

The Burden of Disease of Diabetic Macular Edema and Neovascular Age-Related Macular Degeneration in Honduras, El Salvador & Dominican Republic

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Introduction

Diabetic macular edema (DME) and neovascular age-related macular degeneration (nAMD) are two of the leading causes of blindness and vision loss worldwide [1,2]. In Honduras, El Salvador & Dominican Republic, the burden of these diseases is a growing concern as the population ages and the prevalence of diabetes continues to increase [3,4]. Therefore, understanding the impact of DME and nAMD on population's health is crucial for developing effective prevention and treatment strategies.

DME is a complication of diabetes that affects the central part of the retina, causing swelling and fluid buildup, which can lead to vision loss. On the other hand, nAMD is a degenerative disease that affects the macula, the section of the retina that is responsible for central vision, leading to a gradual loss of sight. The burden of these diseases can have significant socioeconomic consequences, as they often affect people in their productive years, leading to a decrease in quality of life, loss of employment opportunities, and increasing healthcare costs. Thus, raising awareness of the burden of DME and nAMD in these countries is crucial to promote early detection, prevention, and management strategies to mitigate the impact of these diseases on the population's health.

Methods

A Panel Delphi analysis using a cross-sectional survey was designed to interview ophthalmologists and retina specialists practicing in Honduras, El Salvador & Dominican Republic to identify the healthcare resources and costs associated with managing DME and nAMD in the country, from the public and private healthcare systems. Dominican Republic, as per its mixed healthcare system (financed by the private & public sector, and regulated by the second one), was studied as just one system. A list of all practicing ophthalmologists and retina specialists in the countries were obtained by the National College of Physicians and Surgeons, and a group of opinion leaders was involved to participate in the study (informed consent from each participant before the interview was obtained). The questionnaire inquiry the number of patients with DME and nAMD seen by the participants, the type of healthcare resources required for managing these conditions (e.g., drugs, equipment, and personnel), and the associated costs. In the public healthcare sector, the costs were also validated with national formularies (if applicable). All the costs are in 2023 USD (\$).

The data collected from the interviews was analyzed using descriptive statistics to determine the prevalence of DME and nAMD, the healthcare resources used, and the associated costs. The study adhered to ethical guidelines for research involving human subjects, and the research team ensured the confidentiality of the participants and the data collected. The study results will inform policymakers, healthcare providers, and other stakeholders about the burden of DME and nAMD in Honduras, El Salvador & Dominican Republic and the resources required to manage these conditions, thus contributing to developing effective prevention and management strategies.

Results

The results were adjusted for the public and private sectors, as well as direct and indirect costs generated by lost productivity due to vision loss. Table 1 shows the healthcare resources used to care for patients with DME and Table 2 those of nAMD in Honduras, El Salvador & Dominican Republic. Figure 1 & 2 shows the healthcare costs of patients with DME and nAMD (respectively) in Honduras, El Salvador & Dominican Republic, adjusted for the type of health system (public or private) and direct and indirect costs. The indirect costs are those related to Lost of Productivity and the use of carer.

Table 1. Health care resources used in Honduras, El Salvador & Dominican Republic; in patients with DME, 2023.

Healthcare resource	Honduras				El Salvador				Dominican Republic	
	Private health system		Public health system		Private health system		Public health system		Health system (Public/Private)	
	Probability of use	Annual frequency of use	Probability of use	Annual frequency of use	Probability of use	Annual frequency of use	Probability of use	Annual frequency of use	Probability of use	Annual frequency of use
Carer	30%	Half Time	30%	Half Time	30%	Half Time	30%	Half Time	30%	Half Time
Lost productivity*	50%	Half Time	50%	Half Time	50%	Half Time	50%	Half Time	50%	Half Time
Intravitreal Bevacizumab	70%	10-12	100%	10-12	75%	8-12	0%	0	90%	10-12
Intravitreal aflibercept	30%	6-8	0%	0	10%	3-5	0%	0	0%	0
Intravitreal ranibizumab	0%	0	0%	0	15%	6-8	100%	8-9	10%	1
Intravitreal triamcinolone acetonide	0%	0	0%	0	5%	1-2	5%	1	10%	1
Laser	10%	2	30%	2	10%	1-2	40%	2	15%	3
Outpatient visits	100%	12	100%	5	100%	12	100%	6	100%	10-12
OCT Scans	100%	12	100%	5	100%	12	100%	3	100%	10-12
Fluorescein angiography	100%	1-3	100%	1	100%	1-2	100%	1	100%	1

Table 2. Health care resources used in Honduras, El Salvador & Dominican Republic; in patients with nAMD, 2023.

Healthcare resource	Honduras				El Salvador				Dominican Republic	
	Private health system		Public health system		Private health system		Public health system		Health system (Public/Private)	
	Probability of use	Annual frequency of use	Probability of use	Annual frequency of use	Probability of use	Annual frequency of use	Probability of use	Annual frequency of use	Probability of use	Annual frequency of use
Carer	30%	Half Time	30%	Half Time	30%	Half Time	30%	Half Time	30%	Half Time
Lost productivity*	50%	Half Time	50%	Half Time	50%	Half Time	50%	Half Time	50%	Half Time
Intravitreal Bevacizumab	60%	10-12	100%	10-12	75%	9-10	0%	0	89%	8-12
Intravitreal aflibercept	40%	6-8	0%	0	10%	3-5	0%	0	1%	6-8
Intravitreal ranibizumab	0%	0	0%	0	10%	6-8	100%	6-8	10%	4-6
Intravitreal triamcinolone acetonide	0%	0	0%	0	0%	0	0%	0	0%	0
Laser	0%	0	30%	0	0%	0	0%	0		
Outpatient visits	100%	1	100%	3	30%	9	100%	6	100%	10
OCT Scans	100%	1	100%	3	100%	3	100%	3	100%	6-8
Fluorescein angiography	40%	1	100%	1	100%	1	100%	1	100%	1

*Minimum wage considered for its calculation in each country.

The cost of DME in Honduras, El Salvador & Dominican Republic for public and private market (2023 USD)

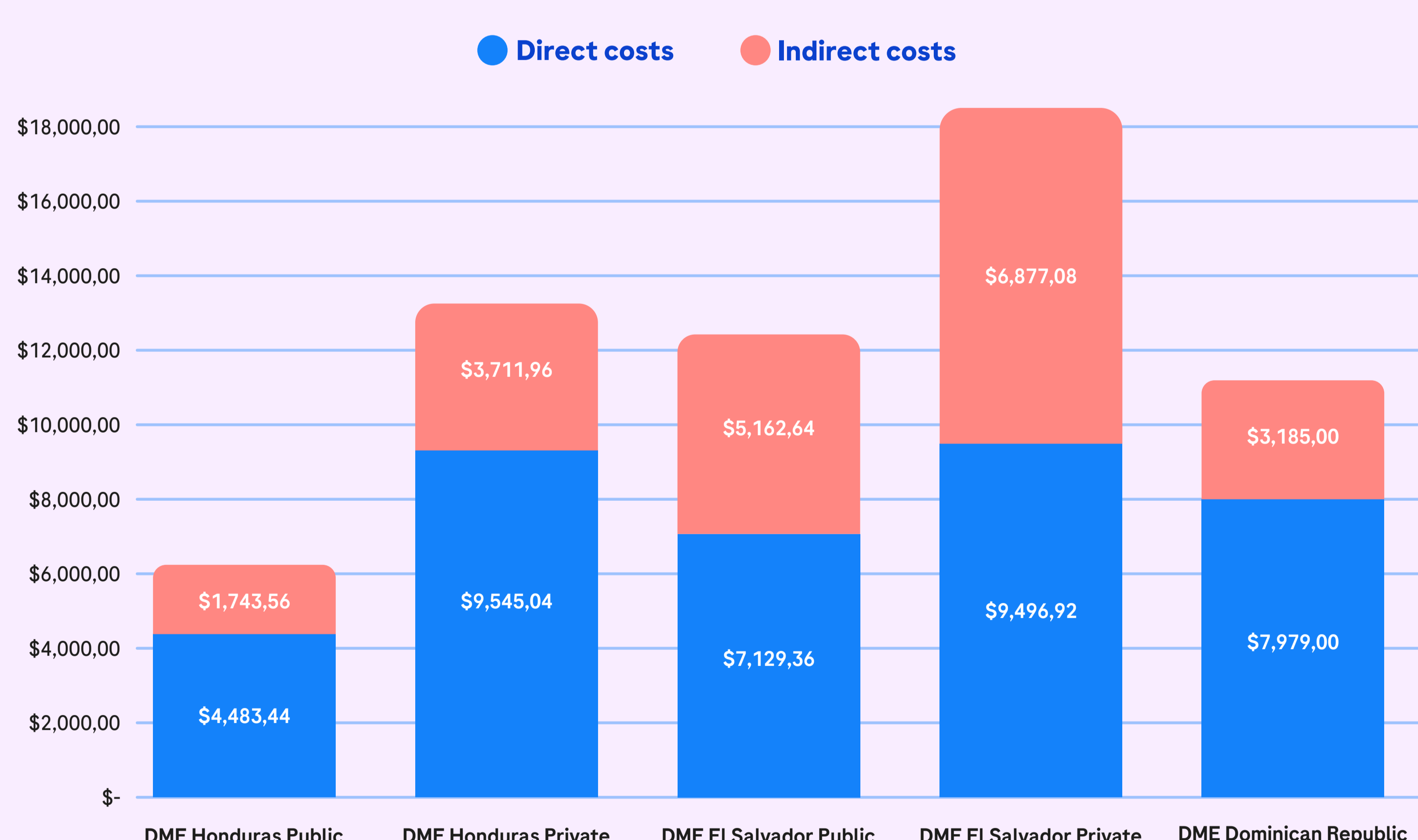


Figure 1. The Burden of EMD in Honduras, El Salvador & Dominican Republic, 2023 USD.

The cost of nAMD in Honduras, El Salvador & Dominican Republic for public and private market (2023 USD)

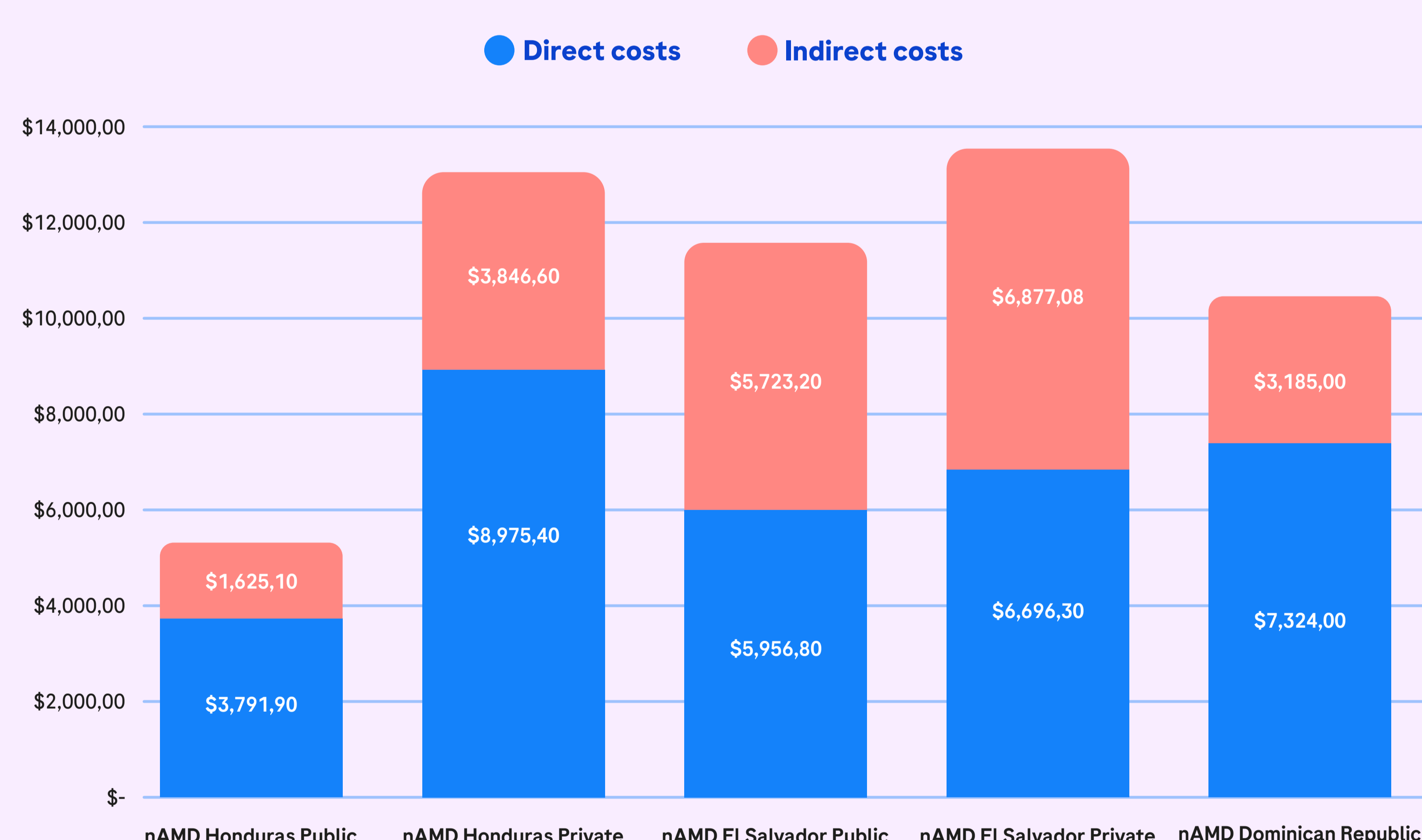


Figure 2. The Burden of nAMD in Honduras, El Salvador & Dominican Republic, 2023 USD.

Discussion

The average cost of health care in Honduras, El Salvador & Dominican Republic for patients with DME is \$10,445, \$14,741 & \$11,164, respectively; and with nAMD, it is \$9,860, \$12,550 & \$10,509, respectively. The trend shows that the higher treatment cost is covered in El Salvador, due the utilization of Ranibizumab instead of Bevacizumab in the public market; as Bevacizumab is not approved in the country for the indications studied. Besides it is also not approved in Honduras & Dominican Republic, the off-label use of Bevacizumab is the medication selected for the management of these diseases. A lower cost of health care of DME vs nAMD is due to the disease evolution and the "treat and extend" strategy of treatment, which was highly used in these countries, and recommended by the public healthcare as the number of visits and the reduction in costs.[5] Also, the public treatment of these diseases tend to be cheaper than the private sector, specially related to the follow-up (less number of clinical visits for patients treated in the public system than those in the private), affecting patients clinical control. The indirect costs were calculated as the interviewers mentioned that a high number of the patients required it, and in the majority of the cases those carers are a member of the family, generating social poverty to the families, so minimum wage was used for its calculation as many of them are not formal workers of this area.

The main weakness of this study is that it did not estimate the healthcare costs associated with anti-VEGF adverse events (Aes) therapy application and blindness sequels such as hip-replacement. Therefore, we recommend that future studies estimate the healthcare costs of AEs related to anti-VEGF agents because care for these AEs is part of the disease burden of AMD and nAMD.

Conclusion

The disease burden of health care for patients with DME and nAMD in Honduras, El Salvador & Dominican Republic fluctuates between \$9,680-\$10,445, \$12,550-\$14,741 & \$10,509-\$11,164 annually, not including the costs of care for AEs related to the application of intravitreal bevacizumab, nor blindness sequels.

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