

Patients' Health Care Resources Utilization and Costs Estimation Across Cardiovascular Risk Categories: Insights From the LATINO Study

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KEY FINDINGS & CONCLUSIONS

- Patients with very high cardiovascular risk have been consuming a substantial portion of healthcare resources across all healthcare settings, resulting in high direct costs.
- This suggests a possible association between the severity of the cardiovascular risk level and the financial strain on medical care, emphasizing the importance of conducting risk assessments and implementing preventive measures, especially for individuals with higher risk factors, such as ASCVD.

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INTRODUCTION

- Atherosclerotic Cardiovascular Disease (ASCVD) is a global and public health problem characterized by the deposition of lipid materials in arterial walls due to inflammatory processes.^{1,2}
- The European Society of Cardiology (ESC) 2021 guidelines for cardiovascular disease (CVD) prevention classify patients into three CVD risk categories to guide treatment and management (low-to-moderate, high and very high-risk).³
- Healthcare Resource Utilization (HRU) is critical in understanding the burden of diseases and the efficiency of healthcare systems. It encompasses both the frequency of healthcare services used by patients and the associated costs.⁴

OBJECTIVES

- This study aims to estimate the HRU and direct costs stratified by CVD risk categories, in a regional population in Portugal, using real-world evidence (RWE) from the LATINO study.⁵

RESULTS

The analysis of 3 112 695 identified episodes, revealed consistent HRU and direct costs across the five years (Table 1).

3 112 695 episodes (2017-2021)	1 011 429 in a hospital setting
	<ul style="list-style-type: none">• 39 774 hospital admissions• 763 138 outpatient appointments• 208 517 emergency room visits
	2 101 266 in primary care setting
	<ul style="list-style-type: none">• 1 858 483 scheduled• 242 783 unscheduled visits

Table 1. Characteristics of the population, HRU and direct costs by year

	2017 n= 82 742	2018 n= 83 667	2019 n= 84 889	2020 n= 84 777	2021 n= 88 432
Female, n (%)	47 617 (57.6)	48 024 (57.4)	48 911 (57.6)	48 837 (57.6)	50 976 (57.6)
Age, median (IQR)	61.0 (21.0)	61.0 (20.0)	61.0 (21.0)	62.0 (21.0)	61.0 (21.0)
CVD Risk Category					
Low-to-moderate risk, n (%)	39 892 (48.2)	39 441 (47.1)	39 086 (46.0)	37 743 (44.5)	39 320 (44.5)
High risk, n (%)	18 573 (22.4)	19 104 (22.8)	19 868 (23.4)	20 007 (23.6)	20 791 (23.5)
Very high risk, n (%)	22 162 (26.8)	23 094 (27.6)	24 029 (28.3)	24 693 (29.2)	25 553 (28.9)
- ASCVD, n (%)	9 290 (11.2)	9 493 (11.3)	9 456 (11.1)	9 516 (11.2)	9 720 (11.0)
- ASCVD-risk equivalent, n (%)	12 872 (15.6)	13 656 (16.3)	14 573 (17.2)	15 177 (17.9)	15 833 (17.9)
Risk category unknown	2 115 (2.6)	2 028 (2.4)	1 906 (2.2)	2 334 (2.8)	2 768 (3.1)
Number of episodes, n					
Inpatient hospital admissions, n (%)	8 560 (1.3)	8 309 (1.3)	8 125 (1.3)	7 120 (1.2)	7 660 (1.2)
Outpatient hospital visits, n (%)	161 925 (25.4)	160 862 (25.4)	156 564 (24.5)	129 350 (22.5)	154 437 (24.6)
Emergency room visits, n (%)	44 205 (6.9)	41 145 (6.5)	42 560 (6.7)	38 549 (6.7)	42 058 (6.7)
GP scheduled visits, n (%)	355 716 (55.7)	356 582 (56.2)	363 873 (57.0)	374 882 (65.2)	407 430 (65.0)
GP unscheduled visits, n (%)	67 747 (10.6)	67 322 (10.6)	67 311 (10.5)	25 001 (4.3)	15 402 (2.5)
Direct Costs for total number of episodes					
Inpatient hospital admissions, €	53 655 671	56 199 288	61 806 014	62 998 246	60 412 772
Outpatient hospital visits, €	7 934 325	7 882 238	7 671 636	6 338 150	7 567 413
Emergency room visits, €	4 954 054	4 611 120	4 769 699	4 320 186	4 713 440
GP appointment, €	20 988 121	21 006 300	21 361 011	24 453 891	25 882 976

ASCVD: very high-risk patients with prior Atherosclerotic Cardiovascular Disease; ASCVD-risk equivalent: Very high CVD risk without prior ASCVD; GP: general practitioner; HRU: healthcare resource utilization; IQR: interquartile range.

HRU and costs by CVD risk

- The direct costs per patient of an episode increased with the CVD risk level, with very high-risk patients with ASCVD and ASCVD-risk equivalent patients having the highest costs across all types of healthcare services (Table 2).
- In 2021, the low-to-moderate risk group was responsible for 19.7% of the total episodes of hospital admissions, the high-risk for 19.1% and the very high-risk (with and without ASCVD) for 60.1%.
- The cost per patient in 2021 is presented in Figure 1.

METHODS

- Retrospective observational study in a local health unit in Portugal (Unidade Local de Saúde de Matosinhos [ULSM]), that comprises 14 primary care health units, assisted by a secondary and tertiary care health Unit.
- Data sources were the Electronic Health Records between 2017 and 2021 from primary and secondary care of the local health unit including ICD-9/ICD-10 and ICPC-2 data, laboratory exams, clinical measurements and medication.
- Study inclusion criteria were:
 - Patients aged ≥40 years;
 - ≥1 general practitioner (GP) appointment in the 3 years before meeting inclusion criteria.
- CVD risk categories were determined based on the 2021 ESC guidelines on CVD prevention in clinical practice (low-to-moderate, high and very high-risk [with ASCVD, and ASCVD-risk equivalent]).³
- HRU encompassed hospital data and primary care (GP) appointments (inpatient hospital admissions, outpatient hospital visits, and emergency room visits for all reasons and GP appointments).
- Direct costs were calculated based on Diagnosis-Related Groups classification payment model, under the current Portuguese legislation.⁶⁻¹⁰

Table 2. Average direct cost per patient in each type of healthcare services, by risk category, across 2017–2021

	Low-to-moderate risk	High risk	Very high risk: ASCVD-risk equivalent	Very high risk: ASCVD
Inpatient hospital admissions, mean (min-max)	148 € (120-172)	474 € (400-557)	1 247 € (1 197-1 287)	2 673 € (2 523-2 878)
Outpatient hospital visits, mean (min-max)	58 € (48-65)	85 € (71-94)	131 € (113-141)	166 € (140-184)
Emergency room visits, mean (min-max)	40 € (38-43)	63 (49-94)	71 € (64-78)	115 € (100-118)
GP appointments, mean (min-max)	224 € (210-247)	285€ (258-304)	330 € (308-359)	365 € (343-395)

ASCVD: very high-risk patients with prior Atherosclerotic Cardiovascular Disease; ASCVD-risk equivalent: Very high CVD risk without prior ASCVD; GP: general practitioner.

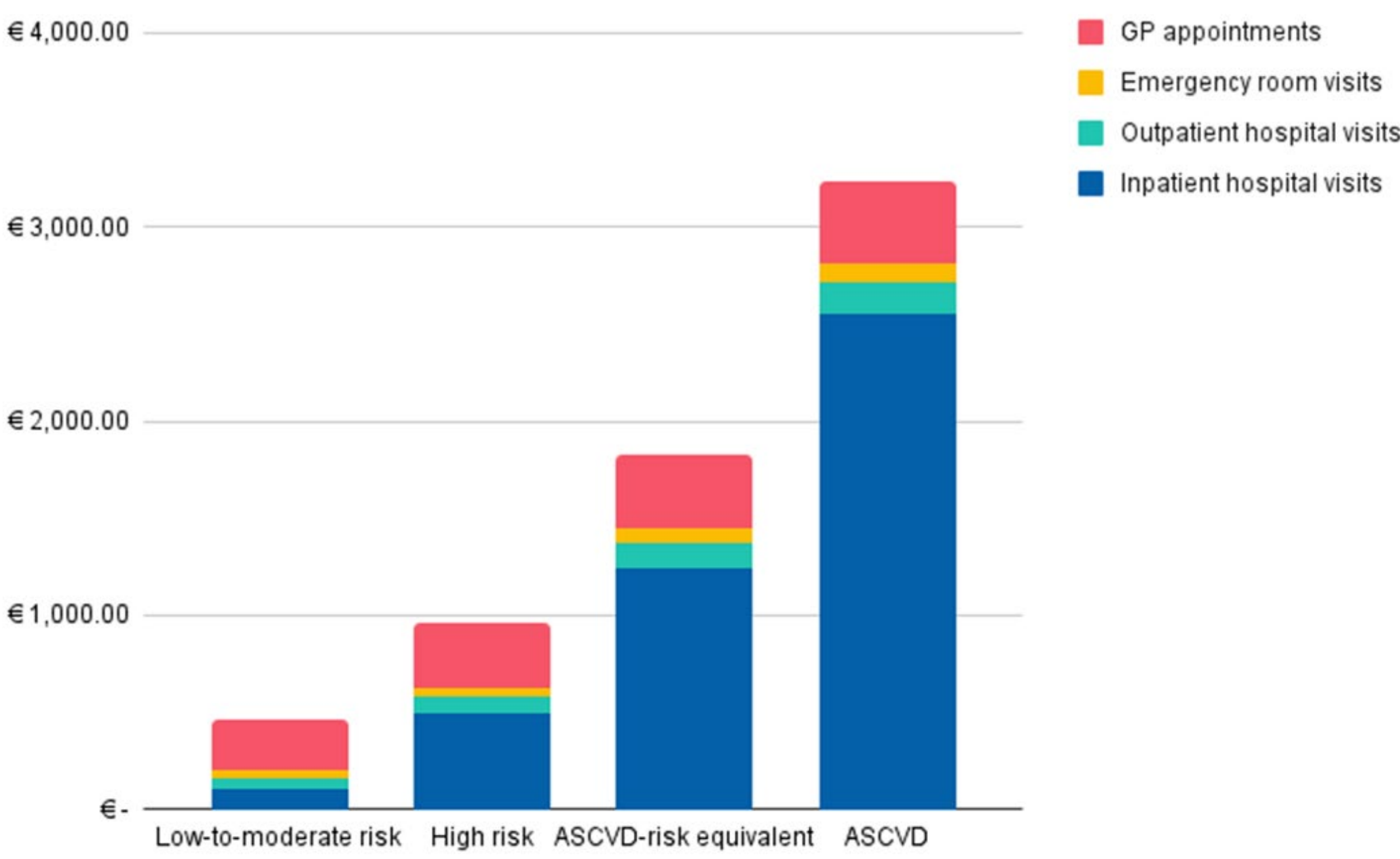


Figure 1. Direct costs per patient by CVD risk categories, in 2021

ASCVD: very high-risk patients with prior Atherosclerotic Cardiovascular Disease; ASCVD-risk equivalent: Very high CVD risk without prior ASCVD; GP: general practitioner.

ASCVD patients

- Among ASCVD patients, inpatient hospital admissions represented the largest proportion of episode costs (Figure 2).
- Primary care settings, despite accounting for a substantial proportion of episode counts, showed lower episode costs.

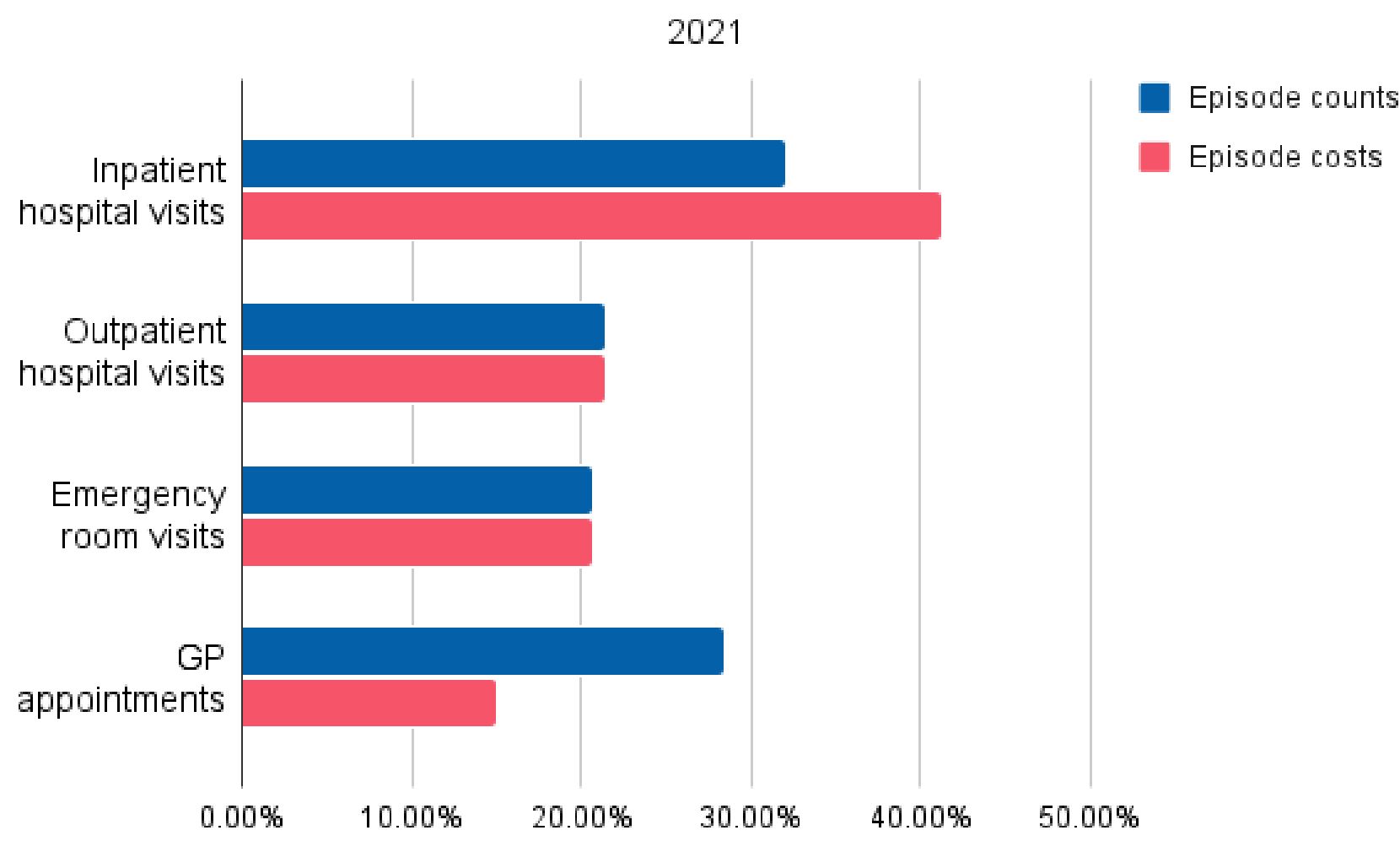


Figure 2. Proportion of each medical setting episode counts over the total episodes and costs over the total costs among ASCVD patients, in 2021

ASCVD: Very high CVD risk with prior ASCVD; GP: general practitioner.

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