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Core 2. Epidemiology and Prevention of CV Disease: Physiology, Pharmacology and Lifestyle

Session Title: Electrocardiography, Screening and Sudden Death

Abstract 12510: Electrocardiographic Data from Screening a Large Cohort of Multiethnic High School Athletes: The Texas Adolescent Heart Screening Registry

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Background: ECG norms in adolescents are based on small numbers and a Caucasian population. ECG data from a larger, ethnically diverse population of adolescents allows for a reevaluation of existing norms.

Methods: The target population of The Texas Adolescent Heart Screening Registry (TAAHSR) included 14–18 year old high school athletes who voluntarily presented to screening venues in Texas between May 2010 and August 2011. A 12-lead ECG was performed on all athletes. All measurements were confirmed by hand and compared to the current standard. Distributions of ECG data were examined and confidence interval (CI) analysis was used to estimate the precision of the mean and 98th percentile of each variable.

Results: A total of 2,450 athletes (67% male) had a 12-lead ECG from three primary ethnic groups (60% Caucasian, 23% Hispanic and 9% African American). Key results for the mean, standard deviation, 95% CI around the mean, select percentiles and 95% CI for the 98th percentile are presented in the table. The large sample size resulted in precise estimates for all measurements. When comparing to the current standard, clinically meaningful differences were found in R wave in V₆, heart rate and QRS axis. The 98th percentile for R wave in V₆ in our study (29 mm) was 6 mm higher than 23 mm used as the current standard. The 2nd percentile, mean and 98th percentile for heart rate were all lower in our study (48 bpm, 70 bpm and 97 bpm) than the current standard of 60 bpm, 85 bpm and 119 bpm, respectively. Also, the 2nd percentile, mean and 98th percentile for QRS axis in our study (14°, 81° and 105°) differed from the current standard of 11°, 59° and 130°, respectively.

Conclusions: Our ECG data more accurately reflects the norms of the multiethnic adolescent population than those currently in use. Use of these new ECG criteria may decrease the false positive ECG findings in an athlete screening program and in clinical practice.

	Mean	95% CI	SD	2%	50%	98%	95% CI
Heart Rate (bpm)	69.9	68.3 69.9	11.4	48	68	97	92.4 97.8
QRS Axis (degrees)	77.1	76.2 77.9	21.2	14	81	105	100.1 105.7
QRS Duration (ms)	90.5	89.8 91.2	17.6	72	90	116	110.7 116.6
PR Interval (ms)	139.9	139.1 140.7	20.7	105	140	186	178.5 186.0
P amplitude (mm)	1.4	1.4 1.4	0.5	0.5	1.2	2.5	2.0 2.9
P duration (ms)	76.0	75.3 76.7	17.5	40	80	120	114.6 120.6
R V ₁ (mm)	2.9	2.8 3.0	2.1	0	2.5	8.5	7.5 9.1
S V ₁ (mm)	9.5	9.3 9.6	4.4	2	9	21	19.3 21.8
R V ₆ (mm)	15.8	15.6 16.1	5.4	7	15	29	26.9 29.9
S V ₆ (mm)	1.8	1.7 1.8	1.7	0	1.5	6	5.2 6.5
Max R+S V ₃ (mm)	22.0	21.6 22.3	8.7	7.5	21	42	39.4 42.9
Max R+S V ₄ (mm)	24.7	24.3 25.1	9.9	9.5	24	46	43.2 46.9
QT (ms)	303.0	391.7 394.2	31.3	336	392	458	443.0 454.7
QTc (ms)	404.4	403.4 405.3	24.7	360	404	450	435.2 446.8

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