more different medications present in their pharmacy claims data over a 3-month period were selected. Cases were developed by combining demographic, medical, and pharmacy claims data, and sent for review by Omnicare's consultant pharmacists. Based on quantitative and qualitative review, recommendations were made on behalf of each retiree at moderate to high risk and the appropriate physician contacted by telephone or fax. **RESULTS:** A total of 488 polypharmacy cases were identified from a sample of 14,000 retirees, of which 309 were eligible for inclusion. An average of 12 medications was prescribed to these individuals. A total of 61.8% had safety, quality, or cost issues of moderate to high risk requiring intervention. In 49.1% (152) of all reviewed cases, medication safety issues were present. Most instances involved an inappropriate medication for use in the elderly. Recommendations for improved management of coronary heart disease and stroke were addressed in 34.0% (105) and 19.4% (60) of the cases, respectively. Other key recommendations involved aspirin use, Cox-2 Inhibitor use in retirees with heart disease, medications associated with increased risk of falls and fractures, and untreated osteoporosis. Recommendations were accepted by over half of responding physicians. **CONCLUSIONS:** Inappropriate medication use continues among elderly persons treated with multiple agents. Pharmacist intervention with physicians can improve prescribing in this population.

RX3

THE ANTIBIOTIC USE IN POLAND IN THE TREATMENT OF COMMUNITY-ACQUIRED PNEUMONIA IN ADOLESCENTS AND ADULTS VERSUS CURRENT GUIDELINES

Cel M, Krzyzanowska AM, Glogowski CA, Gierczynski JM
GlaxoSmithKline Pharmaceuticals S.A, Warsaw, Poland

OBJECTIVES: The aim was to compare prescription patterns in Poland in treatment of community-acquired pneumonia (CAP), matched with current guidelines and their financial consequences. **METHODS:** Epidemiological data from Alexander Project microbiological study were used. The Dataview Medical Database IMS Health for Poland, was the source of medical data on provided medical services and prescriptions made out by outpatient clinic doctors. These were compared with guidelines of Polish Working Group for Standards of Rational Therapy and Prophylaxis of Infections. Drugs prices were taken from offer of leading wholesaler. **RESULTS:** CAP makes up of 4% of all respiratory system infections, 20% of them require hospitalisation. The Alexander Project shows that causes of CAP are: S. pneumoniae (7–76%), H. influenzae (1–16%), S. aureus (0–4%), Gram (–) bacteria (0–28%), non-typical bacteria such M. pneumoniae (0–24%) C. pneumoniae and Legionella sp. (0–15%). In 2002, for patients aged 12–64 years, 302.656 visits (234.451—first visits, 68.206—follow-up visits) because of CAP were registered, in 254.179 (i.e. 84%) cases prescriptions for antibiotics were made-out. The percentages of antibiotics were following: 24.1% oral macrolid, 4.4% injected macrolid, 24.2% oral cephalosporin, 16.4% injected cephalosporin, 14.4% oral wide-spectrum penicillin, 11.6% oral tetracycline, 10.2% aminoglycoside, 2.2% oral fluoroquinoline, 0.2% co-trimoxasole (combined treatment 7.7%). Total cost of antibiotics was €4.549 million. For first visits this cost amounted to €4.043 million and for follow-up visits to €0.507 million. The cost of treatment according to the guidelines was estimated, depending on chosen option, at €3.260 to €6.713 million. **CONCLUSIONS:** Analysis shows that prescription patterns in CAP, differs from the guidelines. 45% of cases were treated in way foreseen for non-typical CAP, whereas epidemiological data shows that real number of such cases does not exceed 20%. Treatment based on recommendations would not bring savings, but would slow down the growth of bacterial resistance.

RX4

PATTERNS OF USE OF COXIBS AND NON-SELECTIVE NSAIDS IN THE ELDERLY POPULATION OF QUEBEC (CANADA)

Moride Y[1], Ducruet T[2], Rochon S[3], Lavoie F[3]
[1]Université de Montréal, Montréal, QC, Canada; [2]Boreal Primum inc, Montréal, QC, Canada; [3]Pfizer Canada Inc, Kirkland, QC, Canada

Few data have been published on the patterns of use COX-2 inhibitors (coxibs)and non-selective NSAIDs in "real-life" setting; a major determinant of effectiveness. **OBJECTIVES:** 1) To assess the rate of persistency of coxibs over the first 3 months of treatment in the elderly population; 2) to determine the rate of switching; 3) to identify characteristics associated with persistency. **METHODS:** A retrospective cohort study was conducted in a cumulative incidence random sample of members (age 65+) of the Quebec drug plan who initiated a treatment with celecoxib (n = 14,396), rofecoxib (n = 6,120) or non-selective NSAIDs (n = 1,202) between January 1st and August 31st 2000. All medical services and prescriptions received by these patients during the previous year were obtained through linkage with the Quebec health services databases. Cox proportional hazard was used to identify factors associated with persistency. **RESULTS:** Over the first 3 months of treatment, the median duration of use was 22 days for celecoxib, 21 days for rofecoxib, and 12 days for non-selective NSAIDs. On average, 24.2% of incident celecoxib users and 17.3% of rofecoxib users were treated for more than 3 months, compared to 10.2% of non-selective NSAID users. Switches were not frequent: 4.1% of celecoxib users switched to rofecoxib, and 2.3% to non-selective NSAIDs. Of rofecoxib users, 2.9% switched to celecoxib and 2.4% to non-selective NSAIDs. Factors significantly associated with persistency were: celecoxib (OR = 1.19; 1.11–1.27), use of gastroprotective agents at treatment initiation (OR = 1.22; 1.16–1.27) or during follow-up

(OR = 1.18; 1.13–1.22), high chronic disease scores (CDS 10+: OR = 1.15; 1.10–1.20; CDS 5–9: OR = 1.13 (1.09–1.17). Previous use of gastroprotective agents, indicative of a history of gastropathy, was negatively associated with persistency: (OR = 0.92; 0.88–0.95). Age, gender, dosage at initiation, prescriber's specialty, and income level did not influence persistency. **CONCLUSION:** Persistency beyond three months was higher for coxibs than for non-selective NSAIDs.

MESSAGES FOR THE HEALTH CARE INDUSTRY

MS1

FINANCING PHARMACEUTICAL R&D: THE ASSOCIATION WITH SALES

Dickson M[1], Gagnon JP[2]
[1]University of South Carolina, Columbia, SC, USA; [2]Aventis Pharmaceuticals Inc, Bridgewater, NJ, USA

OBJECTIVES: There is a long-standing debate over the theory that innovations (including innovative pharmaceuticals) are largely funded internally by companies. Supporters of this theory assert that R&D is financed internally from sales, while opponents argue, that R&D investment is unrelated to sales. The objective of this study is to empirically test the internal funding theory for pharmaceutical R&D and suggest policy implications based on the results. **METHODS:** Data for US pharmaceutical sales, R&D expenditure, profitability (both series are for 1980 to 2001), and new chemical entity (NCE) sales (all NCEs approved from 1988 to 2001) are used in least squares time series regressions to explain variation in annual percent change in R&D expenditure. Log-log regressions are used to model the relationship of the dependent variable to percent change in annual US pharmaceutical sales and NCE 3-year future sales. A full model also is estimated. Linear-log models of percentage change in pharmaceutical sales are estimated for percent return on stockholders' equity, percent 10-year return, and percent annual return. Series were tested for trends, and, where appropriate, sensitivity analyses were conducted on models. **RESULTS:** Empirical evidence from the analyses support the hypothesis that pharmaceutical R&D is internally funded from sales. The sales coefficient was estimated to be 1.2% ($p < 0.001$) and the coefficient for NCEs 3-year future sales was 0.4% ($p < 0.001$). When a full model is estimated with these variables, the coefficients were virtually unchanged and remained statistically significant. Coefficients for the profitability model were 0.09 for percent return on stockholders' equity, 0.05 for 10-year return, and 0.04 for annual return. **CONCLUSIONS:** The importance of sales for funding pharmaceutical R&D is demonstrated. Policies detrimental to this relationship should be expected to cause a shift of R&D effort from the US or to reduce R&D investment in general.

MS2

LISTENING TO OUR CONSUMERS: THE PHARMACEUTICAL BRAND LOYALIST

Annunziata K, Bolge SC, Donohue JA
Consumer Health Sciences, Princeton, NJ, USA

OBJECTIVE: Brand loyalty is an elusive, but sought after consumer attribute. Loyalty, however, is not clearly defined; especially for pharmaceuticals that have only recently been associated with their brands. **METHODS:** Brand loyalty was assessed from a national Health care survey, fielded June 2002 to 30,000 online U.S. adults. For this analysis, three conditions were chosen to represent a range of consumer types. Respondents (n = 7,209) were diagnosed and taking a prescription (Rx) for: depression (20% diagnosed, 51% Rx), gastroesophageal reflux disease (GERD, 10% diagnosed, 64% Rx), and/or high cholesterol (23% diagnosed, 53% Rx). Loyalty was evaluated by summing four Health care attitudes: would ask doctor for prescription; prescription advertising provides useful information; would ask doctor for specific medication; and insist that doctor give brand name medication. Responses were on a 5-point scale: 1 = strongly disagree and 5 = strongly agree. Final scores ranged from 4–20 (mean = 12, standard deviation = 2.8). Loyalty was then categorized as low (score 4–9) 18%, moderate (10–14) 65%, and high (15–20) 16%. **RESULTS:** Loyal consumers were younger, with more severe disease and comorbid illnesses. They sought information frequently and from more sources. Notably, loyal consumers requested medications more than three times more than those with low loyalty. Between 9–19% requested one of their high cholesterol, depression, or GERD medications. Requesters were more likely to be men. They had positive, proactive Health care attitudes and sought information from a variety of sources. Notably, consumers who requested medications remained on them up to six months longer. **CONCLUSIONS:** There is a small, but distinct group of pharmaceutical brand loyalists that is proactive and more likely to request prescription medications. Those who request medications trust doctors' advice and stay on therapy longer. These are our target patients. They can be reached through doctors, the internet, and family and friends with the information they need to make sound Health care decisions.

MS3

A DEMONSTRATION OF THE USE OF BAYESIAN DECISION THEORY TO OPTIMISE DRUG DEVELOPMENT PROGRAMMES

Hawkins NS, Claxton K
University of York, York, United Kingdom

OBJECTIVES: To demonstrate the use of bayesian decision theory to establish optimal commercial drug development programmes. **METHODS:** A probabilistic model of a drug in development was used to estimate the expected net return of alternative development pro-