The HEART Pathway: Bridging the Gap between Operations, Research, and Education.

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The Problem

- 8-10 million patients with chest pain present to an ED annually in the US.

- To avoid missing the diagnosis of acute coronary syndrome (ACS), physicians use a liberal testing strategy.

- Current care patterns for acute chest pain fail to focus health system resources, such as hospitalization and cardiac testing, on patients most likely to benefit.
>50% of ED patients with acute chest pain are hospitalized for a comprehensive cardiac evaluation (serial cardiac biomarkers and stress testing or angiography).

<10% of these patients are ultimately diagnosed with ACS.

over-triage costs an estimated $10-13 billion annually.
Despite high admission rates and costs, roughly 2-5% of patients with AMI are inappropriately discharged from the ED every year. Missed ACS is a top cause of malpractice claims.
The Chronic Care Model
- Identifies the use of decision-support systems as a way to improve healthcare delivery

An accurate ACS risk stratification care pathway, the HEART Pathway, used for decision-support and designed to eliminate unnecessary testing could improve quality by decreasing:
- False positive and non-diagnostic testing
- Radiation
- Costs
The HEART Pathway

- Combines a clinical decision aid (the HEART score) with two serial troponin measurements
- Developed to identify patients with chest pain who can safely be discharged from the ED without objective cardiac testing (stress testing or angiography).
The originators of the HEART Score produced 3 studies:
- Derivation study
- Retrospective validation (910 patients)
- Prospective observational validation study (2,440 patients)
HEART Pathway

- Addition of a serial troponin at 3 hours
- Increases sensitivity for ACS
  - A missed event rate below 2% is considered acceptable for HEART score implementation in Europe
  - A missed event rate above 1% is unacceptable in the US.
Registry data from 1,070 low risk chest pain patients (1.1% incidence of MACE) in our OU.

- The HEART Pathway had 100% sensitivity
- The HEART Pathway would have identified 82% for early discharge without objective testing
HEART Pathway: ED Cohort

- Secondary data of the MIDAS trial
- 1005 patients (22% ACS rate) from 18 US EDs
- HEART pathway
  - 99% sensitive for ACS within 30 days
  - Identified 20% for early discharge

Considering the results of these studies:
- The HEART pathway can have a large impact in avoiding testing in low-risk patients, yet retains high sensitivity when applied to a higher risk population.
HEART Pathway RCT

- Single center RCT
- Designed to determine if real-time use of the HEART Pathway can safely identify patients for early discharge

- RCT arms
  - HEART Pathway
  - Usual Care: ACC/AHA guidelines
HEART Pathway RCT: Preliminary Data

- Interim analysis: 200 pts (101 HEART, 99 usual care)
- HEART Pathway
  - 41% early discharge rate from ED w/o objective testing
  - 20% absolute increase in early discharge from usual care (p=0.003)
  - 10 hour reduction in median LOS (p=0.032)
- No missed adverse cardiac events
HEART Pathway: Summary

- The HEART Pathway safely decreases utilization
  - Identifies patients for early discharge
  - Decreases LOS
  - Acceptable missed adverse event rate
- What is needed now is implementation
  - Test effectiveness
  - Confirm safety
Knowledge Translation Problem

- Slow uptake of research findings and evidence based medicine into daily clinical practice.
- Disconnect between research, educators, and health system leaders.

researchers
educators
administrators

? 

change in clinical practice
Advancing Effectiveness Research and Implementation Science in our Own Backyards:

- Goal: “Developing and implementing evidence-based solutions for improving health to enhance activities that facilitate collaboration across multidisciplinary research teams and educators and that engage clinical and health system partners.”
Broad Goal of this Project

- To build a transformative collaboration bridging the gap between research, education, and health systems operations to more effectively and efficiently provide patient care.
- The vanguard for this collaboration seeks to improve quality of care for patients with acute chest pain by implementing the HEART Pathway
- Collaboration should build framework for QI and knowledge translation.
Integrate the HEART Pathway into cardiovascular care delivery at WFBH.

- Engage key stakeholders within the health system
  - Across the disciplines of cardiology, primary care, nursing, and emergency medicine
Integrate the HEART Pathway

- Into EPIC EMR
Integrate the HEART Pathway

- Into EPIC EMR
Aims: Education

- Develop and test an inter-professional educational platform, spanning the spectrum of learners, to bridge the work of researchers, health system leaders, and educators.
2a) Build an educational framework to support integration of inter-professional quality improvement interventions, beginning with the HEART Pathway, into health system operations at WFBH.

2b) Develop and implement focused problem-solving sessions for undergraduate and graduate learners on team-based interventions to improve health system quality, safety, equity, and effectiveness.
Educational Framework Supporting Implementation

- Dynamic e-learning modules to ensure new content acquisition
- Pre-learning phase: Assure all learners enter the next stage with the same knowledge
- Tailor presentation to the learner (medical student, nurse, non-physician provider, resident, or faculty)
Educational Framework Supporting Implementation

- Dynamic e-learning modules to ensure new content acquisition

- Articulate software
- Responses to quizzes used for formative feedback and module improvement
Educational Framework Supporting Implementation

- Small group inter-professional collaborative practice small group sessions
  - Case scenarios: modified problem-based learning (PBL) approach
  - Group response questions used to facilitate discussions
  - Discuss the benefits of the intervention, to both the learner and the patient
Focused problem-solving sessions
- Engage learners across multiple disciplines
- Educators experienced in team-based quality improvement initiatives
- Discuss how to develop and implement quality improvement initiatives for other symptoms or disease processes.
Teaching Team-Based QI

- Focused problem-solving sessions
  - Brainstorm about possible quality measurements and initiatives
  - Review the current practice and literature
  - Develop a quality improvement
  - Present proposals
  - Best proposals refined by the learners and presented to the Wake HIT operations team which will provide feedback and consider the proposals for implementation.
Aims: Research

Test the safety and effectiveness of the HEART Pathway

Integrate the HEART Pathway into the EHR and leverage the EHR and insurer claims data to perform quality assurance surveillance among patients with acute chest pain.
Study design

- Pre-post study of the HEART Pathway intervention at Wake Forest Baptist Medical Center (WFBMC),
- Pre- and post-intervention cohorts will each accrue patients with acute chest pain for 1 year
- with a 3-month wash out/in period
Quality assurance surveillance data will be collected electronically from all patients using the EHR and insurers’ claims data will be used on a subset of patients insured by BCBS, MedCost, or Medicaid. Pre- and post-HEART Pathway cohorts will be compared for safety and healthcare utilization outcomes.
Outcomes

Assessed at 30 days and 1 year

- **Safety**
  - Death
  - Myocardial infarction

- **Effectiveness/ Healthcare Utilization**
  - Hospitalizations
  - Objective cardiac testing (stress testing and advanced cardiac imaging)
  - Recurrent ED visits
  - Index hospital length of stay
  - Cost
<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
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<tbody>
<tr>
<td>2013</td>
<td>2014</td>
<td>2015</td>
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<tr>
<td>Multidisciplinary collaboration to integrate the HEART Pathway into WFBH system.</td>
<td>Wash-in phase for HEART Pathway intervention</td>
<td>Identify post-implementation cohort</td>
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<td>Identify pre-implementation cohort</td>
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<td>E-surveillance for pre-implementation cohort</td>
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<td>Develop inter-professional educational platform</td>
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<td>Education/Training to support HEART Pathway Integration; e-learning lectures, small group PBL</td>
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<td>Focused problem-solving sessions focused on team based interventions to improve health system quality, safety, equity, and effectiveness</td>
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Wake HIT will convene on a regular basis

- Progress reports will be presented.
  - Operations, education, scientific (research/quality surveillance findings)pertaining to health system integration of the HEART Pathway.

Each Group will have separate regular meetings
Plan the HEART Pathway Implementation

- Integrate into WFBMC clinical workflow
- Integrate into EHR
- Data capture from EHR and claims data

**Operations Group**

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<tr>
<th>Executive Leaders</th>
<th>E-Surveillance Leaders</th>
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<tr>
<td>Russell Howerton</td>
<td>Ronald Gaskins (NWCC)</td>
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<td>Pamela Duncan</td>
<td>Susan Jackson (BCBS)</td>
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<td>Jennifer Houlihan</td>
<td>Sharon Lambros (MedCost)</td>
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<th>Performance Improvement Leaders</th>
<th>Clinical Leaders</th>
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<td>Hannah Shipton</td>
<td>Nursing:</td>
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<td>Susan Bachmeier</td>
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<td>Cardiology:</td>
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<td>David Zhao</td>
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<td>David Herrington</td>
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<td>Primary Care:</td>
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<td>Richard Lord</td>
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<td>Emergency Medicine:</td>
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<td>Chadwick Miller</td>
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<td>William Bryant</td>
<td>Scott Leddy</td>
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<td>John McCullough</td>
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<td>Brian Hiestand</td>
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- Build the educational framework to support HEART Pathway implementation
- Develop and implement focused problem-solving sessions for team-based QI
WAKE HIT: Research Group

- Study design
- Data management
- Pre-post Implementation surveillance

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<th>Research Group</th>
<th>Health Services</th>
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<tr>
<td>Cardiovascular Outcomes</td>
<td>Pamela Duncan Simon Mahler</td>
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<td>Gregory Burke Chadwick Miller Simon Mahler David Herrington Robert Riley</td>
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<td>Comparative Effectiveness</td>
<td>William Applegate</td>
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<td>Biostatistics</td>
<td>Douglas Case</td>
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Questions and Comments?