

CARDIOLOGY

TELEMETRY

NGN NCLEX 2026

PRIORITY SKILL

Continuous Cardiac Monitoring

Lead placement · Telemetry units · Rhythm interpretation · Priority nursing care ·
Patient teaching



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Definition & Overview

WHAT IT IS · WHY IT MATTERS

Continuous cardiac monitoring uses surface electrodes to record the heart's electrical activity in real time, displaying a waveform that allows the nurse to detect dysrhythmias, ischemia, and electrolyte-related changes the moment they occur.

HARDWIRED MONITORING

Bedside Cardiac Monitor

Cables physically connect the patient's electrodes to a bedside unit. Used in **ICU, ED, Step-Down, PACU**. Patient cannot ambulate off the unit.

TELEMETRY (PORTABLE)

Wireless Battery-Powered Unit

Small transmitter clipped to the gown sends signal to a **central monitoring station**. Patient is ambulatory but must stay **within radio range**.

★ WHY IT MATTERS

Early recognition of **lethal rhythms (V-fib, V-tach, asystole)** and **ST-segment changes (ischemia)** directly drives survival. The monitor is a tool — but the **nurse's clinical judgment** is what saves the patient.

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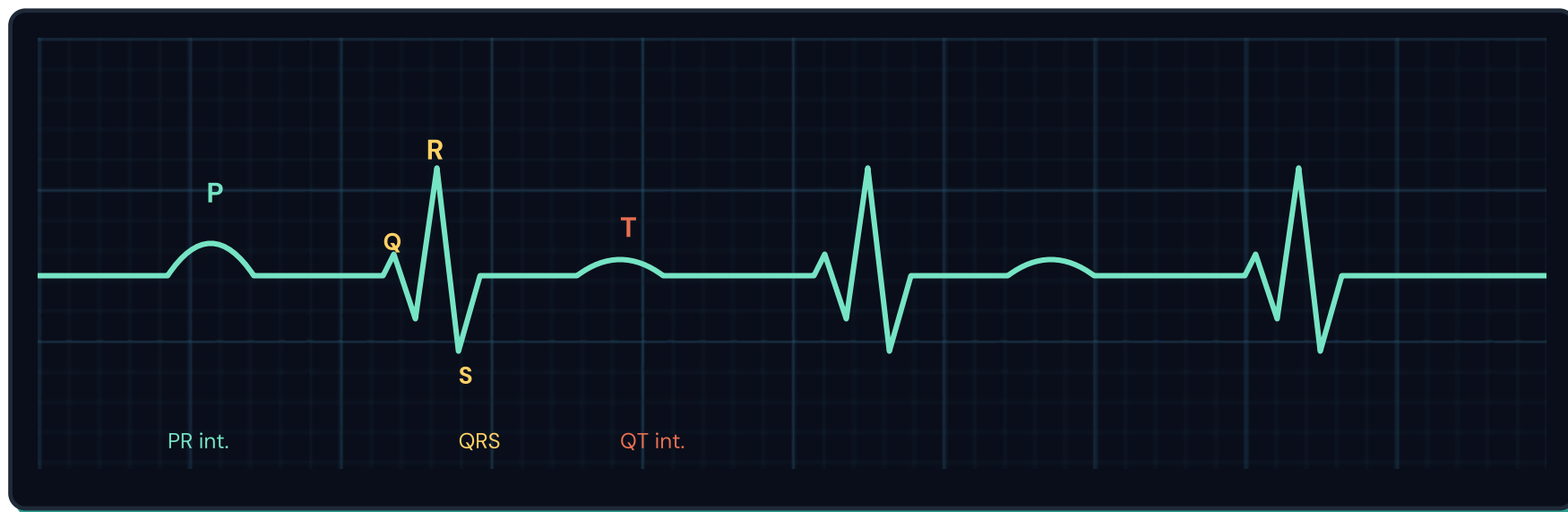
How It Works

ELECTRICAL CONDUCTION · WAVEFORM COMPONENTS

Each heartbeat is an electrical event. Electrodes on the skin detect tiny voltage changes as the wave of depolarization spreads through the heart. The monitor amplifies and displays this as the familiar PQRST waveform.

⚡ Conduction Pathway → Waveform

SA node fires → atrial depolarization → **P wave** → AV node delay → **PR interval** → His-Purkinje conduction → ventricular depolarization → **QRS complex** → ventricular repolarization → **T wave**



Wave/Interval	Represents	Normal Value
P wave	Atrial depolarization	Upright, rounded · <0.12 sec
PR interval	SA node → AV node delay	0.12 – 0.20 sec
QRS complex	Ventricular depolarization	0.06 – 0.10 sec
ST segment	Early ventricular repolarization	Isoelectric (flat on baseline)

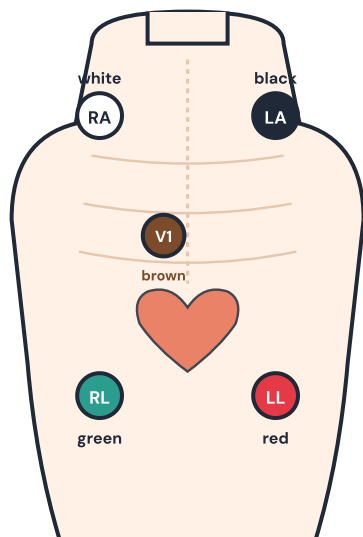
Wave/Interval	Represents	Normal Value
T wave	Ventricular repolarization	Upright, asymmetric
QT interval	Total ventricular activity	0.36 – 0.44 sec

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Lead Placement

3-LEAD · 5-LEAD · WHERE TO STICK WHAT

Each electrode "sees" the heart from a different angle. Wrong placement = wrong rhythm interpretation. **Always confirm color codes match your facility's system (AHA standard shown).**



5-Lead AHA Color Code

- White → RA · Right upper chest
- Black → LA · Left upper chest
- Green → RL · Right lower abdomen
- Red → LL · Left lower abdomen
- Brown → V1 · 4th ICS, R sternal border

3-LEAD SYSTEM

Basic Telemetry

Uses **White (RA)**, **Black (LA)**, **Red (LL)**. Most often Lead II is monitored — best view of P wave for rhythm interpretation.

5-LEAD SYSTEM

ICU / Step-Down Standard

Adds **Green (RL)** ground and **Brown (V1)** chest lead — V1 helps differentiate **SVT vs V-tach** and detect **BBB**.

PRO TIP · LEAD II

Lead II is the **"go-to" rhythm strip lead** because the wave of depolarization travels parallel to it — producing the **tallest, clearest P wave** for identifying atrial activity.

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What the Nurse Recognizes

FINDINGS ON THE STRIP · RED FLAGS

Reading the monitor is recognizing *patterns* first, then verifying with the patient. Below are findings sorted by urgency.

✓ Expected / Stable

- ▶ Regular rate 60–100 bpm
- ▶ P wave before every QRS
- ▶ Narrow QRS (<0.10 sec)
- ▶ Isoelectric ST segment
- ▶ Smooth upright T waves
- ▶ Patient asymptomatic

🚨 RED FLAGS — Act Now

- ▶ **V-fib** — chaotic, no QRS → *defibrillate*
- ▶ **Pulseless V-tach** → *defibrillate*
- ▶ **Asystole** — flat line → *CPR + epi*
- ▶ **ST elevation** ≥1 mm → *STEMI*
- ▶ **Wide QRS** >0.12 sec
- ▶ **Tall peaked T waves** → hyperkalemia
- ▶ **U wave / flat T** → hypokalemia
- ▶ **Prolonged QT** → torsades risk

🚨 ALWAYS DO FIRST

ASSESS THE PATIENT before treating the rhythm. A "lethal" tracing in an awake, talking, perfusing patient is almost always artifact, lead-off, or loose electrode — *not* a code. Touch the patient. Check the pulse. Then treat.

5 Priority Nursing Interventions

SETUP · MONITORING · MAINTENANCE

● Setup & Skin Prep

- ◆ **Clean** the skin with soap & water (not alcohol — dries skin and causes lead-loss).
- ◆ **Dry thoroughly** — moisture prevents adhesion & causes false signal.
- ◆ **Clip excess hair** (do not shave — micro-abrasions raise infection risk).
- ◆ Place electrodes on **flat, bony areas** — avoid muscle groups (movement = artifact).
- ◆ Press the **edge** of the electrode firmly; avoid pressing the gel center.

● Ongoing Monitoring

- ◆ **Set rate & rhythm alarms ON** at the start of every shift — *silencing alarms is a sentinel event*.
- ◆ Set **HR limits** appropriate to the patient (commonly 50–120; tighter for unstable).
- ◆ Run a **rhythm strip q shift** and with any change → label, interpret, place in chart.
- ◆ Measure **rate, rhythm, P-QRS-T, intervals (PR, QRS, QT)** systematically.
- ◆ Compare current strip to prior strips — **change is the warning**.
- ◆ Always **correlate the rhythm with the patient** — pulse, BP, LOC, perfusion, symptoms.

● Skin & Electrode Care

- ◆ Change electrodes **every 24–48 hours** (or per facility policy / when adhesive lifts).
- ◆ **Rotate sites** slightly to prevent skin breakdown.
- ◆ Inspect skin under each electrode — **document redness, irritation, breakdown**.
- ◆ Replace any electrode that becomes **loose, dry, or wet**.

● Telemetry-Specific Care

- ◆ Verify **battery** at start of shift; carry/store **spare batteries**.
- ◆ Confirm patient is **visible on the central monitor** & assigned correct bed.
- ◆ Educate patient on **range limits** — they must stay on the unit.
- ◆ Most telemetry packs are **not waterproof** → remove or protect during showers (per policy).
- ◆ If patient leaves unit (procedure / test): communicate to **monitor tech** & document time off.

LEAD-OFF ALARM WORKFLOW

1. Look at patient first — are they awake & perfusing? **2.** Inspect electrodes & cables. **3.** Replace loose/dry electrodes. **4.** Re-secure cables. **5.** Document the cause. Never just hit "silence" and walk away.

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Related Pharmacology

DRUGS COMMONLY TIED TO MONITORED PATIENTS

Patients on continuous monitoring are very often receiving rhythm-altering drugs. Recognize the class, mechanism, and what to watch on the strip.

Drug / Class	Action	Watch on Monitor	Key Nursing Point
Adenosine ANTIDYSRHYTHMIC	Slows AV conduction; converts SVT	Brief asystole (3–6 sec) is expected , then NSR	Rapid IV push + flush; warn patient of "doom" feeling
Amiodarone CLASS III	Prolongs repolarization	Prolonged QT, bradycardia	Monitor pulmonary, thyroid, liver function
Lidocaine CLASS IB	Suppresses ventricular ectopy	Reduced PVCs / V-tach episodes	Toxicity → confusion, seizures, slurred speech
Atropine ANTICHOLINERGIC	Blocks vagal tone → ↑ HR	HR rises within minutes	For symptomatic bradycardia; causes dry mouth, mydriasis
Digoxin CARDIAC GLYCOSIDE	↑ contractility, ↓ HR	Bradycardia; "scooped" ST segment	Hold if HR <60; toxic >2.0 ng/dL → yellow-green halos, N/V
Beta blockers (metoprolol) CLASS II	Block β_1 → ↓ HR, ↓ BP	Bradycardia, AV blocks	Hold for HR <60 or SBP <90; do not stop abruptly
Diltiazem / Verapamil CCB	Slows AV node conduction	Slowed ventricular rate (a-fib RVR)	Monitor for hypotension & bradycardia
Epinephrine CODE DRUG	α & β stimulation; ↑ HR & BP	Tachycardia post-administration	1 mg IV q3–5 min during cardiac arrest (ACLS)
Magnesium sulfate ELECTROLYTE	Stabilizes cardiac membrane	Used for torsades de pointes	Monitor DTRs, respirations; antidote = calcium gluconate

 TITRATION REMINDER

Drips like **amiodarone, diltiazem, dopamine, dobutamine** are **titrated to monitor parameters** — always require an IV pump and continuous cardiac monitoring (see Titration card).

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NCLEX Test Traps

WRONG-ANSWER PATTERNS · HOW TO CHOOSE RIGHT

1

"The monitor shows asystole — defibrillate immediately."

X TRAP: You **never defibrillate asystole**. **✓ DO:** Check the patient & pulse first. Treat asystole with **CPR + epinephrine**. (And confirm in 2 leads — flat-line in one lead is often a lead-off.)

2

"The alarm is going off constantly — silence it."

X TRAP: Silencing alarms = sentinel event ("alarm fatigue"). **✓ DO:** **Assess the patient and the cause**, then adjust limits appropriately or replace electrodes.

3

"Rhythm strip shows V-fib — give amiodarone first."

X TRAP: Drugs come *after* shock. **✓ DO:** **Defibrillate first** for V-fib / pulseless V-tach (shockable rhythm), then continue CPR, then drugs per ACLS.

4

"Patient is on telemetry — they don't need vital signs."

X TRAP: Telemetry shows electrical activity, NOT perfusion. **✓ DO:** **Assess BP, pulse, mentation, perfusion** — the monitor is a tool, not a substitute for nursing assessment.

5

"Skin under electrode is red — leave it; the rhythm is more important."

X TRAP: Skin breakdown is preventable harm. **✓ DO:** **Move the electrode to a new site**, document, and continue monitoring. Skin care & rhythm care are *both* nursing priorities.

6

"Patient says they need to walk to the gift shop on telemetry."

X TRAP: Telemetry has a **limited radio range**. Off-unit = no monitoring. **✓ DO:** Reinforce **stay on unit** teaching; coordinate with monitor tech if patient must leave.

7

"V-tach on monitor — what do you do FIRST?"

X TRAP: Choosing "call code" or "give amiodarone" before assessment. **✓ DO:** **Check pulse first**. Pulse present = stable V-tach (drugs/cardioversion); No pulse = pulseless V-tach (defibrillate).

8

"Wide tall T waves — give potassium."

✗ TRAP: Tall peaked T waves indicate **hyperkalemia** — adding more K+ is dangerous. **✓ DO:** Recognize the pattern and prepare for **insulin/D50, calcium gluconate, kayexalate**.

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NCJMM Clinical Judgment

SIX-STEP MODEL APPLIED TO MONITORING

A patient on tele just had a sudden HR change from 78 → 158 bpm. Walk through the model:

Step 1 · Recognize Cues

Notice changes

HR jump 78→158, narrow QRS, palpitations, BP 96/60, lightheaded, A-fib RVR pattern visible on strip.

Step 2 · Analyze Cues

Make sense of data

Irregularly irregular rhythm + no clear P waves + rapid ventricular rate = **A-fib with RVR**. BP dropping → loss of atrial kick.

Step 3 · Prioritize

What's most urgent?

Hemodynamic compromise + symptoms = **unstable**. Airway/breathing OK; circulation is the priority. Notify provider.

Step 4 · Generate Solutions

Possible interventions

O₂, IV access, 12-lead ECG, prepare diltiazem/metoprolol, consider cardioversion if persistent instability, fluid bolus per provider.

Step 5 · Take Action

Implement

Stay with patient · run rhythm strip · O₂ on · obtain 12-lead · IV access · call provider · prepare emergency cart · administer ordered rate-control.

Step 6 · Evaluate

Did it work?

HR returns to 80–100, BP improves, patient symptom-free, rhythm strip documents conversion. If not improving → escalate.

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Patient & Family Teaching

WHAT TO SAY · WHAT TO EXPECT

TELEMETRY BASICS

"You are being watched 24/7"

Reassure: a trained tech is watching the central station continuously. The monitor is for **safety, not punishment**.

STAY IN RANGE

"Stay on the unit"

If you leave (test, smoke, gift shop), the signal stops. **Always tell the nurse** before leaving the unit.

SHOWERING

Protect the unit

Most packs are **not waterproof**. Ask the nurse to disconnect & cover, or provide a waterproof bag, before bathing.

HANDS OFF

Don't pull the wires

If a patch lifts, **tell the nurse** — don't tape it back yourself or pull it off. Lead-loss = false alarms.

CELL PHONES

No interference

Modern telemetry is **not affected** by cell phones at normal use distance. Reassure patients & family.

SKIN & ADHESIVE

Report itching or rash

If skin under a patch is itching, red, or blistering — let the nurse know. Hypoallergenic electrodes are available.

SYMPTOMS TO REPORT IMMEDIATELY

Chest pain · palpitations · shortness of breath · dizziness or fainting · sudden weakness · skin breakdown under electrode. "If something feels wrong, push the call light — don't wait."

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Memory Boosters

MNEMONICS · PATTERN RECOGNITION

Mnemonic · 5-Lead

"Snow over Grass · Smoke over Fire · Chocolate close to the heart"

Snow (white) over Grass (green) on the right · **Smoke (black) over Fire (red)** on the left · **Chocolate (brown V1)** in the middle, closest to the heart.

Mnemonic · Right-Side Rule

"White on Right"

Always start with this. **WHITE on the RIGHT** upper chest — every time, every system.

Mnemonic · Rhythm Strip Analysis

"R-R-P-P-Q-Q" (or 6-step)

Rate · **R**hythm regularity · **P** wave present? · **P**R interval · **Q**RS width · **Q**T interval. Walk every strip the same way, every time.

Golden Rule

"Treat the Patient — Not the Monitor"

If the rhythm looks lethal but the patient is awake, talking, and perfusing — **check the leads**. The patient is the truth; the monitor is a tool.

Mnemonic · Lethal Rhythms

"V-Fib, V-Tach, A-systole, P-EA"

The four arrest rhythms. **Shockable: V-fib & pulseless V-tach. Non-shockable: asystole & PEA** → CPR + epi.

Mnemonic · Hyper-K T Waves**"Tall Tented Ts = Too much K"**

Peaked T waves on monitor → think potassium **HIGH**. Flat T + U wave → potassium **LOW**.

Mnemonic · STEMI Recognition**"Tombstone ST = Tomb"**

Marked ST elevation that looks like a tombstone = **massive MI**. Activate cath lab — every minute is muscle.

Decision Reminder**"Pulse First, Drugs Later"**

For any tachy/brady or wide-complex rhythm, **check the pulse first**. The presence or absence of a pulse drives the entire algorithm.