Cardiovascular System

Trainee Handout

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Objectives

• identify the primary componenets of the cardiovascular system

• understand the basic principles of evaluating cardiovascular related disabilities

References

* [**38 CFR 3.307, Presumptive service connection for chronic, tropical or prisoner-of-war related disease, or disease associated with exposure to certain herbicide agents; wartime and service on or after January 1, 1947**](http://www.ecfr.gov/cgi-bin/text-idx?SID=0630d5624c5da26fa967f7f946edcb2f&mc=true&node=se38.1.3_1307&rgn=div8)
* [**38 CFR 3.309, Disease subject to presumptive service connection**](http://www.ecfr.gov/cgi-bin/text-idx?SID=0630d5624c5da26fa967f7f946edcb2f&mc=true&node=se38.1.3_1309&rgn=div8)
* [**38 CFR 4.100, Application of the evaluation criteria for diagnostic codes 7000-7007, 7011, and 7015-7020**](http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=9326662dc5925f175acd349f6883a4dd&mc=true&r=SECTION&n=se38.1.4_1100)
* [**M21-1, Part IV, Subpart ii, 2, C - Service Connection (SC) for Disabilities Resulting From Exposure to Environmental Hazards or Service in the Republic of Vietnam (RVN)**](https://vaww.compensation.pension.km.va.gov/system/templates/selfservice/va_ka/portal.html?portalid=554400000001034)
* [**38 CFR 4.104, Schedule of ratings—cardiovascular system**](http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=9326662dc5925f175acd349f6883a4dd&mc=true&r=SECTION&n=se38.1.4_1104)
* [**M21-1, Part III, Subpart iv, 4, E - Cardiovascular System Conditions**](https://vaww.compensation.pension.km.va.gov/system/templates/selfservice/va_ka/portal.html?portalid=554400000001034)
* [**Drosky v. Brown, No 96-573, May 14, 1997**](https://vaww.compensation.pension.km.va.gov/system/templates/selfservice/va_ka/portal.html?portalid=554400000001034https://vaww.compensation.pension.km.va.gov/system/templates/selfservice/va_ka/portal.html?portalid=554400000001034)
* [**Otero-Castro v. Principi, No. 01-1360, Octber 4, 2002**](https://vaww.compensation.pension.km.va.gov/system/templates/selfservice/va_ka/portal.html?portalid=554400000001034https://vaww.compensation.pension.km.va.gov/system/templates/selfservice/va_ka/portal.html?portalid=554400000001034)

Topic 1: Function of Cardiovascular System

**ANATOMY OF THE HEART**

The heart is located under the ribcage in the center of the chest between the right and left lungs. Its muscular walls beat, or contract, pumping blood to all parts of your body.

The size of the heart can vary depending on age, size, and the condition of the heart. A normal, healthy, adult heart usually is the size of an average clenched adult fist. Some diseases can cause the heart to enlarge.

The heart has four chambers. The heart's upper chambers, the right and left atria (AY-tree-uh), are shown in purple. The heart's lower chambers, the right and left ventricles (VEN-trih-kuls), are shown in red.

Some of the main blood vessels (arteries and veins) that make up the circulatory system are directly connected to the heart.

**The Right Side of the Heart**

After the body's organs and tissues have used the oxygen in the blood, the vena cavae carry the oxygen-poor blood back to the right atrium of the heart.

The superior vena cava carries oxygen-poor blood from the upper parts of the body, including the head, chest, arms, and neck. The inferior vena cava carries oxygen-poor blood from the lower parts of the body.

The oxygen-poor blood from the vena cavae flows into the heart's right atrium and then to the right ventricle. From the right ventricle, the blood is pumped through the pulmonary (PULL-mun-ary) arteries (shown in blue in the center of figure B) to the lungs.

Once in the lungs, the blood travels through many small, thin blood vessels called capillaries. There, the blood picks up more oxygen and transfers carbon dioxide to the lungs—a process called gas exchange.

The oxygen-rich blood passes from the lungs back to the heart through the pulmonary veins (

**The Left Side of The Heart**

Oxygen-rich blood from the lungs passes through the pulmonary veins (shown in red to the right of the left atrium in figure B above). The blood enters the left atrium and is pumped into the left ventricle.

From the left ventricle, the oxygen-rich blood is pumped to the rest of the body through the aorta. The aorta is the main artery that carries oxygen-rich blood to the body.

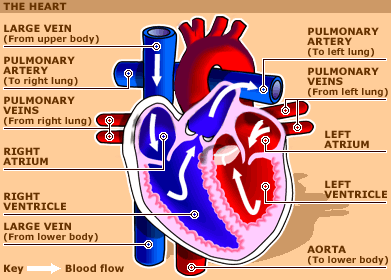
Like all of the organs, the heart needs oxygen-rich blood. As blood is pumped out of the heart's left ventricle, some of it flows into the coronary arteries (shown in red in figure B).

The coronary arteries are located on the heart's surface at the beginning of the aorta. They carry oxygen-rich blood to all parts of the heart.

**FUNCTION OF THE CARDIOVASCULAR SYSTEM**

**Function of the heart**

The heart is a hollow muscular organ that lies in the center of the chest. The right and left sides of the heart each have an upper chamber (*atrium*) that collects blood and a lower chamber (*ventricle*) that ejects blood. To ensure that blood flows in only one direction, the ventricles have an *inlet* and *outlet* *valve*. The heart’s primary functions are to supply oxygen to the body and to rid the body of waste products (carbon dioxide). The heart performs these functions by collecting oxygen-depleted blood from the body and pumping it to the lungs where it picks up oxygen and drops off carbon dioxide. The heart then collects the oxygen-enriched blood from the lungs and pumps it to the entire body. During each heartbeat, each heart chamber relaxes as it (a period called *diastole*) and then contracts as it pumps blood (a period called *systole*).

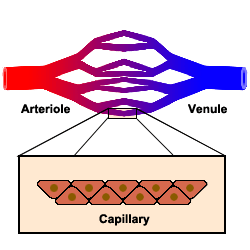
**BLOOD FLOW THROUGH THE HEART**

**Blood flow**

Blood then moves through the body in the following manner:

* Oxygen-depleted, carbon dioxide-laden blood from the body flows through the two largest veins (the *inferior and superior vena cavae*) into the *right atrium*. When this chamber fills, it propels the blood into the *right ventricle*.
* When the *right ventricle* fills, it pumps blood through the *pulmonary valve* into the *pulmonary arteries*, which supply the *lungs*.
* The blood then flows through tiny capillaries, which surround the air sacs in the lungs, absorbing oxygen and giving up carbon dioxide, which is then exhaled.
* The now oxygen-rich blood flows through the *pulmonary veins* into the *left atrium*. This circuit between the right side of the heart, the lungs and the left atrium is called the *pulmonary circulation*.
* When the *left atrium* fills, it propels oxygen-rich blood into the *left ventricle*. When this chamber fills, it pumps blood through the *aortic valve* into the *aorta*, the largest artery in the body. This oxygen-rich blood supplies all of the body except the lungs.

**Function of the circulatory system**

The rest of the circulatory system is composed of *arteries*, *arterioles*, *capillaries*, *venules*, and *veins*. The *arteries*, which are strong and flexible, carry blood away from the heart and bear the highest blood pressure. Their resilience helps maintain blood pressure while the heart is between beats. The *smaller arteries and arterioles* have muscular walls that adjust their diameter to increase or decrease blood flow to a particular area. Capillaries are tiny, extremely thin-walled vessels that act as bridges between arteries, which carry blood away from the heart, and veins, which carry blood back to the heart. The capillaries allow oxygen and nutrients to pass from the blood into the tissues and allow waste products to pass from the tissues into the blood. They drain into the *venules*, which in turn drain into the veins that lead back to the heart. Because *veins* are thin-walled but generally larger in diameter than arteries, they carry the same volume of blood at a lower speed and under much less pressure.

Topic 2: Principles of evaluating cardiovascular disabilities

**REGULATIONS, RATING SCHEDULE PROVISIONS,**

**GENERAL CONSIDERATIONS**

There are several diseases in this section for which service connection may be granted on a presumptive basis under provisions of 38 CFR §3.309(a): **Arteriosclerosis; Cardiovascular-renal disease, including hypertension; Endocarditis (This term covers all forms of valvular heart disease); Myocarditis; Thromboangiitis obliterans (Buerger‘s Disease).**

**Atherosclerotic heart disease or hypertensive vascular disease (including hypertensive heart disease) and their complications (including myocardial infarction, congestive heart failure, arrhythmia)** are conditions for which service connection may be granted on a presumptive basis for former prisoners of war under the provisions of 38 CFR §3.309(c). These conditions were added effective October 7, 2004 (See Fast Letter 04-27 dated October 15, 2004).

Prior to October 7, 2004, beriberi (including beriberi heart disease) was one of the conditions for which service connection may be granted on a presumptive basis for former prisoners of war under the provisions of 38 CFR §3.309(c). The term *beriberi heart disease* included ischemic heart disease in a former POW who had experienced localized edema during captivity. With the rule change that became effective October 7, 2004, the presence of edema is no longer required in order to establish service connection for ischemic heart disease for former POWs.

Prior to October 7, 2004, a former POW had to have been interned or detained for a minimum of not less than 30 days before becoming eligible for service connection on a presumptive basis for beriberi heart disease. This 30-day minimum internment requirement for atherosclerotic heart disease or hypertensive vascular disease was removed by the rule that became effective October 7, 2004.

Organic residuals of frostbite are also a presumptive condition for former POWs, if it is determined that the veteran was interned in climatic conditions consistent with the occurrence of frostbite. Prior to December 6, 2003, a former POW had to have been interned or detained for a minimum of not less than 30 days before becoming eligible for service connection on a presumptive basis for organic residuals of frostbite. This 30-day minimum requirement was removed by the rule that became effective December 6, 2003.

**DISEASES OF THE HEART AND SPECIFIC DIAGNOSTIC CODES**

**DC 7000, Valvular heart disease (includes rheumatic heart disease)**

Valvular heart disease (including rheumatic heart disease) includes all types of valvular heart disease, as well as those of traumatic origin. In the past, most cases of chronic valve disease either resulted from or were ascribed to previous rheumatic fever. With the declining incidence of acute rheumatic fever, other etiologies are increasingly recognized: Congenital defects that may not become apparent until late childhood or adult years, infectious endocarditis, syphilis, sclerosis and calcification. Heart valve disease may obstruct blood flow between the heart’s chambers or between the heart and major arteries. A valve that leaks may allow blood to flow backward. These conditions increase the heart muscle’s workload and eventually weaken the force of the heart’s contractions. Whatever the etiology, valve obstruction or regurgitation causes characteristic physical and laboratory findings.

The criteria provide a 100-percent evaluation for active infections with valvular heart damage for three months following cessation of therapy.

The criteria for evaluating valvular heart disease are those previously described utilizing METs and the alternatives.

There is not a zero-percent level of evaluation shown since zero percent may be assigned under any diagnostic code when the criteria for a compensable evaluation are not met (38 CFR 4.31).

*Excerpts from M 21-1MR III iv.4.E.:*

**g. Effects of Rheumatic Heart Disease**

Chronic rheumatic heart disease results from single or repeated attacks of rheumatic fever that produce:

* rigidity and deformity of the cusps,
* fusion of the commissures, or
* shortening and fusion of the chordae tendineae.

The earliest evidence of organic valvular disease is:

* a significant murmur, and
* hemodynamically significant valvular lesions found on x-ray, fluoroscopy, or electrocardiogram (ECG) study, since these reveal the earliest stages of specific chamber enlargement.

Grant service connection for an aortic valve insufficiency that manifests without other cause, after an in-service case of rheumatic fever.

**h. Rheumatic Heart Disease Coexisting With Hypertensive or Arteriosclerotic Heart Disease**

Accepted medical principles do not concede an etiological relationship between rheumatic heart disease and either hypertensive or arteriosclerotic heart disease.

If a veteran who is SC for rheumatic heart disease develops hypertensive or arteriosclerotic heart disease after the applicable presumptive period following military discharge, request a medical opinion to determine which condition is causing the current signs and symptoms.

***Notes*:**

* If the examiner is unable to separate the effects of one type of heart disease from another, the effects must be rated together.
* Do not extend service connection to systemic manifestations or arteriosclerosis in areas remote from the heart, since medically there is no recognized etiological relationship between rheumatic heart disease and later developing hypertensive or arteriosclerotic changes.

**Repeating Criteria Under DC 7001, 7002, and 7003**

The evaluation criteria are repeated under each diagnostic code for endocarditis DC 7001, pericarditis DC 7002, and pericardial adhesions DC 7003 to which they apply, rather than being rated as valvular heart disease. However, there is no three-month period of convalescence evaluation for pericardial adhesions (DC 7003) if evaluated strictly under the criteria for valvular heart disease (DC 7000). Pericardial adhesions are a chronic condition rather than an acute infection, and a convalescence evaluation is, therefore, inappropriate.

**DC 7001, Endocarditis**

An inflammation that is most often the result of a bacterial infection of the smooth lining of the heart (endocardium). Heart valves that are congenitally deformed or damaged by previous disease are predisposed to infection. Normal valves are rarely attacked.

**DC 7002, Pericarditis**

The pericardiumis the membranous sac enclosing the heart. The pericardium may be involved by inflammation, trauma or neoplasms. Inflammation follows bacterial, viral, or fungal infection and sometimes accompanies systemic diseases (rheumatoid arthritis, systemic lupus erythematosus, uremia). Trauma may be due to penetrating or non-penetrating injuries. Neoplasms would include carcinoma, sarcoma and lymphomas.

**DC 7003, Pericardial Adhesions**

These are usually caused by rheumatic fever**.** The adhesions often do not change the physical signs usual with chronic valvular heart disease. Sometimes they increase the degree of heart atrophy.

**DC 7004, Syphilitic heart disease**

*Treponema pallidum*invades the blood stream in the first 2 to 3 days of primary acquired syphilis, but cardiovascular symptoms usually occur during the late phase of the disease, 10 to 25 years after in initial infection. The organisms enter the large blood vessels, especially the aorta, and particularly those adjacent to the mediastinum after passing through the lungs. The early symptoms are those of slight cardiac insufficiency with pains in the region of the heart due to aortic vascular disease. Improvement can be rapid with treatment. But there may be heart failure and death may be sudden.

Criteria for DC 7004 are based on the same objective measurements of the level of physical activity that causes symptoms. There is a note following this diagnostic code directing that syphilitic aortic aneurysms be evaluated under DC 7110 (aortic aneurysm), since the criteria under DC 7110 apply to aortic aneurysm of any etiology.

**DC 7005, Arteriosclerotic Heart Disease**

Arteriosclerotic heart disease, also diagnosed as ischemic heart disease and coronary heart disease, is a disease of the heart caused by the diminution of blood supply to the heart muscle due to narrowing of the cavity of one or both coronary arteries due to the accumulation of fatty material on the inner lining of the arterial wall.. The involvement of the coronary arteries may lead to anginal pain, occlusion with sudden death, aneurysm of the heart and rupture, or cardiac decompensation.

The criteria for evaluating arteriosclerotic heart diseaseare those previously described utilizing METs and the alternatives; i.e., percentage evaluations based on the level of activity that causes symptoms.

Note that the Court has held in *Otero-Castro v. Principi* that Diagnostic Code 7005 does not require a separate showing of left-ventricular dysfunction in addition to an ejection fraction of 30 through 50% in order to qualify for a 60% rating if the claim is rated using the alternative criteria to METS.

Ischemic heart disease is a presumptive disability for former POWs under §3.309(c).

**DC 7006, Myocardial Infarction**

A myocardial infarction is the death of heart muscle due to the loss of blood supply. Its most frequent cause is a complete blockage of a coronary artery by a blood clot. Death of the heart muscle causes chest pain and electrical instability of the heart muscle tissue. The heart cannot pump or deliver oxygenated blood to the brain.

During and for three months following myocardial infarction, documented by laboratory tests, a 100% evaluation is assigned. Thereafter, criteria for evaluating this disabilityare those previously described utilizing METs and the alternatives; i.e., percentage evaluations based on the level of activity that causes symptoms.

**DC 7007, Hypertensive Heart Disease**

High blood pressure is not linked to a single etiology. Heredity predisposes to hypertension but obesity, a sedentary lifestyle, stress, and excessive amounts of alcohol or salt in food all can play a role in the development of high blood pressure. The presence of hypertension increases the workload of the left ventricle, producing first hypertrophy, followed by dilation and heart failure.

The criteria for evaluating hypertensive heart diseaseare those previously described utilizing METs and the alternatives; i.e., percentage evaluations based on the level of activity that causes symptoms.

Rating Schedule:

Chronic congestive heart failure, or; workload of 3 METs or less results in dyspnea, fatigue, angina, dizziness, or syncope, or; left ventricular dysfunction with an ejection fraction of less than 30 percent **100%**

More than one episode of acute congestive heart failure in the past year, or; workload of greater than 3 METs but not greater than 5 METs results in dyspnea, fatigue, angina, dizziness, or syncope, or; left ventricular dysfunction with an ejection fraction of 30 to 50 percent **60%**

Workload of greater than 5 METs but not greater than 7 METs results in dyspnea, fatigue, angina, dizziness, or syncope, or; evidence of cardiac hypertrophy or dilatation on electrocardiogram, echocardiogram, or X-ray **30%**

Workload of greater than 7 METs but not greater than 10 METs results in dyspnea, fatigue, angina, dizziness, or syncope, or; continuous medication required **10%**

**DC 7008, Hyperthyroid Heart Disease**

A disease caused by excessive functional activity of the thyroid gland, causing tachycardia, atrial fibrillation and congestive heart failure. Iodine treatment often helps alleviate the disease.

Rating Schedule:

1. Include as part of the overall evaluation for hyperthyroidism using DC 7900.
2. However, when atrial fibrillation is present, hyperthyroidism may be evaluated either under DC 7900 or under DC 7010 (supraventricular arrhythmia), whichever results in a higher evaluation.

**What are the ventricular arrhythmias?**

* Ventricular ectopic beat, or premature ventricular contraction or complex (PVC), or ventricular extra-systole.

1. An extra heartbeat caused by electrical activation of the ventricles before the normal heartbeat.The heart then seems to pause until the next beat.
2. They are common, occurring occasionally in almost everyone.
3. When they occur frequently in a person who has heart failure or aortic stenosis or who has had a heart attack, they may be followed by more dangerous arrhythmias such as ventricular fibrillation, which can cause sudden death.
4. The main symptom is feeling a strong or skipped beat.

**Ventricular tachycardia:**

Is a ventricular rate of at least 120 beats per minute triggered in the ventricles, usually with palpitations. Transient symptoms are not as significant as sustained ones.

Sustained ventricular tachycardia

1. Ventricular tachycardia lasting at least 30 seconds.
2. Occurs in various heart diseases, commonly weeks or months after a heart attack.
3. Often requires emergency treatment because the ventricles cannot fill adequately and pump blood normally. Blood pressure falls, and heart failure may follow. Can worsen to become ventricular fibrillation--a form of cardiac arrest.

**Ventricular fibrillation** - electrically similar to atrial fibrillation, but is much more serious:

1. The ventricles contract ineffectively and only quiver instead of pumping blood. No blood is pumped from the heart. It is a form of cardiac arrest and is fatal unless treated immediately.
2. The main causes are CAD or MI.
3. It leads to unconsciousness in seconds, then convulsions and irreversible brain damage after about 5 minutes because oxygen is not reaching the brain. Death soon follows.

**DC 7010, Supraventricular arrhythmias**

A condition where the heart rate suddenly increases to 100-200 beats a minute. At the beginning of an episode a sudden, rapid, regular fluttering sensation in the chest is easily noticed. Most patients feel weak and faint but syncope is rare. Shortness of breath is not uncommon and older patients may develop angina during the attacks. Polyuria often occurs during or after attacks.

The criteria require more than four episodes a year of paroxysmal atrial fibrillation or other supraventricular tachycardia for the 30-percent level, and permanent atrial fibrillation or one to four episodes a year of paroxysmal atrial fibrillation or other supraventricular tachycardia for the 10-percent level. Both sets of criteria require documentation by ECG or Holter monitor.

Rating schedule:

1. Paroxysmal atrial fibrillation or other supraventricular tachycardia, with more than four episodes per year documented by ECG or Holter monitor 30%
2. Permanent atrial fibrillation (lone atrial fibrillation), or; one to four episodes per year of paroxysmal atrial fibrillation or other supraventricular tachycardia documented by ECG or Holter monitor 10%

**DC 7011, Ventricular Arrhythmias (Sustained)**

A condition involving depolarization of the atria or ventricles, or both, that occurs before the next expected sinus beat. In other words this is a premature heartbeat. Most complain of a skipped beat, flutter or extra beats in the chest but usually disregard them until they become frequent. The cause must be found before treatment can be started. ECG is the most likely method of determining a cause.

The criteria are the same objective measurements that are used for arteriosclerotic heart disease and other heart diseases. However, there are specific provisions for a total evaluation while an Automatic Implantable Cardioverter-Defibrillator (AICD) is in place.

AICD - Automatic Implantable Cardioverter-Defibrillator - A pulse generator (smaller than a deck of cards) is implanted in the abdomen underneath the skin. Electrodes sense the rhythm of the heart and deliver a powerful shock when a life-threatening rhythm occurs (ventricular tachycardia or fibrillation). If necessary, it can give three to four additional shocks. The batteries are designed to last 4 to 5 years and deliver about 100 shocks. It originally required open-chest surgery for implantation. Now electrodes are inserted into the heart through veins. The pulse generator must be replaced (minor surgery) when batteries die. Firing may cause depression, anxiety, thoughts of dying, etc.

Uses of AICD:

* For people at high risk for sudden death.

1. For episodes of ventricular tachycardia.
2. For those who have survived ventricular fibrillation but have not had an acute heart attack; or those who are at high risk for another episode of ventricular fibrillation.
3. For those with structural defects of the heart, like massive dilation or excessive thickening of the heart muscle.

After implantation, recovery of normal activity is expected in 4 to 6 weeks.

Rating Schedule:

1. For indefinite period from date of hospital admission for initial evaluation and medical therapy for a sustained ventricular arrhythmia, or; for indefinite period from date of hospital admission for ventricular aneurysmectomy, or; with an automatic implantable Cardioverter-Defibrillator (AICD) in place 100%
2. Chronic congestive heart failure, or; workload of 3 METs or less results in dyspnea, fatigue, angina, dizziness, or syncope, or; left ventricular dysfunction with an ejection fraction of less than 30 percent 100%
3. More than one episode of acute congestive heart failure in the past year, or; workload of greater than 3 METs but not greater than 5 METs results in dyspnea, fatigue, angina, dizziness, or syncope, or; left ventricular dysfunction with an ejection fraction of 30 to 50 percent 60%
4. Workload of greater than 5 METs but not greater than 7 METs results in dyspnea, fatigue, angina, dizziness, or syncope, or; evidence of cardiac hypertrophy or dilatation on electrocardiogram, echocardiogram, or X-ray 30%
5. Workload of greater than 7 METs but not greater than 10 METs results in dyspnea, fatigue, angina, dizziness, or syncope, or; continuous medication required 10%

**Note:** A rating of 100 percent shall be assigned from the date of hospital admission for initial evaluation and medical therapy for a sustained ventricular arrhythmia or for ventricular aneurysmectomy. Six months following discharge, the appropriate disability rating shall be determined by mandatory VA examination. Any change in evaluation based upon that or any subsequent examination shall be subject to the provisions of 38 C.F.R. § 3.105(e).

**DC 7015, Atrioventricular Block**

The contraction of muscle fibers in the heart is controlled by an electrical discharge that flows from the heart’s pacemaker, the sinoatrial node. When impulses fail to emerge or emerge tardily from the sinus node, there is an SA block present. If the impulse merely takes an undue length of time to enter the atrial muscle, there is a first-degree block present. If one or more impulses fail to emerge, a second-degree block exists. If no impulses emerge, a complete SA block is present.

The criteria for DC 7015 provide the same objective evaluation criteria we have used for ventricular arrhythmias (DC 7011) and many other heart conditions, since heart block may result in a variety of cardiac signs and symptoms and a wide range of disabilities.

The only difference in the criteria for atrioventricular block (DC 7015) and ventricular arrhythmias (DC 7011) is that a 10-percent evaluation for DC 7015 will be assigned when either a pacemaker (a common method of treatment for this condition) ***or*** continuous medication is required.

**7016, Heart valve replacement (prosthesis)**

The level of residual disability following valve replacement can also be objectively determined based on the level of activity that results in symptoms in the same manner as for valvular heart disease.

The criteria for evaluating heart valve replacementare those previously described utilizing METs and the alternatives; i.e., percentage evaluations based on the level of activity that causes symptoms.

A total evaluation following heart valve replacement can be assigned for an indefinite period, with a mandatory VA examination six months after the surgery, with any change in evaluation based on that or any subsequent examination to be made under the provisions of 38 CFR 3.105(e). This requires a 60-day notice before VA reduces an evaluation and an additional 60-day notice before the reduced evaluation takes effect.

**DC 7017, Coronary Bypass Surgery**

Coronary bypass surgery consists of grafting veins or arteries from the aorta to the coronary artery thus bypassing the obstructed area thus allowing oxygen rich blood to nourish the heart muscle. The veins are usually taken from the leg.

The length of the total evaluation following coronary artery bypass surgery (DC 7017) is three months. For the individual who requires a longer than average period of convalescence, a total evaluation may be assigned for a longer period under the provisions of §§ 4.29 and 4.30 of the rating schedule.

The criteria for evaluating condition following coronary artery bypass surgeryare those previously described utilizing METs and the alternatives; i.e., percentage evaluations based on the level of activity that causes symptoms.

**DC 7018, Implantable Cardiac Pacemakers**

An electronic device that acts in the place of the heart’s own pacemaker, the sinoatrial node, and is programmed to imitate the normal conduction sequence of the heart. They are usually surgically implanted under the skin of the chest and have wires running to the heart.

A two-month convalescence evaluation is provided. Following that, the condition is to be rated as supraventricular arrhythmias (DC 7010), ventricular arrhythmias (DC 7011) or atrioventricular block (DC 7015). The minimum evaluation under this code following pacemaker insertion is 10%.

A note following the rating criteria directs that Automatic Implantable Cardioverter-Defibrillators (AICDs) are to be rated under DC 7011 with an evaluation of 100%. An AICD is similar in many respects to an artificial pacemaker; however, pacemakers are usually chosen to correct a heart rhythm that is too slow (bradycardia) whereas AICDs are used to correct a heart rhythm that is too fast. AICDs are used to correct more serious heart irregularities than typical pacemakers, as described under DC 7011. People with AICDs need to be much more careful in certain situations. Because of the severity of the conditions that require an AICD, it is the *only* implantable pacemaker that supports the 100% evaluation.

**DC 7019, Cardiac Transplantation**

This is the replacement of the existing heart by a heart from another body. End-stage coronary artery disease and cardiomyopathy are the common indications for cardiac transplantation. Long term survival rates and rehabilitation levels are now approaching those of patients receiving kidney transplants.

Diagnostic Code 7019 is for cardiac transplantation allowing a total evaluation for an indefinite period following the transplant, with a mandatory VA examination to be conducted one year later.

As with other indefinite periods of convalescence evaluations, any change in evaluation based on the results of the examination will be implemented under the notice and effective date provisions of § 3.105(e), which require VA to notify the claimant of any proposed reduction, once the examination has been carried out and reviewed, and allows 60 days for the claimant to provide additional evidence to show that a reduction should not be carried out.

Cardiac transplantation (DC 7019) is evaluated under the same criteria as other heart disease, i.e., based on a METs assessment or other objective findings according to the level of activity that causes symptoms. Because almost every patient will permanently require immunosuppressive therapy following cardiac transplantation, there is 30 percent the minimum evaluation.

**DC 7020, Cardiomyopathy**

An acute or chronic disorder of theheart muscle of unknown or obscure etiology in which the ventricles enlarge but aren’t able to pump enough blood for the body’s needs, resulting in heart failure. It is not atherosclerotic in origin. The earliest signs are subtle EKG changes. As the cardiomyopathy worsens symptoms of fatigue, dyspnea, palpations and precordial discomfort develop.

Cardiomyopathy (DC 7020) is evaluated under the same criteria as arteriosclerotic heart disease (DC 7005), i.e., according to the level of activity that causes symptoms. Cardiomyopathy has no minimum evaluation.

**DISEASES OF THE ARTERIES AND VEINS**

**DC 7101, Hypertensive Vascular Disease (hypertension and isolated systolic hypertension)**

Arterial hypertension is elevation of systolic and/or diastolic blood pressure either primary (essential hypertension) or secondary. Essential hypertension is not linked to a single etiology. Heredity predisposes to hypertension, but environmental, neurogenic, humoral, and vascular factors also interact and influence hypertension to various extents. Secondary hypertension is associated with bilateral renal disease.

The rule regarding evaluation of hypertension secondary to renal disease is included in the part of the rating schedule addressing the genitourinary system at § 4.115. Secondary hypertension associated with aortic insufficiency or thyroid disease, and isolated systolic hypertension, which may be secondary to arteriosclerosis, is addressed under DC 7101 (hypertensive vascular disease).

Rating Schedule:

1. Diastolic pressure predominantly 130 or more 60%
2. Diastolic pressure predominantly 120 or more 40%
3. Diastolic pressure predominantly 110 or more, or; systolic pressure

predominantly 200 or more 20%

1. Diastolic pressure predominantly 100 or more, or; systolic pressure

predominantly 160 or more, or; minimum evaluation for an individual

with a history of diastolic pressure predominantly 100 or more

who requires continuous medication for control 10%

**Note 1:** Hypertension or isolated systolic hypertension must be confirmed by readings taken two or more times on at least three different days. For purposes of this section, the term hypertension means that the diastolic blood pressure is predominantly 90 mm. or greater, and isolated systolic hypertension means that the systolic blood pressure is predominantly 160 mm. or greater with a diastolic blood pressure of less than 90 mm.

**Note 2:** Evaluate hypertension due to aortic insufficiency or hyperthyroidism, which is usually the isolated systolic type, as part of the condition causing it rather than by a separate evaluation.

**Note 3**: Evaluate hypertension separately from hypertensive heart disease and other types of heart disease. *Excerpts from M 21-1MR III.iv.4.E.:*

**d. Rating Hypertensive Vascular Disease**

Do *not* rate separately from the primary cause the elevation of systolic blood pressure due to aortic insufficiency or thyrotoxicosis, or the elevation of systolic or diastolic blood pressure due to nephritis.

However, a separate evaluation for hypertension may be awarded when the sole renal disability is the absence of a kidney, or the requirement of regular dialysis.

***Note***: The cause of hypertension is unknown in the vast majority of cases.

***Reference***: For more information on hypertension and nephritis, see [Opens New Window38 CFR 4.115](http://www.warms.vba.va.gov/regs/38CFR/BOOKC/PART4/S4_115.DOC).

**e. Considering Long Term Effects of Hypertension**

Hypertension may:

* exist for years without causing symptoms,
* so increase the cardiac load as to result in hypertrophy of the cardiac muscle or cardiac dilation and decompensation, if sufficiently severe, and
* cause arteriosclerosis of uneven distribution that often involves the vessels of one organ to a greater degree than those of the rest of the body, in cases where hypertension is long-standing.

If the hypertension is of sufficient degree to cause significant impairment of circulation to the organ, symptoms will manifest in accordance with the

* organ involved, and
* degree of impairment.

**f. Granting Service Connection for Arteriosclerotic Manifestations Due to Hypertension**

If any of the following arteriosclerotic manifestations are diagnosed in a veteran with service-connected (SC) hypertension, grant service connection through the relationship to hypertension:

* symptoms and signs in the brain that warrant a diagnosis of cerebral arteriosclerosis or thrombosis with hemiplegia
* nephrosclerosis of the kidneys with impairment of renal function, or
* myocardial damage or coronary occlusion of the heart.

***Notes***:

* Arteriosclerosis occurs with advancing age without preexisting hypertension, and may occur in some younger individuals who are predisposed to arterial changes.
* The existence of arteriosclerosis does not imply or indicate previous hypertension.

**DC 7110, 7111, 7112, Aneurysms**

An aneurysm is a sac formed by the dilationof the walls of an artery or vein and filled with blood. The main symptoms of arterial aneurysm are the formation of a pulsating tumor, a peculiar bruit heard over the swelling and pressure symptoms consisting of pain and paralysis from pressure on nerves

Small artery aneurysms may produce symptoms such as headaches or visual abnormalities due to local pressure effects, and an aneurysm that ruptures may result in a wide variety of symptoms. An asymptomatic aneurysm of a small artery has no disabling effects and does not warrant a compensable evaluation.

**Aortic Aneurysm (DC 7110)**

This is evaluated as totally disabling under either of two circumstances:

1. If the aneurysm is 5 cm. or greater in diameter, or
2. For six months following resection of an aneurysm of any size.

The period of total evaluation following surgery under DCs 7110 and 7111 continues indefinitely, and an examination six months following the date of admission for surgical correction will determine whether a change in evaluation is warranted, based on actual residuals documented at that time. Since any change will be implemented under the notice and effective date provisions of § 3.105 (e), the veteran will have the opportunity to present medical evidence if he or she disagrees with the proposed change in evaluation.

Rating schedule:

1. If five centimeters or larger in diameter, or; if symptomatic, or; for indefinite period from date of hospital admission for surgical correction (including any type of graft insertion) 100%
2. Precluding exertion 60%
3. Evaluate residuals of surgical correction according to organ systems affected.

**Note:** A rating of 100 percent shall be assigned as of the date of admission for surgical correction. Six months following discharge, the appropriate disability rating shall be determined by mandatory VA examination. Any change in evaluation based upon that or any subsequent examination shall be subject to the provisions of 38 C.F.R. § 3.105(e).

**7111, Aneurysm, any large artery**

A 100-percent evaluation is required if symptomatic, or for an indefinite period from the date of hospital admission for correction.

Three notes were added under DC 7111, the first explaining the ankle/brachial index, the second explaining the method of evaluation when more than one extremity is affected, and the third describing the method of postoperative convalescence evaluation.

Rating Schedule:

1. If symptomatic, or; for indefinite period from date of hospital admission for surgical correction 100%

Following surgery:

1. Ischemic limb pain at rest, and; either deep ischemic ulcers or ankle/brachial index of 0.4 or less 100%
2. Claudication on walking less than 25 yards on a level grade at 2 miles per hour, and; persistent coldness of the extremity, one or more deep ischemic ulcers, or ankle/brachial index of 0.5 or less 60%
3. Claudication on walking between 25 and 100 yards on a level grade at 2 miles per hour, and; trophic changes (thin skin, absence of hair, dystrophic nails) or ankle/brachial index of 0.7 or less 40%
4. Claudication on walking more than 100 yards, and; diminished peripheral pulses or ankle/brachial index of 0.9 or less 20%

**Note 1:** The ankle/brachial index is the ratio of the systolic blood pressure at the ankle (determined by Doppler study) divided by the simultaneous brachial artery systolic blood pressure. The normal index is 1.0 or greater.

**Note 2:** These evaluations are for involvement of a single extremity. If more than one extremity is affected, evaluate each extremity separately and combine (under §4.25), using the bilateral factor, if applicable.

**Note 3:** A rating of 100 percent shall be assigned as of the date of hospital admission for surgical correction. Six months following discharge, the appropriate disability rating shall be determined by mandatory VA examination. Any change in evaluation based upon that or any subsequent examination shall be subject to the provisions of §3.105(e) of this chapter.

**7112, Aneurysm, any small artery**

Aneurysms of cerebral arteries are evaluated under DC 7112, as are all other aneurysms of small arteries. An aneurysm is a **sac filled with blood**, formed by the dilatation (expansion) of the walls of an artery, a vein, or the heart. **Aneurysms** are classified by shape and location.

Rating Schedule:

1. Asymptomatic 0%

**Note:**  If symptomatic, evaluate according to body system affected. Following surgery, evaluate residuals under the body system affected.

**DC 7113, Arteriovenous Fistula, Traumatic**

This is an abnormal channel between and artery and a vein causing blood to flow directly from an artery into a vein bypassing the capillaries. Penetrating wounds (as from bullet, knife or needle biopsy) may lead to rupture of an artery and vein, particularly in the iliac, brachial or carotid regions where an artery and vein are sheathed together.

Shown below are the specific designations of the cardiac and vascular signs that warrant the corresponding evaluations.

Rating schedule:

1. With high output heart failure 100%
2. Without heart failure but with enlarged heart, wide pulse pressure,
3. and tachycardia 60%

Without cardiac involvement but with edema, stasis dermatitis, and either ulceration or cellulitis:

1. Lower extremity 50%
2. Upper extremity 40%

With edema or stasis dermatitis:

1. Lower extremity 30%
2. Upper extremity 20%

**DC’s 7114, 7115, 7117**

The method of evaluation when more than one extremity is affected by peripheral arterial disease requires a separate evaluation of each affected extremity, with use of the bilateral factor when applicable. These evaluations are to be combined, as other multiple disabilities of the extremities are.

**DC 7114, Arteriosclerosis Obliterans**

This is an obstruction of blood supply to the extremities by atherosclerotic plaques. The initial symptom is intermittent claudication due to deficient blood supply in the exercising muscle. This distress is described as a pain, ache, cramp or tired feeling that occurs on walking. It occurs most commonly in the calf. It is relieved quickly by resting and the person can walk the same distance again before the pain recurs. Pulses are reduced or absent. Since the most common residuals of bypass surgery are signs and symptoms of arterial insufficiency, it is appropriate to evaluate them under the criteria for arteriosclerosis obliterans.

Rating schedule:

1. Ischemic limb pain at rest, and; either deep ischemic ulcers or ankle/ brachial index of 0.4 or less 100%
2. Claudication on walking less than 25 yards on a level grade at 2 miles per hour, and; either persistent coldness of the extremity or ankle/ brachial index

of 0.5 or less 60%

1. Claudication on walking between 25 and 100 yards on a level grade at 2 miles per hour, and; trophic changes (thin skin, absence of hair, dystrophic nails) or ankle/brachial index of 0.7 or less 40%
2. Claudication on walking more than 100 yards, and; diminished peripheral pulses or ankle/brachial index of 0.9 or less 20%

**Note 1:** The ankle/brachial index is the ratio of the systolic blood pressure at the ankle (determined by Doppler study) divided by the simultaneous brachial artery systolic blood pressure. The normal index is 1.0 or greater.

**Note 2:**  Evaluate residuals of aortic and large arterial bypass surgery or arterial graft as arteriosclerosis obliterans.

**Note 3:** These evaluations are for involvement of a single extremity. If more than one extremity is affected, evaluate each extremity separately and combine (under §4.25), using the bilateral factor (§4.26), if applicable.

**Ankle-brachial index test**

**Exam Overview**

This test is done by measuring blood pressure at the ankle and the arm, while a person is at rest. Measurements are then repeated at both sites after 5 minutes of walking on a treadmill.

By dividing the highest blood pressure at the ankle by the highest recorded pressure in either arm, the ankle-brachial index (ABI) can be calculated. The ABI result is used to predict the severity of [peripheral arterial disease](javascript:AddNavBar('../health_guide_atoz/stp1421.asp');) (PAD) that may be present. A decrease in the ABI result with exercise is a sensitive indicator that significant PAD is probably present.

**Why It Is Done**

This test is done to screen for peripheral arterial disease of the legs.

**Results**

The resting ABI result can help diagnose peripheral arterial disease (PAD). If the index number drops after exercise, this may indicate that significant PAD is present.

*Normal*

A normal resting ankle-brachial index is 1 or 1.1. This means that your blood pressure at your ankle is the same or greater than the pressure at your arm and there is no significant narrowing or blockage of blood flow.

*Abnormal*

A resting ankle-brachial index of less than 1 is abnormal. If the ABI is:

Less than 0.95, significant narrowing of one or more blood vessels in the legs is indicated.

Less than 0.8, pain in the foot, leg, or buttock may occur during exercise ([intermittent claudication](javascript:AddNavBar('../health_guide_atoz/aa127148.asp');)).

Less than 0.4, symptoms may occur when at rest.

0.25 or below, severe limb-threatening PAD is probably present.

**What To Think About**

You may experience leg pain during the treadmill portion of the test if you have peripheral arterial disease (PAD).

Undiagnosed arterial disease in the arms can cause inaccurate test results.

Blood pressure readings may not be accurate when the blood vessel being measured is hardened by calcium (calcified). Arteries may calcify more than usual if you have [diabetes](javascript:AddNavBar('../health_guide_atoz/std120744.asp');) or kidney problems (renal insufficiency).

A very abnormal ABI test result may require more testing to determine the location and severity of PAD that might be present.

**Ankle/brachial index studies**

*Question:* (C&P Website FAQ dated Monday, February 09, 2004)

Ankle/brachial index studies are now being returned with both pre- and post-exercise readings. Should the pre-exercise or post-exercise readings be used for rating purposes? This significantly changes the rating evaluation.

*Answer:*

There is no requirement for exercising the veteran. The AMIE worksheet neither asks for, nor requires, it. An ankle/brachial index ("ABI") is similar to a "blood pressure reading". ABIs, like BPs, are generally taken at rest. Although the regulation doesn't clearly specify whether the pre-or post-exercise readings are to be used for rating purposes, generally checking an ABI after exercise is done to confirm a diagnosis of claudication, and resting ABIs are done to uncover peripheral vascular disease. Considering all of the above, the rating is to be based on the resting ABIs.

**DC 7115, Thromboangiitis obliterans (Buerger's Disease)**

This disease is characterized by inflammatory changes in the small and medium sized arteries and veins. It occurs predominately in men aged 20 to 40 who smoke cigarettes. The etiology is unknown but the relationship of smoking to the occurrence and progression is well documented. Onset is gradual starting in the most distal vessels and progressing proximally culminating in the development of distal gangrene. There may be coldness, numbness, tingling or burning before objective evidence of the disease is present. Raynaud’s phenomenon is common. Intermittent claudication occurs in the involved extremity, usually the leg or foot. Arteriograms show segmental occlusions of the distal arteries.

This condition is listed under the presumptive conditions in 38 CFR 3.309(a).

Rating schedule:

1. Ischemic limb pain at rest, and; either deep ischemic ulcers or ankle/ brachial index of 0.4 or less 100%
2. Claudication on walking less than 25 yards on a level grade at 2 miles per hour, and; either persistent coldness of the extremity or ankle/ brachial index

of 0.5 or less 60%

1. Claudication on walking between 25 and 100 yards on a level grade at 2 miles per hour, and; trophic changes (thin skin, absence of hair, dystrophic nails) or ankle/brachial index of 0.7 or less 40%
2. Claudication on walking more than 100 yards, and; diminished peripheral pulses or ankle/brachial index of 0.9 or less 20%

**Note 1:** The ankle/brachial index is the ratio of the systolic blood pressure at the ankle (determined by Doppler study) divided by the simultaneous brachial artery systolic blood pressure. The normal index is 1.0 or greater.

**Note 2:** These evaluations are for involvement of a single extremity. If more than one extremity is affected, evaluate each extremity separately and combine (under §4.25), using the bilateral factor (§4.26), if applicable.

**DC 7117, Raynaud's syndrome**

This is a spasm of the arterioles, especially in the digits and occasionally other acral parts such as the nose and tongue, with intermittent pallor or cyanosis of the skin. Raynaud’s phenomenon may be idiopathic or secondary to other conditions such as connective tissue disorders. Idiopathic Raynaud’s disease is most common in young women. Attacks of vasospasm of the digital arteries may last for minutes to hours but are rarely severe enough to cause gross tissue loss. In persons with long-standing disease the skin of the digits may become smooth, shiny and tight with loss of subcutaneous tissue. Intermittent attacks of blanching or cyanosis of the digits are precipitated by exposure to cold or by emotional upsets. Normal color and sensation are restored when the hands are warmed. Paresthesias consisting of numbness, tingling or burning are frequent during the attack.

Rating schedule:

1. With two or more digital ulcers plus autoamputation of one or more digits and history of characteristic attacks 100%
2. With two or more digital ulcers and history of characteristic attacks 60%
3. Characteristic attacks occurring at least daily 40%
4. Characteristic attacks occurring four to six times a week 20%
5. Characteristic attacks occurring one to three times a week 10%
6. **Note:** For purposes of this section, characteristic attacks consist of sequential color changes of the digits of one or more extremities lasting minutes to hours, sometimes with pain and paresthesias, and precipitated by exposure to cold or by emotional upsets. These evaluations are for the disease as a whole, regardless of the number of extremities involved or whether the nose and ears are involved.

**DC 7118, Angioneurotic edema**

This is a skin eruption with large edematous areas that involve subcutaneous structures as well as the dermis. It can be due to drug allergy, insect stings or bites, desensitization injections or ingestion of certain foods. Acute recurrent angioedema may be hereditary. It usually involves the hand, feet, eyelids, lips, genitalia or mucous membranes. Angioneurotic edema is a condition that is ordinarily self-limited, with attacks subsiding in one to seven days but at times palliative treatment is used. There are also unusual types that are more persistent and resistant to therapy.

Rating schedule:

1. Attacks without laryngeal involvement lasting one to seven days or longer and occurring more than eight times a year, or; attacks with laryngeal involvement of any duration occurring more than twice a year 40%
2. Attacks without laryngeal involvement lasting one to seven days and occurring five to eight times a year, or; attacks with laryngeal involvement of any duration occurring once or twice a year 20%
3. Attacks without laryngeal involvement lasting one to seven days and occurring two to four times a year 10%

**DC 7119, Erythromelalgia**

A rare syndrome characterized by burning pain, increased skin temperature and redness of the feet and less often the hands. The etiology is unknown. Secondary erthromelalgia may occur with myeloproliferative disorders, hypertension, venous insufficiency or diabetes mellitus.

Rating schedule:

* Characteristic attacks that occur more than once a day, last an average of more than two hours each, respond poorly to treatment, and that restrict most routine daily activities: 100%
* Characteristic attacks that occur more than once a day, last an average of more than two hours each, and respond poorly to treatment, but that do not restrict most routine daily activities: 60%
* Characteristic attacks that occur daily or more often but that respond to

treatment: 30%

* Characteristic attacks that occur less than daily but at least three times a week and that respond to treatment: 10%

**Note:** For purposes of this section, a characteristic attack of erythromelalgia consists of burning pain in the hands, feet, or both, usually bilateral and symmetrical, with increased skin temperature and redness, occurring at warm ambient temperatures. These evaluations are for the disease as a whole, regardless of the number of extremities involved.

**DC 7120, 7121 (Revised)**

**Chronic Venous Insufficiency**

The effects of chronic venous insufficiency are the same, whether from varicosities, thrombophlebitis, or some other cause. The post-phlebitic syndrome itself may lead to the development of varicosities because of chronic venous insufficiency. Therefore, the possible manifestations and disabling effects of varicose veins and post-phlebitic syndrome are very similar, and the same criteria is used to evaluate both conditions, with evaluation levels of 0%, 10%, 20%, 40%, 60%, and 100% for involvement of a single extremity, and the same method of evaluation for multiple extremity involvement as that used in arterial vascular disease of the extremities.

**DC 7120, Varicose veins**

The precise cause of varicose veins is unknown but is probably a weakness in the walls of the superficial veins. Over time, the weakness causes the veins to lose their elasticity. The stretch and become longer and wider. To fit in the same space they occupied when they were normal, the elongated veins become tortuous, with a snakelike appearance if they cause a bulge in the skin over them. More important than the elongation is the widening, which causes the valve cusps in the vein to separate. As a result the veins rapidly fill with blood when the person stands, and the thin-walled, tortuous veins enlarge even further.

Varicose veins are ordinarily asymptomatic or mildly symptomatic, but may produce prolonged venous insufficiency and progress to thrombophlebitis and post-phlebitic syndrome. Signs of venous insufficiency, such as edema, stasis pigmentation, ulceration, eczema, and induration, and symptoms such as aching and fatigue, are the major disabling effects of varicose veins.

**Varicose Veins and Phlebitis.** With severe varicose veins, tests to determine [impairment](http://152.124.112.221/mepss/glossary/i/impairment_11171.html) of deep return [circulation](http://152.124.112.221/mepss/glossary/c/circulation_circulatory_10232.html) are essential, as the [superficial](http://152.124.112.221/mepss/glossary/s/superficial_12460.html) [varicosities](http://152.124.112.221/mepss/glossary/v/varicosities_12933.html) may be caused by the impairment of deep return circulation. Phlebitis may also occur as a complication of varicose veins, and in such an instance, assign the appropriate higher evaluation for either varicose veins or phlebitis.

Rating Schedule:

With the following findings attributed to the effects of varicose veins:

1. Massive board-like edema with constant pain at rest: 100%
2. Persistent edema or subcutaneous induration, stasis pigmentation or eczema, and persistent ulceration: 60%
3. Persistent edema and stasis pigmentation or eczema, with or without intermittent ulceration: 40%
4. Persistent edema, incompletely relieved by elevation of extremity, with or without beginning stasis pigmentation or eczema: 20%
5. Intermittent edema of extremity or aching and fatigue in leg after prolonged standing or walking, with symptoms relieved by elevation of extremity or

compression hosiery 10%

1. Asymptomatic palpable or visible varicose veins: 0%

**Note:** These evaluations are for involvement of a **single extremity**. If more than one extremity is involved, evaluate each extremity separately and combine (under §4.25), using the bilateral factor (§4.26), if applicable.

**DC 7121, Post-phlebitic syndrome of any etiology**

A post-phlebitic syndrome can be due to deep vein thrombosis or thrombophlebitis. Deep vein thrombosis is blood clotting in the deep veins. Thrombophlebitis is inflammation and clotting in a superficial vein. Chronic venous insufficiency after thrombophlebitis is manifested by swelling and dilated superficial veins. There may be complaints of fullness, aching or tiredness in the leg. This occurs during standing or walking and is relieved by rest and elevation. With time, skin changes occur on the lateral aspect of the ankle and lower leg.

The effects of chronic venous insufficiency are the same, whether from varicosities, thrombophlebitis, or some other cause. The post-phlebitic syndrome may itself lead to the development of varicosities because of chronic venous insufficiency, and the possible manifestations and disabling effects of varicose veins and post-phlebitic syndrome are very similar. The same criteria are used to evaluate both conditions, with evaluation levels of 0%, 10%, 20%, 40%, 60%, and 100% for involvement of a single extremity.

As previously stated, notes were added under DC 7120: "With the following findings attributed to the effects of varicose veins," and under DC 7121: "With the following findings attributed to venous disease" in order to assure that the examiner has determined that the abnormal findings are attributed to venous disease.

**DC 7122, Cold injury residuals**

Residuals of frostbite (cold injury) is a presumptive disability for former POWs if it is determined that the veteran was interned in climatic conditions consistent with the occurrence of frostbite. Frostbite injury may occur at different temperatures and after different lengths of exposure, depending on the individual. If a veteran was a POW during seasons other than winter, the possibility of exposure to climatic conditions consistent with permanent frostbite injury must not be eliminated without careful consideration. A citation from M21-1MR, follow the Rating Schedule inserts below. The rating criteria for this condition were amended effective January 12, 1998 and August 13, 1998. **Remember that a Rating Schedule change cannot be applied to a claim prior to its effective date.**

**Rating Schedule effective from January 12, 1998 to August 12, 1998:**

DC 7122 Cold injury residuals:

* With pain, numbness, cold sensitivity, or arthralgia plus two or more of the following: tissue loss, nail abnormalities, color changes, locally impaired sensation, hyperhidrosis, X-ray abnormalities (osteoporosis, subarticular punched out lesions, or osteoarthritis) of affected parts: 30%
* With pain, numbness, cold sensitivity, or arthralgia plus tissue loss, nail abnormalities, color changes, locally impaired sensation, hyperhidrosis, or X-ray abnormalities (osteoporosis, subarticular punched out lesions, or osteoarthritis) of affected parts: 20%
* With pain, numbness, cold sensitivity, or arthralgia: 10%

**Note 1:** Amputations of fingers or toes, and complications such as squamous cell carcinoma at the site of a cold injury scar or peripheral neuropathy should be separately evaluated under other diagnostic codes.

**Note 2:** Evaluate each affected part (e.g., hand, foot, ear, nose) separately and combine the ratings, if appropriate, in accordance with §§4. 25 and 4.26.

**Rating Schedule effective August 13, 1998:**

DC 7122 Cold injury residuals:

With the following in affected parts:

Arthralgia or other pain, numbness, or cold sensitivity plus two or more of the following: tissue loss, nail abnormalities, color changes, locally impaired sensation, hyperhidrosis, X-ray abnormalities (osteoporosis, subarticular punched out lesions, or osteoarthritis) 30%

Arthralgia or other pain, numbness, or cold sensitivity plus tissue loss, nail abnormalities, color changes, locally impaired sensation, hyperhidrosis, or X-ray abnormalities (osteoporosis, subarticular punched out lesions, or osteoarthritis): 20%

Arthralgia or other pain, numbness, or cold sensitivity: 10%

**Note 1**: Separately evaluate amputations of fingers or toes, and complications such as squamous cell carcinoma at the site of a cold injury scar or peripheral neuropathy, under other diagnostic codes. Separately evaluate other disabilities that have been diagnosed as the residual effects of cold injury, such as Raynaud’s phenomenon, muscle atrophy, etc., unless they are used to support an evaluation under DC 7122.

**Note 2**: Evaluate each affected part (e.g., hand, foot, ear, nose) separately and combine the ratings in accordance with §§4.25 and 4.26.

*Excerpts from M21-1 MR III.iv.4.e.2 Change date May 8, 2015*

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| **III.iv.4.E.2.a****.  General Effects of Injury Due to Cold** |  | Injury due to exposure to extremely cold temperatures causes structural and functional disturbances of   * small blood vessels * cells * nerves * skin, and * bone.   The physical effects of exposure may be acute or chronic, with immediate or latent manifestations.    ***Examples***:  Exposure to   * damp cold temperatures (around freezing) cause frostnip and immersion or trench foot. * dry cold, or temperatures well below freezing, cause frostbite with, in severe cases, loss of body parts, such as fingers, toes, earlobes, or the tip of the nose. |

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| **III.iv.4.E.2.b****.  Long-Term Effects of Exposure to Cold** |  | The fact that the immediate effects of cold injury may have been characterized as “*acute”* or “*healed”* does not preclude development of disability at the original site of injury many years later. |

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| --- | --- | --- |
| **III.iv.4.E.2.c****.  Chronic Effects of Exposure to Cold** |  | Veterans with a history of cold injury may experience the following signs and symptoms at the site of the original injury   * chronic fungal infection of the feet * disturbances of nail growth * hyperhidrosis * chronic pain of the causalgia type * abnormal skin color or thickness * cold sensitization * joint pain or stiffness * Raynaud’s phenomenon * weakness of hands or feet * night pain * weak or fallen arches * edema * numbness * paresthesias * breakdown or ulceration of cold injury scars * vascular insufficiency, indicated by edema, shiny, atrophic skin, or hair loss, and * increased risk of developing conditions, such as   + peripheral neuropathy   + squamous cell carcinoma of the skin, at the site of the scar from a cold injury, or   + arthritis or other bone abnormalities, such as osteoporosis, or subarticular punched-out lesions. |

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| --- | --- | --- |
| **III.iv.4.E.2.d****.  Granting SC for Residuals of Cold Injuries** |  | Grant service connection for the residuals of cold injury if   * the cold injury was incurred during military service, and * an intercurrent NSC cause cannot be determined.   ***Notes***:   * The fact that an NSC systemic disease that could produce similar findings is present, or that other areas of the body not affected by cold injury have similar findings, does not necessarily preclude SC for residual conditions in the cold-injured areas. * When considering the possibility of intercurrent cause, always resolve reasonable doubt in the Veteran’s favor.   ***Reference***:  For more information on reasonable doubt, see [38 CFR 3.102](http://www.ecfr.gov/cgi-bin/text-idx?SID=8c8c1718ddbc2174459adeeef00bc703&node=se38.1.3_1102&rgn=div8). |

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| **III.iv.4.E.2.e****.  Separate Evaluations for Residuals of Cold Injuries** |  | The following separately diagnosed residuals of cold injuries should be evaluated under the appropriate DC   * amputations of fingers * amputations of toes * squamous cell carcinoma * scars, and * peripheral neuropathy.   All other disabilities separately diagnosed as the residual effect of a cold injury should be separately evaluated *unless* they are used to support an evaluation under [38 CFR 4.104, DC 7122](http://www.ecfr.gov/cgi-bin/text-idx?SID=8c8c1718ddbc2174459adeeef00bc703&node=se38.1.4_1104&rgn=div8).  Examples of such disabilities include, but are not limited to   * Raynaud’s phenomenon, and * muscle atrophy.   ***Note***:  Separately evaluate each part (e.g., hand, foot, ear, nose) affected by cold injuries and then combine in accordance with [38 CFR 4.25](http://www.ecfr.gov/cgi-bin/text-idx?SID=8c8c1718ddbc2174459adeeef00bc703&node=se38.1.4_125&rgn=div8) and [38 CFR 4.26](http://www.ecfr.gov/cgi-bin/text-idx?SID=8c8c1718ddbc2174459adeeef00bc703&node=se38.1.4_126&rgn=div8). |

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| **III.iv.4.E.2.f****.  Considering Cold Injuries Incurred During the Chosin Reservoir Campaign** |  | The Chosin Reservoir Campaign was conducted during the Korean War, October 1950 through December 1950, in temperatures of –20ºF or lower.  Many participants in this campaign suffered from frostbite for which they received no treatment and, as a result, there may be no STRs to directly support their claims for frostbite.    If the Veteran’s participation in the Chosin Reservoir Campaign is confirmed, concede exposure to extreme cold under the provisions of [38 U.S.C. 1154(a)](http://www.law.cornell.edu/uscode/text/38/1154). |

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| **III.iv.4.E.2.g****.  Granting SC for Cold Injuries Incurred During the Chosin Reservoir Campaign** |  | Grant SC under the provisions of [38 CFR 3.303(a)](http://www.ecfr.gov/cgi-bin/text-idx?SID=8c8c1718ddbc2174459adeeef00bc703&node=se38.1.3_1303&rgn=div8) and [38 CFR 3.304(d)](http://www.ecfr.gov/cgi-bin/text-idx?SID=8c8c1718ddbc2174459adeeef00bc703&node=se38.1.3_1304&rgn=div8) if   * the Veteran has a disability which is diagnosed as a residual of cold injury, and * there are no other circumstances to which this disability may be attributed. |

**DC 7123, Soft Tissue Sarcoma (of vascular origin)**

Soft tissue sarcomas are a relatively rare class of malignant tumors arising largely from connective tissues in the middle layer of the skin. They begin as soft tissue masses that grow, become symptomatic and often develop a hard consistency. They produce weight loss, fever and general malaise. Localized sarcomas are generally treated by surgery.

A rating of 100 percent for soft tissue sarcoma and shall continue beyond the cessation of any surgical, X-ray, antineoplastic chemotherapy or other therapeutic procedure. Six months after discontinuance of such treatment, the appropriate disability rating shall be determined by mandatory VA examination. Any change in evaluation based upon that or any subsequent examination shall be subject to the provisions of §3.105(e) of this chapter. If there has been no local recurrence or metastasis, rate on residuals.

**SECONDARY SERVICE CONNECTION**

**SUBSEQUENT TO AMPUTATION**

Service connection on a secondary basis will be granted for ischemic heart disease or other cardiovascular disease developing in a veteran who has:

* a service-connected amputation of one lower extremity at or above the knee, or
* service-connected amputations of both lower extremities at or above the ankles.

**Review Questions**

1. With complete heart block, it may be necessary to implant a pacemaker. Once a pacemaker has been inserted and the authorized convalescence period paid, the minimum evaluation is?

1. 0%
2. 10%
3. 20%
4. 30%
5. None of the above

2. The term congenital heart defect generally covers common heart conditions due to prenatal influences.

1. True
2. False

3. Evidence of cardiac hypertrophy will entitle the veteran to what minimum rating for hypertensive heart disease?

1. 10%
2. 20%
3. 30%
4. 40%

4. If hypertension is long continued arteriosclerosis of uneven distribution may occur.

1. True
2. False

5. What rating will be established for hypertension when there is a history of diastolic pressure of predominantly 100 or more and requirement for continuous medication for control?

1. 0%
2. 10%
3. 20%
4. 30%

6. Which of the following statements is correct?

1. Syphilitic heart disease is of misconduct origin and service connection cannot be granted.
2. Hypertension is a presumptive disease for service connection.
3. Buerger’s disease is a common term for thrombophlebitis.
4. None of the above

7. Phlebitis may be rated as a complication of varicose veins.

1. True
2. False

8. What is the most significant and common pathological finding in the heart after the development of rheumatic heart disease?

1. Hypertension
2. Arteriosclerosis
3. Damage to heart valves
4. Coronary occlusion

9. To evaluate post-phlebitic syndrome in both lower extremities or in both upper extremities:

1. Rate each extremity separately, then apply the bilateral factor.
2. Rate one extremity and add 10% for involvement of the second extremity.
3. Rate as severe varicose veins.
4. Rate as Raynaud’s disease.

10. Hypertension or isolated systolic hypertension must be confirmed by readings taken two or more times on at least three different days.

1. True
2. False

11. If aortic aneurysm precludes exertion, what rating will be established?

1. 20%
2. 40%
3. 60%
4. 100%

12. Which of the following conditions may occur as secondary to hypertension?

1. Nephrosclerosis
2. Coronary occlusion
3. Cerebral arteriosclerosis
4. All of the above
5. a. and b. above

13. Ischemic or other cardiovascular disease developing in a veteran who has a service connected amputation of one lower extremity at or above the knee or service connected amputation of both lower extremities at or above the ankles, shall be held to be the proximate result of the service connected amputation(s).

1. True
2. False

14. Which of the following cardiovascular diseases are subject to presumptive service connection?

1. Arteriosclerosis
2. Buerger’s disease
3. Hypertension
4. Raynaud’s disease
5. All of the above
6. a, b, and c of the above

15. Which of the following conditions may be secondary to cold injury?

1. Arthritis
2. Osteoporosis
3. Squamous cell carcinoma
4. All of the above
5. a and b above

16. What rating will be established following myocardial infarction when there is evidence of chronic congestive heart failure?

1. 30%
2. 50%
3. 70%
4. 100%
5. None of the above

17. For how many months will a veteran receive a total rating following discharge from hospitalization for heart valve replacement?

1. 1 month
2. 3 months
3. 6 months
4. 12 months

Practical Exercise

Directions: Complete the following scenarios

**Cardiovascular Fact Pattern-1**

Veteran was in the Army from 1-26-96 to 1-25-00 with honorable service.

Service medical records show:

BP 122/68---Entrance examination

BP 138/86—Discharge examination.

No diastolic blood pressure reading in service was above 88.

Cholesterol readings in service averaged 216.

Veteran claimed service connection for hypertension on 9-1-00.

VAE on 11/14/00 had BP readings of 142/94, 146/102, and 142/100.

He was diagnosed with hypertension controlled poorly with medication.

VA treatment records from 7/31/00 had BP readings of 156/102 and 144/94.

The doctor ordered immediate 3-day BP check which showed the following results.

1st day—150/100, 148/96, 148/98

2nd day—148/102, 138/98, 146,102

3rd day—155/106, 152/104, 148/100

Physician diagnosed hypertension and placed the veteran on medication.

Other VA treatment records show the following BP readings:

09/24/00---BP 136/92, 134/90

10/30/00—BP 124/84, 132/88

11/12/00—BP 144/94, 140/90

12/11/00—BP 136/90, 136/88

Should service connection be granted? If so, for which condition? What diagnostic code, evaluation and effective date? Why? If not, why not?

**Cardiovascular Fact Pattern-2**

The veteran served in the Marine Corps from 09-04-00 to 09-01-03 with honorable service.

Service medical records show:

Blood pressure at entrance 132/76

Blood pressure at discharge 144/92

The service medical records show no diagnosis of hypertension.

Service medical records show the following BP readings:

06-01-03—BP 140/92

02-12-03—BP 140/88

12-06-02—BP 136/90

10-02-02—BP 136/88

The veteran filed a claim for hypertension on 10-01-03 and was provided with a VCAA notice and development letter.

VA examination 11-04-03 showed blood pressures: 154/98, 152/96 and 152/96.

The veteran was diagnosed with hypertension and the physician recommended the veteran get an outpatient appointment to check his blood pressure.

Review of VHA electronic records system on 12-06-03 showed no outpatient treatment records for the veteran, nor did veteran submit any additional medical evidence.

Grant or deny SC? If grant, what percentage and effective date? If not, why? Any other action(s)?

**Cardiovascular Fact Pattern-3**

The veteran served in the Army from 4/1/68 to 5/3/73 with Honorable Service.

Service Medical Records show:

Blood pressure at entrance 122/66

Blood pressure at discharge 120/66

3/6/72 - The veteran reported with complaints of chest pain. The doctor noted occasional irregular heartbeat. The veteran’s chest pain eventually stopped. He was told to report to sick call if it happened again.

9/2/72 - The veteran reported with complaints of shortness of breath. He stated his chest and heartbeat “feels strange.” Examiner again noted periodic irregular heartbeat. The veteran was given cardiac appointment; however, he did not show up for the appointment.

11/2/72 - The veteran reported with shortness of breath and chest pain. He was hospitalized for observation. The doctor noted that arrhythmia was persistent and recommended veteran be transferred for complete work up and monitoring. Monitor showed periodic arrhythmia, but the monitoring was never completed.

The veteran’s separation examination shows no cardiac problems.

Veteran filed a claim for service connection for heart problems on 6/4/00. A letter was sent to veteran on July 1, 2000 asking him to furnish medical evidence of treatment for heart problems from the time of his discharge to the present. A VA examination was also requested.

The veteran furnished record of treatment dated 4/2/00 from National Hospital. This record shows he was hospitalized April 2, 2000 with severe chest pain, fatigue and shortness of breath. Holter monitor showed long strings of irregular heartbeats. Medication was provided and the arrhythmias decreased. He was released 5/19/00.

VA examination dated 7/25/00 showed an irregular heartbeat. The examiner recommended against a treadmill test. Blood pressure was 140/86. METS were estimated at 5 to 6. The diagnosis was ventricular arrhythmias.

Question: Is service connection warranted? If so, what diagnostic code and what percentage? If not, why? Any other action(s)?

**Cardiovascular Fact Pattern-4**

(A) The veteran was in the Navy from 04-02-91 through 06-19-00 with honorable service.

Enlistment examination was negative for any pre-existing heart condition or hypertension. Blood pressure on enlistment examination was noted to be 120/78. The veteran was diagnosed in service with arteriosclerotic heart disease and severe angina. Medical evaluation board recommended discharge with severance pay for arteriosclerotic heart disease/hypertension.

Blood pressure readings from the discharge exam were: 160/102 & 156/102.

Physical evaluation board assigned: 7005 ASHD 30%

7101 HTN 10%

The veteran filed a claim for a heart condition and hypertension on 01-31-01.

A VA physical examination dated 11-04-00 noted blood pressures: 158/98, 160/100, & 160/102. The examiner noted that the veteran is on medication for control of hypertension. The veteran has chest pain on medium exertion, shortness of breath, and dyspnea. The heart was not enlarged. The veteran was noted to have METS of 4 to 5.

The examiner also noted the veteran had pain on walking 100 yards in the left leg and, if he continued walking, at about 175 to 200 yards, pain is noted in the right leg also. Pain of both extremities resolved with rest.

Should SC be granted? If so, what diagnostic code(s), percentage(s) and effective date(s)?

If not, why not?

(B) Assume that the veteran’s enlistment examination was completely negative for any cardiovascular conditions to include elevated blood pressure. Also assume that the veteran had no findings of any cardiovascular disabilities or elevated blood pressure while on active duty. Also assume that the veteran was first noted to have a diagnosis of arteriosclerotic heart disease and hypertension on 12-15-00. He filed his claim on 01-31-01.

Should SC be granted or denied?

**Cardiovascular Fact Pattern-5**

Veteran served 4/9/50 to 5/6/52 with honorable Service.

BP at entrance: 120/60

BP at discharge: 120/60

Served with 1st Marine Division, Korean Service from 9/2/50 to 6/5/51, Infantry Rifleman.

The veteran filed a claim for residuals of cold injury.

VAE: Examination report notes the veteran served in retreat from the Chosin Reservoir area, Fall of 1950 and reports cold injuries to hands, feet, face and ears. Veteran reports pain in both feet and redness of the feet when they are immersed in cool water. Physical examination findings note an antalgic gait, no hair on the feet, and nail abnormalities.

The veteran also complained of pain in his hands during cold weather. No changes were noted on examination. The veteran complained of severe pain during cold weather for the face and ears, no physical findings were observed by the examiner. The examiner diagnosed cold weather injury residuals of the feet, hands, and the face and ears.

Is SC appropriate? If so, please discuss the evaluation.