

## Abstract



**Background:** Juvenile sudden cardiac death (SCD) has high impact on the family and society of the victim. While SCD screening programmes are effective in athletes, most (70-80%) young non-athletes individuals are not routinely screened.

**Research question:** We hypothesized that a low-cost screening program may early identify subjects at risk of juvenile SCD, even in non-athletes.

**Goals:** To evaluate the prevalence of SCD-related abnormal findings and, ultimately, to test the effectiveness of a screening programme in high schools.

**Methods:** Between April 2023 and June 2024, high school individuals were enrolled in a screening programme in Tuscany (Pisa, Lucca and Livorno), based on a questionnaire investigating family history of juvenile SCD or diseases predisposing to SCD and symptoms (syncope, palpitations, chest pain), and digitally recorded electrocardiograms (ECGs). In case of abnormal findings, second-line investigations locally (echocardiography, Holter ECG monitoring and/or exercise testing) or third-line investigations at Fondazione Monasterio, Pisa, Italy (cardiac MRI, genetics or electrophysiological testing) were planned. Only preliminary results of the first-line screening are hereby reported.

**Results:** We have currently enrolled 872 individuals (age  $17.1 \pm 1.8$  years, 481 [55%] males, 288 [33%] smokers, 102 [11.7%] recreational drugs users, and 645 [74%] non-competitive athletes). At questionnaires, 56 individuals (6.4%) had a family history of SCD, 32 (3.7%) a first-degree relative with cardiomyopathy, and 13 (1.5%) with channelopathy. As for symptoms, 21 participants (2.4%) reported chest pain or 26 (3%) syncope during exertion, while 90 (10.3%) paroxysmal palpitations. At ECG, we found 2 cases (0.2%) with a type-2 Brugada pattern, 1 female case (0.1%) with prolonged QTc interval (QTc 480 ms), 20 cases (2.3%) with V1-V3 T wave inversion (age > 16 years), 18 cases (2%) of left ventricular hypertrophy (non-athletes), and 4 cases (0.5%) with atypical ventricular ectopy. After the first-line screening, 61 (7%) and 10 (1.2%) individuals were referred to second and third-line investigations, which are currently

