

## Echocardiogram - Pre-operative - Full Clinical Guideline

Reference no.: CG-T/2023/047

### 1. Aim and Purpose

#### Aim

To target echocardiography to patients who will benefit from having this diagnostic test

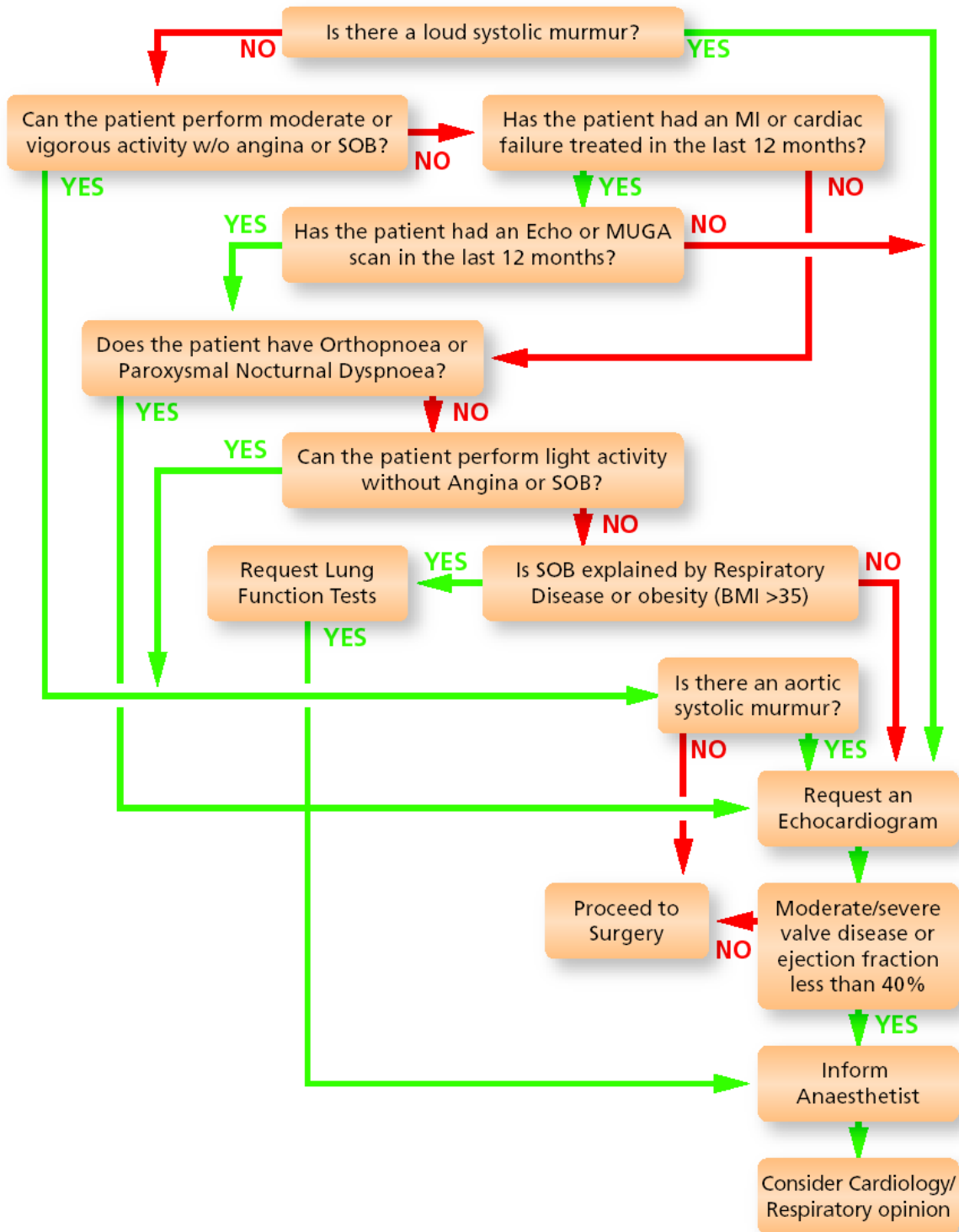
#### Purpose and Scope

To enable the echocardiogram to be delivered to those patients who are clinically at risk of peri-operative complications. To prevent inappropriate request of echocardiogram for those patients whose clinical management would not be affected by having a reported echocardiography.

2. Main body of Guidelines

DERBY HOSPITALS NHS FOUNDATION TRUST

**GUIDELINES ON REQUESTING PRE-OPERATIVE ECHOCARDIOGRAM FOR ASSESSMENT UNIT STAFF**



G1257402.06

**3. References (including any links to NICE Guidance etc.)**

Pre-existing Transthoracic Echocardiography Guidelines

**4. Documentation Controls**

Development of Guideline:	Consultant Cardiologist (Lead) Consultant Anaesthetist Service Manager (Medicine)
Consultation with:	
Approved By:	8/3/18 - Anaesthetics 12/4/18 - Division of Diagnostics, Surgery and Anaesthetics Review no change – Cardiology Medicine division – 1yr Approval to make cross site
Review Date:	Dec 2024
Key Contact:	Consultant Anaesthetics (Alison Brewer)

**5. Appendices**

*Appendix 1: LIGHT-INTENSITY ACTIVITIES:*

Walking slowly

Golf, powered cart

Swimming, slow treading

Gardening or pruning

Bicycling, very light effort

Dusting or vacuuming

Conditioning exercise, light stretching or warm up

Moderate-Intensity Activities:

Walking briskly

Golf, pulling or carrying clubs

Swimming, recreational

Mowing lawn, power motor

Tennis, doubles

Bicycling 5 to 9 mph, level terrain, or with a few hills

Scrubbing floors or washing windows

Weight lifting, Nautilus machines or free weights

Vigorous-Intensity Activities:

Racewalking, jogging or running

Swimming laps

Mowing lawn, hand mower

Tennis, singles

Bicycling more than 10 mph, or on steep uphill terrain

Moving or pushing furniture

Circuit training

## General Physical Activities Defined by Level of Intensity

The following is in accordance with CDC and ACSM guidelines.

<b>Moderate activity<sup>+</sup></b> 3.0 to 6.0 METs* (3.5 to 7 kcal/min)	<b>Vigorous activity<sup>+</sup></b> Greater than 6.0 METs* (more than 7 kcal/min)
Walking at a moderate or brisk pace of 3 to 4.5 mph on a level surface inside or outside, such as <ul style="list-style-type: none"> <li>• Walking to class, work, or the store;</li> <li>• Walking for pleasure;</li> <li>• Walking the dog; or</li> <li>• Walking as a break from work.</li> </ul> Walking downstairs or down a hill Racewalking—less than 5 mph Using crutches Hiking Roller skating or in-line skating at a leisurely pace	Racewalking and aerobic walking—5 mph or faster Jogging or running Wheeling your wheelchair Walking and climbing briskly up a hill Backpacking Mountain climbing, rock climbing, rapelling Roller skating or in-line skating at a brisk pace
Bicycling 5 to 9 mph, level terrain, or with few hills Stationary bicycling—using moderate effort	Bicycling more than 10 mph or bicycling on steep uphill terrain Stationary bicycling—using vigorous effort
Aerobic dancing—high impact Water aerobics	Aerobic dancing—high impact Step aerobics Water jogging Teaching an aerobic dance class
Calisthenics—light Yoga Gymnastics General home exercises, light or moderate effort, getting up and down from the floor Jumping on a trampoline Using a stair climber machine at a light-to-moderate pace Using a rowing machine—with moderate effort	Calisthenics—push-ups, pull-ups, vigorous effort Karate, judo, tae kwon do, jujitsu Jumping rope Performing jumping jacks Using a stair climber machine at a fast pace Using a rowing machine—with vigorous effort Using an arm cycling machine—with vigorous effort
Weight training and bodybuilding using free weights, Nautilus- or Universal-type weights	Circuit weight training
Boxing—punching bag	Boxing—in the ring, sparring Wrestling—competitive
Ballroom dancing Line dancing Square dancing Folk dancing Modern dancing, disco Ballet	Professional ballroom dancing—energetically Square dancing—energetically Folk dancing—energetically Clogging
Table tennis—competitive Tennis—doubles	Tennis—singles Wheelchair tennis
Golf, wheeling or carrying clubs	-----
Softball—fast pitch or slow pitch Basketball—shooting baskets Coaching children's or adults' sports	Most competitive sports Football game Basketball game Wheelchair basketball Soccer Rugby Kickball Field or rollerblade hockey Lacrosse

Volleyball—competitive	Beach volleyball—on sand court
Playing Frisbee Juggling Curling Cricket—batting and bowling Badminton Archery (nonhunting) Fencing	Handball—general or team Racquetball Squash
Downhill skiing—with light effort Ice skating at a leisurely pace (9 mph or less) Snowmobiling Ice sailing	Downhill skiing—racing or with vigorous effort Ice-skating—fast pace or speedskating Cross-country skiing Sledding Tobogganing Playing ice hockey
Swimming—recreational Treading water—slowly, moderate effort Diving—springboard or platform Aquatic aerobics Waterskiing Snorkeling Surfing, board or body	Swimming—steady paced laps Synchronized swimming Treading water—fast, vigorous effort Water jogging Water polo Water basketball Scuba diving
Canoeing or rowing a boat at less than 4 mph Rafting—whitewater Sailing—recreational or competition Paddle boating Kayaking—on a lake, calm water Washing or waxing a powerboat or the hull of a sailboat	Canoeing or rowing—4 or more mph Kayaking in whitewater rapids
Fishing while walking along a riverbank or while wading in a stream—wearing waders	----
Hunting deer, large or small game Pheasant and grouse hunting Hunting with a bow and arrow or crossbow—walking	----
Horseback riding—general Saddling or grooming a horse	Horsebackriding—trotting, galloping, jumping, or in competition Playing polo
Playing on school playground equipment, moving about, swinging, or climbing Playing hopscotch, 4-square, dodgeball, T-ball, or tetherball Skateboarding Roller-skating or in-line skating—leisurely pace	Running Skipping Jumping rope Performing jumping jacks Roller-skating or in-line skating—fast pace
Playing instruments while actively moving; playing in a marching band; playing guitar or drums in a rock band Twirling a baton in a marching band Singing while actively moving about—as on stage or in church	Playing a heavy musical instrument while actively running in a marching band
Gardening and yard work: raking the lawn, bagging grass or leaves, digging, hoeing, light shoveling (less than 10 lbs per minute), or weeding while standing or bending Planting trees, trimming shrubs and trees, hauling branches, stacking wood Pushing a power lawn mower or tiller	Gardening and yard work: heavy or rapid shoveling (more than 10 lbs per minute), digging ditches, or carrying heavy loads Felling trees, carrying large logs, swinging an ax, hand-splitting logs, or climbing and trimming trees Pushing a nonmotorized lawn mower
Shoveling light snow	Shoveling heavy snow
Moderate housework: scrubbing the floor or	Heavy housework: moving or pushing heavy

<p>bathtub while on hands and knees, hanging laundry on a clothesline, sweeping an outdoor area, cleaning out the garage, washing windows, moving light furniture, packing or unpacking boxes, walking and putting household items away, carrying out heavy bags of trash or recyclables (e.g., glass, newspapers, and plastics), or carrying water or firewood</p> <p>General household tasks requiring considerable effort</p>	<p>furniture (75 lbs or more), carrying household items weighing 25 lbs or more up a flight or stairs, or shoveling coal into a stove</p> <p>Standing, walking, or walking down a flight of stairs while carrying objects weighing 50 lbs or more</p>
<p>Putting groceries away—walking and carrying especially large or heavy items less than 50 lbs.</p>	<p>Carrying several heavy bags (25 lbs or more) of groceries at one time up a flight of stairs</p> <p>Grocery shopping while carrying young children <i>and</i> pushing a full grocery cart, or pushing two full grocery carts at once</p>
<p>Actively playing with children—walking, running, or climbing while playing with children</p> <p>Walking while carrying a child weighing less than 50 lbs</p> <p>Walking while pushing or pulling a child in a stroller or an adult in a wheelchair</p> <p>Carrying a child weighing less than 25 lbs up a flight of stairs</p> <p>Child care: handling uncooperative young children (e.g., chasing, dressing, lifting into car seat), or handling several young children at one time</p> <p>Bathing and dressing an adult</p>	<p>Vigorously playing with children—running longer distances or playing strenuous games with children</p> <p>Racewalking or jogging while pushing a stroller designed for sport use</p> <p>Carrying an adult or a child weighing 25 lbs or more up a flight of stairs</p> <p>Standing or walking while carrying an adult or a child weighing 50 lbs or more</p>
<p>Animal care: shoveling grain, feeding farm animals, or grooming animals</p> <p>Playing with or training animals</p> <p>Manually milking cows or hooking cows up to milking machines</p>	<p>Animal care: forking bales of hay or straw, cleaning a barn or stables, or carrying animals weighing over 50 lbs</p> <p>Handling or carrying heavy animal-related equipment or tack</p>
<p>Home repair: cleaning gutters, caulking, refinishing furniture, sanding floors with a power sander, or laying or removing carpet or tiles</p> <p>General home construction work: roofing, painting inside or outside of the house, wall papering, scraping, plastering, or remodeling</p>	<p>Home repair or construction: very hard physical labor, standing or walking while carrying heavy loads of 50 lbs or more, taking loads of 25 lbs or more up a flight of stairs or ladder (e.g., carrying roofing materials onto the roof), or concrete or masonry work</p>
<p>Outdoor carpentry, sawing wood with a power saw</p>	<p>Hand-sawing hardwoods</p>
<p>Automobile bodywork</p> <p>Hand washing and waxing a car</p>	<p>Pushing a disabled car</p>
<p>~Occupations that require extended periods of walking, pushing or pulling objects weighing less than 75 lbs, standing while lifting objects weighing less than 50 lbs, or carrying objects of less than 25 lbs up a flight of stairs</p> <p>Tasks frequently requiring moderate effort and considerable use of arms, legs, or occasional total body movements.</p> <p>For example:</p> <ul style="list-style-type: none"> <li>• Briskly walking on a level surface while carrying a suitcase or load weighing up to 50 lbs</li> <li>• Maid service or cleaning services</li> </ul>	<p>~Occupations that require extensive periods of running, rapid movement, pushing or pulling objects weighing 75 lbs or more, standing while lifting heavy objects of 50 lbs or more, walking while carrying heavy objects of 25 lbs or more</p> <p>Tasks frequently requiring strenuous effort and extensive total body movements.</p> <p>For example:</p> <ul style="list-style-type: none"> <li>• Running up a flight of stairs while carrying a suitcase or load weighing 25 lbs or more</li> <li>• Teaching a class or skill requiring</li> </ul>

<ul style="list-style-type: none"> <li>• Waiting tables or institutional dishwashing</li> <li>• Driving or maneuvering heavy vehicles (e.g., semi-truck, school bus, tractor, or harvester)—not fully automated and requiring extensive use of arms and legs</li> <li>• Operating heavy power tools (e.g., drills and jackhammers)</li> <li>• Many homebuilding tasks (e.g. electrical work, plumbing, carpentry, dry wall, and painting)</li> <li>• Farming—feeding and grooming animals, milking cows, shoveling grain; picking fruit from trees, or picking vegetables</li> <li>• Packing boxes for shipping or moving</li> <li>• Assembly-line work—tasks requiring movement of the entire body, arms or legs with moderate effort</li> <li>• Mail carriers—walking while carrying a mailbag</li> <li>• Patient care—bathing, dressing, and moving patients or physical therapy</li> </ul>	<p>active and strenuous participation, such as aerobics or physical education instructor</p> <ul style="list-style-type: none"> <li>• Firefighting</li> <li>• Masonry and heavy construction work</li> <li>• Coal mining</li> <li>• Manually shoveling or digging ditches</li> <li>• Using heavy nonpowered tools</li> <li>• Most forestry work</li> <li>• Farming—forking straw, baling hay, cleaning barn, or poultry work</li> <li>• Moving items professionally</li> <li>• Loading and unloading a truck</li> </ul>
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**Source:** U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition and Physical Activity. *Promoting physical activity: a guide for community action*. Champaign, IL: Human Kinetics, 1999. (Table adapted from Ainsworth BE, Haskell WL, Leon AS, et al. Compendium of physical activities: classification of energy costs of human physical activities. *Medicine and Science in Sports and Exercise* 1993;25(1):71-80. Adapted with technical assistance from Dr. Barbara Ainsworth.)

\* The ratio of exercise metabolic rate. One MET is defined as the energy expenditure for sitting quietly, which, for the average adult, approximates 3.5 ml of oxygen uptake per kilogram of body weight per minute (1.2 kcal/min for a 70-kg individual). For example, a 2-MET activity requires two times the metabolic energy expenditure of sitting quietly.

+ For an average person, defined here as 70 kilograms or 154 pounds. The activity intensity levels portrayed in this chart are most applicable to men aged 30 to 50 years and women aged 20 to 40 years. For older individuals, the classification of activity intensity might be higher. For example, what is moderate intensity to a 40-year-old man might be vigorous for a man in his 70s. Intensity is a subjective classification.

Data for this chart were available only for adults. Therefore, when children’s games are listed, the estimated intensity level is for adults participating in children’s activities. To compute the amount of time needed to accumulate 150 kcal, do the following calculation: 150 kcal divided by the MET level of the activity equals the minutes needed to expend 150 kcal. For example:  $150 \div 3 \text{ METS} = 50$  minutes of participation. Generally, activities in the moderate-intensity range require 25-50 minutes to expend a moderate amount of activity, and activities in the vigorous-intensity range would require less than 25 minutes to achieve a moderate amount of activity. Each activity listed is categorized as light, moderate, or vigorous on the basis of current knowledge of the overall level of intensity required for the average person to engage in it, taking into account brief periods when the level of intensity required for the activity might increase or decrease considerably.

Persons with disabilities, including motor function limitations (e.g., quadriplegia) may wish to consult with an exercise physiologist or physical therapist to properly classify the types of physical activities in which they might participate, including assisted exercise. Certain activities classified in this listing as moderate might be vigorous for persons who must overcome physical challenges or disabilities.



Echocardiography is for the diagnosis of structural cardiac abnormalities. It does not look at the coronary arteries nor is it a dynamic test.

## The British Society of Echocardiography recommendations are :-

### 16 Pre-Operative Echocardiography for Elective and Semi-urgent Surgery

#### 16.1 Indicated

- a. Documented ischaemic heart disease with reduced functional capacity (<4 METS)
- b. Unexplained shortness of breath in the absence of clinical signs of heart failure if ECG and/or CXR abnormal
- c. Murmur in the presence of cardiac or respiratory symptoms
- d. Murmur in an asymptomatic individual in whom clinical features or other investigation suggest severe structural heart disease.

#### 16.2 Not indicated

- a. Repeat assessment of previous echocardiogram with no intervening change in clinical status
- b. "Routine" pre-operative echocardiography

## Nice guidelines

### 1.9 Echocardiography

1.9.1 Do not routinely offer resting echocardiography before surgery.

1.9.2 Consider resting echocardiography if the person has:

- a heart murmur **and** any cardiac symptom (including breathlessness, pre-syncope, syncope or chest pain)
- **or**
- signs or symptoms of heart failure.

Before ordering the resting echocardiogram, carry out a resting electrocardiogram (ECG) and discuss the findings with an anaesthetist.

In the Preoperative setting at Derby Hospitals, the request for an echocardiogram should be discussed with a senior anaesthetist.

If a senior anaesthetist is not available and the Preop nurse is a Band 6 or above **and**

has attended a formal heart and lung training course, then the nurse may request an echocardiogram

**provided**

that an anaesthetist is made aware of the request (by keeping a formal record database of nurse requests) . This will enable results to be scrutinised and any inappropriate echocardiogram requests to be noted and fed back.

There should be a list of "approved nurse echocardiogram requesters"