



Reduction of Inappropriate Admission ECG Use: A Quality Improvement Project

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INTRODUCTION

- Electrocardiogram (ECG) is a rapid, inexpensive test to assess cardiopulmonary chief complaints.
- Without insurance, an ECG cost approximately \$200 on average within a range from \$175 to \$300.
- However, the practice of defensive medicine to rule out lethal cardiac etiology resulted in overuse of ECG.
- This can lead to a significant delay in transition of care and increase overall healthcare cost.

OBJECTIVE/AIM STATEMENT

- **Objective:** Reduce the number of inappropriate ECG use.
- **Aim:** By end of January 31st 2023, there will be at least 30% reduction with inappropriate ECG test orders upon admission at DMC Sinai Grace Hospital.

METHODS

- **Plan Do Study Act (PDSA)** model of Quality Improvement
 - **Plan:** identify problem, background research, intervention development
 - **Do:** Implement intervention
 - **Study:** Analyze results and modify intervention accordingly
 - **Act:** Implement the new intervention within the organization

• For 4 weeks with the following intervention, a handout of typical chief complaints (chest pain, dyspnea) requiring an ECG test will be provided to Emergency Department resident physicians.

• If the presenting complaint is not consistent with the list on handout, an ECG order must be approved by the on-call attending physician.

• Patient chief complaints and number of ECG orders will be documented each week.



RESULTS MEASURES

- Preliminary data collection will be based on the following outcome, process, and balance measures:

Outcome Measures

- Percentage of ECG orders not consistent with a compliant listed on the handout.

Process Measures

- Percentage of ED residents adherent to the protocol
- Number of attending approvals of ECG in presentations that may require an ECG.

Balance Measures

- Number of ECG required later in the same admission
- Number of readmission due to a cardiac etiology later identified on ECG.

Chief complaint

- Syncope
- Chest pain
- Overdose/ingestion
- Respiratory
- Seizure/shaking/weakness
- Cardiovascular
- GI (vomiting, diarrhea, abdominal pain)
- Behavioral
- Dizziness
- Other (dehydration, abnormal labs/films, rash)
- Fever
- Eating disorder/anorexia/weight loss
- AMS
- Abuse/trauma
- Musculoskeletal (sickle cell with pain)
- Headache
- Fall

Figure 1. Sample List of Diagnosis required an ECG. Retrieved from Gandhi et al, 2018.

CONCLUSION

- From analysis of randomized data over a two weeks period at Detroit Medical Center (DMC) Sinai Grace Hospital, at least 40% of patients on admission did not need an ECG yet one was completed.
- The goal of the project is to decrease the number of inappropriate use of ECG will reduce individual and overall healthcare cost in the long run.
- **Defensive medicine:** tests are ordered to rule out lethal causes in the setting of low pre-test probability.
- This can lead to medical errors and malpractice [2,3].
- Limitations:
 - Data collection is dependent on residents, who may not report improper ECG use.
- **Next Steps/Future Studies:**
 - **Plan:** analyze collected data in January 2023 to propose interventions.
 - **Do Phase:** collaborate with hospital and nursing administration to reduce inappropriate ECG orders. Educate hospital personnel and conduct intervention.
 - **Study Phase:** analyze post-intervention results after implementation.
 - **Act Phase:** incorporate newly adapted protocols into hospital systems.
 - Future studies should include assessment of a reduction in hospital length of stay (LOS) from intervention measures.

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