

# REGIONAL ANALYSIS OF INDIRECT COSTS OF EARLY RETIREMENT DUE TO RHEUMATIC DISEASES IN PORTUGAL

**Pedro Lares<sup>1,2</sup>; Miguel Gouveia<sup>3</sup>; Helena Canhão<sup>1,4</sup>; Ana Rodrigues<sup>2,5</sup>; Nélia Gouveia<sup>2,6</sup>; Mónica Eusébio<sup>7</sup>; Jaime Branco<sup>4,8</sup>**

<sup>1</sup> Faculdade de Medicina da Universidade de Lisboa, Lisbon Academic Medical Center, Lisbon, Portugal

<sup>2</sup> EpiReumaPt Study Group - Sociedade Portuguesa de Reumatologia, Lisbon, Portugal

<sup>3</sup> Católica Lisbon School of Business and Economics, Lisbon, Portugal

<sup>4</sup> Rheumatology Research Unit, Instituto de Medicina Molecular - Faculdade de Medicina da Universidade de Lisboa, Lisbon, Portugal

<sup>5</sup> EpiDoc Unit – Unidade de Epidemiologia em Doenças crónicas (CEDOC, NMS/UNL), Lisbon, Portugal

<sup>6</sup> Center de Estudos de Doenças crónicas (CEDOC) da NOVA Medical School - Universidade Nova de Lisboa (NMS/UNL), Lisbon, Portugal

<sup>7</sup> Sociedade Portuguesa de Reumatologia, Lisbon, Portugal

<sup>8</sup> Rheumatology Department - Hospital Egas Moniz, Lisbon.

# BACKGROUND

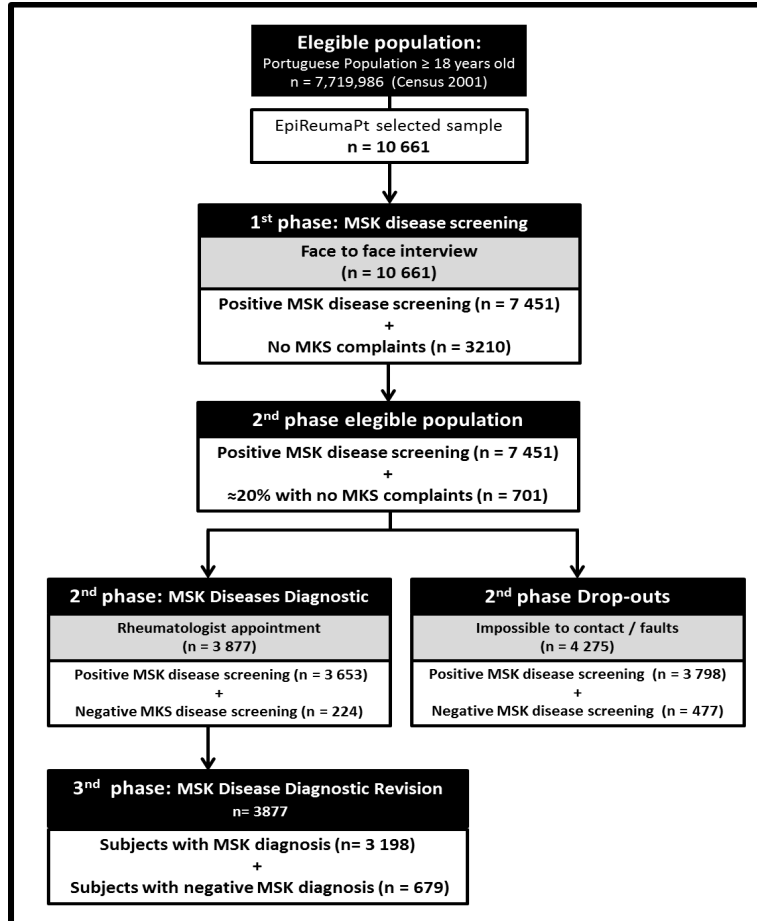
- Early Retirement continues to occur frequently and is a major challenge to be confronted by social and health policies.
- There are several factors affecting early retirement, including health problems. Rheumatic diseases (RD) being some of the most relevant.
- RD are characterized by pain and physical disability that may lead to early withdrawal from paid employment, generating substantial costs to society.
- Epidemiologic and socioeconomic heterogeneity throughout the country may result in regional differences.

# EpiReumaPt

## Population

10.000 PT inhabitants randomly surveyed within a representative sample of the Portuguese population

Observational cross-sectional study on RD in Portugal (2010-2014)



## All ages

Observations: 10.661

Population size: 8.081.109

2<sup>nd</sup> Phase: 3.877

Self-reported RD=21%

RD Confirmed=56%

## Age-range 50-65

Observations: 2.792

Population size: 1.706.750

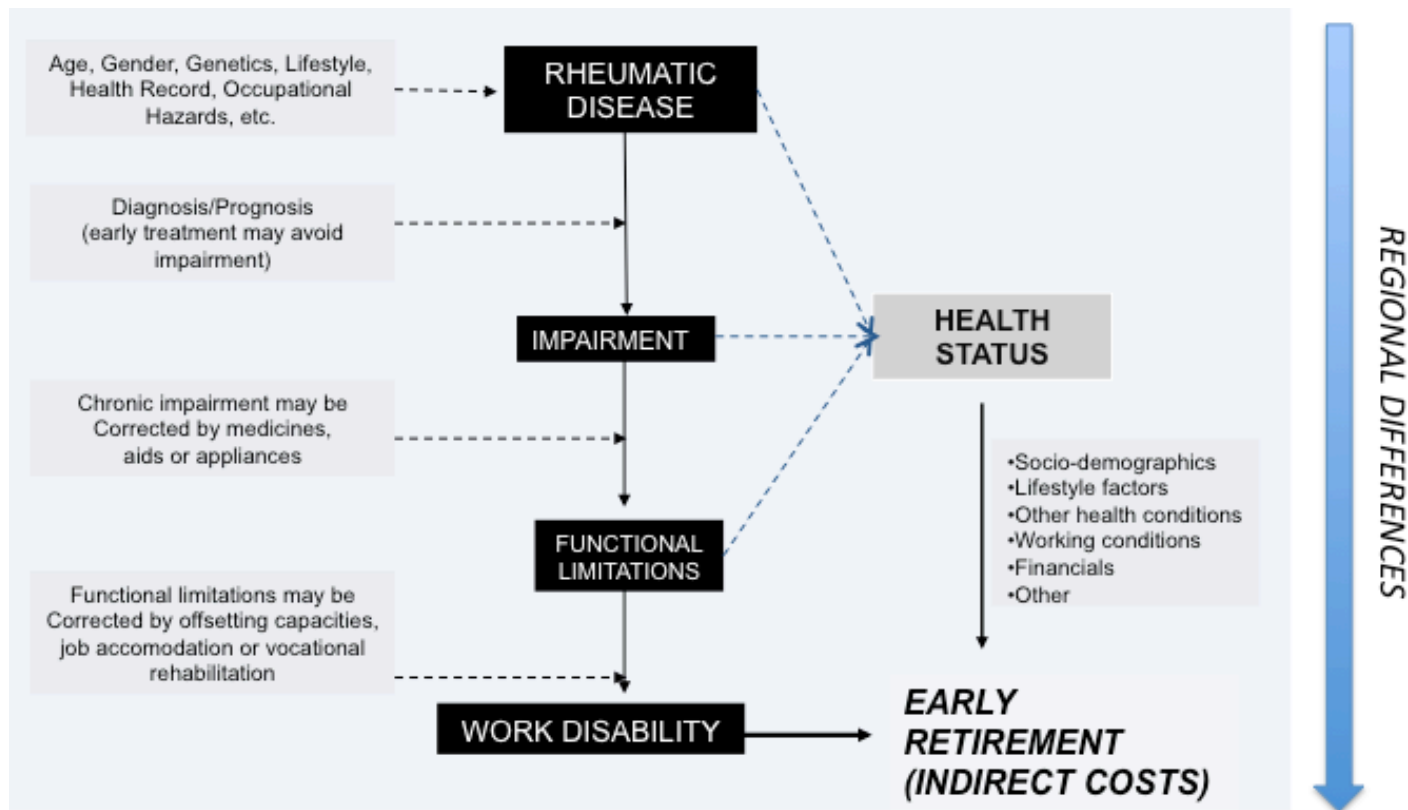
2<sup>nd</sup> Phase: 1.286

Self-reported RD=34% (INS=37%)

RD Confirmed=73%

# OBJECTIVE

- To analyze the indirect costs of early retirement due to RD in mainland Portugal and its regions.



# METHODS I

- **SAMPLE:** We used individual level data the cross-sectional, population-based EpiReumaPt study (2011-2013). 10,661 inhabitants were randomly surveyed in order to capture and characterize all cases of RD within a representative sample of the Portuguese population.
- The analysis used all participants aged between 50 and 65 years old, near the statutory official retirement (n=2,792).
- **MEASUREMENTS:** Early retirement caused by RD was assessed through participants' self-reporting.
- Indirect Costs: we used the **human capital approach** to estimate productivity costs by valuing healthy time lost due to the disease using market wage rates, which can be viewed as the loss of an investment in a person's human capital.
- Unit Values of Production: "Quadros do Pessoal" database for 2013 was used to calculate productivity values by gender, age and region from mainland of Portugal.

*This approach obtained an annual average value of €24,891 for men and €16,079 for women, for ages between 50 and 64 years old.*
- Annual indirect costs associated with early retirement due to RD were obtained by summing all annual average values of production (previously assigned in the EpiReumaPt sample according to age, gender and geographic region) for those from the analyzed sample who self-reported early retirement caused by RD.
- Due to the uncertainty on the officially reported data on wages we didn't include the islands in this analysis.

# METHODS II

- Additionally, since this could be considered an overestimation by attributing full indirect costs to RD, therefore not considering additional retirement risk imposed by other factors, we also deployed **population attributable fractions (PAF)**.
- PAF were calculated as the resulting proportional change in the probability of early retirement due to RD (using logistic multivariable models) after a counterfactual exercise where the presence of RD is artificially eliminated from the sample.
- This recalculated probability of early retirement was then used to estimate the indirect costs attributable to RD by multiplying each observation's probability change with the corresponding unit value of production.
- All results were based on weighted data reflecting the stratified sampling nature of the survey.

# RESULTS I

- **Lisbon** has the highest self-reported RD prevalence and ~10% of retirement caused by RD above the national average, However it has the highest average age of this sort of retirement.
- **North and Algarve** regions are the opposite.
- **Center and Alentejo** Regions are worse than the national average in all these assessments.

REGION	Self-Reported Rheumatic Diseases (RD) Prevalence (%)	Retirement Caused by RD (%)	Average Age of Retirement Caused by RD (yo)
NORTH	29,9	3,2	53,5
CENTER	37,0	4,3	54,1
LISBON (LVT)	38,0	4,3	58,6
ALENTEJO	34,8	5,5	53,2
ALGARVE	24,1	1,7	41,5
<b>NATIONAL</b>	<b>34,2</b>	<b>3,9%</b>	<b>54,8</b>

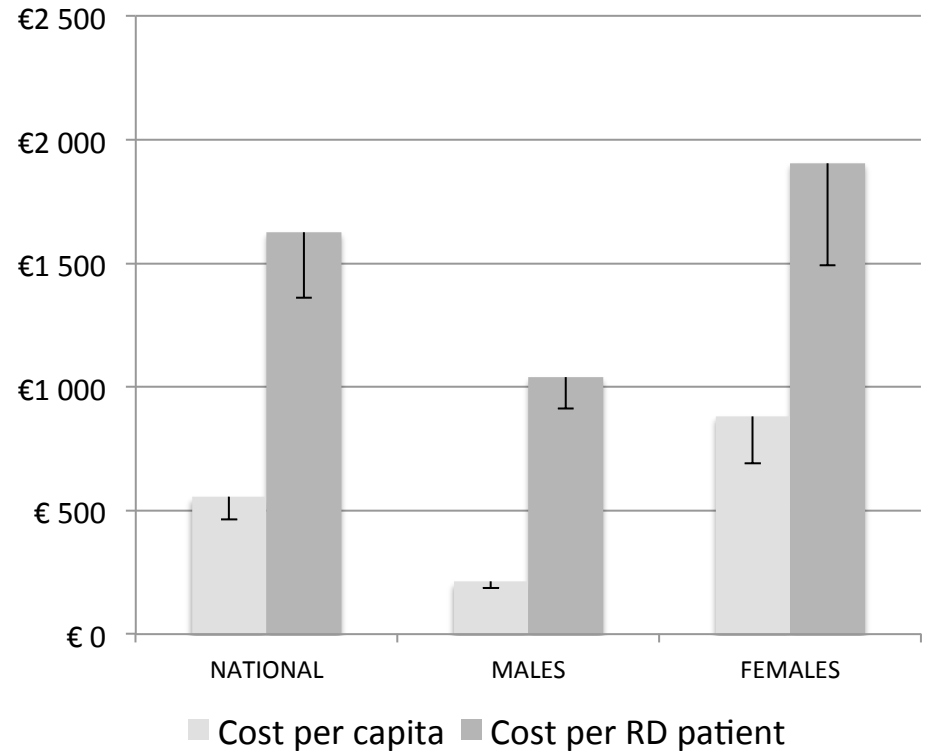
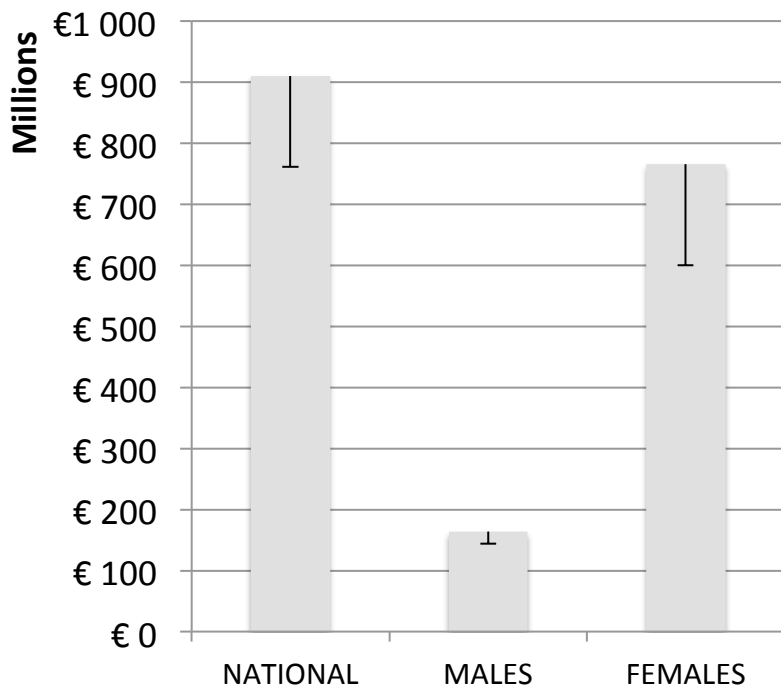
■ *better than national average*

■ *worse than national average*

# RESULTS II

## INDIRECT COSTS

- The estimated annual indirect cost following premature retirement caused by RD was €910 million (€555 per capita and €1,625 per self-reported RD patient).
- Women contributed with 84% of these costs (€766 million; €882 per capita versus €187 from men).

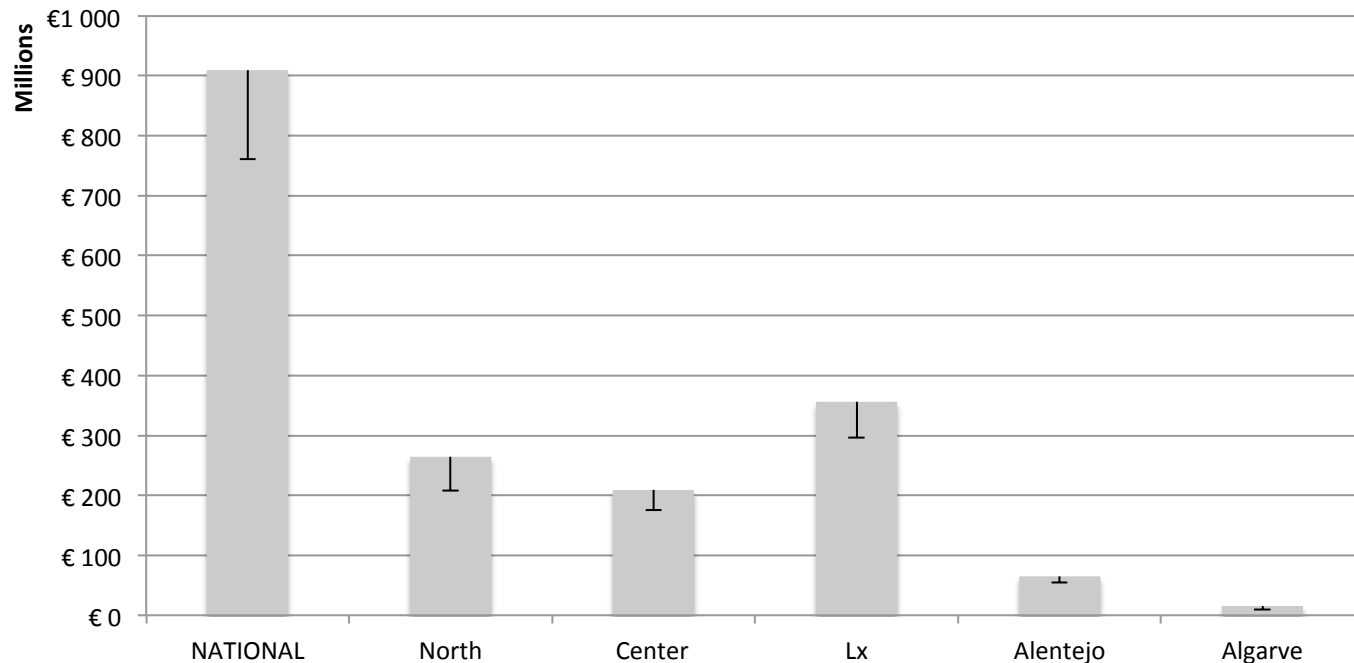




# RESULTS III

## INDIRECT COSTS

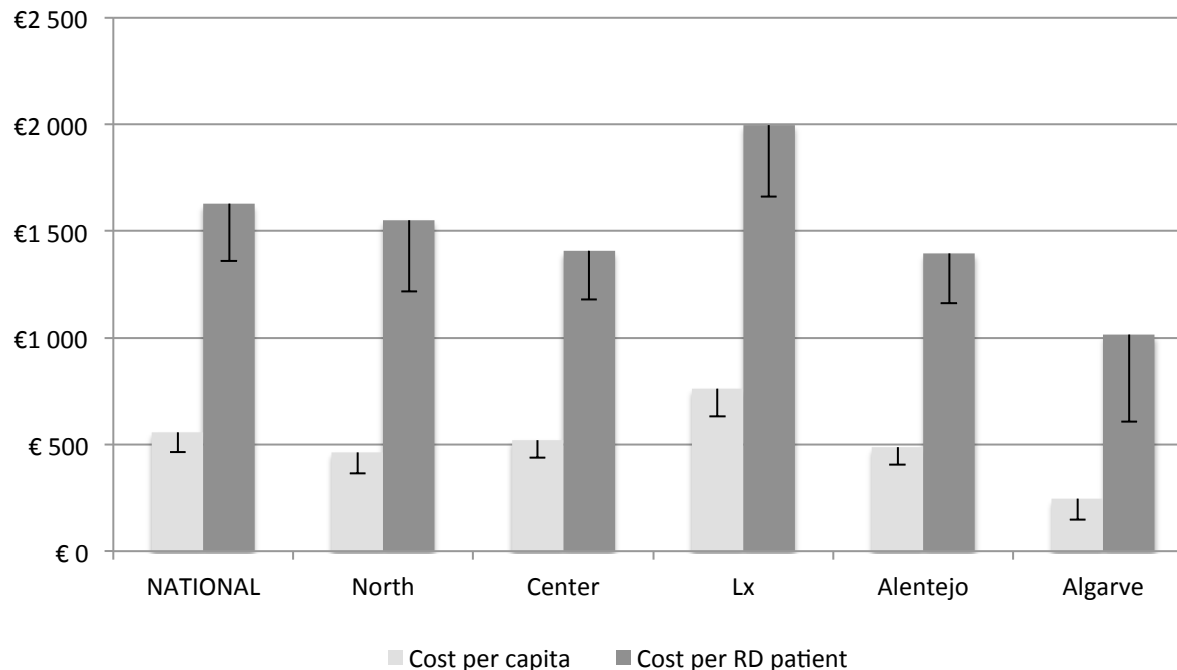
- **Lisbon** region had the highest overall share (39%; €356 million).
- Followed by the **North and Center** regions (€265 and €209 million, respectively).
- **Alentejo and Algarve** region had the lowest estimates (€65 and €15 million, respectively).



# RESULTS IV

## INDIRECT COSTS

- **Lisbon** region had the highest cost per capita (€759 per capita and €1,997 per RD patient).
- Followed by the **North, Center and Alentejo** regions.
- **Algarve** region had the lowest estimates (€244 per capita and €1,014 per RD patient). However, this region has low access to RD diagnosis with the highest observed gap between self-reported RD (24.1%) and clinically confirmed RD (74.2%).



# CONCLUSIONS

- We estimated high costs of early retirement due to RD in Portugal mainland and observed substantial overall heterogeneity in the regional analysis.
- However, we cannot conclude that these discrepancies are entirely caused by RD *per se*
- Other factors play an important role, such as wage differences, access to diagnosis, patients' RD self-awareness, etc.
- Structural variations, other than wage differences, may also have an influence. Nevertheless we did not observe a significant regional effect in the risk of early retirement caused by RD (*data not shown*).
- In order to better address this impact, regional heterogeneity should be taken in account with targeted interventions and appropriate public health policies.