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.

Disclosure of Interests: None declared

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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).