fracture incidence. For example, the published incidence_pop for spinal fractures for males age 80-84 is reported as 3.58/1,000 patient-years. When incidence_pop is used as incidence_no_risk, our model predicted 6.89 spinal fractures/1,000 patient-years. After adjustment, the model predicted the fracture incidence accurately as 3.45/1,000 patient-years. **CONCLUSIONS:** The fracture incidence in non-risk patients, the baseline incidence used in the model, can be calculated using this method based on the fracture incidence from the study population, the risk factor prevalence, and the relative risk increase associated with the risk factor.

PMS39
THE COST-EFFECTIVENESS OF ALTERNATIVE TREATMENT SEQUENCES IN RHEUMATOID ARTHRITIS
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OBJECTIVES: Many patients with rheumatoid arthritis (RA) fail to respond adequately to first-line therapy with conventional disease-modifying antirheumatic drugs (cDMARDs). Biologic disease-modifying antirheumatic drugs (bDMARDs) have improved outcomes, and multiple guidelines National Institute for Health and Care Excellence (NICE) govern their prescription in England and Wales. The study objective was to estimate the cost-effectiveness of treatment sequences of alternative bDMARDs versus cDMARDs in patients who have failed to respond to at least two cDMARDs. **METHODS:** A discrete event simulation model was used to explore the cost-effectiveness of bDMARDs in combination with methotrexate versus cDMARDs. Populations of interest were patients with severe and moderate to severe RA who failed to respond to at least two cDMARDs including methotrexate (cDMARD-IR). In the severe population, eight alternative bDMARD strategies and one cDMARD strategy were considered. In the moderate population, a single bDMARD strategy was compared against a cDMARD strategy. Strategies evaluated differed by the therapy with which the strategy began (a bDMARD or cDMARDs) and thereafter were based on current NICE guidance. The perspective was that of the UK National Health Service and Personal Social Services. The main outcome was the incremental cost-effectiveness ratio (ICER, expressed as cost per quality-adjusted life years). **RESULTS:** In a severe population, etanercept resulted in an ICER of £20,520 versus a cDMARD strategy (7 strategies strictly or extendedly dominated). In a moderate to severe population the ICER for the etanercept strategy was £24,727 versus the cDMARD strategy. In probabilistic sensitivity analysis, the etanercept strategy had the highest probability of being cost-effective at a threshold of £30,000. **CONCLUSIONS:** Based on the results of this analysis, a treatment strategy beginning with etanercept was considered to be the most cost-effective in patients with severe and moderate to severe RA who failed to respond to at least two conventional DMARDs.

PMS40
IMPACT OF PRICE REGULATION OF BIOLOGIC THERAPIES FOR RHEUMATOID ARTHRITIS IN COLOMBIA – A COST MINIMIZATION ANALYSIS
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OBJECTIVES: Following a recent price regulation for biopharmaceutical products in Colombia, we aimed to determine the impact on the cost of treatment with biologic therapies for rheumatoid arthritis in patients who failed to respond to oral DMARDS. **METHODS:** Current guidelines and evidence suggest similar efficacy and safety among 7 biologic products available in Colombia for the treatment of rheumatoid arthritis following DMARD failure: abatacept, adalimumab, certolizumab, etanercept, golimumab, infliximab and tocilizumab. We compared the annual direct medical cost of treatment (including drug costs, administration and monitoring) for intravenous (IV) and subcutaneous (SC) injections of these biologics. Dosages were determined based on the approved product labels and the average weight (62 Kg) for a cohort of 275 patients with rheumatoid arthritis from a private institution in Bogota, Colombia. Costs were calculated using the data from most current price regulation guidance from the Ministry of Health (Circular 04-05/2013) and official sources for payments of treatments and procedures (SISMED). Sensitivity analyses were performed using different dosages and patients' weights. **RESULTS:** Direct annual cost of treatment with biologics was higher in the first year than in subsequent years, except for tocilizumab, etarnercept, adalimumab and golimumab which do not need additional dosages in the first year. Abatacept, both IV and SC, consistently showed the lowest direct medical cost after 3 years. The additional cost of treatment with other biologic therapies compared to abatacept ranged from 11% to 48% after 3 years. Despite having additional costs of administration, IV biologics had lower total direct medical cost compared to SC, mainly due to higher cost per dosage of the drugs. **CONCLUSIONS:** Under the current price regulation for biologics in Colombia, the cost of treatment for rheumatoid arthritis favors the use of abatacept as a first line biologic after DMARD failure.

PMS41
ECONOMIC EVALUATION OF TOFACITINIB COMPARED WITH BIOLOGICAL THERAPY AS INITIAL MEDICATION AFTER FAILURE TO METHOTREXATE IN ADULTS WITH RHEUMATOID ARTHRITIS IN COLOMBIA
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OBJECTIVES: To compare, from the Colombian health care system perspective, both costs and effectiveness of tofacitinib with biological therapy as initial treatment in adults with rheumatoid arthritis after failure to methotrexate. **METHODS:** We used an Excel-based patient level simulation model to compare, with different time horizons (1, 2, 3 , 5, 10, and 20 years), cohorts of patients with tofacitinib as initial therapy compared with adalimumab, certolizumab, etanercept, golimumab or infliximab. All the patients modeled received concomitant treatment with methotrexate. The characteristics of the patients included: age, weight, initial HAQ score, and clini-

cal response to short and long term treatment, based on all available randomized controlled trials (and indirect comparisons, where appropriate). All costs, in 2012 Colombian pesos (1 USD$ = COP$1800) were obtained locally, using official databases for drug costs, and tariff manual (ISS 2001+30%) for procedures and complications. HAQ scores were used to calculate utilities, measured in QALYs. Annual discount rate was 3% both for cost outcomes. **RESULTS:** Total costs, in million COP$, for the first year of treatment were $25.51 for adalimumab, $26.96 for certolizumab, $26.94 for etanercept, $34.79 for golimumab, $25.63 for infliximab and $22.71 for tofacitinib. Tofacitinib represented a 16% cost reduction over a market-share weighted average of biological therapy in the first year, with equivalent or slightly better QALY gain (0.62 vs. 0.61). Cost savings and utility gained were maintained, and dominance was attained in more than 50% of Monte Carlo trials in the different time horizons and against all comparators considered. **CONCLUSIONS:** Under our model assumptions, and current costs in Colombia, for the national health care system, the sequence initiating with tofacitinib is a cost-saving alternative compared with biological therapy after failure to methotrexate in adults with rheumatoid arthritis, attaining at least the same average effectiveness in all the different time horizons considered.

PMS42
COST-EFFECTIVENESS OF ADALIMUMAB FOR RHEUMATOID ARTHRITIS IN GERMANY
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OBJECTIVES: Rheumatoid Arthritis (RA) can be treated with TNFα inhibitors after the failure of conventional disease-modifying antirheumatic drugs like methotrexate. The percentage of German patients treated with TNFα inhibitors has been rising from 2 % in 2000 to 20 % in 2008. In 2012, adalimumab was the most popular TNFα inhibitor and the best selling drug in the German statutory health insurance system with net expenditure of 581 mn €. We aim to analyze the cost-effectiveness of adalimumab for the treatment of RA in Germany. **METHODS:** We set up a Markov Chain Monte Carlo lifetime model to simulate 10,000 hypothetical patients. Initially, patients can achieve one of three responses according to American College of Rheumatology criteria or fail the therapy. Each response is associated with an initial improvement in functional status. In each cycle, treatment might be discontinued due to loss of efficacy or adverse events. **RESULTS:** In the base case, patients gain 2.64 quality-adjusted life years (QALYs) with methotrexate monotherapy and 6.25 QALYs if adalimumab combination therapy is added to the treatment algorithm. The incremental cost-utility ratio (ICUR) is 32,210 € based on German list prices. After deduction of mandatory rebates and taxes, the ICUR is only 23,755 €. Adalimumab combination therapy lowers indirect cost from 295,070 € to 235,531 €. The ICUR based on total cost is 15,728 € (7,274 € after deducting taxes and rebates). ICURs further improve for younger baseline age. Limiting the simulation time to 5 or 10 years increases ICURs. **CONCLUSIONS:** Adalimumab therapy for the treatment of RA is cost-effective in Germany even in the base case scenario, which uses incorrectly high list prices and ignores indirect cost savings. Our analysis shows that cost-effectiveness analysis of drugs for chronic diseases need to consider indirect costs and need to take a lifetime modeling perspective.

PMS43
HEALTH CARE EXPENDITURES ASSOCIATED WITH DEPRESSION AMONG INDIVIDUALS WITH OSTEOARTHRITIS: POST-REGRESSION LINEAR DECOMPOSITION APPROACH
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OBJECTIVES: Osteoarthritis commonly co-occurs with depression leading to poor health outcomes and high economic burden. The objective was to examine the contributing factors to excess total health care expenditures associated with depression among those with osteoarthritis using a post-regression linear decomposition approach. **METHODS:** Data were derived from the 2010 Medical Expenditure Panel Survey (MEPS) and self-reported osteoarthritis and depression were identified. Chi-square tests and ordinary least square regressions (OLS) on log-transformed expenditures were used to determine the association between depression status and health care expenditures after controlling for predisposing (gender, race, and age), enabling (marital status, education, employment, poverty status, insurance coverage, and usual source of care), need (perceived physical and mental health, anxiety, presence of cardiovascular conditions, and other chronic conditions), lifestyle (Body-Mass index, exercise, and smoking status), and external environment factors (metro versus non-metro). Post-regression linear decomposition technique was used to estimate the relative contribution of individual-level variables to the excess expenditures associated with depression and osteoarthritis compared to those without depression. **RESULTS:** Among individuals with osteoarthritis 20.6% reported having depression. The average total health care expenditures were $13,684 for those with depression compared to $9,284 among those without depression. OLS regression on log-transformed total health care expenditures revealed that those with depression had 38.8% greater health care expenditures (p < 0.001) compared to adults without depression. Post-regression linear decomposition analysis indicated that nearly 50% of the difference in average health care expenditures among adults with and without depression can be explained by differences in individual-level characteristics between the two groups. These differences may be attributable mainly to the need factors such as perceived health status, anxiety, presence of cardiovascular conditions, and other chronic conditions. **CONCLUSIONS:** Results from the study suggest that excess health care expenditures associated with depression may be reduced by improving the co-management of chronic physical and mental health conditions.

PMS44
RESOURCE USE RELATED TO VERTEBRAL FRACTURES BASED ON DATA FROM ICUROS
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OBJECTIVES: The International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS) is an ongoing 18 months prospective observational study with the objective of estimating resource use and health related quality of life related to osteoporotic fractures. This study aims to describe the resource utilization after vertebral fractures (sustained during 2007-2012) pooled from nine countries: Australia, Austria, France, Italy, Lithuania, Mexico, Russia, Spain, and the UK. **METHODS:** Patients studied were ≥ 50 years and lived at home prior to fracture. Data were collected through patient interviews and review of medical records: at baseline, 4, 12, and 18 months after fracture. Only resource use related to the fracture event was collected. **RESULTS:** There were 636, 572, and 536 patients available for analysis at 4, 12 and 18 months follow-up, respectively. The mean age (±SD) at fracture was 70±10 years and 81% were women. 45% of patients were hospitalized. Mean hospital length of stay (LoS) (±SD) was 5.7±12.4 days during months 0-4 and 0.9±9.8 during months 5-18. The mean number of physician visits (±SD) was 2.8±2.7 during months 0-4 and 1.9±3.4 between months 5-18. The mean number of nurse visits (±SD) was 1.4±8.5 and 1.5±19.9 during the corresponding periods, respectively. During months 0-4, 72% of patients used analgesics, 59% calcium/vitamin D, and 41% pharmacological interventions for osteoporosis. The respective uptakes for months 5-18 were 56%, 55% and 34%. **CONCLUSIONS:** The majority of health care consumption related to vertebral fracture occurs during the first 4 months but substantial consumption persists up to 18 months after fracture.

PMS45

HEALTH CARE UTILIZATION PATTERNS ASSOCIATED WITH ONSITE VERSUS OFFSITE CHIROPRACTIC CARE

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OBJECTIVES: Musculoskeletal conditions are the primary cause of physical disability in the United States, and have implications for workplace productivity and employer health costs. This study determined the influence of employer-sponsored, onsite chiropractic care on health care utilization. **METHODS:** A retrospective claims analysis of members of an employer-sponsored health plan receiving chiropractic care exclusively onsite or offsite from 2010-2012. Data were obtained from the employer's health benefits administration program. Eligible participants had continuous enrollment in the health plan and ≥1 billing code for chiropractic services during the 36-month study period. Utilization was assessed in 2 categories: radiological procedures and clinical care. Utilization differences were evaluated by having ≥1 health care event in any category. Continuous variables were summarized as means, and binary variables as counts and proportions. Differences were assessed via chi-square test for categorical variables and t-test and Kruskal-Wallis non-parametric test for continuous variables. Comparisons were considered significant at alpha = 0.05. **RESULTS:** The analysis included 876 onsite and 759 offsite participants. The populations were similar in gender; the onsite group was slightly younger. The offsite group received more radiology services overall (55.5% vs 38.2%, P<0.001) including x-ray (46.0% vs 26.6%; P < 0.0001); ultrasound (15.8% vs 10.7%, P<0.0001), and magnetic resonance imaging (14.6% vs 12.4%, P<0.0001); had higher outpatient (47.3% vs 30.2%, P<0.0001) and emergency department (19.0% vs 13.1%; P = 0.022) utilization; and demonstrated greater use of chiropractic care (mean 15.2 vs 9.16 visits; P<0.0001) and physical therapy (mean 9.6 vs 1.5 visits; P<0.0001). **CONCLUSIONS:** In patients needing chiropractic care, those utilizing onsite services had lower health care utilization, including radiology services , clinical care, and counts of chiropractic and physical therapy services. The study results support the value of chiropractic services offered at onsite health centers, where more tightly managed and evidence-based approaches to musculoskeletal conditions can be facilitated.

PMS46

HEALTH CARE RESOURCE UTILIZATION IN THE MANAGEMENT OF KNEE OSTEOARTHRITIS WITH HYALURONIC ACID IN A CANADIAN REAL-WORLD POPULATION

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OBJECTIVES: To examine the health care resource utilization in patients with knee osteoarthritis and treated with Hylan G-F 20 (Synvisc, Genzyme Biosurgery) compared with patients treated with alternative intra-articular hyaluronic acid (HA) injections in Ontario, Canada. **METHODS:** This is an observational, prospective cohort of patients 18 years and older who, between June 1, 1999 and December 31, 2012 had: 1) a diagnosis of knee osteoarthritis identified by ICD 9-10 or text coding; 2) received at least 1 treatment cycle with intra-articular HA and; 3) complete pain and mobility data for each treatment cycle. Data from the Southwestern Ontario (SWO) database, has been continuously compiled since 1999 and includes demographic, biometric, laboratory, diagnostic and health resource measures as collected in a primary care setting. Health care resource utilization included clinic visits, emergency visits, hospitalizations, home care visits, knee bracing, radiographs, and work absenteeism. Differences between treatments were compared using independent sample t-tests. **RESULTS:** 6,618 patients met all inclusion criteria of which 44% were treated with Hylan G-F 20. Patients were similar across treatment groups. During the follow-up period, patients received, on average, 6 HA treatment cycles

and an annual knee X-ray, with 445 of them needing a knee brace during this period. During the study period there were 6,705 osteoarthritis-related hospitalizations, and over 10,000 combined physiotherapy(PT)/occupational therapy (OT) and home care nursing visits among patients prescribed HA. Hylan G-F 20 patients had fewer visits to a GP (36%) and specialist (39%), lower use of PT/OT (23% and 1%) and home care nursing (2%) services compared to other HA treatments (p<0.05 for all comparisons). **CONCLUSIONS:** This analysis demonstrates that not all HA injections in patients with knee osteoarthritis represent similar resource utilization. Further real world examination of the effectiveness of HA for reducing clinical symptoms and improving health care resource utilization in knee osteoarthritis is warranted.

MUSCULAR-SKELETAL DISORDERS – Patient-Reported Outcomes & Patient Preference Studies

PMS47

THE RELATIONSHIP BETWEEN ADHERENCE AND HEALTH CARE COST AMONG PATIENTS WITH RHEUMATOID ARTHRITIS: A RETROSPECTIVE CASE COMPARISON STUDY

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OBJECTIVES: The objective of this research report was to examine the relationship between medication adherence levels and health care cost among patients with rheumatoid arthritis (RA). **METHODS:** This study used a retrospective case comparison design to examine per member per month (PMPM) medical cost. The commercial population of patients with RA was extracted from two large claims data bases between years 2006 and 2009. The case cohort consisted of compliant patients (MPR ≥ 80%) receiving medication management from the Specialty division of a large pharmacy retail chain. The comparison cohort consisted of non-compliant patients (MPR < 80%) from a national benchmark pharmacy and medical claims data base. Using propensity scores, patients were matched on age, gender, risk score, socio-economic status, standard industrial classification code, comorbid conditions, and pre-medication gap. This process resulted in 512 one-to-one match pairs. **RESULTS:** Patients with RA who were compliant to their medication regimen had 25% lower PMPM medical cost (in-patient, out-patient, professional, and emergency room cost) than patients who were non-compliant ($637 vs. $855 respectively; P=0.0458). The majority of this cost difference was due to in-patient cost which was 46% lower for compliant patients, followed by professional cost which was 15% lower for compliant patients. A closer look at medical cost by levels of compliance reveals that PMPM medical cost decreased at each level of medication compliance described below. Patients with adherence levels less than 40% had PMPM cost of $1024, those with adherence levels between 40% and 80% had PMPM cost of $838, and patients with adherence levels greater than or equal to 80% had PMPM cost of $637. **CONCLUSIONS:** Medical cost decreases as adherence to the RA medication regimen increases. Given that the cost of treating RA can be extremely expensive, one approach to addressing this financial issue is to target medication adherence.

PMS48

WITHDRAWN

PMS49

GOLIMUMAB UTILIZATION PATTERNS AND REFILL ADHERENCE IN PATIENTS WITH RHEUMATOID ARTHRITIS, PSORIATIC ARTHRITIS AND ANKYLOSING SPONDYLITIS

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