February 2025

Decision support tool

APPROPRIATE USE OF CARDIAC MONITORING IN THE EMERGENCY DEPARTMENT

This tool is provided as a guideline only, and does not replace the clinical judgment of nurses performing activities reserved to them by law or regulation. These recommendations are based on scientific literature and the knowledge and experience of Quebec healthcare professionals. For further details, please consult inesss.qc.ca.

GENERAL INFORMATION

PRACTICES TO BE OPTIMIZED AND HARMONIZED

- It is essential to distinguish between signs and symptoms of benign conditions and the more alarming ones that require cardiac monitoring.
- The large number of patients admitted to emergency departments with chest pain affects the availability of stretchers equipped with cardiac monitors in hospital settings.
- Appropriate use of cardiac monitoring optimizes healthcare resources utilization and patient management.

TOOL SCOPE

- The tool is primarily intended for nursing staff. Its aim is to optimize and harmonize the use of cardiac monitors by:
  - ☑ Guiding nurses in deciding whether to use cardiac monitoring during triage in the emergency department.
  - ☑ Promoting the appropriate use of cardiac monitors.
- Indications apply to adults and children.
- The tool does not apply to in-patients in a care unit, consultations in ambulatory clinics, implantable cardiac devices such as pacemakers and cardiac defibrillators, or cardiac monitoring in a non-hospital setting.
- The tool does not specify good practice for cardiac monitoring use (e.g., how to place electrodes and read results), nor the efficacy, sensitivity and diagnostic performance of the various types of cardiac monitors.

USE OF CARDIAC MONITORING IN THE EMERGENCY DEPARTMENT

- Cardiac monitoring **allows the detection of complex arrhythmias** and promotes targeted management and appropriate ongoing monitoring.

✗ The use of stretchers with cardiac monitors is not indicated for vital sign monitoring.

An ECG is a rapid, non-invasive, inexpensive diagnostic test that provides vital information on heart rhythm by detecting abnormalities.

- It should be performed by emergency nursing staff when a heart problem is suspected.
- It is complementary to cardiac monitoring.

CAUTION WHEN SUSPECTING ACUTE CORONARY SYNDROME

- An ECG should be performed within 10 minutes of the patient's arrival at the emergency department, and the result immediately presented to the physician.
- A normal initial ECG does not determine patient orientation and should not be the only test used to rule out an acute coronary syndrome.

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Criteria justifying the use or non-use of cardiac monitoring in the emergency department

Cardiac monitoring recommended

⚠ Suspicion of acute coronary syndrome:
- Active chest pain and/or pain in arm(s), neck or jaw with 1 severity criterion[1] or with ≥ 3 cardiovascular risk factors (see inset on page 3)

- Syncope of suspected cardiac origin

- Abnormal initial ECG in the presence of **cardiac symptoms** (syncope, lipothymia, palpitations or chest pain):
  - QTc increased (QTc > 500 ms)
  - High-grade atrioventricular block
  - ST segment changes suggestive of acute myocardial infarction (ST ≥1 mm)

- Recent proven or presumed arrhythmia:
  - Adult: HR ≤ 40 BPM OR ≥ 140 BPM
  - Pediatric: HR ≥ 2 standard deviations for age without external stimuli (see appendix)

- Hemodynamic instability:
  - Altered state of consciousness and/or
  - Signs of shock (pallor, diaphoresis, cold skin) and/or
  - Respiratory distress

- Recent intoxication or overdose with drugs or other substances[2], as indicated by the poison control center

- De novo seizures[3]

- Non-penetrating chest trauma with possibility of cardiac contusion

- Electrification, according to Hydro-Québec standards:
  - Arrhythmia in the pre-hospital setting
  - Loss of consciousness
  - 3rd degree burn at point of entry
  - Voltage ≥ 750
  - Abnormal ECG

- Pacemaker or implantable cardioverter defibrillator dysfunction and/or shock

- Cardiorespiratory arrest

- **Symptomatic** congenital heart disease in children

- Signs suggestive of a stroke (FAST)

Cardiac monitoring to consider

- Palpitations with ECG changes

- Suspected aortic dissection : sudden onset of chest pain radiating to the back[4]

- **Symptomatic** electrolyte disorders[5]:
  - Hyperkaliemia (≥ 6.5 mmol/L)
  - Hypomagnesemia (< 0.6 mmol/L)
  - Hypocalcemia (< 1.8 mmol/L)

Cardiac monitoring not recommended

- Syncope of suspected vasovagal origin

- Low-risk, non-cardiac chest pain with < 3 cardiovascular risk factors (see inset on page 3)

- Patient with known arrhythmia, asymptomatic and hemodynamically stable

Abbreviations: **BPM**: beats per minute, **ECG**: electrocardiogram, **HR**: Heart rate, **FAST**: Face drooping, Arm weakness, Speech difficulty, Time to call 911.

1. Severity criteria : dyspnea, diaphoresis, lipothymia, syncope or pallor.
2. Substances for which cardiac monitoring should be initiated without delay in the event of intoxication or overdose: antidepressants, antipsychotics, beta-blockers, calcium channel blockers and other antiarrhythmics, local anesthetics, potassium salts, cocaine/amphetamines or derivatives.
3. Except in cases of known epilepsy.
4. Measure blood pressure in both arms and notify the physician.
5. The decision to put a patient with these results on cardiac monitoring depends on the context in which they presented to the emergency department and on their history; a consultation with the physician may be necessary to judge the relevance of using monitoring.

Cardiovascular risk factors to consider for chest pain	
• Age ≥ 50 years	• Family history (1st degree) of arteriosclerotic coronary artery disease ≤ 60 years (angina, infarction, sudden death)
• History of heart disease (arteriosclerotic coronary artery disease, heart failure, heart defects)	• Retrosternal pain that appears on exertion
• High blood pressure	• Sudden and severe retrosternal pain
• Diabetes	• Obesity
• Dyslipidemia	• Smoking
• Recent use of cocaine, amphetamines or derivatives	• Percutaneous coronary intervention within the last week

BEWARE OF ATYPICAL SYMPTOMS OF ACUTE CORONARY SYNDROME

Diabetic patients, women and the elderly may present atypical symptoms.

APPENDIX

Table 1. Standard deviation of heart rate in children

Standard deviation of heart rate in children							
Age	**1**	**2**	**3**	**Normality 4/5**	**3**	**2**	**1**
0-3 months	< 40	40-65	65-90	90-180	180-205	205-230	> 230
3-6 months	< 40	40-63	63-80	80-160	160-180	180-210	> 210
6-12 months	< 40	40-60	60-80	80-140	140-160	169-180	> 180
1-3 years	< 40	40-58	58-75	75-130	130-145	145-165	> 165
3-6 years	< 40	40-55	55-70	70-110	110-125	125-140	> 140
6-10 years	< 30	30-45	45-60	60-90	90-105	105-120	> 120

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REFERENCES

To consult the rationale behind the content of this tool and all the supporting references, see the INESSS report associated with the tool.