Innovative hyperlipidemia screening protocol focusing on 10-year risk of atherosclerotic cardiovascular disease

Christopher H. Nakagawa, Pharm.D. Candidate; Caroline J. Rhee, Pharm.D. Candidate; Vivian L. Tran, Pharm.D. Candidate;
Jarred B. Prudencio, Pharm.D., BC-ADM

The Daniel K. Inouye College of Pharmacy, University of Hawai'i at Hilo

Background

- The Daniel K. Inouye College of Pharmacy's previous hyperlipidemia screening protocol allowed all community members older than 18 years of age to receive a point-of-care lipid panel or total cholesterol test
- The college of pharmacy's initial protocol focused on a patient's specific total cholesterol, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglyceride levels
- Screening costs - lipid panels and cholesterol tests - escalated to thousands of dollars, challenging students to create a more cost-effective screening protocol

Objective

- Develop a new hyperlipidemia screening protocol that validates the use of point-of-care tests to improve the overall cost of community outreach screening events
- Create a screening protocol that incorporates the patient's 10-year atherosclerotic cardiovascular disease (ASCVD) risk score to reflect the 2013 American College of Cardiology (ACC)/American Heart Association (AHA) cholesterol guideline

Methodology

- The campus wide screening protocol was developed and implemented in September 2016
- A patient questionnaire form (Figure 1) was used to determine all patients' eligibility for a point-of-care lipid panel
- Tables depicting patients' 10-year ASCVD risk score were designed to include all possible risk factor combinations, with age in 5 year increments (Figure 2)
- The total amount of point-of-care lipid panels and total cholesterol tests utilized, test strips ordered, and overall cost of supplies were gathered from each of the school's student organizations and the student services department

Figure 1. Patient Questionnaire

DKICP Health Screening
Hyperlipidemia Preliminary Questions

1. Are you currently taking any cholesterol lowering medications? **YES / NO**
   a. Have you ever had a heart attack or a stroke? **YES / NO**
   b. If the patient is taking cholesterol lowering medications or has a history of ASCVD:
      i. **DO NOT** PROCEED WITH LIPID PANEL
2. When was the last time you saw your physician? _____
3. Ask the question below **ONLY** to patients who are taking cholesterol lowering medication:
   Do you remember your pretreatment HDL and TC values? If so, what are they? **HDL:**_____
   a. Patient levels must be BEFORE receiving cholesterol lowering treatment **TC:**_____
4. How old are you? (Must be 40 - 79 for ASCVD) **Age:**_____
   a. (1 pt for Males ≥ 45 yo, Females ≥ 55 yo)
5. Have you been diagnosed with HTN or are you taking any BP lowering medication? **(1 pt)** **YES / NO**
   a. MEASURE BLOOD PRESSURE AND RECORD VALUES _____
6. Do you currently have diabetes? **(1 pt)** **YES / NO**
7. Do you smoke? **(1 pt)** **YES / NO**
8. Has anyone in your immediate family suffered from a heart attack or stroke? If so, how old were they? **YES / NO**
   a. Immediate family includes: parents, siblings, and children **Age:**_____
   b. (1 pt for Males ≤ 55 yo, Females ≤ 65 yo)
9. Are you of African American heritage? **(1 pt)** **YES / NO**

*Additional **1 pt** for male patients

Total Risk Factors (points): _____

IF THE PATIENT HAS 5 OR MORE RISK FACTORS, BETWEEN THE AGE OF 40-79, IS NOT TAKING A CHOLESTEROL LOWERING MEDICATION, AND HAS NO HISTORY OF ASCVD, PROCEED WITH LIPID PANEL.

IF THE PATIENT HAS LESS THAN 5 RISK FACTORS, OUTSIDE THE AGE OF 40-79, IS TAKING A CHOLESTEROL LOWERING MEDICATION, OR HAS A HISTORY OF ASCVD, DO NOT PROCEED WITH LIPID PANEL.

Results

- Main focus of the newly implemented protocol was to increase patients' understanding of their individual risk factors contributing to their ASCVD risk score

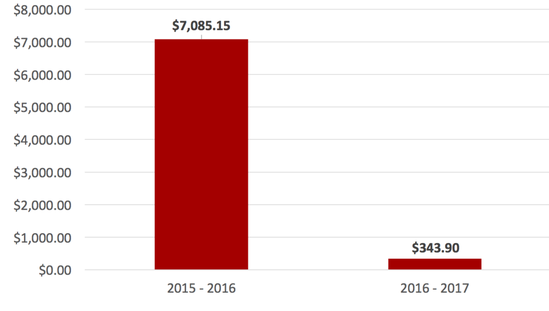
Figure 2. ASCVD Risk Sheets

Gender	Age	Race	TC	HDL	SBP	HTN Tx	Diabetes	Smoker	10 yr-ASCVD Risk Score
Male	60	African American	200	50	120	N	N	N	7.3%
Male	60	African American	240	40	160	N	N	N	13.5%
Male	60	African American	200	50	120	N	N	Y	12.3%
Male	60	African American	240	40	160	N	N	Y	22.2%
Male	60	African American	200	50	120	N	Y	N	13.5%
Male	60	African American	240	40	160	N	Y	N	24.1%
Male	60	African American	200	50	120	N	Y	Y	22.2%
Male	60	African American	240	40	160	N	Y	Y	38.9%
Male	60	African American	200	50	120	Y	N	N	11.9%
Male	60	African American	240	40	160	Y	N	N	22.1%
Male	60	African American	200	50	120	Y	N	Y	19.7%
Male	60	African American	240	40	160	Y	N	Y	35.1%
Male	60	African American	200	50	120	Y	Y	N	21.5%
Male	60	African American	240	40	160	Y	Y	N	37.8%
Male	60	African American	200	50	120	Y	Y	Y	34.2%
Male	60	African American	240	40	160	Y	Y	Y	56.1%
Male	65	African American	200	50	120	N	N	N	8.9%
Male	65	African American	240	40	160	N	N	N	16.2%
Male	65	African American	200	50	120	N	N	Y	14.8%
Male	65	African American	240	40	160	N	N	Y	26.3%
Male	65	African American	200	50	120	N	Y	N	16.2%
Male	65	African American	240	40	160	N	Y	N	28.6%
Male	65	African American	200	50	120	N	Y	Y	26.3%
Male	65	African American	240	40	160	N	Y	Y	44.1%
Male	65	African American	200	50	120	Y	N	N	14.3%
Male	65	African American	240	40	160	Y	N	N	26.2%
Male	65	African American	200	50	120	Y	N	Y	23.5%
Male	65	African American	240	40	160	Y	N	Y	40.9%
Male	65	African American	200	50	120	Y	Y	N	25.5%
Male	65	African American	240	40	160	Y	Y	N	43.9%
Male	65	African American	200	50	120	Y	Y	Y	40.0%
Male	65	African American	240	40	160	Y	Y	Y	63.3%

Table 1. Annual Comparison

	2015 - 2016	2016 - 2017	Variance (%)
Lipid panels and total cholesterol tests used	697	1	-696 (99.9%)
Tests ordered	1305	30	-1275 (97.7%)
Cost	$7,085.15	$343.90	-$6,741.25 (95.1%)

Figure 3. Cost Comparison



Discussion

- Patients gained autonomy to implement lifestyle changes and empowerment to have an active role in their direction of care
- Students had the opportunity to apply their clinical knowledge to a patient centered setting
- Limitations of the study included lack of a follow-up questionnaire assessing patients' medical literacy and potential errors regarding the use of point-of-care tests for student trainers versus patients

Conclusion

- In comparison to the 2015-2016 academic year, the new protocol resulted in an overall cost savings of $6,741.25 (95.1%) for point-of-care cholesterol screenings
- Counseling patients on their 10-year ASCVD risk allowed them to understand and identify their individual risk factors, and discern the severity of their condition
- Re-evaluation of a patient's eligibility for a lipid panel is warranted due to a recent update to the ACC ASCVD Risk Estimator; the new update emphasizes that a patient's cholesterol has the same impact on their 10-year ASCVD risk score with or without statin therapy

The authors have nothing to disclose
This project was approved by the University of Hawai'i Institutional Review Board