma progression to blindness;
3. learn about the newer classes of anti-glaucoma medications; and
4. describe the cost savings to plans of effective glaucoma treatment.

Economic cost evaluation of an older generic versus a newer anti-glaucoma medication

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PURPOSE: To determine total treatment cost associated with a generic version of an older glaucoma medication versus a newer glaucoma treatment.

METHODS: A cost-effectiveness evaluation was conducted based on the results of a one-year randomized drug trial in which we compared generic timolol 0.5% versus Lumigan (bimatoprost 0.03%, a new synthetic prostamide) to reduce glaucoma patients' intraocular pressure (IOP) to the newer treatment target of 17 mm Hg or lower. Total annual costs included both drug costs and ophthalmologist visits.

RESULTS: At six months 37% of patients reached target IOP with generic timolol (n=241) vs. 64% with bimatoprost (n=474, p<0.001). Average expected annual treatment costs estimated based on target achieved at six months were $524 versus $844 for timolol vs. bimatoprost, respectively. This included costs of successful patients and patients who would require additional medications and office visits after six months. Average annual cost-effectiveness was estimated to be $1,416 versus $1,455 for timolol versus bimatoprost, based on 37% of timolol and 58% of bimatoprost patients achieving target pressure at the end of the one-year trial (p<0.001).

CONCLUSION: The acquisition cost of a newer medication, bimatoprost, is greater than the generic versions of an older medication, timolol. However, average annual cost-effectiveness for bimatoprost was nearly equal to timolol because of the additional cost of medications and visits required to achieve new lower treatment targets with the less effective older medication.

LEARNING OBJECTIVES: Audience participants will:
1. learn about newer glaucoma medications available;
2. understand cost-effectiveness comparisons for glaucoma medications;
3. describe the costs associated with not effectively treating glaucoma patients; and
4. recognize the role that treatment alternatives play in slowing and/or stopping the progression of glaucoma.

Identification and management of oral isotretinoin utilization inconsistent with product labeling

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INTRODUCTION: The purpose of this research was to (1) identify oral isotretinoin utilization inconsistent with product labeling that recommends reserving for patients with severe nodular acne unresponsive to conventional therapy and (2) develop a system to minimize potentially inappropriate oral isotretinoin utilization.

METHODS: Retrospective pharmacy claims database analysis assessed acne medications used by patients in the six months prior to starting oral isotretinoin.

RESULTS: Twenty-one percent (43/203) of patients did not receive any type of acne medication in the six months prior to starting oral isotretinoin. An additional 30% (61/203) of patients received acne treatment that did not include a topical retinoid. A prior-authorization protocol was initiated, including guidelines that patients must have severe acne and have failed to respond to both oral antibiotics and topical retinoids (e.g., tazarotene, tretinoin) prior to starting oral isotretinoin. Three months after protocol initiation, monthly prescription volume for oral isotretinoin decreased 30%.

CONCLUSIONS: Approximately one-half of patients may not have received adequate conventional acne therapy prior to starting oral isotretinoin as recommended by labeling. The prior-authorization protocol yielded a 30% decrease in oral isotretinoi-
tinoin prescription volume three months after initiation.

LEARNING OBJECTIVES: Audience participants will:
1. describe the role of oral isotretinoin in treating acne vulgaris;
2. identify database markers of potential inappropriate use of oral isotretinoin in a specific patient sample; and
3. discuss the impact of a prior-authorization protocol on oral isotretinoin utilization.

Patient concordance with 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase inhibitor therapy among two types of prescription services (mail service and traditional network of pharmacies)

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INTRODUCTION: This study examines patient concordance with HMG-CoA reductase inhibitor therapy by two types of prescription services through a retrospective database analysis of pharmacy and medical claims.

METHODS: Patients newly started on HMG-CoA therapy between January 1, 1998, and December 31, 1998, were identified and followed for 360 days. These patients were stratified into two cohorts: those that exclusively filled prescriptions through mail service (n=1,572) and those that exclusively filled prescriptions through a traditional pharmacy network (n=13,254). Patients were excluded if they were not continuously enrolled or utilized a combination of services to obtain medications. The mail service system offers patients the option to refill chronic types of prescriptions. Once the first prescription was dispensed by mail, patients could contact the mail service by telephone, by mail, or by the Internet to have future refills sent to their address within less than two weeks. Since obtaining prescription medications through mail service offers additional convenience, we hypothesized that patients utilizing this service would have greater compliance, medication possession ratio (MPR), duration of therapy and persistence.

RESULTS: All outcome measures were statistically significantly greater for the mail-order cohort than the traditional network cohort (p<0.0001). After controlling for significant baseline characteristic differences that included age, gender, and chronic disease score, the adjusted analysis showed that the mail-order cohort continued to demonstrate greater compliance, MPR, duration, and persistence.

CONCLUSIONS: This retrospective analysis suggests that patients who used a mail-service system to fill their prescriptions exhibit a higher degree of compliance with HMG-CoA therapy.

LEARNING OBJECTIVES: Audience participants will:
1. recognize the value of implementing a mail-prescription service;
2. identify convenience as an important aspect to increase patient concordance with drug therapy; and
3. discuss innovative strategies to increase patient concordance with drug therapy.

Point-of-care (POC) technologies improve prescriber efficiency and benefit-plan adherence

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INTRODUCTION: The growing increase in prescription volumes and more complex drug benefit designs have created inefficiencies in prescription management and distribution. Thirty to fifty percent of prescriptions result in rework for safety reasons or benefit questions. Point-of-care (POC) prescribing solutions are hypothesized to reduce prescribing inefficiencies while improving drug benefit adherence through proactive communication of patient benefit information.

METHODS: A POC technology solution was implemented in a 14-physician primary care practice. The solution incorporated formulary messaging and passive reminders of mail benefit availability providing cost-savings opportunities for the plan and member. Pre- and post-implementation measurements were conducted to gauge prescribing efficiencies. Incoming call volumes were tracked, and the percentage of prescriptions complying with the formulary and days fulfilled via mail service were measured for six months post-implementation and compared to a control group.

RESULTS: Before implementation, 50% of inbound calls were pharmacy-related. After implementation, calls from pharmacies decreased 42%; formulary calls fell 84% with stable formulary compliance; and clarification calls declined 30%. The increase in mail-service utilization was nearly double that of the control group.

CONCLUSIONS: POC technologies can facilitate management of the pharmacy benefit by providing access to patient-specific clinical and benefit information during the patient encounter. Efficiency gains for prescribers, pharmacists, and patients can be realized, without impacting benefit plan compliance. Providing additional information at the point of care can encourage dialogue between prescriber and patient to fully maximize plan design opportunities.

LEARNING OBJECTIVES: Audience participants will:
1. understand the potential impacts of an increasingly complex benefit plan design on physician office workflow based on evidence from a high-volume primary care practice;
2. identify and discuss the potential advantages of point-of-care electronic prescribing interventions on reducing rework and promoting efficiencies for various stakeholders in the prescription process; and
3. discuss how passive messaging at the point of care may impact drug benefit design compliance.