

Optimizing Chronic Obstructive Pulmonary Disease (COPD) diagnosis and management to reduce healthcare costs: systematic review and modeling

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Introduction

COPD represents a major public health problem associated with a substantial economic and social burden.^{1,2}

Underdiagnosis, treatment not administered in accordance with clinical guidelines or deficient inhalation techniques derive in poor clinical outcomes.³

Suboptimal treatment of COPD produces additional costs and a great burden for the National Health System (NHS) in Spain.^{4,5}

Methods

The study has 2 phases:

Phase 1. Systematic review of the literature

A systematic review of the literature, between 2002-2012, was carried out by searching international and national electronic databases (MedLine/Pubmed, Cochrane Library, ISI WOK, MEDES, IBECS, CSIS, Google Scholar) to identify articles on resource use and COPD direct costs.

Phase 2. Modeling

Based on available epidemiological data and information identified in the systematic review, current COPD annual direct costs in Spain were estimated and potentially avoidable direct costs were calculated considering the following hypothetical situations simulating the implementation of some of the recommendations of the Spanish NHS COPD Strategy⁶:

- Early COPD diagnosis** by performing spirometry to 1% of the undiagnosed population.
- Reduction by 1% of COPD progression** (avoiding that 1% of mild and moderate COPD patients progresses to the next stage of severity) by improving treatment effectiveness as a result of implementing treatment guidelines.
- Improvement of therapeutic adherence and persistence.**

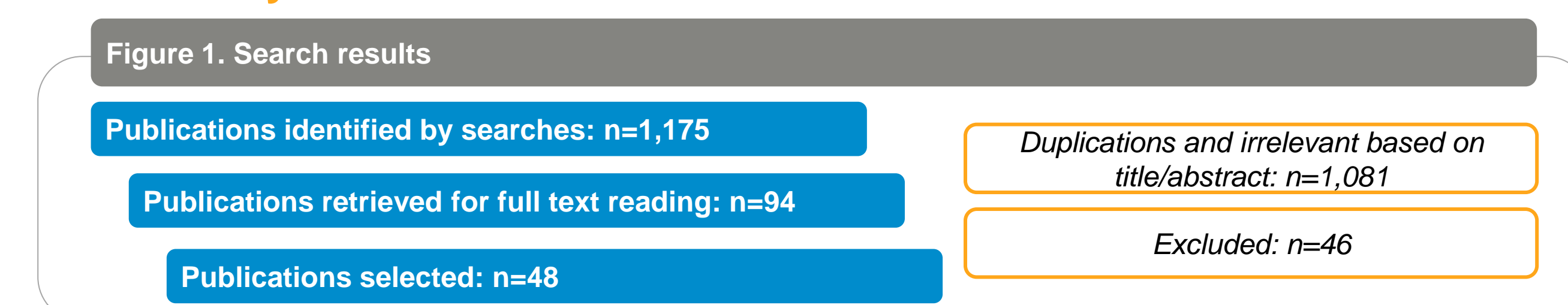
The difference between COPD annual direct costs and costs associated to each situation were calculated. All costs were updated (Euros, 2012).

The following definitions were applied:

- Adherence as proportion of days covered (PDC): percentage of days with any COPD maintenance medication divided by the duration of the therapy. Patients with PDC of $\geq 80\%$ were classified as "high" adherers.
- Persistence assesses the duration of time an individual takes the prescribed COPD maintenance medications.

Results

Phase 1. Systematic review of literature



Direct costs

- Direct costs are highly heterogeneous depending on country, study design, population profile and resources use included.
- In Spain, the average direct cost per year ranges between €301 and €4,226, with high variability depending on the study.^{7,8}

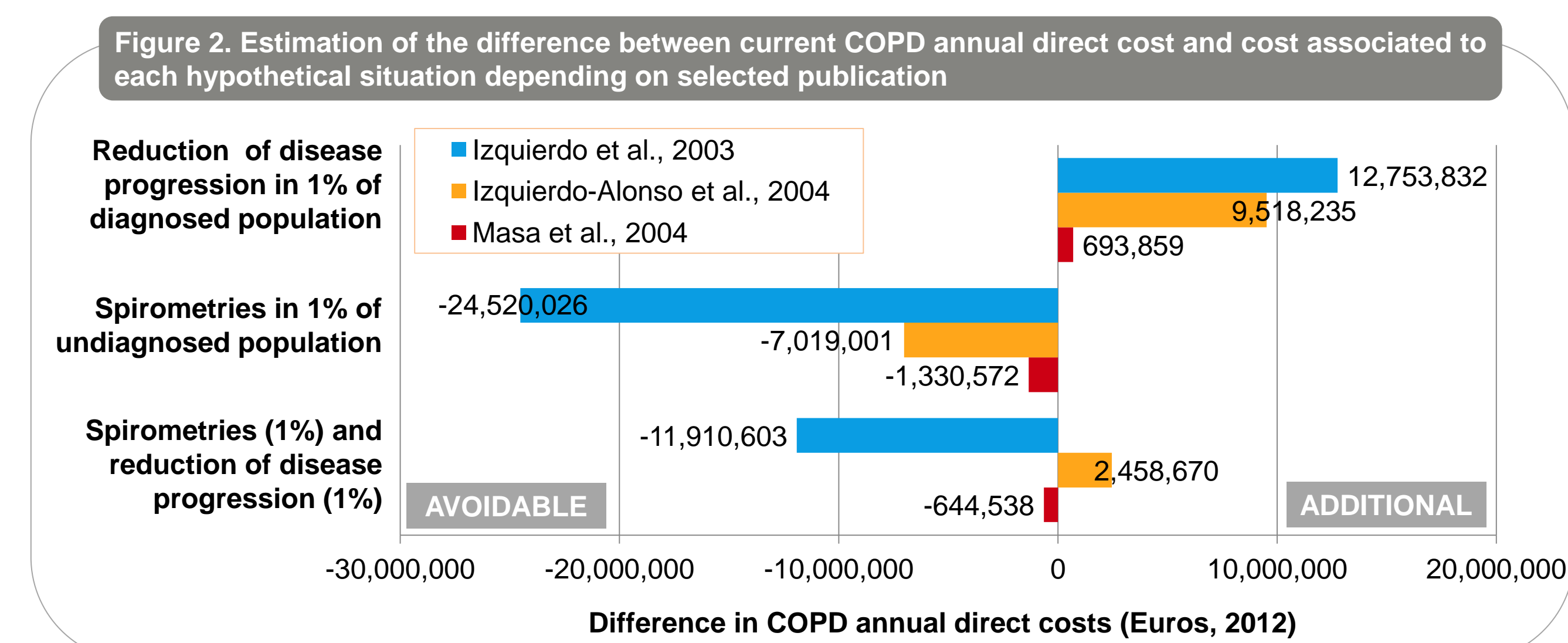
Adherence and persistence in COPD treatment

- Average direct costs per patient decrease by 9% when treatment adherence is achieved. On the contrary, costs increase by 5% in case of non-adherence.⁴
- When treatment persistence is achieved, COPD average direct cost per patient are reduced by 3%. In case of non-persistence, direct costs increase by 13%.⁴

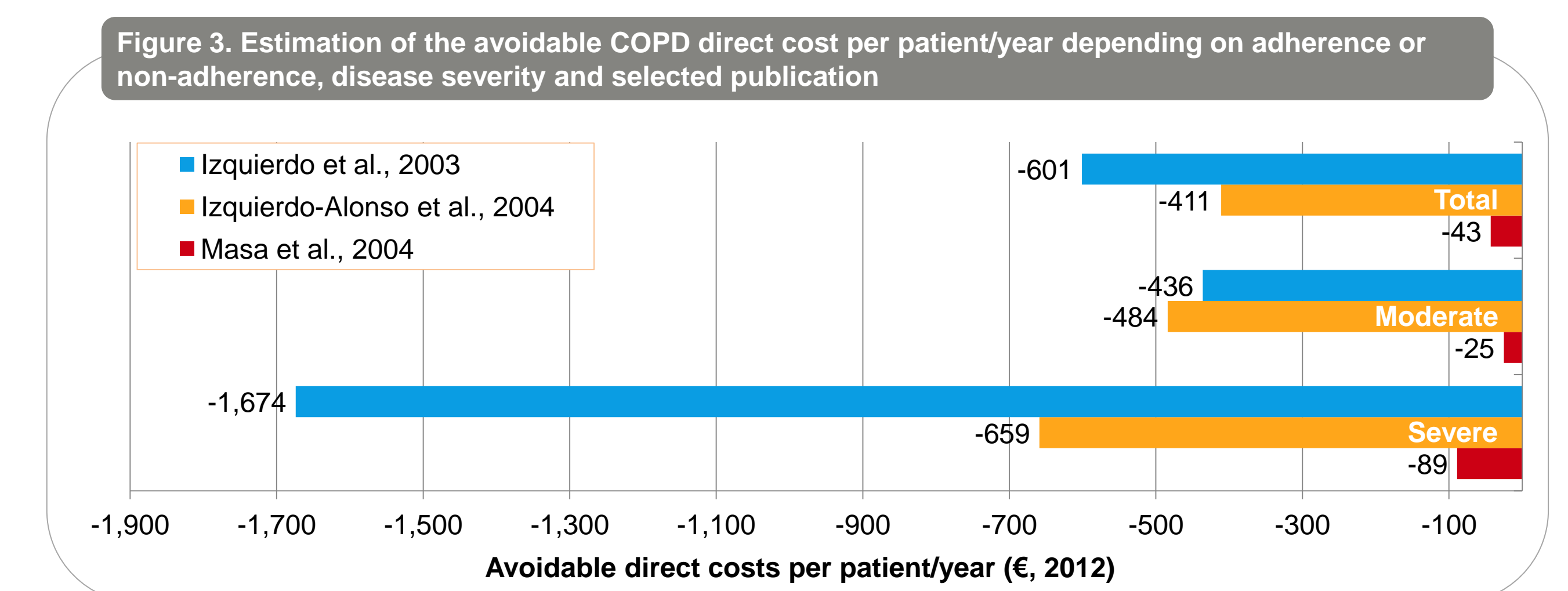
Phase 2. Modeling

In order to cover the range of COPD direct costs per patient and year in Spain, 3 cost estimations were performed based on data from 3 Spanish sources selected from literature review: Izquierdo et al. 2003⁷, Izquierdo-Alonso et al. 2004⁹ and Masa et al. 2004⁸ which present the higher, middle and lowest COPD direct costs, respectively.

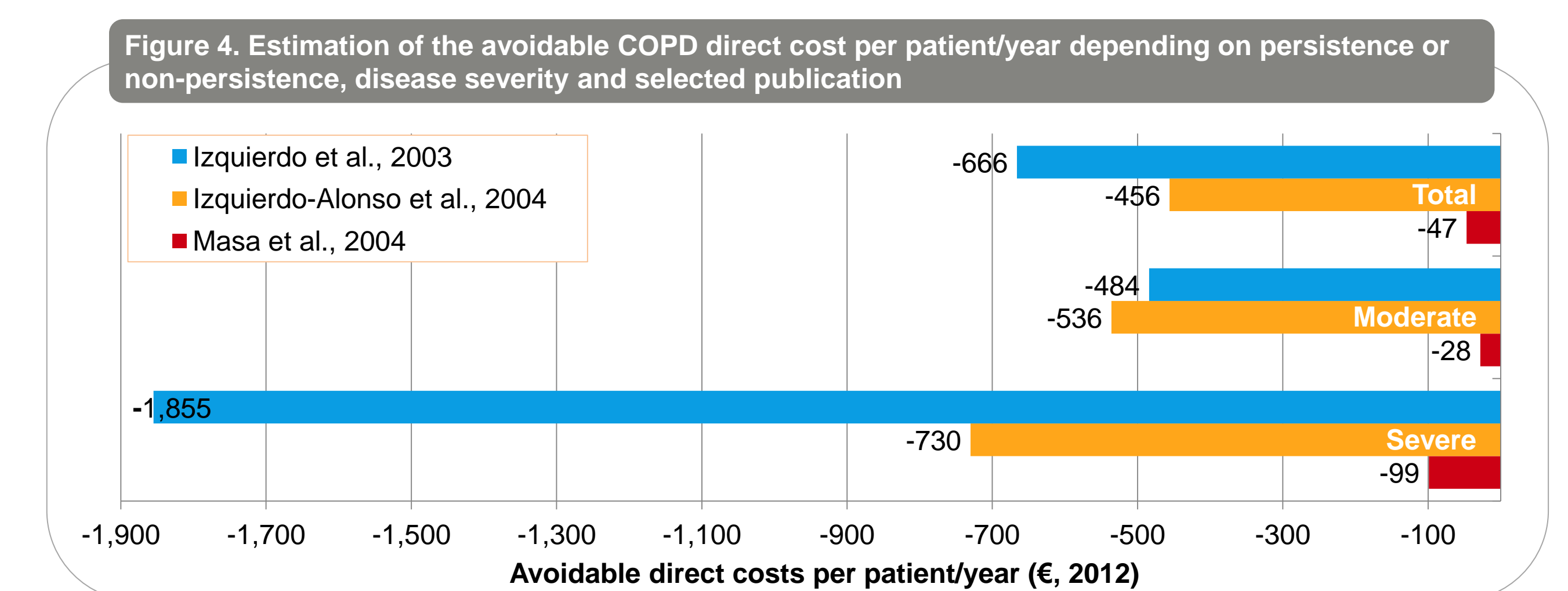
- Performing spirometries in 1% of the undiagnosed population in order to improve early diagnosis implies an additional direct cost between €12,753,832 and €696,859/year, depending on the selected publication (Figure 2).
- Reducing disease progression to the next severity stage in 1% of the diagnosed population avoids €24,520,026 to €1,330,572/year in direct costs (Figure 2).
- Early diagnosis and reduced disease progression could jointly save between €11,910,603 and €644,538 in direct costs/year (Figure 2).
- Results show that the initial investment on performing spirometries and augmenting the proportion of diagnosed patients would be outweighed by the substantial gain derived from avoiding COPD progression to the next severity stage in the diagnosed population.



- Improving treatment adherence could further avoid €43 to €601 per patient/year (depending on the selected publication), reaching €89 to €1,674 in severe patients (Figure 3).



- Improving treatment persistence could save between €47 and €666 per patient/year (depending on the selected publication), rising up to €99-1,855 in severe COPD patients (Figure 4).



Conclusion

Available studies on COPD costs are highly heterogeneous. Thus it is difficult to obtain robust estimates and draw definitive conclusions. Nevertheless, hypothetical scenarios show that promoting an earlier diagnosis, decreasing disease progression and improving therapeutic adherence and persistence are undoubtedly crucial to reduce COPD costs in the Spanish NHS.

Comprehensive, up-to-date research on COPD costs and treatment compliance as a costs driver is greatly needed.

References

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