A Systems-Based Quality Improvement Protocol: Preventing Lost-to-Follow-Up in Cardiac Device Patients

1. Purpose

To establish a standardized process for identifying, contacting, and re-engaging cardiac device patients who have become inactive in remote monitoring or clinic follow-up, in order to reduce missed transmissions, prevent delayed clinical intervention, and improve patient safety.

2. Scope

This protocol applies to all adult patients with cardiac implantable electronic devices (CIEDs), including pacemakers, implantable cardioverter-defibrillators (ICDs), and cardiac resynchronization therapy (CRT) devices, enrolled in remote monitoring or device clinic follow-up.

3. Definitions

- **Active monitoring:** Device transmission received within the expected monitoring interval.
- **Inactive monitoring:** No transmission received beyond the expected interval (see thresholds below).
- **Lost-to-follow-up:** Inactive monitoring combined with unsuccessful patient contact after defined outreach attempts.

Inactivity Thresholds (modifiable by local policy)

- ICD / CRT devices: No transmission >14 days
- Pacemakers: No transmission >30 days
- Recent implant (<90 days): No transmission >7–14 days

4. Roles and Responsibilities

Device Company Specialist

- Identify inactive transmitters through vendor platforms
- Perform technical troubleshooting when possible
- Communicate inactivity lists to device clinic staff

Device Clinic Staff (RN)

- Maintain inactive monitoring registry
- Lead patient outreach and documentation
- Perform initial clinical risk stratification
- Escalate per protocol when criteria are met

Supervising Physician (EP/Cardiologist)

- Provide clinical oversight
- Review escalated cases
- Determine need for urgent in-person evaluation or ED referral

5. Identification Process

1. Generate an **inactive monitoring report** at least weekly.
2. Populate the **Inactive Monitoring Registry** with:

    - Patient identifiers
    - Device type
    - Date of last transmission
    - Date of last clinic visit
    - Contact information
    - High-risk status

High-Risk Criteria

- ICD or CRT device
- Pacemaker-dependent patient
- Recent implant (<90 days)
- Known lead or battery concern
- History of VT/VF or ICD therapies
- Cognitive, language, or social barriers

6. Outreach and Re-Engagement Workflow

Step 1: Initial Outreach (Day 0–1)

- Two phone call attempts at different times
- Portal message or SMS if available
- Document all attempts in EMR

Step 2: Secondary Outreach (Day 2–3)

- Additional phone attempt
- Voicemail using standardized script
- Attempt secondary contact if permitted

Step 3: Escalated Outreach (Day 5–7)

- RN review
- Written communication (letter) if unable to reach
- Technical troubleshooting with device company specialist

7. Troubleshooting and Resolution

When contact is made, assess and address the barrier:

- Monitor unplugged or powered off
- Change in residence or contact information
- Connectivity issues (cellular/Wi-Fi)
- Lack of understanding of remote monitoring
- Language or technology barriers

Provide step-by-step guidance and confirm successful transmission when possible.

8. Escalation Criteria

Immediate escalation to supervising physician is required if:

- ICD/CRT patient inactive >14 days and unreachable
- Pacemaker-dependent patient inactive >30 days
- Recent implant inactive >7–14 days
- Patient reports concerning symptoms (syncope, shocks, chest pain, dyspnea, palpitations)

Physician may recommend:

- Urgent in-person device interrogation
- Same-day clinic visit
- Emergency department evaluation

9. Documentation Standards

All outreach attempts, patient contacts, troubleshooting steps, and escalation decisions must be documented in a standardized EMR location to ensure continuity and accountability.

10. Quality Improvement Metrics

Outcome Measures

- Percentage of patients inactive >30 days
- Median time to reconnection

Process Measures

- Percentage of inactive patients contacted within 48 hours
- Percentage of inactive patients with documented barrier type

Balancing Measures

- Staff time spent on outreach
- Unnecessary urgent visits generated

11. Review and Maintenance

This protocol should be reviewed annually or after any significant adverse event related to missed device monitoring.