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The economic impact of neovascular age-related macular degeneration (AMD), diabetic retinopathy (DR) and diabetic macular edema (DME): A systematic literature review of the emerging literature.

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INTRODUCTION

Neovascular age-related macular degeneration (nAMD), diabetic retinopathy (DR), as well as its consequence, such as diabetic macular edema (DME), are some of the leading causes of vision impairment in people aged 50 years and older[1]. In the advanced stages of these conditions, treatment often relies on repeated intravitreal injections of anti-vascular endothelial growth factors (VEGFs), namely, ranibizumab, aflibercept faricimab, brolucizumab, and bevacizumab (off-label use)[2–4]. While the advent of VEGF injections changed the treatment landscape; Clinical trials investigating the therapeutic potential of gene therapy in nAMD, DR and DME show promising results[5,6] and may inform future care provision. Given the high price of innovative medicines, it is essential to consider the economic costs associated with these conditions to inform resource allocation decisions.

OBJECTIVES

To examine the recent literature on the economic impact of nAMD, DR and DME, more specifically:

- The range of costs associated with these conditions.
- The share of anti-VEGF treatments costs in relation to other costs incurred.

METHODS

- A systematic literature review was conducted to examine the recent literature on the economic impact of nAMD, DR and DME.
- The Medline, CINAHL, EconLit and Embase databases were searched from January 1st 2022 to June 3rd 2024.
- The search strategy was guided by PICOS framework *(Table 1)*.
- The focus was on economic studies estimating costs (direct and indirect) associated with nAMD, DR and DME.
- Data synthesis and quality assessment were conducted according to the PRISMA guidelines.

Table 1 PICOS Framework

Category	Inclusion Criteria	Exclusion Criteria
Population	• Patients diagnosed with nAMD, DR or DME. • Collaterally impacted individuals (i.e. caregivers).	• Patients with retinal diseases outside the scope of interest. • Studies involving undiagnosed individuals, such as in screening strategies.
Intervention	Not applicable.	Not applicable.
Comparator	Not applicable.	Not applicable.
Outcome	Costs reported by the studies associated with nAMD, DR and DME in patients: • Direct medical and non-medical costs. • Indirect costs, such as loss of productivity. • Informal care. • Intangible costs.	• Economic or wellbeing impact that is not reported as a monetary value.
Study Design	• Partial economic evaluations, namely cost of illness studies. • Full economic evaluations, such as CEAs and CUAs.	• Reviews of already published economic studies. • Studies that make use of highly theoretical models. • Conference papers.

RESULTS

Figure 1 Study Selection Flow Diagram

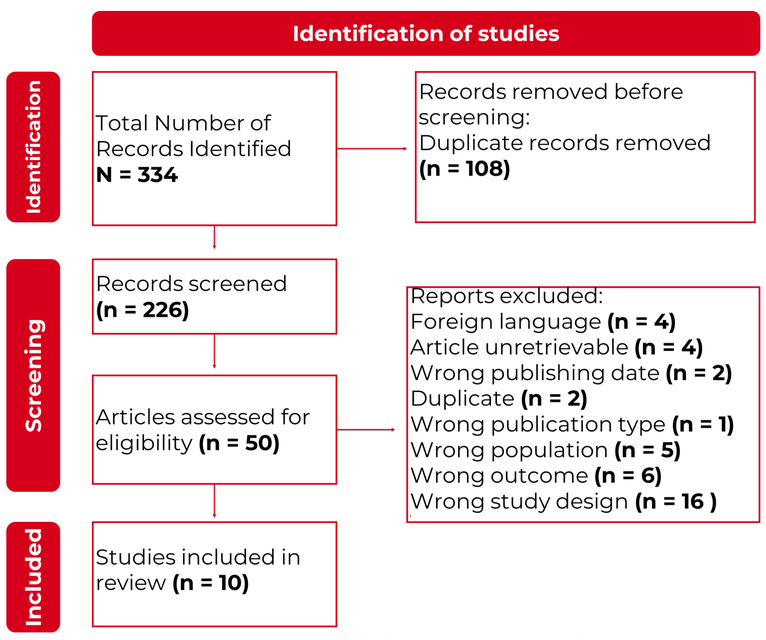
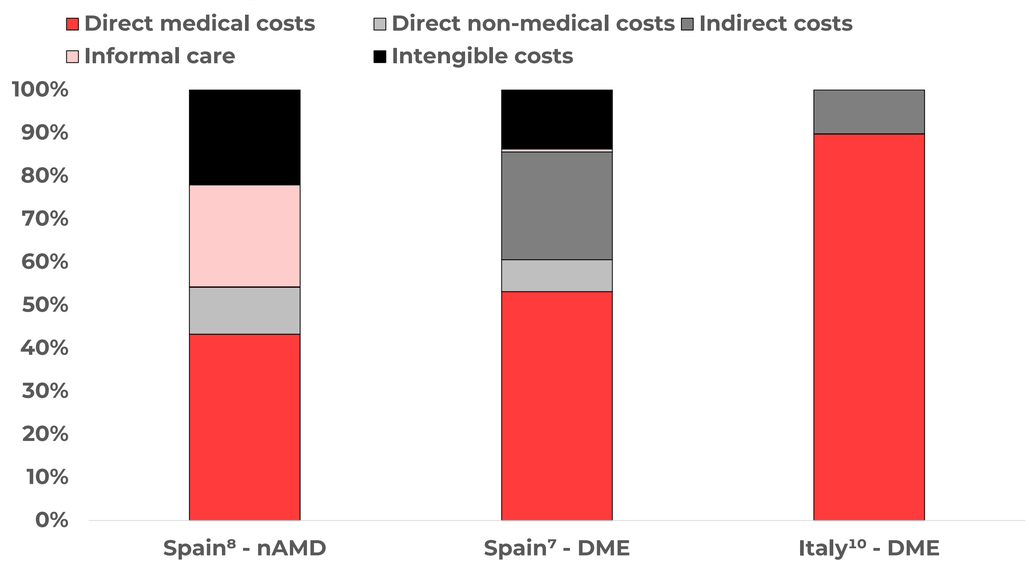


Table 2: Study Characteristics

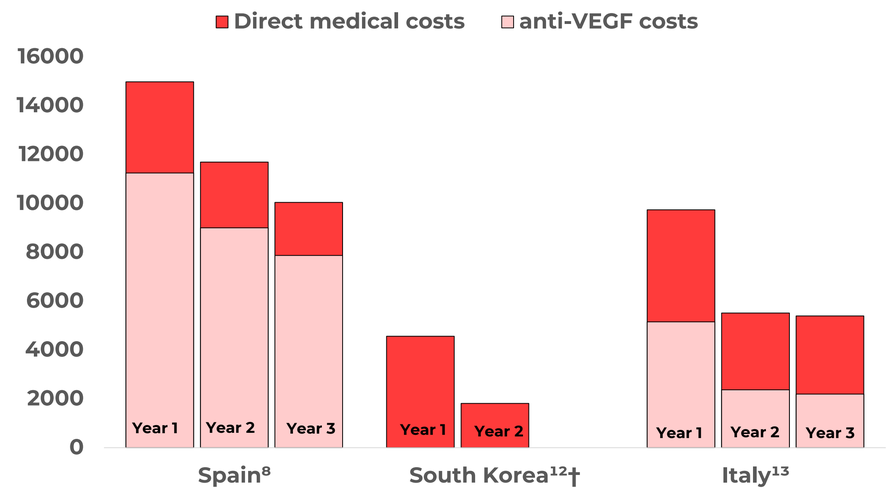
Category	Results Description
Country of Study	Spain (n = 3), Italy (n = 2), Norway (n = 1), South Korea (n = 1), UK (n = 2) , USA (n = 1).
Retinal Disease Examined	DME (n = 6), nAMD (n = 4).
Economic Evaluation Type	**Full:** CEA (n = 1), CUA (n = 3) **Partial:** Cost-of-illness study (n = 5) Cost comparison of two alternatives (n = 1)
Primary Perspective	Society (n = 2), Society and Health System (n = 1), Health System (n = 4), Health system and Patient (n = 1), Healthcare sector (n = 1), Health system and government (n = 1).
Time Horizon	1 to 2 years n = 5, 2 to 5 years n = 4, 25 years n = 1.
Discount Used	3% - 3.5% p.a. (n = 3).
Resource quantification	Top-down (n = 4), Bottom-up (n = 6).
Cost Data Source	Multiple data sources (n = 9), Electronic medical records (n = 1).

Figure 2 Distribution Of Total Costs [a]



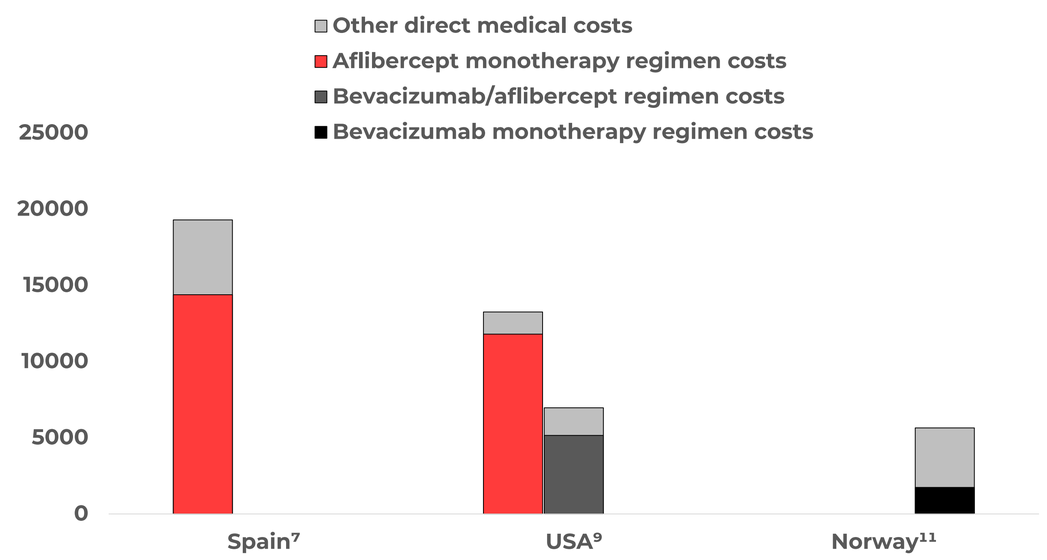
[a] For studies reporting both direct and societal costs (n = 3).

Figure 3 Direct Medical Costs associated with nAMD post-diagnosis (in USD per patient per year)[b]



[b] For studies reporting annual direct medical costs per patient associated with nAMD post diagnosis (n = 3).
† Study not specifying costs of anti-VEGFs or third year direct-medical costs.

Figure 4 Direct Medical Costs associated with DME (in USD per patient per year)[c]



[c] For studies reporting medical costs per patient associated with DME treated with aflibercept and/or bevacizumab anti-VEGFs (n = 3)..

CONCLUSIONS

- The studies varied in terms of methodology, the range of costs considered, as well as how costs were valued and reported.
- In studies reporting both direct and societal costs, direct medical costs represent at least 40% of the total costs incurred.
- The costs of anti-VEGF injections represent a significant proportion of the total direct medical costs in both nAMD and DME.
- Direct medical costs associated with nAMD tend to decrease over time.
- DM costs associated with DME tend to be lower when bevacizumab-based treatments (monotherapy and switch strategy) are administered as opposed to aflibercept-based treatments.
- Further evidence regarding the costs associated with nAMD, DR and DME is needed to evaluate the feasibility of introducing new better adapted therapies for these conditions.

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TARGETING RNA AS AN APPROACH FOR TREATING RETINAL DISEASE
Funded by the European Union
CUBS CORK UNIVERSITY BUSINESS SCHOOL
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