

CARDIOVASCULAR SYSTEM¹

I. INTRODUCTION

The cardiovascular system can be divided into the following groups of disorders to facilitate consideration of cardiac fitness and the ability to perform the job functions of a patrol officer.

- A. Congenital
- B. Valvular
- C. Cardiomyopathy
- D. Hypertension
- E. Coronary Artery Disease (CAD)
- F. Arrhythmias

II. IMPLICATIONS FOR JOB PERFORMANCE

Patrol officers engage in vigorous, aerobic activities requiring above-average degrees of fitness (Adams, 2010). A cardiac limitation to exercise may cause serious injury to both the patrol officer and the public. The impact of cardiac conditions on peace officer job performance is codified in California Government Code 12940.1, which establishes that law enforcement candidates with heart trouble are presumed to be unable to perform their duties in a manner that would not endanger their health or safety or the health and safety of others. While this presumption may be overcome by evidence showing that the candidate would be able to perform the job, the legislative intent of this statute is clear.²

The following are examples of peace officer physical job demands³:

- **Running in pursuit of suspects:** speed is important in up to 90% of incidents; distances may range up to 500 yards.
- **Pursuit followed by physical altercation:** subduing combative subjects takes an average of three minutes.

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² It is important to note that the U.S. Americans with Disabilities Act (which trumps state law if there is a conflict) includes no such presumption; therefore, it is necessary to conduct an individualized assessment of candidates with cardiovascular conditions, and base the determination of their medical suitability in the same way as all other peace officer candidates.

³ See Patrol Officer Job Demands: Their Implication for Medical Screening in the Background Information section of this Manual.

- **Moving incapacitated persons:** ability to lift and carry someone distances of 40+ feet when speed is critical.

The minimum exercise capacity required to perform these tasks can be estimated from published tables of oxygen consumption (Jetté, et al., 1990). These indicate that oxygen consumption at a level of approximately 42 ml O₂/kg/min (12 METS) is necessary to perform activities such as those listed above and specifically with wrestling, running, and extensive lifting at a level of moderate to heavy intensity (Adams 2010). Since oxygen consumption in a life-or-death struggle could easily exceed 42 ml O₂/kg/min, this value represents a valid minimal level of fitness. Historically, this value has been noted to represent the average fitness level of the most common group of arrestees, males < 30 years old (Pollack, et al., 1980).

III. MEDICAL EXAMINATION AND EVALUATION GUIDELINES

Evaluation of patrol officer candidates for cardiovascular diseases requires a comprehensive history, physical examination and an electrocardiogram (EKG). A treadmill stress test may be indicated in those believed to be at increased risk of sudden incapacitation.

A. History

Responses to the cardiovascular system items in the POST Medical History Statement (POST 2-252) or equivalent questionnaire should be reviewed. Positive responses require further questioning and will need to be correlated with physical findings to assess their importance and the need for confirmatory medical records and further assessment.

B. Physical Examination

A thorough physical examination of the cardiovascular system is essential. This examination should include listening for carotid and abdominal bruits, assessment for elevated jugular venous pressure, auscultation of the heart for murmurs, gallops and rubs, palpation of the radial and femoral pulses, and inspection of the lower legs and feet for signs of vascular insufficiency.

C. Routine Testing

A 12-lead electrocardiogram should be performed and examined for ST-T wave abnormalities, Q waves, conduction abnormalities, ventricular hypertrophy, arrhythmias, prolonged QTc, or heart block. Further evaluation of abnormal EKGs may be indicated. Lipid testing should be performed on all male candidates age 35 or older and on all female candidates age 45 or older to allow the calculation of a 2-year Framingham cardiac event risk score (Table I-1a for males; Table I-1b for females; D'Agostino, 2000).

Table I-1a (Males): Calculation of 2-year Framingham Risk Score (No Prior CAD)

Age	Points	Age	Points	Age	Points						
35-39	0	45-49	3	55-59	6						
40-44	1	50-54	4	60-64	7					POINTS	
										Subtotal	
Total Cholesterol	HDL										
	25	30	35	40	45	50	60	70	80		
160	8	7	5	5	4	3	2	1	0		
170	8	7	6	5	4	4	2	1	0		
180	9	7	6	5	5	4	3	2	1		
190	9	8	7	6	5	4	3	2	1		
200	9	8	7	6	5	5	3	2	1		
210	10	8	7	6	6	5	4	3	2		
220	10	9	8	7	6	5	4	3	2		
230	10	9	8	7	6	6	4	3	2		
240	10	9	8	7	7	6	5	4	3		
250	11	9	8	8	7	6	5	4	3		
260	11	10	9	8	7	6	5	4	3		
270	11	10	9	8	7	7	5	4	3		
280	11	10	9	8	8	7	6	5	4		
290	12	10	9	9	8	7	6	5	4		
300	12	11	10	9	8	7	6	5	4		
										Subtotal	
Diabetes						Cigarette Smoking					
Yes	No					Yes	No				
3	0					4	0				
										Subtotal	
Systolic BP											
Treated				Untreated							
<110	0	165-184	4	<110	0	135-144	4				
110-124	1	185-214	5	110-114	1	145-154	5				
125-144	2	≥ 215	6	115-124	2	≥ 155	6				
145-164	3			125-134	3						
										Subtotal	
										TOTAL POINTS	

Total Points	2-year Risk	Risk Level
0 - 15	<2%	Low
16 - 20	2 - 4%	Intermediate
21+	>4%	High

