and that over time, the indirect associated portion of costs remains almost constant, showing that over time the costs of indirectly related issues are becoming a larger proportion of total costs. Methodological advancements in costing attribution over time could contribute to understanding the patterns in health care resource usage among populations with chronic diseases.

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THU0546 HEALTHCARE COSTS OF NOT ACHIEVING REMISSION IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Background: Guidelines recommend sustained remission as a treatment goal for patients with rheumatoid arthritis (RA). However, only one-third of patients are known to achieve this goal with current treatments. A few studies have evaluated the impact of remission in a real-world setting, but evidence is limited to the elderly population.

Objectives: To understand the impact of remission on healthcare costs by comparing overall and RA-related direct healthcare costs and resource use in patients with RA who maintain vs those who do not maintain remission using a real-world database.

Methods: Data for this retrospective cohort study were derived from Optum electronic health records linked to claims from commercial and Medicare Advantage health plans in the United States. Patients with ≥ 2 diagnoses for RA, ≥ 1 Disease Activity Score 28 (DAS28-CRP/ESR) or Routine Assessment of Patient Index Data 3 (RAPID3) measurement, and continuous medical and pharmacy coverage 6 months before and 1 year after the index date were included. Two cohorts were created: remission and non-remission. Remission was defined as DAS28 < 2.6 or RAPID3 ≤ 3.0 . In the remission cohort, the index date was defined as the first date remission was achieved. In the non-remission cohort, the index date was defined as the first date of DAS28 or RAPID3 measurement. Outcomes were all-cause and RA-related total, medical, and prescription costs; healthcare resource use (number of inpatient, emergency department [ED], outpatient, and other visits); and number of prescriptions within 1 year of index date. A weighted generalized linear model and binomial regression were used to estimate adjusted annual direct costs and healthcare resource use, respectively. Confounding between cohorts due to age, sex, race and comorbidities using the Elixhauser index was controlled for in the models.

Results: A total of 335 patients with RA (remission cohort: 125; non-remission cohort: 210) met the study inclusion criteria. Annual all-cause total direct costs in the remission cohort were significantly less than in the non-remission cohort (\$30,427 vs \$38,645, respectively; cost ratio (CR)=0.79; 95% CI: 0.63, 0.99). All-cause medical costs were significantly lower in the remission cohort than in the non-remission cohort (Figure 1); furthermore, among all-cause medical costs, outpatient visit costs were significantly lower in the remission than in the non-remission cohort. All-cause resource use (mean number of visits) was less in the remission vs non-remission cohort: inpatient (0.23 vs 0.63; visit ratio (VR)=0.36; 95% CI: 0.19, 0.70), ED (0.36 vs 0.77; VR=0.47; 95% CI: 0.30, 0.74), and outpatient visits (20.7 vs 28.5; VR=0.73; 95% CI: 0.62, 0.86). Annual RA-related total direct costs were similar in both cohorts (Figure 2); however, RA-related medical costs were numerically lower in the remission vs non-remission cohort (\$8,594 vs \$10,002, respectively; CR=0.86; 95% CI: 0.59, 1.25). RA-related resource use (mean number of visits) was less in the remission vs non-remission cohort: inpatient (0.15 vs 0.22; VR=0.67; 95% CI: 0.35, 1.30), ED (0.04 vs 0.13; VR=0.31; 95% CI: 0.10, 0.95), and outpatient visits (5.4 vs 7.4; VR=0.72; 95% CI: 0.58, 0.91).

Conclusion: Significant economic burden was associated with patients who did not maintain remission compared with those who maintained remission. Although outpatient visits were the driver of medical costs in both groups studied in this analysis, the contribution of outpatient visits was greater among those who did not maintain remission.

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THU0547 ESTIMATION OF THE IMPACT OF A STRATEGY TO OPTIMIZE COSTS ON NATIONAL HEALTH-CARE SYSTEM IN PATIENTS WITH RHEUMATOID ARTHRITIS: A DIRECT COST ANALYSIS

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Background: Rheumatoid arthritis (RA) is a disease associated with a high and increasing direct cost to the health-care resources. It is estimated that about 250,000 persons may have RA in Colombia. The characteristic joint damage and disability associated to RA increase slowly over many years (10–20 years).

Objectives: To assess the development of RA in Colombian-population over the next five-years and to estimate the impact of a strategy to reduce direct-costs on the national health-care system.

Methods: We use a population-based approach of epidemiological type to analyze the development of the disease over time. We design a continuous mathematical model for the transmission and evolution of RA in a population. The description of a biological phenomenon (disease), by differential equations is called mathematical modeling and allows us not only to study and analyze the dynamics of the disease, but also to predict its future development. The system is formed by eight ordinary differential-equations, explaining the influence of the epidemiological parameters considered in the evolution of RA. This mathematical modeling-approach has been extensively used to study the dynamical behavior of diseases in populations from an epidemiological point of view. The parameters of the mathematical-model are estimated using real-data from RA-prevalence. Total population was divided into eight groups as follows: general population, prevalent (at risk), pre-clinical (asymptomatic), symptomatic (tender/swollen joints), diagnosed without treatment (fulfilling classification-criteria), starting early treatment (before two years of symptoms), starting late treatment (after two years of symptoms), and chronic RA patients (disease duration more than 2 years). Numerical simulations allow to explain the RA-epidemiology and predict the disease over the next five-years.

Results: In the next five-years there will be 129,000 new RA-patients in Colombia, with an estimated cost on the national health-care system of about \$4125 million (USD). The analysis of the proposed mathematical model allows us to recommend an action-strategy to optimize and reduce direct-costs. The strategy is related to the implementation of the optimal clinical-diagnosis of RA and starting timely-treatment of patients with the most effective approaches available. Applying this strategy would allow the health-care system to reduce about 20% of its direct costs over the next five-years, reducing costs from \$4125 million to \$3337 million with estimated savings of \$789 million. Figure 1

Figure 1 Comparison of direct-costs associated to rheumatoid arthritis over time

Conclusion: We investigated the development of RA over the next five-years and were able to predict the number of new patients. The impact of the implementation of a strategy based on optimal-diagnosis and timely-treatment may reduce about 20% of its direct costs over the next five-years.

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THU0548

THE ECONOMIC BURDEN OF ANKYLOSING SPONDYLITIS IN SPAIN. RESULTS OF THE SPANISH ATLAS 2017

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Background: Ankylosing Spondylitis (AS) is a disease associated with a high number of comorbidities, chronic pain, functional disability, and resource consumption.

Objectives: This study aimed to estimate the burden of disease for patients diagnosed with AS in Spain.

Methods: Data from 578 unselected patients with AS were collected in 2016 for the Spanish Atlas of Axial Spondyloarthritis via an online survey. The estimated costs were: Direct Health Care Costs (borne by the

National Health System, NHS) and Direct Non-Health Care Costs (borne by patients) were estimated with the bottom-up method, multiplying the resource consumption by the unit price of each resource. Indirect Costs (labour productivity losses) were estimated using the human capital method. Costs were compared between levels of disease activity using the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) score (<4 or low inflammation versus ≥4 or high inflammation) and risk of mental distress using the 12-item General Health Questionnaire (GHQ-12) score (<3 or low risk versus ≥3 or high risk).

Results: The average annual cost per patient with AS in 2015 amounted to €11,462.3 (± 13,745.5) per patient. Direct Health Care Cost meant an annual average of €6,999.8 (± 9,216.8) per patient, to which an annual average of €611.3 (± 1,276.5) per patient associated with Direct Non-Health Care Cost borne by patients must be added. Pharmacological treatment accounted for the largest percentage of the costs borne by the NHS (64.6%), while for patients most of the cost was attributed to rehabilitative therapies and/or physical activity (91%). The average annual Indirect Costs derived from labour productivity losses were €3,851.2 (± 8,484.0) per patient, mainly associated to absenteeism. All categories showed statistically significant differences (p<0.05) between BASDAI groups (<4 vs ≥4) except for the Direct Non-Healthcare Cost, showing a progressive rise in cost from low to high inflammation. Regarding the 12-item General Health Questionnaire (GHQ-12), all categories showed statistically significant differences between GHQ-12 (<3 vs ≥3), with higher costs associated with higher risk of poor mental health (Table 1).

Table 1. Average annual costs per patient according to BASDAI and GHQ-12 groups (in Euros, 2015)

	N	Direct Health Costs	Direct Non-Health Costs	Indirect Costs	Total Cost
BASDAI					
<4	91	7,592.0*	557.3	2,426.5*	10,575.8*
≥4	376	9,706.9*	768.0	5,104.8*	15,579.7*
Psychological distress (GHQ-12)					
<3	146	8,146.8*	493.6*	3,927.2*	12,567.6*
≥3	260	9,772.9*	807.2*	4,512.3*	15,092.5*
Total	578	6,999.8	611.3	3,851.2	11,462.3

* p < 0.05

Conclusion: Direct Health Care Costs, and those attributed to pharmacological treatment in particular, accounted for the largest component of the cost associated with AS. However, a significant proportion of the overall costs can be further attributed to labour productivity losses.

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THU0549

COST-EFFECTIVENESS OF DIAGNOSING AXIAL SPONDYLOARTHRITIS IN THE NETHERLANDS

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Background: In order to facilitate diagnosis of axial spondyloarthritis (axSpA) in clinical practice, three diagnostic algorithms have been published: the original Berlin algorithm (BER), and modifications 1 (M1) and 2 (M2). These mainly differed mainly in the position and definition of inflammatory back pain (Figure). BER was the most specific of these algorithms, while M2 was most sensitive, and the latter was accepted as the algorithm of choice. However, it is unknown to what extent it is acceptable, in terms of costs and effects, to increase sensitivity (i.e. reducing underdiagnosis and undertreatment) at the expense of specificity (i.e. increasing overdiagnosis and overtreatment).