

BRIDGING THE TREATMENT GAP: PROSPECTIVE CARDIOVASCULAR PREVENTION IN THE ARIA LUNG CANCER SCREENING PROGRAM

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Introduction: Coronary artery calcification (CAC) is highly prevalent in lung cancer screening (LCS) populations and is a strong predictor of cardiovascular (CV) morbidity and mortality. However, most available evidence is derived from retrospective studies and demonstrates limited therapeutic impact following CAC detection, with statin initiation rates typically below 10%. The ARTificial Intelligence for heAlth and prevention of smoking-related diseases (ARIA) trial is a prospective interventional study designed to address this implementation gap.

Methods: Eligible participants were current or former smokers aged ≥ 50 years, with a PLCom2012 risk $\geq 1.2\%$ and smoking cessation ≤ 15 years (Fig.1). All participants underwent low-dose CT (LDCT) with visual CAC scoring (none, mild, moderate, severe), along with baseline CV risk stratification using SCORE2/SCORE2-OP. Based on CAC severity, a two-tier CV prevention model was implemented: participants with mild or moderate CAC received structured telephone counselling, whereas those with severe CAC underwent in-person CV evaluation, including lifestyle counselling, lipid profile assessment, and personalized prevention planning. Treatment recommendations (statins, antiplatelet therapy, blood pressure optimization, and smoking cessation) were systematically communicated. Predefined outcomes included: CAC prevalence and severity distribution; baseline statin undertreatment; initiation of statins or antiplatelet therapy; referral rates for second-level cardiologic investigations (cardiac ultrasound, exercise ECG, stress imaging, coronary CT angiography, invasive coronary angiography); and rates of downstream interventional procedures in an asymptomatic high-risk population.

1. In-person visit	According CACs	27/51 (at the time of the analysis)
	After phone assessment	7/335 (2.1%)
2. Therapy initiation	Antiplatelet	5 (14.7%)
	Statin	7 (20.6%)
3. Second-level cardiologic investigations 29 pts (85.3%)	Cardiac US	5 (14.7%)
	Stress test	11 (32.4%)
	SPECT	1 (2.9%)
	Cardiac CT	14 (41.2%)
	Invasive coronary angiography	5 (14.7%)
4. Angiography treatment	Conservative	1 (2.9%)
	Revascularization	4 (11.8%)

Table 1: Primary CV prevention and downstream interventions.

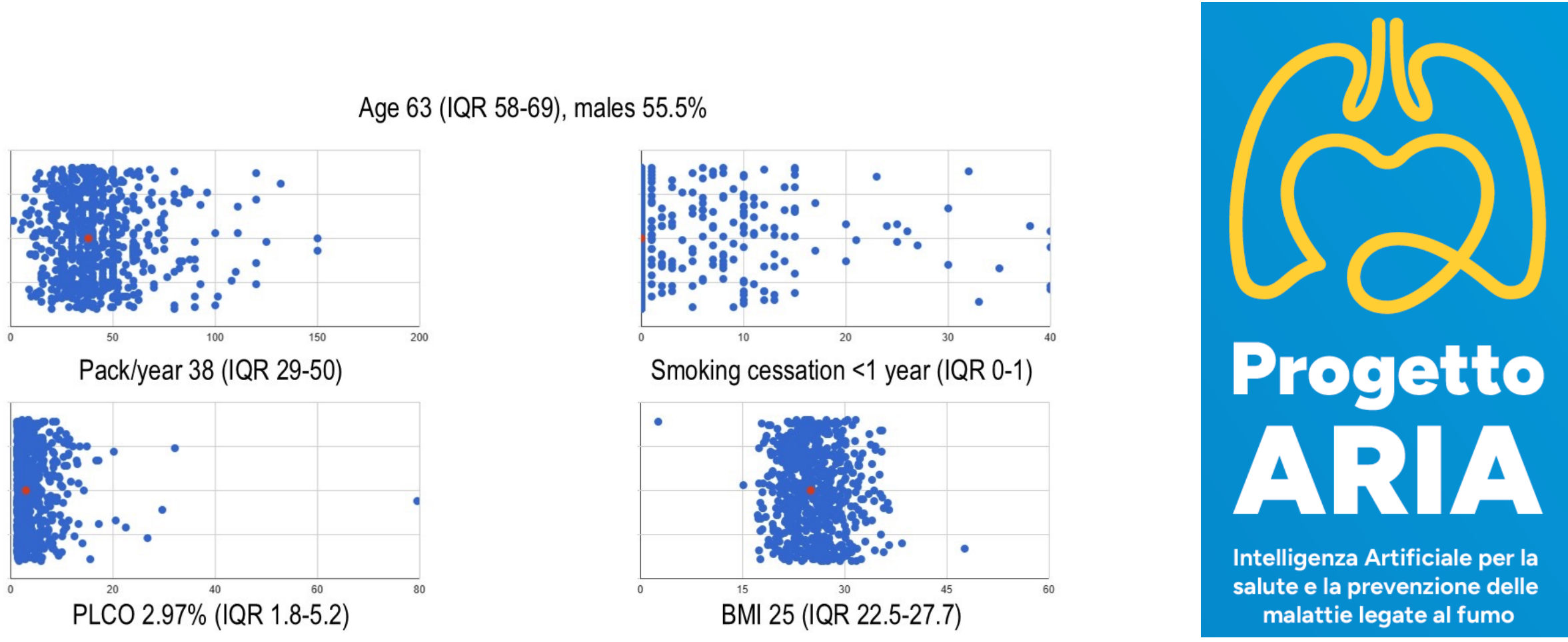


Fig. 1: General characteristics of the study population.

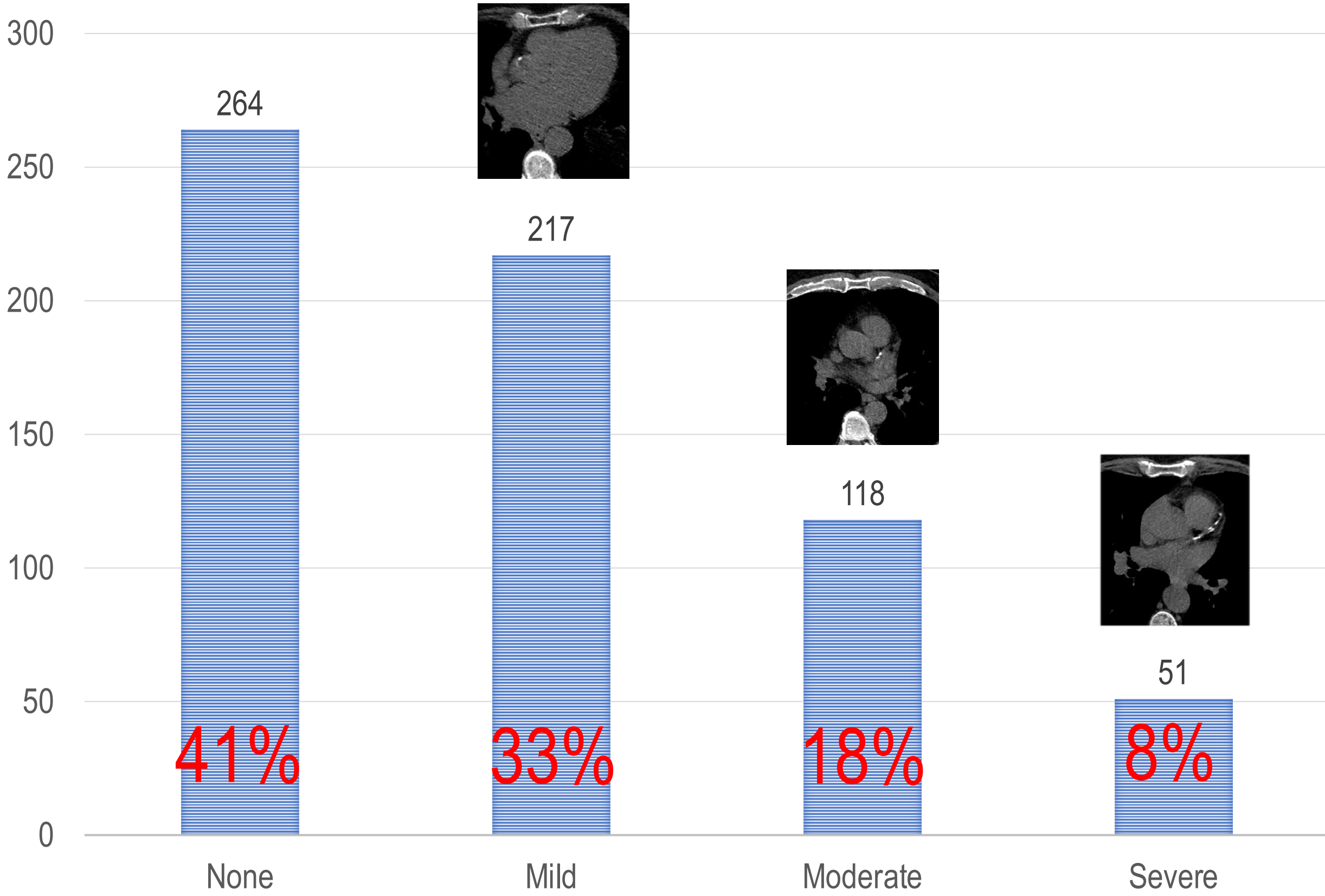


Fig. 2: Prevalence of CACs among the ARIA Study participants.

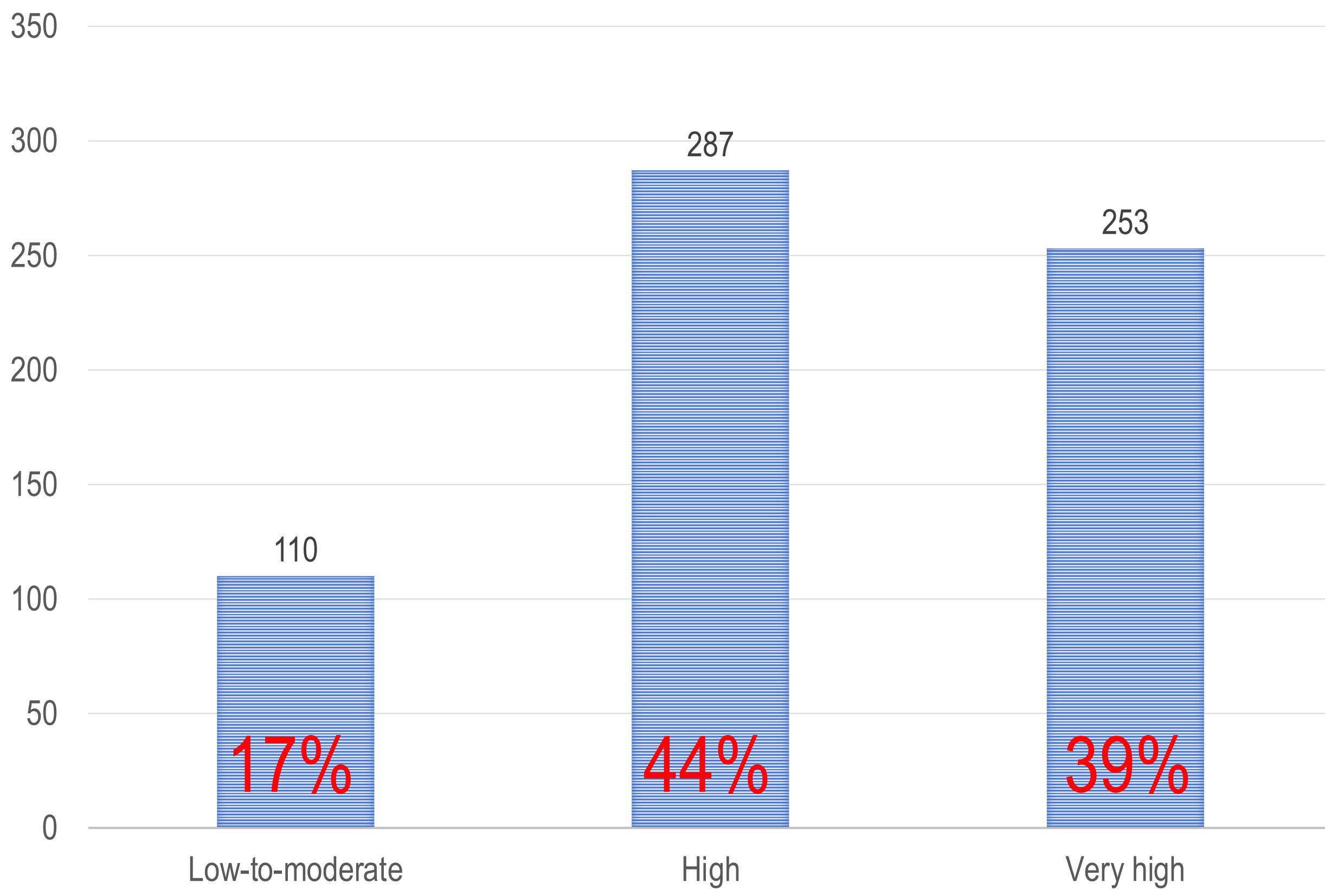


Fig. 3: CV stratification according SCORE2/SCORE2-OP.

Results: Among the first 650 participants enrolled (January 2025-January 2026), CAC was detected in 386 individuals (59.4%): mild in 217 (33.4%), moderate in 118 (18.2%), and severe in 51 (7.8%) (Fig. 2). According to SCORE2/SCORE2-OP, 16.9% were classified as low-to-moderate risk ($<5\%$), 44.2% as high risk (5-10%), and 38.9% as very high risk ($>10\%$) (Fig. 3). At baseline, 44% of high-risk participants were not receiving statin therapy. Following telephone assessment, 7 additional participants (2.1%) with non-severe CAC were referred for in-person evaluation due to elevated SCORE2/SCORE2-OP risk, significant lipid abnormalities, or suspected subclinical ischemia. Among the 34 participants referred for in-person evaluation at the time of analysis (27/51 with severe CAC; 7 with non-severe CAC and additional risk factors), antiplatelet and statin therapy were newly initiated in 5 (14.7%) and 7 (20.6%) cases, respectively. Second-level cardiologic investigations were recommended in 29 participants (85.3%), including 5 echocardiograms, 11 exercise or pharmacologic stress tests, 1 SPECT scan, 14 coronary CT angiographies, and 5 invasive coronary angiographies. Among these, 4 asymptomatic participants underwent downstream coronary interventions. One patient with chronic asymptomatic coronary occlusion was managed conservatively (Table 1). Structured smoking cessation counselling was offered to all 403 active smokers (62%). No study-related adverse events were reported.

Conclusions: By integrating LDCT-based CAC assessment, CV risk stratification, structured counselling, and targeted treatment recommendations, ARIA represents one of the first prospective European programs to evaluate the feasibility and early effectiveness of an integrated CV primary prevention strategy within LCS. Ongoing follow-up will assess long-term CV outcomes and the added value of AI-enhanced imaging and risk prediction tools.

References:

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Artificial Intelligence (AI) Use Disclaimer: Generative AI (ChatGPT, OpenAI) was used for language refinement only. The authors take full responsibility for all scientific content.