COMPONENTS OF THIS POLICY AND PROCEDURE ARE POST-ENTRY LEVEL COMPETENCIES (PELC) FOR RNS AND LPNS AND REQUIRE ASSESSMENT OF COMPETENCY PRIOR TO PERFORMING

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POLICY
1. This policy provides guidance on the use of cardiac monitoring on Telemetry Designated units at Dartmouth General Hospital.

2. **Registered Nurses (RNs)** are required to obtain and maintain competency for **cardiac rhythm assessment** as outlined in the PELC CC 10-013 Cardiac Monitoring: Cardiac Rhythm Assessment and Telemetry Monitoring policy and associated learning module.

3. **Licensed Practical Nurses (LPNs)** are required to obtain and maintain competency for **skin preparation and lead application for cardiac monitoring** as outlined in the PELC CC 10-013 Cardiac Monitoring: Cardiac Rhythm Assessment and Telemetry Monitoring policy and associated learning module.

4. **Patients must physically remain** in areas where the telemetry signal can be received by the central monitoring system.

DEFINITIONS
**Telemetry:** Technology that records the electrical activity of the heart and sends the data to a central monitoring station. Telemetry monitoring serves to detect significant and life-threatening variations in the patients’ cardiac rhythm to facilitate early therapeutic intervention(s).

GUIDING PRINCIPLES
1. Timely initiation and discontinuation of cardiac monitoring facilitates appropriate treatment and allocation of resources.

2. The American Heart Association (AHA) has established criteria to aid in determining when to initiate cardiac telemetry. (Appendix A)
   
   2.1. **Class I** – cardiac monitoring is indicated in most if not all patients in this group. Patients who are hemodynamically unstable or who require more specialized monitoring may require ICU/CCU admission.

   2.2. **Class II** – cardiac monitoring may be of benefit in some patients, but is not essential for all.

   2.3. **Class III** – at low risk or unlikely to benefit from cardiac monitoring

PROCEDURE
1. **Patient Safety**
   
   1.1. For patient safety reasons, advise patients to:
       
       1.1.1. remain on Telemetry Designated Unit while requiring telemetry monitoring.

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1.1.2. not to use cellular phones while on cardiac telemetry as they may interfere with signal transmission. (Refer to: Q100-030.000 Cellular Phones and Two-Way Radios, use of.)

2. Internist/Hospitalist

2.1. Complete telemetry preprinted order set (PPO0470 Telemetry – Dartmouth General Hospital)

2.2. In consultation with internist/hospitalist:
   
   2.2.1. Reassess telemetry requirement daily.
   
   2.2.2. Write order to discontinue telemetry when patient not longer meets criteria.

3. RN and LPN (Telemetry Designated Unit)

3.1. Ensure PPO0470 Telemetry – Dartmouth General Hospital has been completed by the appropriate physician.

3.2. Select a transmitter and note its channel number. Check that the five lead wires are securely attached; if one becomes faulty, replace the complete set.

3.3. Install the batteries.

   3.3.1. Change the batteries when the low battery indicator appears on the central monitor or transmitter.

   Note - Do not store the unit with batteries in place.

   3.3.2. Change the batteries every 24 hours or when indicated on monitor

3.4. Explain the purpose of ECG monitoring to the patient and family.

3.5. Prepare the skin as recommended; apply the electrodes to the lead wires and then to the patient in the correct anatomical location.

   3.5.1. Change electrodes every 48 hours to avoid skin irritation and to ensure electrode gel is sufficient for conduction. (Refer to CC 10-013 Cardiac Monitoring: Cardiac Rhythm Assessment and Telemetry Monitoring.)

   3.5.2. Secure lead wires with a stress loop.

   3.5.3. Press the Verify leads button (✓) and ensure all lights come on.

3.6. Instruct the patient not to leave the unit; provide the rationale – that the signal must be received by the central monitoring system located on the unit.

3.7. When Telemetry is discontinued:

   3.7.1. Confirm the Physician Order.

   3.7.2. Remove telemetry monitoring unit from the patient.

   3.7.3. Remove batteries from the unit and discard.

   3.7.4. Clean the unit and place in basket.

   3.7.5. Delete the patient history and discharge from the central monitoring system.

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3.7.6. Notify ICU.

4. **Registered Nurse ONLY** (Telemetry Designated Unit)
   
   4.1. Complete a baseline assessment of patient and interpret the initial cardiac rhythm strip.
   
   4.2. Complete the *DGH Telemetry Rhythm Interpretation* Form (CD2444MR).
   
   4.3. Admit the patient on the central monitoring system corresponding with the transmitter unit number.
      
      4.3.1. Enter the patient room, bed number and last name.
      
      4.3.2. Enter first and middle initial if two or more patients exist with the same last name.
      
      4.3.3. **Do not** enter patient diagnosis.
      
      4.3.4. Place the names of assigned hospitalist and internist in the screen notes.
      
      4.3.5. Indicate the AHA Class next to the bed number.
   
   4.4. Select an appropriate lead in which to monitor the patient based on:
      
      4.4.1. The patient’s clinical condition.
      
      4.4.2. Goals of telemetry (monitoring for arrhythmia or ischemia).
   
   4.5. Complete the *DGH Telemetry Profile* sheet, including an initial rhythm strip and notify the ICU Telemetry RN of admission.
      
      4.5.1. Submit the completed *DGH Telemetry Profile* sheet to ICU.
   
   4.6. Discuss with the ICU RN the appropriate alarm parameters and adjust as the patient’s rhythm and condition warrant. Document any alarm changes in the progress notes. Ensure alarm volumes are audible.
      
      4.6.1. Communicate **directly** to the ICU Telemetry Nurse to ensure the transfer of information is complete.
   
   4.7. Document the assessment of heart rate, rhythm, PR, QRS and QT intervals, and interpret the rhythm every shift.
      
      4.7.1. Attach a printed rhythm strip for each assessment to the *DGH Telemetry Rhythm Interpretation* form (CD2444MR). Tape strips in single rows and do not fold or overlap. Place under the appropriate tab in the patient’s health record.
   
   4.8. Document any alarms or rhythm changes during the shift and attach the strip to the *DGH Telemetry Rhythm Interpretation* form. Document the patient assessment in the progress notes.
   
   4.9. Communicate any significant events or alarms to ICU, if not already reported by the ICU Telemetry RN.
      
      4.9.1. Document any conversations, recommendations or support provided by ICU.

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4.10. Notify the physician when the patient:
   4.10.1. Develops a new dysrhythmia.
   4.10.2. Becomes symptomatic with dysrhythmia
   4.10.3. Requires immediate intervention secondary to the dysrhythmia.

4.11. Review the alarm history, wave review and trend review every 12 hours or whenever an RN Transfer of Accountability (TOA) occurs.
   4.11.1. Attach a rhythm strip on the *DGH Telemetry Rhythm Interpretation* Form documenting changes discovered in the history.
   4.11.2. Communicate any events or changes to ICU.
   4.11.3. Document assessment of alarms in the progress notes.

4.12. Check the patient *immediately* in the event of a significant or life-threatening arrhythmia and/or upon notification of changes from ICU Telemetry RN. If necessary, call Code Blue from the bedside.

4.13. Review telemetry admission criteria daily to assess need for continued monitoring and discuss with physician.

5. **RN (ICU/CCU)**:
   5.1. Confirm that the patient name, room number and transmitter number indicated on *DGH Telemetry Profile* sheet corresponds with the information on the central monitoring system.
   5.2. Communicate directly to the Telemetry Designated Unit RN when placing a patient on telemetry to ensure transfer of information is complete.
      5.2.1. Review alarm parameters, and adjust accordingly following consultation with the Telemetry Designated Unit RN. Ensure alarm volumes are audible.
      5.2.2. Select the appropriate lead in which to monitor the patient.
      5.2.3. Place the *DGH Telemetry Profile* sheet in the binder according to the transmitter number.
      5.2.4. Review the DGH Telemetry Profiles admission to telemetry and for existing patients, at the beginning of each shift.
      5.2.5. Perform a baseline rhythm assessment for each patient on telemetry monitoring at the beginning of each shift.
   5.3. Review the alarm history, wave review and trend review at least every 12 hours or when an RN TOA occurs. Communicate any events or changes to the Telemetry Designated Unit RN, if not already documented as communicated.
   5.4. Observe for and report rhythm changes by immediately contacting the Telemetry Designated Unit RN to assess the patient.
5.4.1. Analyze the strip and document the event in the progress note section of the DGH Telemetry Profile sheet. As appropriate, request information about medication changes and the patient’s plan of care.

5.5. Respond to any potentially lethal rhythms by *immediately* communicating with the Telemetry Designated Unit RN to ensure appropriate assessment of patient.

5.6. Provide leadership, expertise and support to the care providers of Telemetry Designated Unit RN, as it relates to telemetry monitoring.

**REFERENCES**


**RELATED DOCUMENTS**

**Policies**

CC 10-013 Cardiac Monitoring: Cardiac Rhythm Assessment and Telemetry Monitoring.
Q100-030.000 Cellular Phones and Two-Way Radios, Use of.

**Forms**

CD2444MR DGH Telemetry Rhythm Interpretation
PPO0470 Telemetry – Dartmouth General Hospital
DGH Telemetry Profile

**Appendices**

Appendix A - Guidelines for Cardiac Monitoring

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Appendix A

Guidelines for cardiac monitoring are adopted from the guidelines published by the American Heart Association (2004) which were referenced by the Canadian Agency for Drugs and Technologies in Health (2008).

**Class I** – includes all patients at significant risk of an immediate, life-threatening arrhythmia. Cardiac monitoring is recommended for most, if not all patients in the following groups:

- **Resuscitated from cardiac arrest**
  - ECG monitoring should continue until an implantable cardioverter defibrillator (ICD) is implanted, unless the patient had a clearly transient, reversible, and preventable and now corrected cause of the cardiac arrest.

- **Early phase of acute coronary syndromes (ST-Elevation or Non-St-Elevation MI, Unstable angina/”Rule out” MI) and all patients receiving early reperfusion therapy**
  - ECG monitoring should begin as soon as the patient presents to the Emergency Department and continue uninterrupted for a minimum of 24 hours and until they remain event free for 12 to 24 hours
  - All patients who receive early reperfusion therapy should undergo uninterrupted ECG monitoring, including during intra-hospital transport
  - Patients with unstable angina or rule out MI should undergo monitoring until infarction has been ruled out and signs and symptoms of myocardial ischemia have been absent for 24 hours.

- **Presentation to the Emergency department with chest pain or anginal equivalent symptoms**
  - ST segment monitoring is recommended for 8 to 12 hours unless ongoing symptoms or ECG changes are detected.

- **Possible variant angina resulting from coronary vasospasm**
  - ST segment monitoring should continue until therapy has been initiated and the patient has been ST event free for 12-24 hours.

- **Following uncomplicated cardiac surgery**
  - ECG monitoring should be performed for a minimum of 48 to 72 hours
  - For patients at high risk of developing postoperative atrial fibrillation, monitoring should continue until hospital discharge.

- **Implantation of an automatic defibrillator lead or pacemaker lead and considered device dependant**
  - ECG monitoring of the patient is recommended for 12 to 24 hours after implantation

- **AV block or new onset of bradyarrhythmias**

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Monitoring is indicated for patients with bradyarrhythmias, Mobitz II block, advanced (2:1 or higher) second degree AV block, complete heart block, or new onset of bundle branch block in the setting of an acute MI (especially anterior). ECG monitoring should be continued until the block is resolved or until definitive therapy is implemented (usually permanent pacemaker).

- **Arrhythmias complicating Wolff-Parkinson-White Syndrome with rapid anterograde conduction over an accessory pathway**
  - ECG monitoring is recommended until a definitive therapy is established (usually an ablation procedure).

- **Long QT syndrome and associated ventricular arrhythmias**
  - Strict monitoring of these patients is required
  - For patients administered an antiarrhythmic drug known to cause Torsades de Pointes, the recommended timeframe for ECG QT interval monitoring include 48 to 72 hours for patients initiating or increasing therapy with quinidine, procainamide, disopyramide, sotalol, and dofetilide, and 4 to 5 hours for patients who are being treated with ibutilide. In patients who develop a prolonged QTc greater than 0.50 second, the offending drug should be discontinued and ECG monitoring should continue until the agent washes out and the QTc is observed to decrease.
  - For patients who overdose from a potentially proarrhythmic agent, ECG monitoring of the QT interval should continue until drug levels have decreased and evidence of marked QT prolongation or associated arrhythmia is no longer found.
  - Patients with severe hypokalemia or hypomagnesemia should be monitored until the disorder is corrected and no QT-related arrhythmias are present.

- **Acute heart failure/pulmonary edema**
  - Continuous monitoring is recommended for all patients until the signs and symptoms of acute heart failure have resolved and cardiac monitoring reveals no hemodynamically significant arrhythmia for at least 24 hours.

- **Any other hemodynamically unstable arrhythmia**
  - Arrhythmias considered benign in patients without heart disease may be lethal in a patient with significant heart disease (atrial fibrillation in a patient with severe aortic stenosis or HCM)

**Class II** - Cardiac monitoring may be beneficial for, but is not considered essential for patients in the following groups:

- **Post acute myocardial infarction (MI)**
  - Continue to monitor for arrhythmias beyond 48 hours to discharge in patients with the following predictors: previous hypertension, COPD, previous MI, ST-
segment changes at presentation, higher Killip class, lower initial systolic blood pressure.
  o ST monitoring should not be discontinued in patients who have experienced recurrent chest pain or anginal symptoms or who have had a second elevation in cardiac enzymes indicating infarct extension until they have experienced a 24 hour long ST event free period.

- **Chest pain syndromes**
  o Inpatient monitoring should be initiated for patients with any sign of ischemia or infarction on initial ECG tracing, as well as for patients with more than one evidence-based risk factor (low systolic blood pressure, pulmonary rales, or exacerbation of ischemic heart disease). ECG monitoring should continue for 12 to 24 hours until acute MI has been ruled out by negative biomarkers.

- **Undergone uncomplicated, nonurgent percutaneous coronary intervention**
  o No longer that 6 to 8 hours if the patient received a stent and there is concern regarding arrhythmia
  o ST monitoring is not required; however monitoring may be initiated if the patient is experiencing post PCI pain and continued until the pain has been ruled non-cardiac in origin
  o Monitor for 12 to 24 hours in patients with coronary angiography without stent implantation when there is concern regarding arrhythmias

- **Administration of an antiarrhythmic drug requiring adjustment of drugs for rate control with chronic atrial tachyarrhythmias in patients at low risk for of proarrythmia.**
  o ECG monitoring is recommended when the drug has the potential of prolonging the QT interval
  o When the integrity of the sinus node is uncertain, monitoring is useful in assessing sinus node function after initiating a drug with negative chronotropic properties
  o In patients with compromised left ventricular function (EF less than 40%), monitoring will assist in the detection of hemodynamic deterioration after initiating an antiarrythmis drug with negative inotropic properties
  o When increasing patient activity, ECG monitoring will assist in the assessment of the efficacy of the drug to control the ventricular rate in chronic atrial fibrillation or flutter

- **Pacemaker lead implantation but not pacemaker dependant**
  o 12 to 24 hours of postprocedual ECG monitoring is recommended to confirm that pacing function and programming are appropriate. Monitoring may be discontinued once sensing and pacing components have been tested.

- **Uncomplicated ablation of an arrhythmia**
  o Post procedure monitoring is warranted in patients who have experienced prolonged rapid heart rates from an incessant tachycardia
In patients with chronic atrial fibrillation who have undergone AV junction ablation with the implantation of a pacemaker, 12 to 24 hours of monitoring is recommended.

- Patients with significant organic heart disease who undergo ventricular tachycardia ablation warrant monitoring for 12 to 24 hours.

- **Routine coronary angiography**
  - Monitoring may be warranted in those at risk of post-procedural vasovagal reaction. Monitoring should be discontinued once patient is ambulatory.

- **Subacute heart failure**
  - Perform ECG monitoring in the subacute phase of acute heart failure while medications, device therapy, or both are being manipulated.

- **Syncope**
  - Patients with syncope of truly unknown origin should have at least 24 hours of inpatient monitoring.
  - When suspicion arises about an arrhythmic cause for the syncope or in inpatients who have primary electrophysiologic disorders, inpatient monitoring is indicated for 24 to 48 hours, or until an arrhythmic cause has been ruled out by invasive electrophysiological testing.

- **Do not resuscitate orders with arrhythmias that cause discomfort**
  - ECG monitoring to assist in titrating antiarrhythmic drugs for optimum rate control can be continued until rate control has been achieved.

- **High risk for ischemia after cardiac or non cardiac surgery**
  - ST monitoring should be considered intra and postoperatively, continuing for 24 to 48 hours in patients in any of the following high risk categories:
    - Older adult patients who are at risk of cardiac complications (patients with left ventricular hypertrophy, coronary artery or peripheral vascular disease, or cardiac risk factors)
    - Patients with emergent major operations (particularly older adults), aortic and other major vascular surgeries, peripheral vascular surgery, and anticipated prolonged surgical procedures associated with large fluid shifts, blood loss, or both.
    - All adults patients who are critically ill and have a high cardiovascular demand

- **Treatment with antipsychotic or other drugs with possible risk of Torsades de points**
  - In hospital monitoring is recommended in those rare individuals with a history of QT prolongation but in whom the addition of the following drugs is judged necessary (Amitriptyline, Ciprofloxacin, Clomipramine, Desipramine, Diphenhydramine, Doxepin, Fluconazole, Fluoxetine, Galantamine, Imipramine, ...
Itraconazole, Ketoconazole, Nortriptyline, Paroxetine, Protriptyline, Ritonavir, Sertraline, Solifenacin, Trazodone, Trimethoprim-Sulfa, Trimipramine)

- **Acute neurological events**
  - Patients with QTc greater than 0.50 seconds should be monitored for QT-related arrhythmias and further prolongation of the QT interval.

**Class III** - Cardiac monitoring is not indicated because a patient’s risk of a serious event is so low that monitoring has no therapeutic benefit.

- **Monitoring for rhythm abnormalities are not indicated in the following groups:**
  - Postoperative patients who are at low risk of cardiac arrhythmias
  - Patients with permanent, rate controlled atrial fibrillation
  - Patients undergoing hemodialysis
  - Stable patients with chronic ventricular premature beats

- **ST segment ischemia monitoring is not indicated in the following groups:**
  - Patients with Left Bundle branch block
  - Patients with frequent intermittent right bundle branch block
  - Patients with ventricular pacing rhythm
  - Patients who are agitated, restless or confused where ECG signals do not allow for interpretation
  - Patients with other confounding arrhythmias that obscure the ST segment
    - Coarse atrial fibrillation or flutter
    - Intermittent accelerated ventricular rhythm

- **QT interval and ECG monitoring for detection of proarrythmia is not indicated in the following groups:**
  - Healthy patients administered drugs that pose little risk of torsades de pointes