

# Burden of cardiocerebrovascular disease in Portugal (2010-2018)

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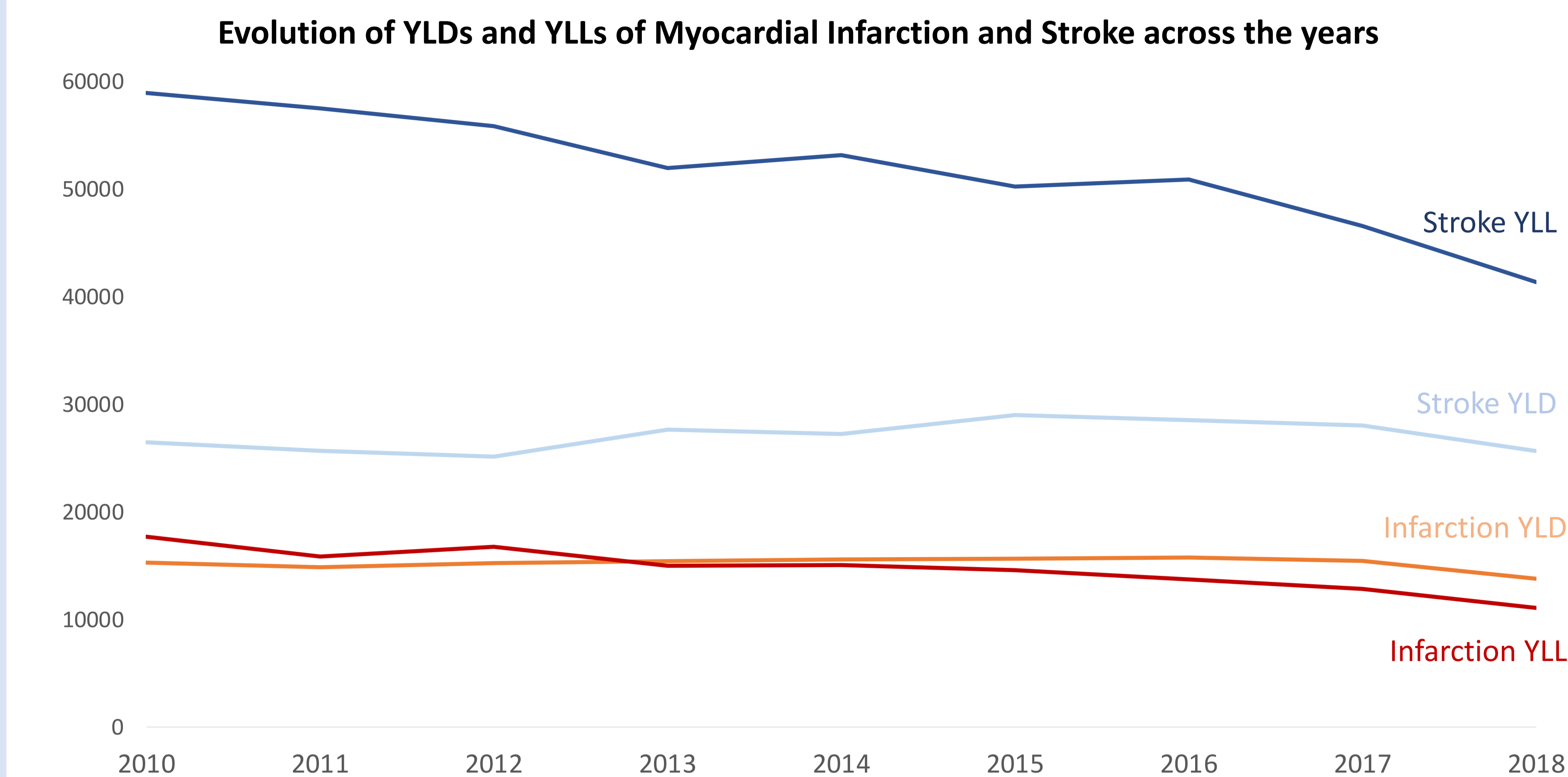
## Background:

- **Cardiocerebrovascular diseases (CCVD)** are the **leading cause of disease burden globally**, comprising **one-third of all deaths** and being a **major contributor to disability**.<sup>1</sup>
- To develop timely and effective strategies to address the rising CCVD epidemic, it's essential to understand their current epidemiological characteristics.
- However, studies examining the burden of disease (BoD) using detailed and timely health registry **data in Portugal are scarce and outdated**.<sup>2</sup>
- Thereby we aimed to **quantify the burden of CCVD in Portugal**, spanning a comprehensive 9-year period, by calculating DALYs of acute myocardial infarction and stroke.
- We also assessed **how this impact varied across demographic and geographical factors** to provide valuable insights to local and national policymakers to guide public policy.

## Methods:

- We estimated the **BoD of CCVD from 2010 to 2018**, using an administrative record of hospitalizations in all public hospitals in Portugal.
- We used data coded for acute myocardial infarction and stroke, following the International Classification of Diseases (**ICD-9/10-CM**). BoD was estimated in DALYs, providing year-by-year estimates.
- Data were analyzed using R (version 4.3.0), R Core team (2023). We applied Monte Carlo simulation with 1,000 iterations to quantify uncertainties introduced by disability weights. The following methodological data and severity levels were used:<sup>3,4</sup>

Severity level	Percentage of individuals (%)			Disability weight
Myocardial infarction (first 2 days)	7			0.432
Myocardial infarction (3 to 28 days)	93			0.074
	<70 years	70-79 years	≥ 80 years	
Mild Stroke	79	72	60	0.019
Moderate Stroke	17	19	26	0.070
Severe Stroke	4	9	14	0.552



## Results:

### Myocardial infarction burden (2010-2018):

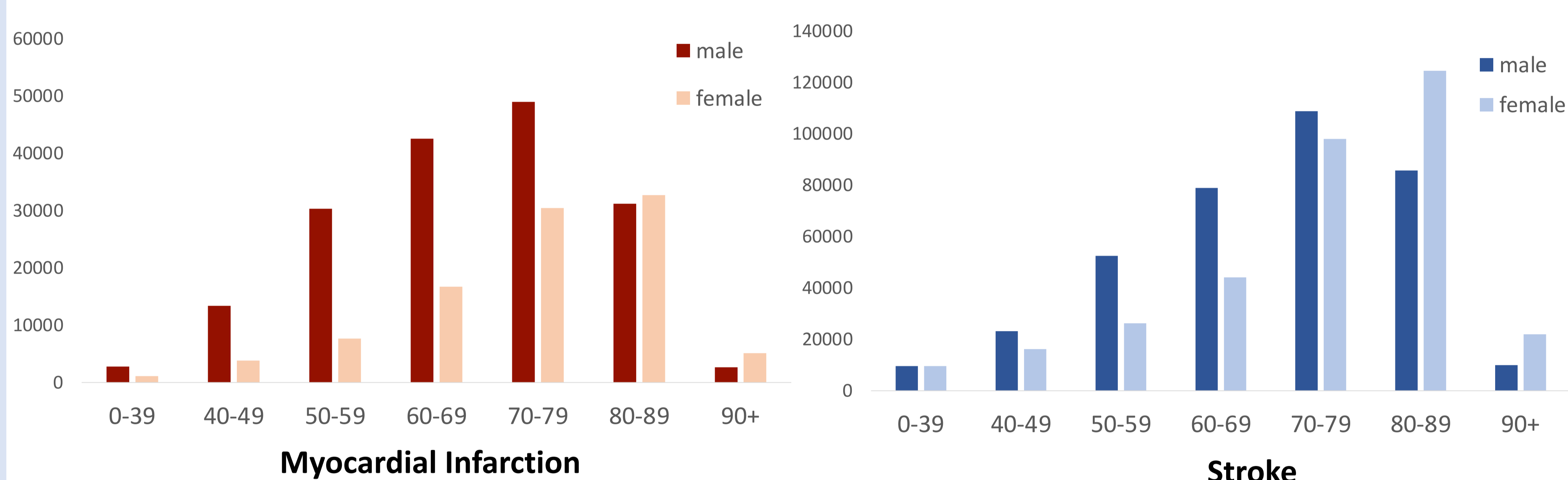
- 50.9% due to early mortality (YLL);
- 49.1% due to non-fatal burden (YLD);
- 63.7% in men *versus* 36.3% in woman.

### Stroke burden (2010-2018):

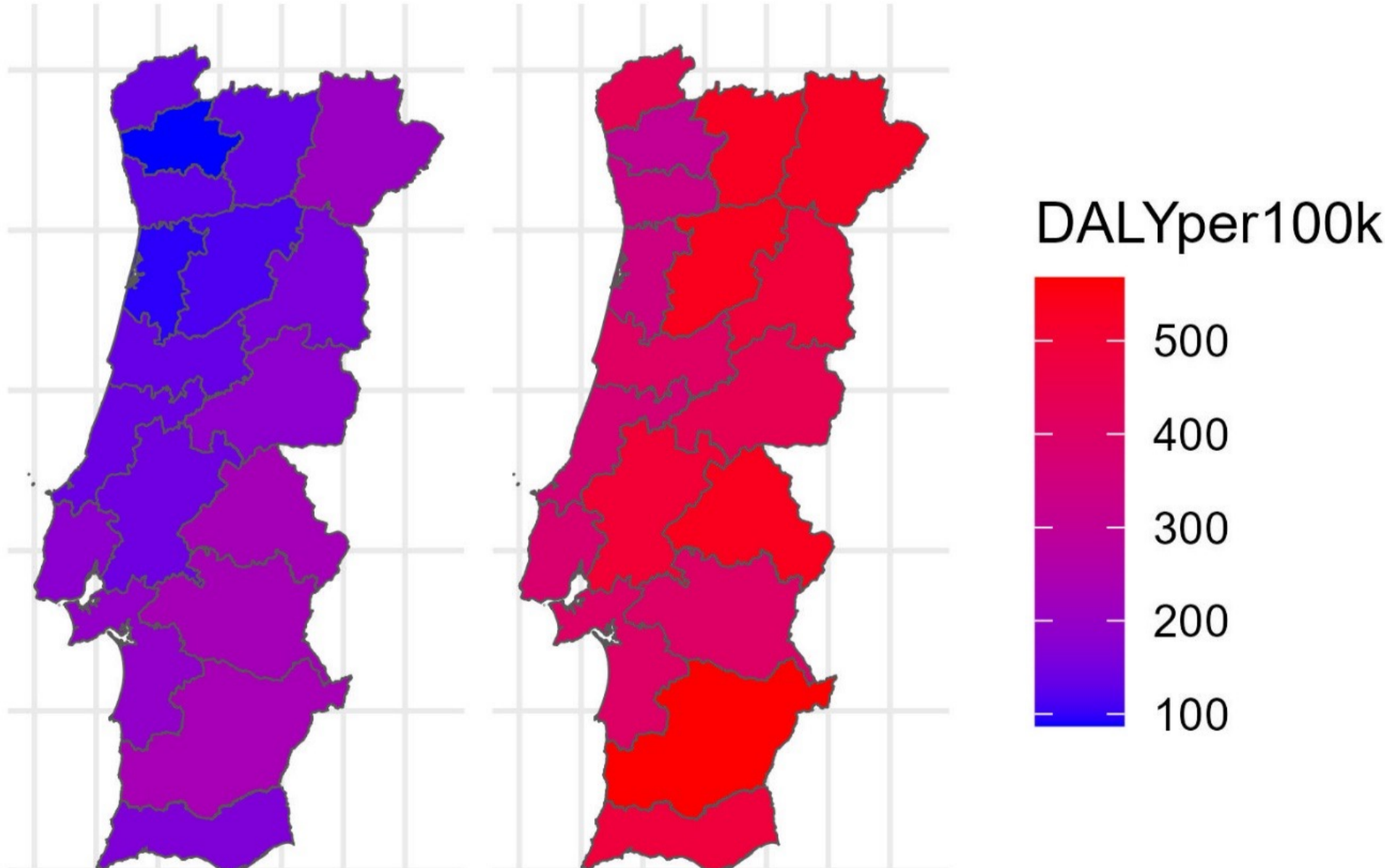
- 65.7% due to early mortality (YLL);
- 34.3% due to non-fatal burden (YLD);
- 51.9% in men *versus* 48.1% in woman.

- For both conditions, **men consistently bore a higher burden** from birth to 79 years old. From age 80 and onward, women exhibited a greater burden.

### DALYs of Myocardial Infarction and Stroke categorized by sex and age (per district and per 100.000 inhabitants)



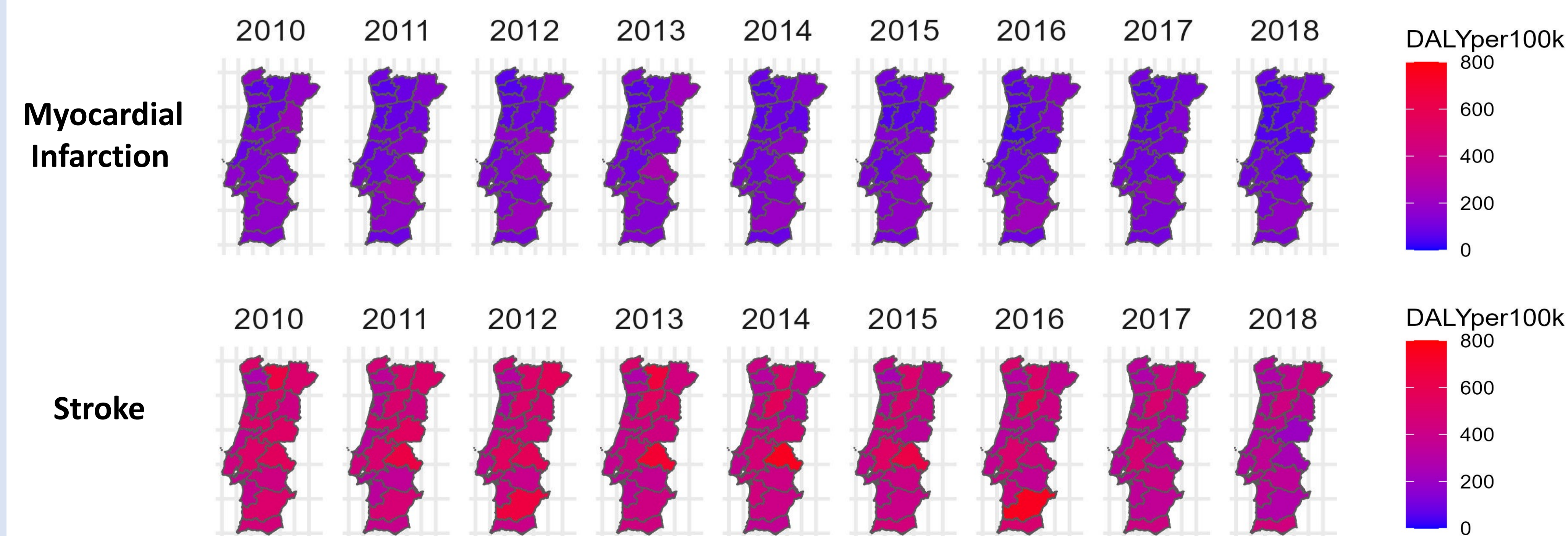
### Total DALYs for Myocardial Infarction and Stroke (per district and per 100.000 inhabitants over the 9-year period)



### Over the 9-year period (2010-2018):

- 372,293 individuals were hospitalized due to CCVD in Portugal, with 30.7% (n=114,372) due to myocardial infarction and 69.2% (n=257,921) due to stroke;
- Myocardial Infarction resulted in 269,409 DALYs;
- Stroke resulted in 709,445 DALYs;
- Both conditions contributed to 978,854 DALYs.

### Trends in Total DALYs for Myocardial Infarction and Stroke across the years (per district and per 100.000 inhabitants)



- **Myocardial infarction:** Beja, Portalegre, and Évora districts had the highest burden per 100.000 inhabitants;
- **Stroke burden:** Beja, Portalegre and Viseu districts had the highest burden per 100.000 inhabitants;
- The highest absolute DALYs for both conditions: Lisbon and Porto (the most densely populated cities).

**Key-message 1:**  
Despite the significant impact of both diseases, there has been a consistent decrease in the total DALYs observed for both conditions over the years.

**Key-message 2:**  
Men consistently experienced a larger burden for both myocardial infarction and stroke throughout the entire period and across the country.

**Key-message 3:**  
While myocardial infarction and stroke significantly impact public health in Portugal, stroke accounts for nearly triple the overall BoD.

**References:** <sup>1</sup>Roth GA et al. Global Burden of Cardiovascular Diseases Writing Group. Global Burden of Cardiovascular Diseases and Risk Factors, 1990-2019: Update From the GBD 2019 Study. J Am Coll Cardiol. 2020 Dec 22;76(25):2982-3021. <sup>2</sup>Henriques A et al. Disability-adjusted life years lost due to ischemic heart disease in mainland Portugal, 2013. Rev Port Cardiol. 2017;36(4):273-281. <sup>3</sup>Salomon JA et al. Disability weights for the Global Burden of Disease 2013 study. Lancet Glob Health. 2015 Nov;3(11):e712-23. <sup>4</sup>Scottish Burden of Disease Study Cerebrovascular disease technical overview. Published by NHS Health Scotland 2017 and ISD 2017, Edinburgh.



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