

**STAT Cardiac Testing is available for inpatients only.**

**ECHOCARDIOGRAM**

A (transthoracic) echocardiogram (2D Echo) is a 2-dimensional graphic of the heart's movement, valves and chambers using ultrasound (high-frequency sound waves). Doppler ultrasound and Color Doppler ultrasound is also utilized to visualize the blood flow across the heart valves.

INDICATIONS

- Symptoms of suspected cardiac etiology
  - Chest pain
  - LV function
  - Murmurs & valvular heart disease
  - Systemic hypertension
  - A-fib
- Evaluation of suspected complication of myocardial ischemia/infarction
- Initial evaluation of murmur for whom there is a reasonable suspicion of valvular or structural heart disease
- Initial evaluation of prosthetic valve for establishment of baseline after placement
- Initial evaluation of suspected infective endocarditis with positive blood cultures or new murmur
- Evaluation of cardiac mass (suspected tumor or thrombus)
- Evaluation of pericardial conditions i.e. pericardial effusion, constrictive pericarditis
- Initial evaluation of known or suspected cardiomyopathy
- Known or suspected Marfan disease for evaluation of proximal aortic root &/or mitral valve
- Assessment of known or suspected adult congenital heart disease

ORDER

- Echo 2D Complete CPT Code 93306 (or "Echo 2D Complete Pediatric" if the patient is 17 years old and younger)
- Patients must have a written prescription for the test
- High quality ultrasound images may be difficult to obtain due to certain patient conditions (medical and/or physical). Therefore, if certain criteria are met/visualized during the echo, the Cardiac Ultrasound Technologist may elect to add "contrast" to the echocardiogram to enhance the images. A PCP or PCP office does NOT order contrast, it will be added by protocol if needed.

INSTRUCTIONS

Patient instructions are outlined on the LVHN Learn More About that you may give the patient.

- Patients should take all heart medication as usual on the day of the test
- Patients may eat and drink as usual the day of the test
- Patients will be asked to change into a hospital gown the day of the test
- Patients must bring insurance card and photo ID for registration/check-in the day of the test
- Patients should call if they need to cancel the appointment

## STRESS ECHO

(Note: There are 2 types of Stress Echo: Exercise Stress Echo or Dobutamine Stress Echo)

### 1. EXERCISE STRESS ECHO

An Exercise Stress Echocardiogram Is a test that visualizes the heart function before and after exertion (exercise). An echocardiogram is performed at rest to record the heart's function/movement. Then the patient is ask to walk on a treadmill to increase the heart rate. The speed and incline gradually increases (about every 3 minutes) until the target heart rate is met. An echocardiogram is performed immediately following the exercise to record the heart's function/movement with exercise. Doppler ultrasound and Color Doppler ultrasound is also utilized to visualize the blood flow across the heart valves. The Cardiologist will review both the resting and exercise images and compare functionality.

For an EXERCISE Stress Echo a patient must be ABLE TO WALK briskly on an incline without assistive devices.

#### INDICATIONS

- Initial evaluation of chest pain syndrome or anginal equivalent
- Worsening symptoms: CAD, abnormal catheterization OR abnormal prior stress imaging study
- Evaluation of cardiac etiology of exertional dyspnea
- Preoperative evaluation/risk assessment
- Evaluation/risk assessment post-revascularization
- Ischemic cardiomyopathy, assessment of viability/ischemia
- Evaluation of heart valve stenosis severity

#### ORDER

- Echo 2D Stress Exercise CPT Code 93351
- Patients must have a written prescription for the test
- High quality ultrasound images may be difficult to obtain due to certain patient conditions (medical and/or physical). Therefore, if certain criteria are met/visualized during the echo, the Cardiac Ultrasound Technologist may elect to add "contrast" to the echocardiogram to enhance the images. A PCP or PCP office does NOT order contrast, it will be added by protocol if needed.

#### INSTRUCTIONS

Patient instructions are outlined on the LVHN Learn More About that you may give the patient.

- **DECISION POINT:** To have patient HOLD beta blocker, or not. The (exercise) target heart rate may be difficult to achieve if beta blocker is not held, however, PCP needs to determine what is most appropriate for the patient according to patient's medical condition(s)
- Patients should NOT eat 4 hours before their test (note: in some instances the testing department may alter this instruction, for example if the patient is diabetic)
- Patients should NOT eat or drink anything with caffeine 12 hours before their test (note: in some instances this is altered, for example for an inpatient. Then a minimum of 1 hour is required)
- Patients MAY drink non-alcoholic non-caffeine liquids as usual
- **DECISION POINT:** If the patient is diabetic, how the patient should take their diabetic medication the day of the test
- Patients should STOP/REMOVE nitro (nitroglycerin) patch or nitro paste at least 2 HOURS before the test
- Patients should NOT smoke at least 4 hours before the test

- If patients use an Inhaler they SHOULD bring their Inhaler with them to the test
- Patients SHOULD wear appropriate shoes and clothing for walking on a treadmill
- Patients should NOT use gels, oils, lotions, powders the day of the test
- Patients MUST bring insurance card and photo ID for registration/check-in the day of the test
- Patients SHOULD call if they need to cancel the appointment

## 2. DOBUTAMINE STRESS ECHO

A Dobutamine Stress Echocardiogram is a test that visualizes the heart function before and after "exertion" (heart rate increase from Dobutamine medication). A Dobutamine stress echo is ordered for a patient that uses assistive devices to walk or cannot walk briskly on an incline (treadmill) safely.

An echocardiogram is performed at rest to record the heart's function/movement. Then the patient is administered Dobutamine through an IV that is started at the time of the test, to increase the heart rate until the target heart rate is met. An echocardiogram is performed immediately following target heart rate being met, to record the heart's function/movement with "exertion". Doppler ultrasound and Color Doppler ultrasound is also utilized to visualize the blood flow across the heart valves. The Cardiologist will review both the resting and "exercise" images and compare functionality.

### INDICATIONS

- A Dobutamine stress echo is ordered for a patient that uses assistive devices to walk or cannot walk briskly and on an incline on a treadmill

### ORDER

- Echo 2D Stress Dobutamine CPT Code 93351
- Patients must have a written prescription for the test
- High quality ultrasound images may be difficult to obtain due to certain patient conditions (medical and/or physical). Therefore, if certain criteria are met/visualized during the echo, the Cardiac Ultrasound Technologist may elect to add "contrast" to the echocardiogram to enhance the images. A PCP or PCP office does NOT order contrast, it will be added by protocol if needed.

### INSTRUCTIONS

- Patient instructions are outlined on the LVHN Learn More About that you may give the patient.
- DECISION POINT: To have patient HOLD beta blocker, or not. The (exercise) target heart rate may be difficult to achieve if beta blocker is not held, however, PCP needs to determine what is most appropriate for the patient according to patient's medical condition(s)
- Patients should NOT eat 4 hours before their test (note: in some instances the testing department may alter this instruction for example, if the patient is diabetic)
- Patients should NOT eat or drink anything with caffeine 12 hours before their test (note: in some instances this is altered for example for an inpatient. Then a minimum of 1 hour is required)
- Patients MAY drink non-alcoholic non-caffeine liquids as usual
- DECISION POINT: IF the patient is diabetic, how the patient should take their diabetic medication the day of the test
- Patients should STOP/REMOVE nitro (nitroglycerin) patch or nitro paste at least 2 HOURS before the test
- Patients should NOT smoke at least 4 hours before the test
- If patients use an Inhaler they SHOULD bring their Inhaler with them to the test

- Patients should NOT use gels, oils, lotions, powders the day of the test
- Patients MUST bring insurance card and photo ID for registration/check-in the day of the test
- Patients SHOULD call if they need to cancel the appointment

## TRANSESOPHAGEAL ECHOCARDIOGRAM (TEE)

A TEE (Transesophageal Echocardiogram) uses sound waves to create an image of the heart and its blood vessels. A probe with ultrasound transducer is passed into the esophagus and records an image, while the patient is under conscious sedation. A TEE can provide clearer images for hard to view locations not easily seen with standard 2D Echocardiography or for certain pathology such as abnormal tissue or mass (from bacteria, virus, fungus or cancer), abscess and clots, or quantification of regurgitation and stenosis.

### INDICATIONS

- Evaluation of potential cardiac source of embolus
- Evaluation of suspected acute aortic pathology including dissection/transection
- To determine mechanism of regurgitation and determine suitability of valve repair
- To diagnose/manage endocarditis (e.g., bacteremia, especially staph bacteremia or fungemia)
- Persistent fever in patient with intracardiac device
- Evaluation of atrial fibrillation/flutter to facilitate clinical decision-making with regards to anticoagulation and/or cardioversion and/or radiofrequency ablation

### ORDER

- Echo TEE CPT Code 93312
- Patients must have a written prescription for the test
- If the patient also requires a cardioversion at the same time as the TEE, the order is: Echo TEE With Cardioversion CPT Code 93312 & 92960
- If certain criteria are met/visualized during the TEE, the Cardiologist may elect to add "contrast" to enhance the images. A PCP or PCP office does NOT order contrast, it will be added by protocol if needed.

### INSTRUCTIONS

- Patient instructions are outlined on the LVHN Learn More About that you may give the patient.
- Patients may NOT eat or drink anything after midnight on the day before the test
- Patients should NOT take diabetic medication the day of the test
- If patient checks blood sugar, they SHOULD bring the blood sugar result for the nurse to review the day of the test
- Patients SHOULD take all heart medication as usual on the day of the test with a sip of water
- If patient takes a blood thinner, they SHOULD obtain a coagulation test before the TEE
- Patients should NOT smoke at least 4 hours before the test
- Patients should NOT use gels, oils, lotions, powders the day of the test
- Patients MUST bring insurance card and photo ID for registration/check-in the day of the test
- Patients SHOULD call if they need to cancel the appointment
- Patients MUST have a driver the day of the test due to conscious sedation

## STRESS TEST

(Note: There are 3 types of Stress Tests: Exercise Stress, Exercise Nuclear Stress, or Pharmacological Nuclear Stress)

### 1. EXERCISE STRESS TEST (sometimes called TREADMILL STRESS TEST)

An Exercise or Treadmill Stress Test records heart rate, blood pressure and electrocardiogram (ECG) response during exercise. It is indicated for diagnosis and prognosis of cardiovascular disease, specifically CAD. This is the initial procedure of choice for patients with a normal or near-normal resting electrocardiogram who are capable of adequate exercise. The patient is asked to walk on a treadmill to increase the heart rate. The speed and incline gradually increases (about every 3 minutes) until the target heart rate is met.

For an EXERCISE or TREADMILL Stress Test a patient must be ABLE TO WALK briskly on an incline without assistive devices.

#### INDICATIONS

- This is the initial procedure of choice for patients with a normal or near-normal resting electrocardiogram who are capable of adequate exercise
- Diagnosis and prognosis of cardiovascular disease, specifically CAD
- Evaluation of functional capacity
- Evaluation of effects of therapy/interventions

#### ORDER

- Stress Test Exercise CPT Code 93017
- Patients must have a written prescription for the test

#### INSTRUCTIONS

- Patient instructions are outlined on the LVHN Learn More About that you may give the patient.
- DECISION POINT: To have patient HOLD beta blocker, or not. The (exercise) target heart rate may be difficult to achieve if beta blocker is not held, however, PCP needs to determine what is most appropriate for patient according to medical condition(s)
- Patients should NOT eat 4 hours before their test (note: in some instances the testing department may alter this instruction, for example if the patient is diabetic)
- Patients should NOT eat or drink anything with caffeine 12 hours before their test (note: in some instances this is altered, for example for an inpatient. Then a minimum of 1 hour is required)
- Patients MAY drink non-alcoholic non-caffeine liquids as usual
- DECISION POINT: IF the patient is diabetic, how the patient should take their diabetic medication the day of the test
- Patients should STOP/REMOVE nitro (nitroglycerin) patch or nitro paste at least 2 HOURS before the test
- Patients should NOT smoke at least 4 hours before the test
- If patients use an inhaler they SHOULD bring their inhaler with them to the test
- Patients SHOULD wear appropriate shoes and clothing for walking on a treadmill
- Patients should NOT use gels, oils, lotions, powders the day of the test
- Patients MUST bring insurance card and photo ID for registration/check-in the day of the test
- Patients SHOULD call if they need to cancel the appointment

## 2. EXERCISE NUCLEAR STRESS TEST

An Exercise Nuclear Stress Test or myocardial perfusion imaging (MPI) records heart rate, blood pressure and electrocardiogram response with exercise. It is used to evaluate blood flow to the heart. It is indicated if you suspect CAD or if an Exercise or Treadmill Stress Test did not pinpoint the cause of symptoms, such as chest pain or shortness of breath. During the test a small amount of radioactive tracer is injected intravenously into the bloodstream. A gamma camera detects the radiation released by the tracer to produce computer images of the heart. Combined with exercise, the test can help determine if there is adequate blood flow to the heart during activity vs. at rest, and if reduced blood flow is associated with ischemia or scar. During the exercise, the patient will walk on a treadmill to increase the heart rate. The speed and incline gradually increases (about every 3 minutes) until the target heart rate is met.

This is a "3 part test", that is resting images are obtained under the gamma camera, then the patient is exercised, then images are obtained under the gamma camera following exercise. The Radiologist or Cardiologist will look at both the resting and exercise images for comparison.

- For an EXERCISE NUCLEAR STRESS TEST a patient must be ABLE TO WALK briskly on an incline without assistive devices.
- The patient should also realize they will need to lay on a narrow hard table under the gamma camera for resting images and for images following the exercise portion of the test (this may be a problem if they are claustrophobic).
  - An option for the claustrophobic is to provide medication for them, or order alternative test Exercise Stress Echo.
- The patients should also realize this test takes about 3 to 5 hours to complete.

### INDICATIONS

- Diagnosis of coronary artery disease -Presence -Location (coronary territory) -Severity
- Assessment of the impact of coronary stenosis on regional perfusion
- Distinguish viable ischemic myocardium from scar
- Risk assessment and stratification -Post myocardial infarction -Pre-operative for major surgery in patients who may be at risk for coronary events
- Monitor treatment effect -After coronary revascularization -Medical therapy

### ORDER

- Stress Test Nuclear Exercise CPT Code 78452
- Alternative test is Exercise Stress Echo CPT Code 93351
- Patients must have a written prescription for the test

### INSTRUCTIONS

- Patient instructions are outlined on the LVHN Learn More About that you may give the patient.
- DECISION POINT: To have patient HOLD beta blocker, or not. The (exercise) target heart rate may be difficult to achieve if beta blocker is not held, however, PCP needs to determine what is most appropriate for the patient according to patient's medical condition(s)
- Patients should NOT eat 4 hours before their test (note: in some instances the testing department may alter this instruction for example, if the patient is diabetic)
- Patients should NOT eat or drink anything with caffeine 12 hours before their test (note: in some instances this is altered for example for an inpatient. Then a minimum of 1 hour is required)



- Patients MAY drink non-alcoholic non-caffeine liquids as usual
- **DECISION POINT:** IF the patient is diabetic, how the patient should take their diabetic medication on the day of the test.
- Patients should **STOP/REMOVE** nitro (nitroglycerin) patch or nitro paste at least 2 HOURS before the test
- Patients should **NOT** smoke at least 4 hours before the test.
- If patients use an Inhaler they **SHOULD** bring their Inhaler with them to the test
- Patients **SHOULD** wear appropriate shoes and clothing for walking on a treadmill
- Patients should **NOT** use gels, oils, lotions, powders the day of the test
- Patients **MUST** bring Insurance card and photo ID for registration/check-in the day of the test
- Patients **SHOULD** call If they need to cancel the appointment

### **3. PHARMACOLOGICAL NUCLEAR STRESS TEST (LEXISCAN NUCLEAR STRESS TEST or DOBUTAMINE NUCLEAR STRESS TEST)**

(Note: Lexiscan is utilized at LVHN unless there is a clinical reason to use Dobutamine)

A Lexiscan Nuclear Stress Test or a Dobutamine Nuclear Stress Test records heart rate, blood pressure and electrocardiogram (ECG) response with "exertion" (heart rate Increase from the medication Lexiscan or the medication Dobutamine). It is ordered for a patient that uses assistive devices to walk or cannot walk briskly on an Incline (treadmill) safely. It is indicated if you suspect CAD or patient has symptoms such as chest pain or shortness of breath or if patient has a pacemaker or LBBB (Left bundle branch block). During the test a small amount of radioactive tracer is Injected Intravenously Into the bloodstream. A gamma camera detects the radiation released by the tracer to produce computer Images of the heart. Combined with "exertion" (the heart rate Increase from the medication Lexiscan or the medication Dobutamine), the test can help determine If there Is adequate blood flow to the heart with heart rate Increase vs. at rest, and If reduced blood flow Is associated with Ischemia or scar. Lexiscan or Dobutamine Is administered through an IV and Increases blood flow through the arteries of the heart. Lexiscan or Dobutamine Is administered when patients are **UNABLE** to exercise adequately.

This Is a "3 part test", that Is resting Images are obtained under the gamma camera, then the patient's heart rate is increased, then Images are obtained under the gamma camera following "exertion". The Radiologist or Cardiologist will look at both the resting and heart rate Increase Images for comparison.

- The patient should also realize they will need to lay on a narrow hard table under the gamma camera for resting Images and for Images following the "exertion" portion of the test (this may be a problem if they are claustrophobic).
  - An option for the claustrophobic is to provide medication for them, or order alternative test Echo 2D Stress Dobutamine.
- The patients should also realize this test takes about 3 to 5 hours to complete.

#### **INDICATIONS**

- Patients that use assistive devices to walk or cannot walk briskly and on an incline on a treadmill.
- Suspect CAD
- Symptoms such as chest pain or shortness of breath
- Patient has a pacemaker
- Patient has LBBB (left bundle branch block)

#### ORDER

- Stress Test Nuclear Pharmacological CPT Code 78452 (Note: LVHN uses Stress Test Nuclear Lexiscan unless there are specific reasons to use Stress Test Nuclear Dobutamine)
  - Alternative test is Echo 2D Stress Dobutamine CPT Code 93351
- Patients **MUST** have a written prescription for the test

#### INSTRUCTIONS

Patient instructions are outlined on the LVHN Learn More About that you may give the patient.

- **DECISION POINT:** To have patient **HOLD** beta blocker, or not. The (exercise) target heart rate may be difficult to achieve if beta blocker is not held, however, PCP needs to determine what is most appropriate for the patient according to patient's medical condition(s)
- Patients should **NOT** eat 4 hours before their test (note: in some instances the testing department may alter this instruction for example, if the patient is diabetic)
- Patients should **NOT** eat or drink anything with caffeine 12 hours before their test (note: in some instances this is altered for example for an inpatient. Then a minimum of 1 hour is required)
- Patients **MAY** drink non-alcoholic non-caffeine liquids as usual
- **DECISION POINT:** IF the patient is diabetic, how the patient should take their diabetic medication on the day of the test
- Patients should **STOP/REMOVE** nitro (nitroglycerin) patch or nitro paste at least 2 HOURS before the test
- Patients should **NOT** smoke at least 4 hours before the test
- If patients use an inhaler they **SHOULD** bring their inhaler with them to the test
- Patients should **NOT** use gels, oils, lotions, powders the day of the test
- Patients **MUST** bring insurance card and photo ID for registration/check-in the day of the test
- Patients **SHOULD** call if they need to cancel the appointment
- For Lexiscan Nuclear Stress Test: Patients should **DISCONTINUE** the use of medication that contains Dipyridamole (Persantine Aggrenox) 2 days before the test
- For Lexiscan Nuclear Stress Test: Patients should **DISCONTINUE** the use of medication that contains xanthine or theophylline for 12 hours before the test

## HOLTER MONITOR

A holter monitor is a battery-operated portable device that measures and records heart's activity (ECG) continuously for 24 hours or 48 hours.

**NOTE:** When scheduling appointment for the holter monitor hook-up, the patient must be able to return the holter monitor, or have the holter monitor disconnected, the day following the hook-up appointment (for 24 hour) or 2 days from the hook-up appointment (for 48 hour).

The patient should also realize:

- They will need to sign a form stating they are responsible to return the monitor or they will be billed for the cost of the monitor (to prevent "theft"/non-return of the monitor)
- They will **NOT** be able to shower while monitor is being worn



ORDER

- Holter Monitor-24 Hour CPT Code 93225 or
- Holter Monitor-48 Hour CPT Code 93227
- Patients MUST have a written prescription for the test

INSTRUCTIONS

- Patients SHOULD take all heart medication as usual on the day of the test Patients MAY eat and drink as usual the day of the test Patients should NOT use gels, oils, lotions, powders the day of the test Patients will NOT be able to shower while the monitor is being worn/during testing time Patients MUST bring insurance card and photo ID for registration/check-in the day of the test
- Patients SHOULD call if they need to cancel the appointment

Note: Although similar, a Holter Monitor is different from an Event Monitor or Event Recorder. A Holter Monitor is worn 24 or 48 hours. An Event Monitor/Recorder is designed to be worn for a longer period of time and some can be worn up to one month. With an Event Monitor/Recorder often it is the patient that begins the recording when they experience symptoms. Currently Event Monitors are only offered through LVPG Cardiology.