Achieving Cholesterol Management Goals: Identifying Clinician-Centered Challenges to Optimal Patient Care
Purpose

Explore the adherence rates to cholesterol treatment targets among patients who seek care at all University of Pennsylvania Health System (UPHS) outpatient clinics.
Primary Questions

1. What proportion of patients at UPHS are meeting cholesterol treatment goals according to major national guidelines?

2. Do the proportion of patients receiving care at UPHS who meet cholesterol treatment targets vary according to specific cholesterol treatment guideline used?

3. Are patients treated at UPHS more likely to meet cholesterol treatment targets according to the NLA guidelines versus the ACC/AHA guidelines?
Secondary Questions

1. What is the likelihood of reaching cholesterol treatment targets according to physician and patient factors?

2. Do physician or patient factors influence the likelihood of reaching cholesterol treatment goals according to the different guidelines?
Background

- Clinical Atherosclerotic cardiovascular disease (ASCVD) remains the leading cause of death in the US
- 1 in 3 adults has cardiovascular disease (CVD)
- 1 in 2 adults has a total cholesterol > 200 mg/dl
- Cholesterol continues to be a major risk factor for CVD and it is the foundation that explains atherosclerosis progression
- The LDL hypothesis has not changed for decades – the higher the LDL the high the cardiovascular risk
- Statins and reduction in the risk of myocardial infarction, stroke, and all cause mortality
- Despite the known benefits, prescribing of statins is low and LDL goals are below target
Background

- According to the 2015 Heart disease and stroke statistics fewer than 50% of people with dyslipidemia are treated.
- ~2/3 of people with high LDL-c on treatment are not able to control their cholesterol.
ACC/AHA Guidelines

**High**
- CAD < 75 yo
- LDL > 190
- DM > 7.5%
- Atorva 40, 80
- Crestor 20, 40
- LDL < 70 - 100
- Non-HDL < 100 - 130
- Advanced Labs

**Mod**
- CAD > 75 yo
- DM < 7.5%
- Risk > 7.5%
- Atorva 10, 20
- Rosuv 5, 10
- Simva 20, 40
- Prava 40, 80
- LDL < 100
- Non-HDL < 130
- Advanced Labs

**Low**
- < 7.5%
- Family history of CAD
- CAC
- ABI/PVR
- hsCRP
- Consider risk (CKD)
  - If treat, mod goals
# 2014 NLA Recommendations

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>LDL-C Target Levels</th>
<th>Non-HDL Target Levels</th>
<th>Recommended Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk</td>
<td>&lt;100 mg/dL</td>
<td>&lt;130 mg/dL</td>
<td><strong>First Line:</strong> Moderate- to high-intensity statin</td>
</tr>
<tr>
<td>Moderate risk</td>
<td>&lt;100 mg/dL</td>
<td>&lt;130 mg/dL</td>
<td><strong>Second Line:</strong> Bile acid sequestrants</td>
</tr>
<tr>
<td>High risk</td>
<td>&lt;100 mg/dL</td>
<td>&lt;130 mg/dL</td>
<td>Cholesterol absorption inhibitors</td>
</tr>
<tr>
<td>Very high risk</td>
<td>&lt;70 mg/dL</td>
<td>&lt;100 mg/dL</td>
<td>Nicotinic acid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fibric acids</td>
</tr>
</tbody>
</table>

AACE, Canadian, and European national guidelines for lipid management also endorsed LDL-c targets
Method

Study Population

- We restricted our analysis to patients affiliated with UPHS between September 1, 2014 to August 31, 2015.
- We identified all patients meeting criteria for statin therapy by 2013 ACC/AHA and NLA.
- We used the UPHS electronic health record (EHR) to identify all patients (EPIC version 2014; Verona, WI).
Method

Data Collection

- Adherence to statin therapy was assessed for both the ACC/AHA Guidelines and NLA Recommendations.
- A sub analysis categorized the patients by whether they were seen in the Internal Medicine, General Cardiology, or Preventive Cardiology Departments.
- We also assessed adherence by risk profile and determined the percentage of patients, and their average LDL-cholesterol level.
The study protocol was approved by the Institutional Review Board of the University of Pennsylvania.
Results

- A total of 101,604 patients met criteria for the statin benefit group per the Guidelines
- A total of 172,962 patients met criteria for lipid lowering therapy per NLA Recommendations
- 38% versus 36% adherence
Sub analysis of patients that met ACC/AHA Guidelines by risk profile

- ASCVD age < 75; 39%; n = 25,570
- ASCVD age ≥ 75; 71%; n = 13,633
- LDL-c > 190; 18%; n = 10,301
- DM + risk < 7.5%; 56%; n = 5,498
- DM + risk ≥ 7.5%; 34%; n = 34,352
Sub analysis of patients adherent to NLA Recommendations by risk profile

- Low risk; 40%; n = 63,860
- Moderate risk; 39%; n = 36,639
- High risk; 55%; n = 30,527
- Very high risk; 28%; n = 41,939
Percentage of Very High Risk and High Risk patients adherent to NLA Recommendations taking non-statin in addition to statin.
The average LDL-c (mg/dL) of patients who did not achieve goal by NLA recommendations

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Average LDL-c (mg/dL)</th>
<th>NLA treatment goals LDL-c (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>126</td>
<td>&lt;100</td>
</tr>
<tr>
<td>Moderate Risk</td>
<td>125</td>
<td>&lt;100</td>
</tr>
<tr>
<td>High Risk</td>
<td>135</td>
<td>&lt;100</td>
</tr>
<tr>
<td>Very High Risk</td>
<td>106</td>
<td>&lt;70</td>
</tr>
</tbody>
</table>
Summary of findings

- There is less than optimal adherence to both the ACC/AHA Guidelines and NLA Recommendations
- Adherence rates are similar for ACC/AHA Guideline as for NLA Recommendations, and approach ~50% across the health system — Overlap in management; ACC/AHA Guidelines may be mostly academic without a large clinical impact
- Patients at the highest ASCVD risk were less likely to meet guideline recommendations by both ACC/AHA and NLA
Summary of Findings

- Lower achievement rates were seen for very high-risk patients by NLA Recommendations.
- General Cardiology and Preventive Cardiology rates were higher than Internal Medicine and throughout the health system.
- Adherence rates were higher in older high risk patients (ASCVD >75 yo) compared to younger patients.
Our Findings were consistent with other published studies

- Unni et al. (2016): Retrospective cohort study which found that 1-year from diagnosis of coronary heart disease or a coronary heart disease risk equivalent 38.7% and 44.3% of patients respectively were not prescribed a statin.

- The PINNACLE registry also demonstrated that patients with ASCVD and comorbid CVD risk factors were less likely to achieve lipid/lipoprotein goals.
Achieving LDL-C Goals Remains a Challenge

Real world retrospective analysis of 9,950 CAD patients from a large cardiology practice

- Patients Attaining LDL-C <70 mg/dL (%)
  - Statin Alone: 37
  - Statin + Niacin: 46
  - Statin + Ezetimibe: 41
  - Statin + Fibrates: 35

More patients achieved an LDL-C <70 mg/dL with statin plus niacin (P<0.001) and with statin plus ezetimibe (P=0.01) as compared with statin alone. Statin plus fibrates did not improve LDL-cholesterol goal attainment as compared to statin alone (P=0.23); 80.4% of patients used statins.

LDL-C <70 mg/dL Difficult to Achieve Even with High-Dose Statin

But lower events rates if you can

Meta-analysis of 8 randomized statin trials with 38,153 patients

- LDL-C <70 mg/dL: >40% on high-dose statin did not reach goal

Major cardiovascular events based on achieved LDL-C

- 75 to <100 mg/dL: HR 0.56 (95% CI, 0.46-0.67)
- 50 to <75 mg/dL: HR 0.51 (95% CI, 0.42-0.62)
- <50 mg/dL: HR 0.44 (95% CI, 0.35-0.55)
Nurse practitioner role in optimizing care: what are the clinical challenges that interfere with adherence to practice guidelines?

• Clinical guidelines are meant to guide and not to dictate.
• However, guidelines may not be as explicit and lack clarity. This creates:
  a. Confusion and uncertainty pertaining to guideline interpretation
  b. Leading to variety of interpretation and variation in care measures
• Decreased practice variation has been linked to decreased cost and Improvement of outcomes
• Key is to incorporate measures to improve clinician adherence to practice guidelines (such as ???)
Recommendations

- Failure to reach cholesterol treatment targets could be partly related to failure of use of non statin agents
  a. ACC Consensus Statement on the role of non-statins
  b. IMPROVE-IT
  c. Advent of PCSK 9 inhibitors

- In order to improve adherence, we intend to improve educational opportunities and to establish reminder systems in the EMR

- Future guidelines should find a way to merge the two approaches
Conclusion

- Poor adherence to statin therapy has been well documented in a variety of studies.
- Achieving optimal LDL-c goal for high risk and very high risk patients remain a challenge.
- The use of non-statin agents (PCSK 9 inhibitors and Ezetimibe) are expected to contribute to positive clinical outcomes when added to statin therapy. Clinician awareness??

References