Preventing Heart Failure Readmissions by Using a Risk Stratification Tool

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28th International Nursing Research Congress
July 28, 2017
Ronald Reagan UCLA Medical Center
Los Angeles, CA, USA
Introduction

- Heart disease is the leading cause of death for both men and women in most ethnicities in the United States.
- Heart failure (HF) is the final common pathway for heart disease.
- About half of people who develop HF die within 5 years of diagnosis.
- HF continues to be a major burden in healthcare system despite the advances in medical knowledge and technology.
  - High rates of morbidity, mortality, and cost
Background

• Most of the cost associated with the care of HF patients is attributable to patient rehospitalizations.

• Nearly one in four patients hospitalized with HF is rehospitalized within 30 days of discharge.

• 30 day rates of rehospitalizations in HF have risen over the past 2 decades.

• HF rehospitalizations may be preventable, but effective strategies to prevent rehospitalizations were traditionally underutilized due to lack of incentives.
Traditional Heart Failure Admission

- Tune up with diuretics
- A little bit of education
- List of discharge prescriptions
- Push patient out the door and wave good-bye

Bye-bye...Don’t come back within 30 days!!
TAKE ONE THREE TIMES A DAY AND COME BACK IN 43 YEARS!
All-Cause Mortality After Each Subsequent Rehospitalization for HF

The risk of death is greatest in the early period after hospital discharge and is directly related to the frequency of HF hospitalizations.

What Causes Hospital Readmissions?

- Fragility on discharge
- Lack of understanding of discharge instructions
- Stresses within the hospital
- Inability to carry out discharge instructions

Readmissions
Preventing Avoidable Heart Failure Readmissions

**AIM**

**PRIMARY DRIVERS**
- Identify patients at high-risk for readmission
- Coordinate information along the care continuum
- Ensure adequate follow-up and community resources

**SECONDARY DRIVERS**
- Effective risk assessment and simplified risk stratification.
- Enhanced admission assessment of discharge needs.
- Engagement of interdisciplinary team members to coordinate care.
- Patient-centered medical record.
- Timely communication with members of the outpatient care team.
- Accurate medication reconciliation at admission and discharge.
- Coordination with providers to facilitate resources and f/u needs.
- Implement post-discharge call and visits for high-risk patients.
- Determine the available community resources for the highly vulnerable populations.
30-Day HF and AMI Readmission Rate
Ronald Reagan UCLA Medical Center

Data Source: UHC 2015 Risk Model
30-Readmission Rates by Unit
Heart Failure Service Line – Ronald Reagan UCLA Medical Center

Data Source: UHC 2015 Risk Model
How Does It Work?

• 35 hospitals recruited over 3 years
• Established administrator and physician champions as well as Navigator team members
• American College of Cardiology (ACC) provided onsite training, toolkits, assessments, and webinars
• Hospitals required to report back on metrics
HF/AMI Readmission Committee
ACC Patient Navigator Program Team Charter

Charge
To reduce avoidable hospital readmissions by providing personalized support to patients diagnosed with:
• Acute Myocardial Infarction
• Heart Failure
• Use data to understand all causes of AMI and HF readmissions at Ronald Regan Medical Center
• The data will drive our interventions and improvements in quality
• Develop and apply patient-centered solutions that address functional disabilities, stressors, and other challenges confronting AMI and HF patients that increases these patients’ risk of readmission.
• Risk Model to identify high risk of readmissions prior to discharge
• Verifying follow-up appointments are documented in the medical record
  − 7-day follow-up appointments for all patients
  − Follow-up visit for cardiac rehab (MI patients)
• Identify AMI and CHF patients to be part of our committee and give us timely feedback
• Education (e.g. teach-back) and documentation
  − Treatment regimen (self-care plan) and when to call their health provider
  − Documentation of all prescribed medications and instructions on when and how they should be taken, and about any changes to medications
  − Community resources for patients
• Performance and documentation of medication reconciliation

Guiding Principles

Goals

Navigator Identified Opportunities for Improvement
Risk Prediction Models

- Risk scores allow a prediction to be made to assist in clinical decision making.
- Use factors to calculate or predict an outcome.
- Models are usually developed from large data sets using logistic regression with a combination of categorical and continuous variables.
- Aim to determine the likelihood of the future event occurring within a given population.
- Risk can be assessed in either relative or absolute conditions.
  - Relative risk is the risk of the endpoint, such as disease, death, readmission, among those exposed versus the risk of the endpoint among the unexposed.
  - Absolute risk, is the probability of an event in a population under study, as contrasted with the relative risk.

Risk Tools

• Clinical risk models
  • CMS Risk Model
  • OPTIMIZE-HF Post Discharge Risk Model
  • GWTG-HF Post Discharge Risk Model
  • Lace/Lace+ Index

• Biomarkers
  • BNP / NT-BNP
  • Galectin-3

• Time limited disease management
  • First 30 days of discharge
LACE Index

• Used to predict the risk of unplanned readmission within 30 days after hospital discharge in both medical and surgical patients.

• The LACE high risk index may have utility as a screening tool to predict high risk ED revisits after hospital discharge.

• The LACE index may not accurately predict unplanned readmissions within 30 days from hospital discharge in CHF patients.
The tool scores patients from 0 to 19 on the basis of all the following parameters:

- **Length of stay (L)** of the index admission.
- **Acuity of admission (A)** - specifically if the patient is admitted through the Emergency Department vs. an elective admission.
- **Comorbidity (C)** - incorporates the Charlson Co-Morbidity Index.
- **Emergency department visits in the preceding 6 months (E)**.

**Step 1. Length of Stay**
Length of stay (including day of admission and discharge): ________ days

<table>
<thead>
<tr>
<th>Length of stay (days)</th>
<th>Score (circle as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4-6</td>
<td>4</td>
</tr>
<tr>
<td>7-13</td>
<td>5</td>
</tr>
<tr>
<td>14 or more</td>
<td>7</td>
</tr>
</tbody>
</table>

**Step 2. Acuity of Admission**
Was the patient admitted to hospital via the emergency department?
If yes, enter “3” in Box A, otherwise enter “0” in Box A

**Step 3. Comorbidities**

<table>
<thead>
<tr>
<th>Condition (definitions and notes on reverse)</th>
<th>Score (circle as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous myocardial infarction</td>
<td>+1</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>+1</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>+1</td>
</tr>
<tr>
<td>Diabetes without complications</td>
<td>+1</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>+2</td>
</tr>
<tr>
<td>Diabetes with end organ damage</td>
<td>+2</td>
</tr>
<tr>
<td>Chronic pulmonary disease</td>
<td>+2</td>
</tr>
<tr>
<td>Mild liver or renal disease</td>
<td>+2</td>
</tr>
<tr>
<td>Any tumor (including lymphoma or leukemia)</td>
<td>+2</td>
</tr>
<tr>
<td>Dementia</td>
<td>+3</td>
</tr>
<tr>
<td>Connective tissue disease</td>
<td>+3</td>
</tr>
<tr>
<td>AIDS</td>
<td>+4</td>
</tr>
<tr>
<td>Moderate or severe liver or renal disease</td>
<td>+4</td>
</tr>
<tr>
<td>Metastatic solid tumor</td>
<td>+6</td>
</tr>
</tbody>
</table>

If the TOTAL score is between 0 and 3 enter the score into Box C.
If the score is 4 or higher, enter 5 into Box C

**Step 4. Emergency department visits**
How many times has the patient visited an emergency department in the six months prior to admission (not including the emergency department visit immediately preceding the current admission)?
Enter this number or 4 (whichever is smaller) in Box E

Add numbers in Box L, Box A, Box C, Box E to generate LACE score and enter into box below.

LACE  Score Risk of Readmission: > 10 High Risk
Reliability and Validity

• Of all the various tools available, LACE has been studied most extensively.

• Moderate to high predictive value in identifying those patients at risk for readmission.

• High predictive value in identifying those patients at risk to return the Emergency Department.

• The LACE index was very discriminative for early death (C statistic 0.793, 95% CI 0.733–0.854) and well calibrated (Hosmer–Lemeshow statistic 4.7, p = 0.79).
The **LACE+ Index** (score 0-90) is a modified version of the LACE Index in which each patient receives a score based on all the same parameters used by LACE, as well as the following:

- **Age**
- **Gender**
- **Teaching status of the hospital**
- **Number of days on alternative level of care during admission**
- **Number of elective admissions in previous year**
- **Number of urgent admissions in previous year**

### Covariates in LACE+

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER</td>
<td>3</td>
</tr>
<tr>
<td>ACUITY OF ADMISSION</td>
<td>15</td>
</tr>
<tr>
<td>(Original LACE Score added 3 points if admitted as inpatient)</td>
<td></td>
</tr>
<tr>
<td>TEACHING STATUS of the hospital</td>
<td>-1</td>
</tr>
<tr>
<td>(Original LACE Score added up to max 6 points if LOS ≥ 14 days)</td>
<td></td>
</tr>
</tbody>
</table>

### LACE+ Risk Stratification

| Highest Risk (Hot Pink) | 79-90 |
| High Risk (Red) | 59-78 |
| Moderate Risk (Yellow) | 29-58 |
| Minimal Risk (Green) | 0-28 |

### Table 1

<table>
<thead>
<tr>
<th>Previous urgent admissions &gt; 0</th>
<th>Previous urgent admissions = 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Charlson 0</td>
</tr>
<tr>
<td>&lt;25</td>
<td>25</td>
</tr>
<tr>
<td>25-40</td>
<td>26</td>
</tr>
<tr>
<td>41-60</td>
<td>27</td>
</tr>
<tr>
<td>61-80</td>
<td>28</td>
</tr>
<tr>
<td>81-100</td>
<td>29</td>
</tr>
<tr>
<td>&gt;100</td>
<td>30</td>
</tr>
<tr>
<td>25-40</td>
<td>32</td>
</tr>
<tr>
<td>41-60</td>
<td>33</td>
</tr>
<tr>
<td>61-80</td>
<td>35</td>
</tr>
<tr>
<td>&gt;80</td>
<td>38</td>
</tr>
</tbody>
</table>

### Charlson Comorbidities

<table>
<thead>
<tr>
<th>Charlson</th>
<th>Comorbidities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MI, peripheral vascular disease, cerebrovascular disease, diabetes without complications</td>
</tr>
<tr>
<td>&gt;1</td>
<td>CHF, COPD, mild liver disease, cancer</td>
</tr>
<tr>
<td>2</td>
<td>Dementia, rheumatic disease</td>
</tr>
<tr>
<td>3</td>
<td>Moderate/severe liver disease, AIDS/HIV</td>
</tr>
<tr>
<td>4</td>
<td>Metastatic solid tumor</td>
</tr>
</tbody>
</table>
Strategies in Response to LACE Score

- Identify patients At Risk for Readmission
- Improve self-management skills
- Coordination of care along the care continuum
- Adequate follow-up and community resources
<table>
<thead>
<tr>
<th>Intervention Needed and Responsible Provider</th>
<th>LACE Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (0–6)</td>
</tr>
<tr>
<td>Standardized D/C summary (after-visit summary)</td>
<td>X</td>
</tr>
<tr>
<td>Medication reconciliation (MD/pharmacist)</td>
<td>X</td>
</tr>
<tr>
<td>Update medication list (RN)</td>
<td>X</td>
</tr>
<tr>
<td>Physical therapy consultation</td>
<td>X</td>
</tr>
<tr>
<td>Pharmacy 1:1 teaching</td>
<td>X</td>
</tr>
<tr>
<td>Social work (psychosocial issues/complex cases)</td>
<td></td>
</tr>
<tr>
<td>Care coordination: home health, community-based care transition program (case management)</td>
<td>X</td>
</tr>
<tr>
<td>Nutrition 1:1 teaching (dietician)</td>
<td></td>
</tr>
<tr>
<td>Post hospital follow-up visit with physician (Department of Medicine staff)</td>
<td>≤ 5 days</td>
</tr>
<tr>
<td>Palliative care (PRN)</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: D/C, discharge; LACE, length of stay, acuity of admission, comorbid conditions, and emergency department visits; MD, physician; PRN, as needed; RN, registered nurse.
LACE Interventions: 9/15/15-11/30/15

High Lace Score Interventions

<table>
<thead>
<tr>
<th>Intervention</th>
<th>% of Total Sampled Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readmission</td>
<td>37.50%</td>
</tr>
<tr>
<td>Pharm Admission</td>
<td>90.63%</td>
</tr>
<tr>
<td>Pharm Discharge</td>
<td>22.92%</td>
</tr>
<tr>
<td>Diet</td>
<td>79.17%</td>
</tr>
<tr>
<td>Physical Therapy</td>
<td>54.17%</td>
</tr>
<tr>
<td>Social Work</td>
<td>47.92%</td>
</tr>
<tr>
<td>Case Management</td>
<td>80.21%</td>
</tr>
<tr>
<td>Follow Up w/ PCP or Card</td>
<td>75.00%</td>
</tr>
</tbody>
</table>

96 Cases
# Visual Management

**LACE Score ≥ 11**

<table>
<thead>
<tr>
<th>Care Coordination</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT Consult (MD order needed)</td>
<td></td>
</tr>
<tr>
<td>Pharmacy 1:1 Teaching</td>
<td></td>
</tr>
<tr>
<td>Social Work Consult</td>
<td></td>
</tr>
<tr>
<td>Case Management Consult</td>
<td></td>
</tr>
<tr>
<td>Nutrition Consult</td>
<td></td>
</tr>
<tr>
<td>Follow Up Visit Scheduled (AVS)</td>
<td></td>
</tr>
</tbody>
</table>

**Nursing Interventions**

| Day 1 | Education assessment/identify primary caregiver |           |
| Day 2 | Education: diagnosis/condition, medications & self-care (TEACH BACK) |           |
| Day 3 | Discharge Day: AVS reconciliation               |           |

[Note: The table includes options to check off completed tasks.]
Physician Reminders

LACE Score > 11

✓ Document comorbidities in CareConnect Problem List

✓ Place an order for Physical Therapy and Home Health

✓ Place discharge medication orders to the UCLA outpatient pharmacy 24 hours prior to discharge
  ▪ This ensures 1:1 pharmacy teaching for patients.

✓ Post hospital follow up visit with a Cardiologist or PCP within 3 days
  ▪ Request appointment on Friday if the patient will be d/c on the weekend.
  ▪ STAT request: appointment will be scheduled prior to patient discharge or within 24 hours of patient discharge on business day.
Three Specific Goals

1. To ensure seamless transition of high-risk HF patients to community by optimizing utilization of Home Health, Community-based Care Transitions Program (CCTP), and Interdisciplinary Rounds (IDR) by ≥80% by June 30, 2016

2. To ensure timely and high-quality follow-up with cardiologist and/or primary-care physician for all HF patients within 3-5 days, with an initial target of ≥80% of patients by June 30, 2016.

3. Increase nutrition consult for all high risk HF/AMI LACE patients (score ≥11) by his/her discharge date to ≥80% by June 30, 2016.
Key Strategies: LACE Implementation

Optimization of the LACE score

Partners in Care Relationship

Medicine Resident champion

Daily IDR

Education on home health services
Where have we been?
- No risk assessment tool used routinely
- No interventions associated with risk assessment score
- Delayed referrals to home health
- Unstructured IDR

Where are we today?
- During IDR, case management informs team on the patient’s LACE score
- The score is also communicated during the discharge planning meeting
- If a patient is in-house 4 days EPIC automatically triggers a consult to nutrition and pharmacy

Where are we going?
- Roll out LACE plus system wide
- Review data for patients who have a high LACE score
Key Strategies: Follow-up Appointments

- Education to residents and attending physicians
- EHR Tip Sheet for physicians to make f/u appointment request
- STAT requests for high risk patients
- Loop-back appointments
Where have we been?
• Inconsistent follow-up clinic appointments
• Follow-up orders written for the wrong time frames
• Limited patient transportation options

Where are we today?
• House staff triggers follow-up system and navigators call patients to schedule appointments
• Navigators understand the urgency of follow-up appointments for HF patients and places order as STAT
• Navigators help to identify patient barriers for appointments

Where are we going?
• Looking into using UberHealth for transportation barriers
Key Strategies: Nutrition

- Standardize education for HF
- Have LACE score available during rounds
- MD/RN refer high risk pt to nutritionist
Nutrition

Where have we been?

- Delayed referrals to nutrition services
- High risk patients were defined different by nutritionist
- Lack of standardized nutrition education

Where are we today?

- LACE Score available during rounds
- Standardized referral process

Where are we going?

- Continue to look into auto referrals in EPIC for nutrition consult
- Continue to refine educational resources
Results
HF 30-day Unadjusted Readmission Rate (Metric 1)

- Baseline
- 2015 Q2
- 2015 Q3
- 2015 Q4
- 2016 Q1
- 2016 Q2
- 2016 Q3
- 2016 Q4

- My Hospital Quarterly Data
- Navigator Hospitals’ Means
- Hospital Baseline

UCLA Health
Evaluation of LV Systolic Function for the HF Patient (Metric 7)

- Baseline
- 2015 Q2
- 2015 Q3
- 2015 Q4
- 2016 Q1
- 2016 Q2
- 2016 Q3
- 2016 Q4

- My Hospital Quarterly Data
- Navigator Hospitals' Means
- Hospital Baseline

UCLA Health
HF Patients Identified Prior to Discharge (Metric 8)

- Baseline
- 2015 Q2
- 2015 Q3
- 2015 Q4
- 2016 Q1
- 2016 Q2
- 2016 Q3
- 2016 Q4

- My Hospital Quarterly Data
- Navigator Hospitals' Means
- Hospital Baseline

UCLA Health
Follow-up Appointment Scheduled within 7 Days for the HF Patient (Metric 10)

- My Hospital Quarterly Data
- Navigator Hospitals' Means
- Hospital Baseline

Baseline, 2015 Q2, 2015 Q3, 2015 Q4, 2016 Q1, 2016 Q2, 2016 Q3, 2016 Q4

UCLA Health
HF Patient Attends Follow-up Appointment Within 7 Days After Discharge (Metric 11)

- My Hospital Quarterly Data
- Navigator Hospitals' Means
- Hospital Baseline
Summary:

Strategies to Improve Readmissions

- Readmissions Risk Assessment Tool is now in the EHR
- Ability to identify patients at higher risk using LACE+
- Develop plan of care based on the results of the risk assessment

Stratify intervention by patient risk level

- Low risk: focus on prevention and wellness
- Moderate risk: Work on symptom management, good follow-up, literacy appropriate teaching strategies with strong teach back emphasis
- High risk: Identify any physiological determinants that would continue to send patient back and in those cases address quality of life, advance directives, and palliative care with the patient and family/caregiver
Thank You!

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