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Final DNP Project Report

Evaluation of Treatment for High Cholesterol and Prevention of Cardiovascular Disease in Primary Care

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University of Kentucky

Collage of Nursing

Fall 2016

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Dedication

This manuscript and all of the work invested in this project and DNP program is dedicated to my husband who always pushed me to my full potential and expects no less than the very best effort in all things. This is for my daughter who has been understanding of my needs to complete each and every component of this program with all my effort and hopefully will see this as a guide for her future studies. This is for my younger son who shared the computer, printer, and paper with me as he worked on his bachelors. This is for my older son who has given his time to the military service and supports our country so I have the opportunity to learn and progress. This is for my parents who brought me into this world with love and compassion for people so that my career in nursing is an expression of who I am.

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Abstract

Background Atherosclerotic cardiovascular disease (ASCVD) is the leading cause of death in the United States and more than 610,000 people die every year from ASCVD related causes such as myocardial infarction (MI) or stroke. High cholesterol is one of the leading modifiable risk factors for prevention of ASCVD events. The 2013 American College of Cardiology/American Heart Association guidelines recommend treatment of high cholesterol as primary prevention for ASCVD in adults by lifestyle changes, CV risk estimation with an ASCVD calculator, and intensity dosing of statin medication. Effective strategies to support these recommendation exist in the clinical practice guidelines but evidence suggest use of the ASCVD calculator for risk estimation and statin intensity dosing in primary care is not being implemented by primary care practitioners (PCP) consistently.

Purpose: The purpose of this study was to evaluate current hyperlipidemia practices in a Norton Medical Associates Clinic (NMA) to establish baseline use of educational material, cardiovascular risk estimate with an ASCVD calculator, and statin prescribing methods.

Methods: In this descriptive study utilizing a retrospective chart review, 300 charts from NMA were randomly selected and reviewed for documentation of 1) serum total cholesterol and LDL-c levels, 2) statin medication and dosage prescribed, 3) the intensity of the statin dosage, 4) ASCVD risk factors, and 5) 10 year CV risk estimation. This project evaluated patients between the ages of 21 and 75 with an active diagnosis of high cholesterol and those that met the requirement for statin therapy according to the 2013ACC/AHA guidelines.

Results: According to the results of this review 36% of patients with high cholesterol were not receiving the recommended statin therapy supported by the 2013-guideline grade A or B recommendations. In the three subgroups of patients with dyslipidemia (high risk, moderate risk,

diabetes mellitus (DM), 6 out of 7 patients (86%) in the high-risk group (LDL-c>190) were on the correct type and dosage of a high intensity statin medication. In the moderate risk group (LDL-c 70-189) only 65% were receiving statin therapy. The most concerning result from this study is the moderate risk patient category, where 35% were not receiving any statin therapy when they should have been on at least a moderate intensity statin medication and no ASCVD risk estimate was calculated.

Conclusion: Based on the results from this chart review there is room for improvement for PCPs in the treatment and evaluation of hyperlipidemia patients for primary prevention of ASCVD. This paper will discuss evidence based practice recommendations and suggestions for further investigation.

Evaluation of Treatment for High Cholesterol and Prevention of Cardiovascular Disease in Primary Care

Background and Significance

Atherosclerotic cardiovascular disease (ASCVD) accounts for more deaths annually than any other disease process with an estimated 17 million deaths in 2008 and a projected 23.3 million deaths by 2030. Thirty percent of deaths in Kentucky are related to CV disease (myocardial infarction and strokes) placing Kentucky above the national average for CV deaths in 2009 (Kentucky Heart Foundation [KYGOV], 2012). High cholesterol is one of the leading modifiable risk factors for heart disease and stroke (American Heart Association, 2014). One of the leading health indicators proposed in Healthy People 2020 was to improve ASCVD awareness and prevention by increased screening (Office of Disease Prevention and Health Promotion [HP2020], 2014. Adherence to a healthy lifestyle and statin medication for patients with high cholesterol can reduce development of CV disease (Office of Disease Prevention and Health Promotion [ODPHP], 2014).

Recommendations from the ACC/AHA 2013 Guidelines on the Treatment of High Cholesterol to Reduce Atherosclerotic Cardiovascular Disease in Adults support PCPs in the treatment and management of high cholesterol to reduce the risk of coronary artery disease, heart attack, and stroke (American Heart Association, 2014). High cholesterol is a modifiable risk factor that can be controlled with appropriate doses of statin therapy and lifestyle changes (Stone et al., 2013). According to Stone (2013), statin therapy is divided into three medication groups: high intensity, moderate intensity and low intensity (see Table 1). Intensity dosing of statin medication is based on individual CV risk and elevated serum LDL cholesterol levels. The guideline categorizes individuals into four major statin benefit groups: 1) diagnosed with

ASCVD, 2) primary elevation of LDL-c >190, 3) diabetes age 40-75 with LDLc 70-189, and 4) no ASCVD or DM and LDLc 70-189.

Recommendations for cholesterol treatment prior to the 2013 guidelines focused on treating high cholesterol with statin therapy and decreasing serum cholesterol numbers to a normal range, *treat to target* (Stone et al., 2013). The current 2013 guidelines shift from treatment solely on LDL-c target levels to a focus on reducing LDL-c levels by 30-50% and decreasing the risk of developing ASCVD with statin therapy and lifestyle changes (Sherrod et al., 2015). Historically PCPs have been focused on decreasing serum LDL-c levels with statin therapy. Morris et al. (2014) recommend that providers also focus on decreasing an individual's ASCVD risk estimates with the decrease in LDL-c.

To more accurately guide the PCP in identifying high risk individuals for statin therapy, the ASCVD calculator from the guideline noted as Pooled Cohorts Equations, recommend estimation of 10-year ASCVD risk in both white and black men and women who do not have ASCVD (Stone et al., 2013). The screening goals for primary prevention of CV disease are based on the recommendations of the 2013 AHA/ACC guideline that has been compacted into a one-page algorithm to guide PCPs in cholesterol management (see Figure 1). The ASCVD lifetime risk calculator is based on the Framingham Risk Score (FRS) and used mainly for those individuals categorized into the 4th statin benefit group, those aged 40-75 with LDL-c levels of 70-189, no DM, no ASCVD, LDL-c 70-189 (Stone et al., 2013). The guideline objectives are to achieve measurable improvements for individuals with hyperlipidemia, up to a 50% decrease in LDL-c, by maintaining a healthy lifestyle and adhere to the appropriate intensity statin medication therapy (Stone et al., 2013).

Strategies for ASCVD Prevention

Lifestyle Modifications

A critical review of the literature found the most effective strategies for primary prevention of ASCVD to be lifestyle changes and statin therapy (Fabregas et al., 2014; Lopez-Jimenez et al., 2014; McMonnachie et al., 2014; Morris, Ballantyne, Birtcher, Dunn, & Urbina, 2014; Persell, Lloyd-Jones, Frieseman, Cooper, & Baker, 2013; Sekaran, Sussman, Xu, & Hayword, 2013; Stone et al., 2013). ASCVD is a national healthcare problem where obesity, diabetes, hypertension, and hyperlipidemia are major contributing factors (Fabregas et al., 2014). Lifestyle changes such as exercise, diet, and medication adherence are effective prevention steps for ASCVD. Diet modifications that lower LDL-c consist of fruits, vegetables, low fat dairy, and lean meat products (Sherrod, Sherrod, & Cheek, 2015). Daily cardiovascular exercise for more than 40 minutes and maintaining a BMI<24 are recommended (Stone et al., 2013). For treatment of familial hyperlipidemia high intensity statin therapy and lifestyle modifications were found to be the most significant factor in preventative treatment (Broekhuizen et al., 2012).

ASCVD Risk Estimate

The 2013 AHA/ACC guideline recommends the use of the 10-year ASCVD risk calculator when prescribing statin therapy (Stone et al., 2013). The guideline encompasses several ranges of cholesterol management based on the age and estimated risk calculation of the patient by targeting patients with known ASCVD. The use of this calculator has been shown to improve prescribing accuracy for providers and decrease discrepancies in estimating the appropriate statin dose based on the estimated risk percentage (Sekaran et al., 2013). A patient with 10-year cardiovascular risk >7.5% and elevated LDL-c cholesterol should receive a high intensity statin medication (Stone et al., 2013). Studies supporting the use of a 10-year risk

calculator reported significant differences in PCPs treatment for statin therapy; using the risk calculator significantly increased prescribing strategies in high-risk individual and decreased prescribing strategies in low risk cases (Sekaran et al., 2013).

Statin Therapy

Overall nearly one-third of global mortality is attributed to ASCVD, however, lipid-lowering therapy with statin medications has been shown to decrease LDL-c by 55% (Lardizabal & Deedwana, 2011). The reduction in LDL-c and improvement in elevated lipids associated with stain therapy has been shown to substantially reduce mild and moderate coronary artery lesions developed from plaque ruptures resulting in myocardial events (Lardizabal & Deedwana, 2011). Decrease in arterial plaque size after statin treatment has resulted in significant improvement in patient outcomes after statin treatment (Tian et al., 2012). Statin therapy has shown a significant clinical benefit in lipid lowering therapy in primary prevention ASCVD in numerous randomized controlled trials and a decrease in mortality rates between 1-5% (Lewis, 2011)

Long-term statin therapy, greater than five years, has shown benefit by reducing ASCVD events such as myocardial infarction, stroke, and heart failure (McMonnachie et al., 2014). A reduction of first hospital admission for an ASCVD event and recurrent events were substantially reduced with appropriate statin treatment (McMonnachie et al., 2014). A recent study by McConnachie (2014) found significant improvements in decreasing length of stay (LOS) and quality-adjusted life years (QALY) in patients who had been on statin therapy longer than five years. High intensity statin therapy resulted in decreased hospital length of stay (LOS), however the PCPs did not always calculate cardiovascular risk estimation and utilization of statin therapy did not always follow recommendation guidelines (McMonnachie et al., 2014).

Education on ASCVD Risk

To guide evidence based treatment, a 10-year ASCVD risk calculator was shown to be an effective tool for primary care practitioners in accurate dosing of statin therapy and an educational tool for patients with a >7.5% lifetime risk for an ASCVD event (Allen, Garrison, & McCormack, 2014; Krones et al., 2008; Morris, Ballantyne, Birtcher, Dunn, & Urbina, 2014; Sekaran, Sussman, Xu, & Hayword, 2013;). The10-year CV risk calculator may also be utilized to expand provider documentation in the electronic medical record systems as a tool for screening ASCVD risk, education on individual risk, and promote accurate calculation for statin medication therapy (Sekaran et al., 2013). Education by motivational interviewing also has been used to increased accuracy in proper prescribing of statin therapy by PCPs and primary prevention screening by PCPs (Persell et al., 2013).

Purpose

The purpose of this project was to evaluate current practices among PCPs in the NMA clinics related to treatment of high cholesterol with statin therapy. Based on the 2013 ACC/AHA guideline recommendations for treatment of high cholesterol, screening methods for primary prevention are to include screening for cardiovascular risk factors, lifetime 10-year ASCVD risk for a cardiovascular event, and statin therapy (Stone et al., 2013). Review of these factors will help facilitate providers in reaching medical statin therapy goals and current screening processes for hyperlipidemia. Evaluation of the current hyperlipidemia practices can provide Norton Healthcare baseline quality improvement data for future studies in primary prevention of ASCVD in Kentucky.

Methods

Design

A descriptive study utilizing a retrospective chart review of 300 patients assessed the current practices of NMA clinic PCPs on prescribing statin therapy medication and documentation of ASCVD risk. Patients included in this review were between the age of 21 and 75 and diagnosed with ICD9 and ICD10 codes for high cholesterol, hyperlipidemia, or dyslipidemia. The charts were reviewed for serum total cholesterol and LDL-c levels, statin medication and dosage prescribed, categorized as moderate or high intensity statin, and documentation of cardiovascular risk from 2014, 2015, and 2016. Patients with high cholesterol and a diagnosis of diabetes mellitus (DM) were excluded in the review because they have risk factors similar to those in the secondary prevention group. The chart review was conducted from the EPIC electronic medical record system (EMS). IRB approval was obtained through University of Kentucky and Norton Healthcare.

Sample

For this retrospective chart audit review two of the four statin target groups from the guideline were used. In order to focus on primary prevention of CV disease, patients diagnosed with ASCVD were excluded. The two groups were selected because they focused on primary prevention and received a Grade A or B recommendation for practice from National Heart, Lung, and Blood Institute (Stone et al., 2013). The three areas are:

A. For >21 years with LDLc >190

    1. High intensity statin therapy (B)

    2. Highest does statin tolerated for those with intolerance to high intensity (B)

B. For 40-75, no DM and LDLc 70-189 and CV risk >7.5%

1. Moderate to high intensity statin (A; Stone et al., 2013)

Data Collection

One hundred patients from each year (2014-2016) were randomly selected and pertinent information from each chart was logged into an chart audit tool (see Appendix A) and include the following variables, age, sex, race, ethnicity, BMI, serum total cholesterol, LDL-c, CV risk, CV event, statin medication and dosage, DM, and contraindications to statin medications. The statin medication prescribed was included as well as an indicator variable, categorized as moderate or high intensity statin therapy based on the 2013 guidelines (see Appendix B).

There were three areas of the chart that were reviewed for documentation of ASCVD risk 1) the subjective area (history of present illness), 2) the plan, and 3) the visit summary. ASCVD risk was defined as PCP-documented patient education on the effects of high cholesterol or ASCVD or calculation and documentation of lifetime 10-year ASCVD risk estimate percentage. Patients with a CV event (MI, stroke, or CAD) were excluded from the analysis because they were categorized as secondary prevention candidates.

Data Analysis

Data was analyzed using the IBM Statistical Package for the Social Sciences (SPSS) v 22 software. Descriptive statistics were used to summarize patient demographics, CV risk documentation, and the adherence to prescribed statin therapy by PCPs to 2013 guideline recommendations.

Results

Of the patients reviewed, 203 of the 300 met the inclusion criteria for this review whereas 92 were either >75years of age, did not have a serum LDL-c recorded, and 5 had contraindications to statin therapy. The population sample was mostly Caucasian (90.6%) with 9.4% listed as other. The mean age of the patients was 57.9, with the youngest at 22 years and the max age of 70. This was a mostly obese population with the mean BMI of 31.6 that ranged from 19-54 (see Table 2).

Across all three hyperlipidemia categories, three-quarters (76%) of patients were on statin therapy. The percentage of patients that were on the correct statin therapy based on the 2013 guideline was 64% and 36% of the hyperlipidemia patients were not receiving the appropriate statin therapy. Eighty-two percent of the patients reviewed did not have documentation of cardiovascular risk factors such as hypertension, smoking, elevated BMI, or DM on the plan or visit summary and none of the charts reviewed had documentation for lifetime 10-year cardiovascular risk % estimate.

Of the 203 patients reviewed 7 were in the high-risk category, 119 were in the moderate risk category, and 74 were diabetic. Of the seven in the high-risk category, having an LDL-c >190mg/dL, six of them (85%) were prescribed the appropriate high intensity. Notably, of the 119 patients in the moderate risk category (without DM or CVD and LDLc between 70-189), 47 (35%) were not receiving statin medication (see Table 3). According to the 2013 guidelines an ASCVD risk estimate be calculated to accurately dose statin therapy for patients in the moderate risk category. None of the moderate risk category patients had ASCVD risk calculation.

Discussion

According to the results of this review 36% of patients with high cholesterol are not receiving the recommended statin therapy supported by the 2013-guideline recommendations (see Table 3). This chart review showed that 82% of the time ASCVD risk factors such as family history of heart disease, hypertension, BMI, and smoking were not documented in the SOAP notes and no 10-year CV risk estimate was documented for any patient in the evaluation of statin therapy prescribing. Evidence has shown improved accuracy by PCPs in statin prescribing in each focus area (high risk and moderate risk) with the use of the ASCVD risk estimation (Stone et al., 2013).

Six out of seven patients (86%) in the high-risk group (LDL-c>190) were on the correct type and dosage of a high intensity statin medication. The guideline clearly states all high-risk category patients need high intensity statin therapy, regardless of ASCVD risk estimate (Stone et al., 2013) unless there is intolerance of statin medications such as muscle pain, elevated liver enzymes, or allergic reactions (Stone et al., 2013). Although no documentation of these negative effects were not noted in this chart, not all education or discussion at a patient visit is included in the visit documentation.

Among the moderate risk group (LDL-c 70-189) only 60.5% were receiving statin therapy. The most concerning result from this study is the moderate risk patient category, where 39.5% were not receiving any statin therapy and no ASCVD risk estimate was calculated as recommended in the 2013 guidelines. Despite recent publications on the ASCVD risk factors and risk estimation for patients with high cholesterol, there are an inadequate number of patients receiving appropriate standard lipid lowering therapy across the primary care setting (Morris et al., 2014). Factors contributing to this gap in delivering evidence based care include confusion

in guideline implementation for lipid management and lack of LDL-c related risk estimation by providers (Morris et al., 2014).

If providers consistently followed the clinical practice guidelines, evidence suggests that the effect would show a 30-50 % decrease in LDL-c and a comparable decrease in total cholesterol levels (Stone et al., 2013). For each 39mg/dL reduction in LDL-c with statin therapy ASCVD risk decreases 20% (Sherrod et al., 2015). Notably, with a 30-50% decrease LDL-c the 10-year ASCVD estimated risk with a risk calculator would show a comparable decrease of 30-50% in lifetime risk. For patients with high cholesterol the documentation of the 10-year ASCVD risk estimate could be compared at each visit for improvements in lifestyle behaviors and medical adherence (Sherrod et al., 2015).

Norton Medical Associates providers are not currently documenting CVD risk calculation, however, with implementation of an ASDVD risk calculator in the EMR documentation could be more consistent. For example, Allen and colleagues (2013) found that only 22%-48% of PCPs regularly use risk assessment tools to determine ASCVD risk for patients with high cholesterol (Allen et al., 2013). PCPs subjective estimation of risk without use of a risk calculator is found to be congruent with risk estimation with a calculator approximately 60% of the time (Allen et al., 2013). This reflects the evidence found in this chart review where 60.5% of the patients are receiving the correct statin dosage but 39.5% are not.

Documentation of the risk estimate for Norton PCPs could not only improve statin prescribing and decrease CV risk for the 39.5% of the patients in the clinical area not receiving the appropriate statin therapy but could increase patient outcome measures between visits and interdisciplinary teams. Documentation of the lifetime risk in the EMR allows PCPs an opportunity to initiate education and monitor patient outcomes at each visit. Acceptance and

adaptation of the clinical guidelines in practice is essential to the evaluation and treatment of hyperlipidemia and the appropriate statin medication (Parker et al., 2008).

Evidence supports using a 10-year risk calculator as a starting point for PCP and patient dialogue (Martin et al., 2015) Use of the ASCVD risk assessment between clinician and patient has been shown as an interventional tool to initiate and encourage discussions for patient lifestyle changes (Martin et al., 2015). Patient education about ASCVD risk and primary prevention using a 10-year CV calculator by PCPs has been shown to improve prescribing accuracy for PCPs for statin medications (Fabregas et al., 2014). ASCVD risk assessment in primary care and patient education can lead to an increase in patients adherence to medication therapy and lifestyle changes (Persell et al., 2013).

Barriers to Implementation

Potential barriers for PCPs for complete application of the new guidelines recommendation into their practice include, delayed adaptation of the new recommendations, time constraints, and the complexity of the guideline (Martin et al., 2015; Parker et al., 2008). High intensity statin therapy is associated with more frequent side effects and PCPs are less likely to initially prescribe high intensity statin therapy for the patients in the high-risk group, LDL-c >190 (Ahn et al., 2016). Fear of side effects such as myalgias and rhabdomyolysis, decrease patient adherence with statin therapy and prevent high intensity statin prescribing by PCPs (Virani et al., 2014). Notably, some physicians delay treatment with statin therapy, in the moderate risk group, to allow patients time to make lifestyle modification changes first to decrease cholesterol (Ahn et al., 2016). In order for screening methods to be effective for primary prevention of ASCVD, therapeutic interventions with statin medications must be initiated as early treatment (Ahn et al., 2016).

Variability in the use of different styles of risk calculators has been established in the literature. Recent studies have shown limitations in accuracy and fluctuation of risk percentage calculation of ASCVD risk based on the type of risk calculator selected and the epidemiology of the patient population (Allen et al., 2013). The margin of error for risk calculators is low and inconsistency is due to differing databases, combinations of ASCVD end points and mathematical algorithms for individual databases (Allen et al., 2013). Most of the absolute risk estimate variability was in the high-risk ASCVD patients over 65 years of age. Organizational selection of a risk calculator should reflect characteristics of the patient population.

Recent studies show that most PCPs agreed on the outcomes from the Framingham Risk Calculator (FRC) 90% of the time (Allen et al., 2013). The 2013 guideline Pooled Cohorts supports an ASCVD calculator, which is based on the FRC (Stone et al., 2013). Notably, PCP barriers to the implementation of risk calculation were time, the sense of over simplification with the risk tools, and an ability to predict risk subjectively (Allen et al., 2013). However, research has shown that 40% of PCPs struggle to accurately estimate absolute risk without use of risk estimation tools (Allen et al., 2013).

Limitations

One reason for the lack of documentation of risk factors could be because use of the ASCVD calculator by PCPs for risk estimate and assessment could be occurring for NMA clinics at each visit but not documented in the EMR. Also documentation of these risk factors could have been in previous chart occurrences and reviewed by the provider at the time of the visit. There was an increase in documentation of education on high cholesterol and ASCVD risk from the review of charts in 2014 compared to 2016; Zero in 2014 and 10 in 2016. This improvement

could have been a result of increased educational information in the EMR instead of recognition of the 2013 guideline recommendations.

Implications for Practice

Despite the limitations of this study an important recommendation for this practice site is to implement the ASCVD risk calculator into the EMR. Calculation of ASCVD risk estimation improves PCPs prescribing of statin therapy (Sekaran et al., 2013).

With implementation of the risk calculator in the EMR, estimated risk will be immediately available to the patient and PCP. The calculator will also assist the PCPs in the education on ASCVD and accurate prescribing of statin therapy. For the moderate risk patient the guidelines recommend statin therapy for patients with a CV risk >7.5% or estimated risk 5-7.4% (Stone et al., 2013). Quality improvement monitoring for the documentation of estimated lifetime risk in the patients chart is one way to evaluate adherence of provider participation with the risk calculation and medication prescribing.

Evaluation of current hyperlipidemia reduction practices in the NMA clinics can assist providers in reaching medical therapy goals and improving patient education on cardiovascular risk. Strategies to improve the accuracy of statin prescribing could be developed by auto calculation and flagging ASCVD risk in the EMR. The calculator has been shown to improve statin prescribing accuracy by providers for patient with high cholesterol (Persell et al., 2013). Use of the calculator as a primary prevention tool has been shown as a starting point for provider-patient education about estimated life risk and changes in lifestyle habits to promote a healthy lifestyle (Martin et al., 2015).

ASCVD risk estimation provides the PCP with individual patient risk and visual aids can improve patient understanding and satisfaction (Martin et al., 2015). Documented risk at each

visit can be graphically projected in the patients chart to be used as evaluation of progress or regression by the patient and the provider. The EMR system optimizes opportunity for patient and provider communication by personalization of information and dispersing educational information (Fabregas et al., 2014). Currently in the Norton system the EMR is used to present graphical data showing changes in BMI, blood pressure, hemoglobin A1C, and cholesterol. Use of this graphical system to show 10-year ASCVD risk could be useful to the PCP and the patient to improve education and statin adherence. Use of the EMR for messaging patients about their ASCVD risk has shown to improve lipid-lowering prescribing of statin medications (Persell et al., 2013).

Auto calculation of 10-year ASCVD risk estimation at each patient visit in the EMR would allow PCPs quicker access to patient risk and comparison of patient outcomes. The risk estimation can be auto calculated and located in the subjective section of the chart in order for PCPs easily identify patients at high risk and to initiate discussion for plan of care. With EMR availability, the automation of ASCVD risk calculation and education on risk factors at each patient visit could improve ASCVD screening (Cainzos-Achirica, Eissler, Blaha, Blumenthal, & Martin, 2015). Easy access to the risk estimation can improve education on cardiovascular risk and accuracy in statin dosing (Parker et al., 2008).

Basic ASCVD risk estimation with a calculator is an easy starting point to improve accuracy of prescribing statin therapy and education for patients in primary care with hyperlipidemia. Biomarkers, CRP, and noninvasive testing are also key factors in managing treatment for hyperlipidemia and dyslipidemia patients (Stone et al., 2013). Treatment plans must be individualized and more invasive and expensive options are available such as coronary artery calcium imaging (CAC), serum biomarkers, and the use of radiographic imaging such as

computed tomographic scanning (Cainzos-Achirica, Eissler, Blaha, Blumenthal, & Martin, 2015).

Conclusion

PCPs can use tools from the 2013 ACC/AHA guidelines in practice to improve screening, education, statin therapy prescribing, and to ultimately decrease the risk of CV deaths among patients with high cholesterol. Using a combination of the algorithm from the 2013 guidelines for prescribing statin therapy, 10-year CV risk estimate, and education on lifestyle changes in clinical practice can improve medication accuracy and primary prevention screening in primary care. Implementation of automatic calculation of 10-year risk within the EMR could decrease time barriers, increase ease of accessibility and promote accurate documentation of ASCVD risk.

Introducing the CV risk calculator into primary practice by auto calculation for all patients with the diagnosis of hyperlipidemia in the EMR gives PCPs quick and easy access to risk estimation and graphical visuals for patient education. Documentation of ASCVD in a specified location allows quality improvements in statin prescribing and patient outcomes to be easily accessible in the EMR. Improvement in screening and treatment in primary care based on the recommendations from the 2013 guideline for patients with high cholesterol will ultimately decrease morbidity and mortality in Kentucky.

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Table 1
2013 Guideline Recommended Statin Medication Intensity

Intensity dosing of statin Medication		
High Intensity	**Moderate Intensity**	**Low Intensity**
Daily dosage lowers LDL-c by approximately >50% on average	Daily dosage lowers LDL-c by approximately 30%-50% on average	Daily dosage lowers LDL-c <30% on average
Atorvastatin 40-80 mg	Atorvastatin 10mg	Simvastatin 10 mg
Rosuvastatin 20mg	Rosuvastatin 20-40 mg	Pravastatin 10-20mg
	Simvastatin 20-40 mg	Lovastatin 20mg
	Pravastatin 40mg	Fluvastatin 20-40mg
	Lovastatin 40mg	Pitavastatin 1 mg
	Fluvastatin XL 80mg	
	Pitavastatin 2-4 mg	

(Stone et al., 2013, p. 17)

Table 2
Demographic characteristics of study patients

	Number of Patients N=203	Percent Population	Minimum	Maximum	Mean
Age			**22**	**74**	**58**
BMI			**19**	**54**	**32**
Gender					
Male	**95**	**46.8%**			
Female	**108**	**53.2%**			
Ethnicity					
Caucasian	**184**	**91.1%**			
Asian	**1**	**0.5%**			
African American	**16**	**7.9%**			
Hispanic	**1**	**0.5%**			
Other	**1**	**0.5%**			

Table 3
Descriptive Statistics
Percentage of Patients receiving the appropriate dose statin medication

	Number of Patients	**Percent**
Patients NOT on Recommended Statin Therapy	74	36.5%
Patients on Recommended Dosage of Statin Therapy	129	63.5%
Total	203	100

Table 4
Descriptive statistics on Statin Population

Statin Therapy Review Population					
Patient Population	**Total Patients per group**	**No statin Therapy**	**High Intensity Statin**	**Moderate Intensity Statin**	**Percentage on Statin Therapy**
LDL-c >190mg/dL High Intensity Statin	7	1	6	0	86%
LDL-c 70-189mg/dL* Moderate or High Intensity Statin Based on ASCVD risk >7.5%	119	47	4	68	60.5%
Total Population	126	48	10	68	

*No DM, No ASCVD

Appendix A
Chart Audit Tool

Evaluation of Lipid Blood Levels, Statin Medication and Dosage, BMI, Cardiovascular Risk Documentation

Study Number:

Age (21-75):

		Statin dosage	Statin Medication	BMI	CV Risk Documentation	CV risk >7.5%
LDL>145	Y/N				Y/N	
LDL>190	Y/N				Y/N	

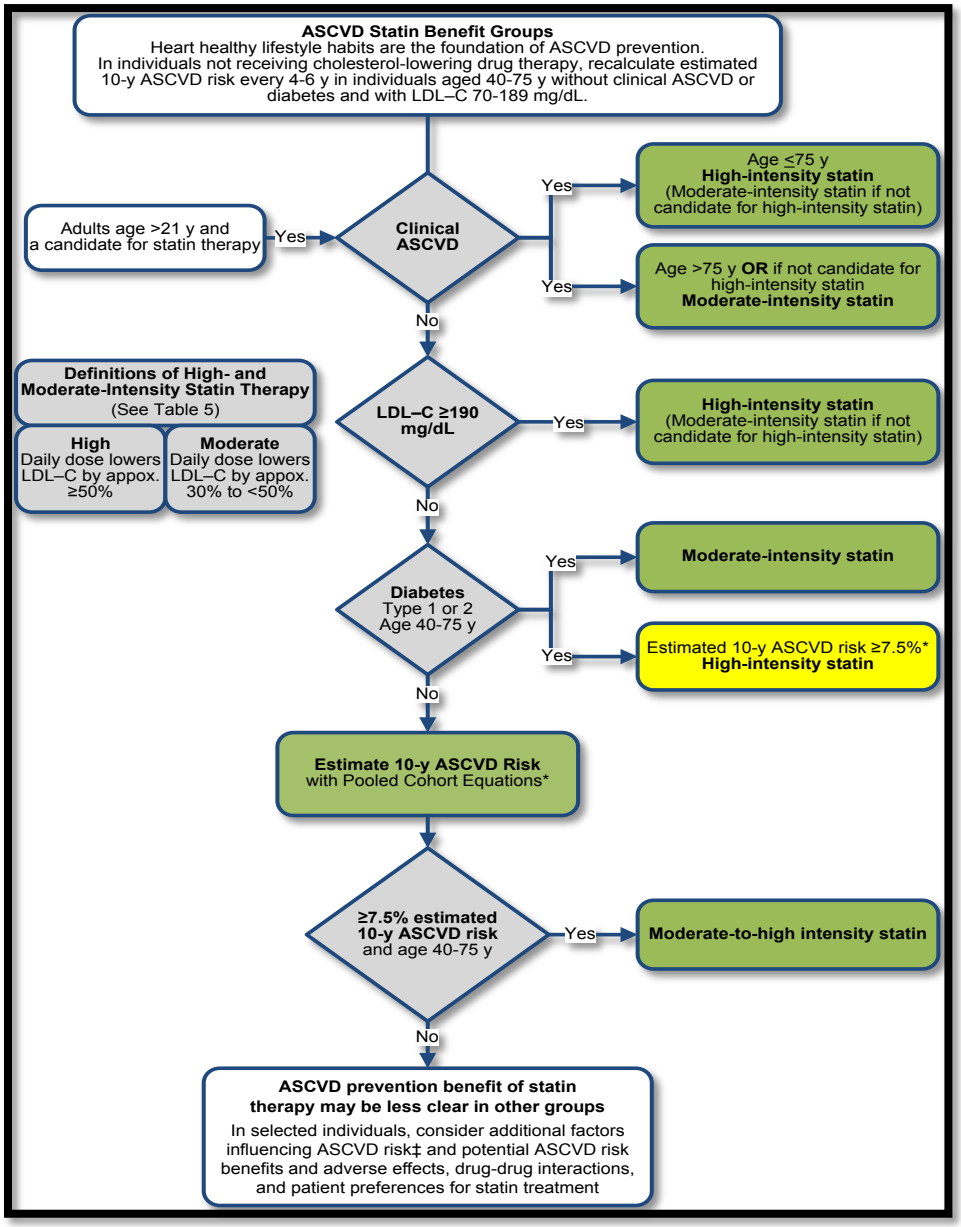
Information:

Was the appropriate Medication prescribed:

Was the appropriate dosage prescribed:

Were there contraindications for this patient for statin therapy: Y/N Describe:

Appendix B
Guideline Algorithm



(Stone et al., 2013, p. 12)