An evidence-based FHIR app for chest pain care

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NCIDEA™
Chest Pain Problem

- 5,025 Emergency Departments
- 8 M Chest Pain Visits
- $13 B Chest Pain Evaluation

- > 50% Patients Admitted
- < 10% Diagnosed with ACS
- 2-4% Missed ACS

*U.S. market per year; ACS = acute cardiac syndrome*
HEART Pathway Research

Estimated over $2 million in funding supported the development and clinical validation of HEART Pathway

- T-32 Training Grant
- Randomized clinical trial
- Implementation study
- Multi-site implementation study
- Multi-site assay validation study
- Pre-hospital applications study
Begin HEART Pathway

Learn More

Disclaimer

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Troponin at 0 and 3 hours recommended. If negative, discharge without stress testing or angiography. This guideline is not meant to replace clinical judgement.

<table>
<thead>
<tr>
<th>History</th>
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<tbody>
<tr>
<td>Middle- or left-sided</td>
</tr>
<tr>
<td>Pinpoint or localized</td>
</tr>
<tr>
<td>NOT heavy/pressure/tightness</td>
</tr>
<tr>
<td>Pain is sharp</td>
</tr>
<tr>
<td>Worse with exertion</td>
</tr>
<tr>
<td>NOT relieved by nitroglycerin</td>
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<tr>
<td>Pain does NOT radiate</td>
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</tbody>
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After negative serial troponins

2 HEAR Score*

<1% risk of MACE within 30 days
The HEART Pathway should not be used for patients with:

- STEMI
- ischemic ECG changes
- coronary artery disease
HEART Pathway Delivers Results

**Enhanced Safety**
Clinically validated in RCT
<br/>
< 1% missed acute cardiac events

**Reduced Cost**
Objective criteria = consistency
<br/>
Over 90% physician adherence

**Better Outcomes**

Results from: Wake Forest Baptist Medical Center
HEART Pathway Delivers Results

Enhanced Safety

$7,810,000 cost reduction in two years*

21% increase in early discharge

12 hour reduced average length of stay

Reduced "observation status" admissions

Reduced Cost

Better Outcomes

* Extrapolated from dataset

Results from: Wake Forest Baptist Medical Center
HEART Pathway Delivers Results

- Enhanced Safety
- Reduced Cost
- Better Outcomes

Used with over 10,000 patients

Less unnecessary testing and risk

Shorter hospital stay

Transparency in care / discharge plan

Results from: Wake Forest Baptist Medical Center
HEART Pathway Validation

The HEART Pathway randomized clinical trial: identifying emergency department patients with acute chest pain for early discharge, Circulation 2015

HEART Pathway accelerated diagnostic protocol implementation: prospective pre-post interrupted time series design and methods, JMIR 2016

A multidisciplinary self-directed learning module improves knowledge of a quality improvement instrument: the HEART Pathway, J Healthcare Quality 2016

Adherence to an accelerated diagnostic protocol for chest pain: secondary analysis of the HEART Pathway randomized trial, AJEM 2016

Chest pain risk stratification: a comparison of the 2-hour accelerated diagnostic protocol (ADAPT) and the HEART Pathway, Critical Pathways in Cardiology 2016

Use of the HEART Pathway with high sensitivity cardiac troponins: A secondary analysis, Clinical Biochemistry 2017
How HEART Pathway Uses FHIR

**Provider Authentication**
EMR bridges single sign-on with FHIR token
Reduces passwords user needs to remember
Speeds up the launch sequence

**Read Access**
Query discrete observations relevant to algorithm
Incorporate into run sequence
Improves runtime and accuracy of inputs

**Write Access**
Create record in EMR after runtime is complete
Store results directly in the patient medical record
Log record of use and HEART Pathway results

*Pre-production status, implementing at first client site this month:* CHA
Data Analytics and Insights
Next Steps

• Bring HEART Pathway to hospitals
• Launch in Cerner AppStore
• Develop new clinical pathways
• Create machine learning algorithms
• Explore R&D collaborations
• Close financing round with investor
Let’s get started

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1. A patient presents to the emergency room with a chief complaint of “chest pain”.

2. A best practice advisory (BPA) in EMR is triggered automatically or manually by the physician.

3. The physician clicks a link in the BPA which opens up the HEART Pathway algorithm.

4. The physician enters patient history, symptoms and ECG variables into HEART Pathway.
In seconds, **HEART Pathway** displays a risk assessment and clinical guidance.

The physician can copy **HEART Pathway** results into the EMR and print a patient handout.

The physician cares for the patient using best clinical judgment and **HEART Pathway** guidance.

Analytical insights are accessible in real time through the administrative dashboard.
Implementation Timeline

Engage
Week 1  Work with client and EMR vendor to enable SMART/FHIR

Implement
Week 2-3  Build client-specific BPA trigger and framework into EMR

Validate
Week 4  Verify functionality of application and data dashboard

Educate
Week 5  Provide training materials for client providers as needed

Launch
Week 6  Launch and go live with HEART Pathway at client site