scription use alone increases the total health expenditure by 17.4 percent (p < 0.05). It also increases the numbers of outpatient visit, emergency room visit, and hospital discharge by 0.23 (p < 0.001), 0.38 (p < 0.01), 0.23 (p = 0.05) respectively per person. Moreover, other predictor variables of healthcare expenditure and utilization include poor health status, chronic diseases, and total number of medication use. **CONCLUSION:** This study identified increased healthcare resources with elderly population due to inappropriate prescription use. It suggests the necessity of health policy to improve medication use in the aged group in an effort to save healthcare dollars while maintaining quality of care.

**PHP19**
**PRESCRIPTION DRUG UTILIZATION PATTERNS AND CHARACTERISTICS OF RETAIL AND MAIL ORDER PHARMACY UTILIZERS**
Yokoyama KK, Yu W
WellPoint Pharmacy Management, West Hills, CA, USA

**OBJECTIVE:** To characterize patient demographics and drug utilization patterns for members who utilize retail and mail order pharmacies in managed care. **METHODS:** Pharmacy claims data from March 1 to May 31, 2002 in 2 large health plans with over 1 and 2 million members, respectively, were extracted. Prescription utilization data statistics were stratified by drug dispensing channel (e.g., retail or mail order pharmacy). Utilizing member characteristics (e.g., age, sex) were evaluated by therapeutic class. Disease state prevalence of retail and mail order utilizing members were also compared. **RESULTS:** Approximately 2% of enrolled members filled at least 1 prescription at a mail order pharmacy, while 30% filled prescriptions at retail pharmacies. Mail order utilizers tended to be older than retail utilizers, with 57% and 31% of prescriptions for patients over age 55, respectively. Sex by prescription volume was 38% male and 62% female for both dispensing channels. The rate of mail order penetration varied by disease state and therapeutic class. The top four drug classes, as ranked by prescription volume, for mail order pharmacies were antihypertensives, antihyperlipidemics, estrogens, and antidepressants and for retail pharmacies were antihypertensives, cough/cold/allergy, anti-infectives, and analgesics. Generic utilization was lower for mail order versus retail pharmacies (32% and 43%, respectively). Prescription volume per utilizing member per month was 1.35 and 2.45 and average days supply per prescription was 69.8 and 23.3 for mail order and retail, respectively. **CONCLUSIONS:** Patient demographics and prescription utilization patterns among retail and mail order utilizers differed. Development of quality improvement programs to modify prescription utilization behavior should take these differences into consideration.

**PHP20**
**DOCUMENTING THE RESULTS OF CLINICAL INTERVENTIONS BY PHARMACISTS IN AN AMBULATORY SETTING**
Calvillo JP1, Lake-Wallace SE2, Hayes D1, Rice GK2, Kulkarni AS1, Sansgiry SS2
1University of Houston, Houston, TX, USA; 2Kelsey Seybold Clinics, Houston, TX, USA

**OBJECTIVES:** The aims of this study were to document the number of clinical interventions conducted by pharmacists in an ambulatory setting and determine their effectiveness. **METHODS:** A pharmacy documentation form was developed and distributed to all Kelsey Seybold pharmacies in the Houston area. Kelsey Seybold Clinics is one of the largest IPA in the region. Pharmacists completed this form whenever they performed an activity outside the normal procedures required to fill a prescription. The form was designed to record five main activities categorized as: interventions, therapeutic interchanges, medication errors, adverse drug reactions and drug information questions. The pharmacists also recorded actions they took, recommendations made, and the results of the intervention. The time taken by the pharmacist to perform these interventions was also recorded along with demographic information of the patients. Data were coded and analyzed using SAS statistical package at a set priori significance level of 0.05. Descriptive and correlation analysis were carried out on the data collected. **RESULTS:** A total of 982 completed forms were obtained for a period of 6 months (May–October 2002). Most interventions (38.9%) were completed within 5 minutes and 30% were completed between 5 to 10 minutes. Pharmacists spent majority of their time on intervention activities (76.27%). Of the 749 interventions classified, they were categorized as therapeutic (14.98%), prescriptions (41.21%), insurance (40.07%), and compliance types (3.75%). Out of the 206 recommendations made by the pharmacists, 96% were accepted by the physicians. Interventions resulted in 30% of the drugs being clarified before being dispensed, while an additional 47% were changed before being dispensed. A negative correlation was seen between prescription volume and interventions. **CONCLUSIONS:** Pharmacists performed numerous interventions to maximize drug therapy outcomes. Intervention by pharmacists resulted in enhancing appropriate drug use thus reducing cost.

**PHP21**
**PHARMACISTS’ UTILIZATION AND PERCEPTIONS OF DRUG INTERACTION PROGRAM WARNINGS**
Coffindaffer JW1, Miller K2, Kavookjian J1, Makela E1
1West Virginia University School of Pharmacy, Morgantown, WV, USA; 2Johns Hopkins University Hospital, Baltimore, MD, USA

**OBJECTIVES:** Recent studies suggest that drug-drug interaction messages ignored by pharmacists raise con-
cens about safety and impact on patient outcomes. Attitudes about the proliferation of messages they perceive as “false-positives” could explain the inconsistency among pharmacist responses to drug interaction messages (DIMs). Our objective is to report a pilot study examining pharmacist utilization and perceptions of DIMs.

METHODS: A semi-structured telephone interview protocol was developed using Likert scales assessing pharmacists’ utilization and attitudes regarding DIMs. Utilization measures included perception of false positive DIMs and desensitization to DIMs. Attitude assessments included confidence, usefulness, and satisfaction with the drug interaction programs, and influence of liability concerns. A convenience sample of 44 West Virginia pharmacists responded during March 2002. ANOVA was used to analyze relationships among variables in this descriptive study. RESULTS: Among respondents, 36.4% perceived that 21–30% of DIMs were insignificant; 13.5% perceived that >50% of DIMs were insignificant. Using a 5-point scale (1 = not at all, 5 = very much), pharmacists reported desensitization to DIMs (median = 4.0). Pharmacists perceiving DIMS as more insignificant also reported greater desensitization to DIMs (F = 3.04, p < .05). Pharmacists found the programs useful (median = 4.0), were somewhat confident (median = 3.5) or satisfied with the programs (median = 3.0). Those who found the program more useful (F = 6.38, p < .05), or were more confident (F = 3.09, p < .05) or satisfied with the program (F = 6.95, p < .05), were significantly less desensitized to DIMs. Also, the more desensitized to DIMs, the more the pharmacist was influenced by liability concerns in deciding to report a DIM to the patient and/or physician (F = 4.54, p < .01). CONCLUSIONS: These pilot results suggest further research is warranted. Pharmacist utilization of drug interaction programs is inconsistent; this may be influenced by attitudes towards DIMs. Information regarding attitudinal barriers can provide content for pharmacist training or for vendor development of drug interaction programs.

PHP22

REVIEWS OF UTAH MEDICAID HIGH UTILIZERS TO CONTROL DRUG COSTS
Oderda GM1, Gunning K1, LaFleur J1, Stockdale W1, Tyler L1, Parke D1, Orlando P1, Brixner D1
1University of Utah, Salt Lake City, UT, USA; 2Utah Medicaid, Salt Lake City, UT, USA

OBJECTIVES: Utah Medicaid began a process to limit patients to 7 paid non-exempt prescriptions per month (maximum 30 day supply) in early 2002. Exempt prescriptions included prescriptions for antibiotics and many chronic drugs, and more than one prescription for the same NDC in the same month. One-third of prescriptions are exempt. Prior to mandating the 7 prescription limit Utah Medicaid contracted to develop a process to improve drug use and reduce costs. The project objective is to describe and evaluate that process. METHODS: Available data include eligibility files, pharmacy claims, and medical claims, including ICD9 coding. Reviews began in May 2002 and focus on the highest utilizers. Two hundred patients are reviewed each month; 30 nursing home patients and 150 non-nursing home patients. There were 249,447 Medicaid eligibles and 147,186 utilizers in FY2002. If drug related issues are identified, letters are sent to prescribers with recommendations along with a list of all prescription claims (including cost). RESULTS: Patients with >7 non-exempt prescriptions have been reduced from 5593 in May 2002 to 2326 in September 2002. The first review cohort (May reviews) showed a reduction from 16.4 to 10.7 in mean non-exempt prescriptions. Drug costs for the May cohort in October were 46% lower than in May. The June and July cohorts were reduced by 32% and 25% respectively; June vs October, and July vs October while drug costs for non-reviewed patients increased at a 16% annual rate. Actual drug costs for the May cohort from May to October were $1,042,643. This compares with an expected cost of $1,592,564 (May costs increased by an annual 16%). Annualized cost savings for the May, June, and July cohorts are approximately $2.3M. Program costs are approximately $300,000 per year. CONCLUSION: Focused reviews of Medicaid high utilizers, and communication with prescribers, can reduce drug costs.

PHP23

PRESCRIBING INCENTIVE SCHEMES: DO THEY GIVE APPROPRIATE INCENTIVES FOR COST-EFFECTIVE PRESCRIBING?
Drummond MF1, Mason A1, Hunter J1, Towse A2, Cooke J2
1University of York, York, United Kingdom; 2Office of Health Economics, London, England; 3South Manchester University Hospitals NHS Trust, Manchester, United Kingdom

OBJECTIVES: The objective of this study was to assess whether prescribing incentive schemes offered to general practitioners in England give appropriate incentives for cost-effective prescribing. METHODS: Prescribing advisers from primary care trusts (PCTs) in England were surveyed and asked to provide a copy of their prescribing incentive scheme, if available. The schemes were then analysed in order to assess the types of incentives offered, the targets (budgetary and non-budgetary) set and the therapeutic areas covered. RESULTS: Responses were obtained from 161 (50.4%) of the 319 PCTs existing in England in 2002. Of those responding, 109 supplied copies of their prescribing incentive scheme, others stated that their scheme was not finalized (N = 34), or offered other reasons why it could not be supplied, such as confidentiality concerns, or that no scheme was under development. Of the schemes analysed, 26% offered the maximum annual incentive of £45,000 per practice. However, many offered incentives much lower than this.