Investigating the disparity of LDL-C screening and management among health care providers in North West Ohio and South East Michigan as compared to NCEP guidelines

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Medical College of Ohio
FINAL APPROVAL OF SCHOLARLY PROJECT
For the Degree of Master of Science in Biomedical Sciences
Concentration in Physician Assistant Studies

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Title of Scholarly Project ____________________________ Investigating the disparity of LDL-C screening and
Management among healthcare providers in Northwest Ohio and Southeastern Michigan when compared to best practice

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Date of Approval: ____________________________
Investigating the Disparity of LDL-C Screening and Management among Health Care Providers in North West Ohio and South East Michigan as Compared to NCEP Guidelines

Scholarly Project
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2004
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Introduction

As reported by many sources, heart disease is the number one killer among American adults, with over 500,000 deaths each year (Fruchart, 2003). This comes as no surprise, as it has been identified that over 50 million American adults have blood cholesterol levels high enough to require therapeutic lifestyle changes and/or medical treatment; and an additional 90 million Americans have cholesterol levels higher than recommended (NCQA: Health Choices, 2003).

Atherosclerotic cardiovascular disease is the leading cause of morbidity and mortality in the Western World, and will soon be in developing countries as well. This process is accelerated by certain lifestyle choices, especially smoking, overeating, under exercising, and consuming foods that contain atherogenic nutrients, such as saturated and trans-unsaturated fats, high glycemic index carbohydrates, and excessive amounts of sodium (Fruchart, 2003).

The culmination of many studies demonstrates the benefits of early reduction of cholesterol levels, and has given merit to the guidelines produced for clinicians. The best recognized of these guidelines are the National Cholesterol Education Program (NCEP), and the American College of Cardiology/American Heart Association (ACC/AHA) Guidelines for Cholesterol management and discharge criteria post cardiovascular event.

The NCEP publication guidelines are the Third Report of the Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III (ATPIII)). It was revised, updating clinical guidelines for cholesterol testing and management, in May of 2001. Research from experimental animals, laboratory investigations, epidemiology, and genetic forms of hypercholesterolemia
indicate that elevated low-density-lipoprotein cholesterol (LDL-C) is a major cause of coronary heart disease (CHD). The NCEP report indicates those persons with CHD and CHD risk equivalents (i.e. diabetes and peripheral arterial disease (PAD)) should have a LDL cholesterol goal of < 100 mg/dl. These guidelines also state that any person hospitalized for a coronary event or procedure should be discharged on LDL lowering drug therapy if LDL is > 130 mg/dl (National Cholesterol Educational Program Guidelines, 2001).

The ACC/AHA Guidelines for the Management of Patients with Acute Myocardial Infarction include a section on the preparation for discharge from the hospital. Part of the discharge plan should include strategies to achieve secondary prevention goals for the management of hyperlipidemia, planned lipid testing, and treatment of elevated lipid levels with a Step II diet and drug therapy (ACC/AHA, 1999).

Many studies have been completed evaluating possible reasons why these guidelines are not followed. These studies have demonstrated that educational programs regarding the guidelines and feedback information on patient lab and medication status have been the most helpful way to improve the management of post cardiovascular (CV) events (Fox, 2001., Bonnette, 1998., Yarzebski, Bujor, Goldberg, Spencer, Lesser, Gore, N.D., Higgins, Russo, Scheurer, Duvall, 2002).

The purpose of this study is to 1) illustrate the deficit of care regarding LDL-C screening and management in post-cardiovascular (CV) event patients in the Northwest Ohio and Southeast Michigan areas through the process of Health Plan Employer Data and Information Set (HEDIS) measures, and 2) to survey a random sample of health care
providers in the above mentioned geographic region to assess their familiarity of the NCEP III Guidelines for LDL-C screening and management.

Problem statement

The question to be asked is; why is there a disparity in LDL-C screening and management after acute cardiovascular event among health care professionals in NW Ohio and SE Michigan when compared to Best National Practice? Data obtained through the National Committee of Quality Assurance (NCQA) via billing codes and manual chart review, demonstrates that the national best practice for LDL-C screening post CV event is 93.6%, and for LDL cholesterol management 85.9% (LDL <130 mg/dl) for the year of 2001. The rate of cholesterol screening post CV in Northwest Ohio and Southeast Michigan ranges from 37%-84%, while LDL cholesterol target goal management (LDL <130mg/dl) ranges from 19%-77% (NCQA Quality Compass 2003). This information is demonstrated on Graph 1 of Appendix B.

These statistics demonstrate a need for understanding why there is a lack of screening and LDL-C target goal management within the noted geographical area. Several studies have been conducted to look at the most effective way to educate physicians on this topic, and how to make it more convenient to order the appropriate lab tests (Majumdar, Gurwitz, Soumerai, 1999). Nationally accepted guidelines such as the ACC/AHA and NCEP have implemented cholesterol testing and lipid lowering medication as part of discharge criteria for persons with cardiovascular conditions.
Purpose

The goal of this study was an attempt to identify and illustrate causes for the failure among healthcare providers in North West Ohio and South East Michigan to implement nationally recommended NCEP guidelines.

This will be attempted by the use of a mail questionnaire. This questionnaire will assess the health care professional’s familiarity of the NCEP guidelines, their knowledge of the proper discharge guidelines, as well as appropriate time and use of cholesterol testing and medications for management.

The results of the questionnaire may assist health care organizations to identify areas of medical providers’ lipid management practice behaviors that are inconsistent with national guidelines. The health care organizations can decide to gear their educational programs on the proper use of the guidelines, the appropriate follow up time for testing after a hospitalization stay for a cardiac procedure, or provide information on the evidence of the benefits of lipid lowering therapy. The possibility of educating the public on the proper care after discharge from a cardiac event may also be of importance.

The importance of this study is demonstrated by several studies that have looked at the benefits of secondary prevention (Olsson, Schwartz, 2001). Secondary prevention should be the goal for any individual that has already been diagnosed with heart disease or a CHD risk equivalent (i.e. diabetes, Abdominal Aortic Aneurysm, PAD). Effective screening, treatment and follow-up of patients with elevated serum lipids are important because of the very strong association between hyperlipidemia and CHD (Fox, 2001).

Extensive clinical observations indicate that elevated blood concentrations of LDL-C increase the risk of CHD and MI (Higgins, Russo, Scheurer, Duvall, 2002). This
stresses the importance of identification and treatment of persons with elevated LDL-C levels.


The overall goal of this study is to increase health care providers’ awareness of the importance of cholesterol screening on all persons that are at risk for CHD, as well as the screening and treatment of those people with known CHD.
Literature Review

There have been many studies demonstrating the decreased mortality rates associated with the control of the atherosclerotic process. The Scandinavian Simvastatin Survival Study (4S) was designed to evaluate the effect of the cholesterol-lowering drug Simvastatin, on the mortality and morbidity of 4,444 hospitalized patients with CHD. Over a 5.4-year median follow-up period on simvastatin, the patients demonstrated mean changes in total cholesterol (TC), low-density-lipoprotein cholesterol (LDL-C), and high-density-lipoprotein cholesterol (HDL-C) of -25%, -35%, and greater than +8% respectively, with few adverse effects. This demonstrated a reduction in risk of all coronary deaths by 30% (4S, 1994).

An additional study that evaluated the association between recurrent event reduction and treatment of cholesterol levels was the CARE trial. This trial studied 4,159 patients who had an acute myocardial infarction (AMI) 3-20 months prior to joining the study. The results of this study showed a risk reduction in recurrent nonfatal MI by 23%, and fatal MI by 37%, with an overall reduction of death from CHD by 24%. Other possible risk reductions included Stroke, TIA, PTCA, CABG, and unstable angina, by 31%, 27%, 23%, 26%, and 13% respectively (Sacks, Pfeffer, Moyle, et al, 1996).

Other trials showing a risk reduction of death from CHD include The Long-Term Intervention with Pravastatin in Ischemic Disease Trial (LIPID) that demonstrated a 24% risk reduction of death due to CHD (LIPID Study Group, 1998). The West Of Scotland Coronary Prevention Study (WOSCOPS) resulted in a 32% risk reduction of death from all cardiovascular causes (Shepard, Cobb, Ford, et al, 1995). The Myocardial Ischemia Reduction with Aggressive Cholesterol Lowering (MIRACL) trial studied the benefits of
early, rapid, and intensive reduction in serum lipids with high dose atrovastatin, and its impact on the reduction of early recurrent ischemic events in patients with unstable angina or non-Q wave myocardial infarction. This study, along with other recent data, suggests that the reduction of LDL-C not only influences chronic processes in the arterial wall, but may also promote prompt improvements in vascular endothelial function, platelet blood interactions, and vascular inflammation. This suggests that there could be clinical benefits associated with the prompt treatment of elevated lipids following an acute CV event (Olsson, Schwartz, 2001).

The above studies have well-established the benefits of statin therapy, which include reduced morbidity and mortality from coronary heart disease, decreased progression of atherosclerosis, regression of atherosclerotic lesions and decreased coronary artery revascularization (Mosca, 2002). The publication of beneficial studies and statements from the American Heart Association and American College of Cardiology, indicating that aggressive risk factor management clearly improves patient survival, reduces recurrent events and the need for interventional procedures, and improves the quality of life for these patients (Smith, Blair, et al, 2001), makes it difficult to understand why there is a lack in cholesterol treatment in patients with known CHD. A study performed by Fonarow, French, Parsons, Sun, Malmgren, 2001 illustrates this lack of proper treatment.

Fonarow and colleagues, 2001 performed an analysis on data collected from the National Registry of Myocardial Infarction 3. The authors assessed the use of lipid-lowering medication at discharge in 138,001 patients hospitalized with acute myocardial infarction. Through their analysis it was concluded that a significant proportion of high-
risk patients did not receive lipid-lowering treatment at the time of discharge. These results demonstrated a missing link in the proper treatment of patients with CHD.

An article published in Value in Health, 1998 stated, “A major challenge in the provision of secondary prevention is the extremely low rate of physician compliance with national treatment guidelines and standards” (Bonnette, 1998). The data from this article indicated approximately a 5% compliance of treatment to goal, regardless whether or not the physician was capped or fee-for-service, suggesting that incentives do not play a major role in compliance. Bonnette, 1998 demonstrated an improvement in prescribing habits when physicians were provided with information regarding their patients’ lipid and medication status and specific recommendations for each patient.

Headrick, 2001 and her partners observed what type of interventions would increase physician compliance with the National Cholesterol Education Program guidelines (Headrick, Speroff, Pelecanos, Cebul, 1992). They also identified that the use of a timely expert panel feedback program regarding clinicians adherence on NCEP Guidelines is superior to groups receiving only a lecture or a lecture plus guidelines chart. They also conducted a survey to observe the knowledge of the physicians in the study before and after the intervention. It was demonstrated that the physicians overestimated their personal compliance with the NCEP guidelines (Headrick, Speroff, Pelecanos, Cebul, 1992).

Other interventions that have demonstrated positive outcomes with regards to adherence to the NCEP guidelines included: a computer based program that can correct qualitative and quantitative differences in test requesting, provide interpretive guidance in accordance with national guidelines, and offer a cost effective model to monitor results of
cholesterol lowering regimens in general practice. A hospital clinic laboratory serving 22 general practices and covering 150,000 patients introduced this program, and within 6 months 78% of their practices adopted the program (Smellie, Lowrie, Wilkinson, 2001). A suggestion made to improve compliance is to augment the health care team with nurses, pharmacists, or a consultant from a dedicated lipid clinic (Higgins, Russo, Scheurer, Duvall, 2002). The major concern with this addition is cost to the health care clinic.

A study performed at Duke University Medical Center identified treatment to goal failure with only 18% of patients reaching their LDL-C goal. They identified that a major barrier to treatment was the failure of physicians to titrate doses of statin therapy high enough to achieve an acceptable therapeutic response. Patients that failed to reach goal were more likely to have LDL-C > 160 mg/dl and, these individuals were started on statin therapy, but were not given higher doses of the drug (Higgins, Russo, Scheurer, Duvall, 2002). Another illustration of this is the study done by the Department of Ambulatory Care and Prevention at Harvard Medical School. They identified that only one third of eligible patients received lipid-lowering drug therapy, and among those that did receive the therapy few had reached nationally recommended goals (Majumdar, Gurwitz, Soumerai, 1999).

Additional studies published on the lack of implementation of guidelines, such as the study by Sueta CA, Chowdury, 1999, observed 48,586 patients with CAD from 140 medical practices in North Carolina, demonstrated that 44% had annual LDL-C testing, and only 39% were taking lipid-lowering therapy. Testing and lipid therapy was less performed in the elderly. A random selection of patient charts that fit criteria via ICD-9
codes of 410-414.9 were observed. A total of 390 charts were selected for evaluation, demonstrating that 39% had no LDL-C documentation, 15% had no lipid-lowering therapy, and 31% were on therapy but did not achieve NCEP goals (LaBresh, Owen et al, 2000).

In conclusion, the goal of this study is to investigate the disparity among healthcare providers’ adherence to NCEP ATP III national guidelines, and attempt to identify possible sources that may explain any variations in practice behaviors.

Hypothesis

It is hypothesized that there will be significant differences among health care providers’ knowledge of the NCEP guidelines when compared to the results of the NCQA data.

Scope and limitations

For the purposes of this study, the scope will include the following definitions:

□ CV Events equates to an individual with a discharge diagnosis of CABG, PTCA, or AMI.

□ Lipid Testing of LDL-C is to be completed within one year (as per NCQA Guidelines) of discharge from hospitalization for a CV event as stated above.

□ Lipid control is stated as LDL-C ≤ 130 mg/dl.

□ The survey population is described as Board Certified health care professionals in the fields of Family Practice, Internal Medicine, or Cardiology.

□ The data that was obtained from chart reviews of patients discharged with a cardiovascular event, and an age range of 18-75 years, allowing for a large, heterogeneous population.
One of the major limitations in the comparison of familiarity of guidelines to treatment and screening of LDL-C is the nonparallel timeframe. The NCQA results of lipid testing and control had come from patients that were discharged in 2001. The practitioners to be surveyed may have improved their knowledge and compliance of the NCEP guidelines since the study data was first collected. There is no foreseeable way to delimit this obstacle. Additionally, a major difficulty is that the screening tool is only being sent to providers in the geographical area that has demonstrated a poor result by NCQA standards, and not to the providers that have demonstrated best practice via NCQA standards.

Other limitations in this study come from the use of a mail questionnaire. There may be a poor response rate to the survey. To decrease the amount of interference this may play, a reminder letter will go out to other practitioners who meet the inclusion criteria in hopes that they will respond within the allotted time frame. Also, there will be a large distribution of surveys in hopes of having a statistically sound response. One other dilemma inherent with mail questionnaires is the assumption that the respondents will cooperate fully, give full disclosure, and have accurate recall history. There is no foreseeable solution to this limitation.
Methodology

The data, which identified a lack of screening and control, was obtained via the National Committee for Quality Assurance (NCQA) Quality Compass 2003. This information is attainable through the NCQA website. These results were gathered following HEDIS guidelines for cholesterol management.

The HEDIS process includes the following description. The percentage of health plan members (Medicaid, Commercial and Medicare) age 18-75 as of December 31 of the measurement year, who were discharged alive in the year prior to the measurement year for acute myocardial infarction (AMI), coronary artery bypass graft (CABG) or percutaneous transluminal coronary angioplasty (PTCA), and had evidence of LDL-C control below the specified thresholds (<130 mg/dl; <100mg/dl), with no more than one gap in enrollment of up to 45 days within 365 days of the event. Using the codes found in Tables 1 and 2 located in Appendix B. (HEDIS 2004, Volume 2)

The second part of this study surveyed Health Care Professionals (i.e. Board Certified Family Practice, Internal Medicine, and Cardiology that are either Medical Doctor’s (MD), Doctors of Osteopathic Medicine (DO), Physician Assistants (PA), and/or Nurse Practitioners (NP)) who were randomly selected from a specified geographical area. The surveys intent was to attempt to identify the discordance of provider compliance in Northwest Ohio and Southeast Michigan regarding the NCEP ATP III recommendations.
Procedure

Upon approval from the Medical College of Ohio human Subjects Committee the selected medical offices were contacted starting February 15, 2004. The mail questionnaires were sent randomly to health care providers (MD, DO, PA, NP) over the age of 25, chosen out of a public phone registry. The following is the stepwise process, which was implemented to help ensure an adequate response rate of the surveys.

1. 132 medical offices containing over 350 health care professionals were randomly selected.

2. The offices were called, explaining the purpose, when they will receive the survey, and that participation is voluntary but appreciated.

3. The packet was either mailed or faxed (office preference) to the office 2 days later. The packet included a letter explaining the purpose, risks involved, and the deadline to return the survey. Also included was the survey, and a self addressed stamped return envelope (if mailed). All were given a fax number to return the completed surveys if more convenient than mailing.

4. One week past the final due date, a reminder letter or fax with a copy of the survey and a letter was sent out to the participants that did not respond, asking them to please take the time and assist in this educational observation. This was done due to a poor response (< 50 respondents) by the marked deadline.
Subjects

The original phone list consisted of 120 primary care offices and twelve cardiology offices that were randomly selected from the Physician Referral Handbook for Toledo and Surrounding areas, 2003-2004. After the initial phone call to the offices asking for permission and preference of sending the survey, the list was reduced to 91 primary care and nine cardiology offices. This was due to either the inability to contact the office or the office staff refusing to take the call.

The demographics of the respondents of this survey demonstrated a young population with most common age range of 25-35 years old with an average of 9.7 years of experience. The majority of the respondents were male, Medical Doctors in Family Practice working in an outpatient setting. Table 3 contains all of the demographic information that was collected.

Statistical analysis

Mean and standard deviations were calculated for years of clinical practice; where as isolated mean scores were developed for the remaining data.
Results

A total of 316 surveys were sent out to family practice, internal medicine and cardiology health care professionals. A total of 52 surveys were returned after the primary and secondary mailings were sent.

The respondents were asked to identify their patient population regarding the percentage of patients with coronary heart disease defined as CAD, CABG, PTCA and/or AMI. The survey also asked the respondents to identify the number of their patients with heart disease that they believe are compliant with the use of their cholesterol medications and regular lipid testing. Table 4 illustrates the results of this series of questions.

In order to identify the base knowledge regarding the guidelines, the subjects were asked to identify if they are familiar with the guidelines; if so, how did they become familiar with them; when should lipid levels be measured in a patient admitted to the hospital; what is the major cause of CHD; which marker reduces coronary mortality; and at which cholesterol range would drug therapy be warranted. The results of these questions are detailed in Table 5.

The most varied of all answers was the set of questions regarding the desirable cholesterol/lipid levels of HDL-C, Triglycerides, LDL-C, and Total Cholesterol per the NCEP Guidelines. The variation of answers can be viewed in Graph 2 and Table 6. The graph demonstrates that the majority of respondents documented a value of > 40 mg/dl for HDL-C, a value of < 150 mg/dl for Triglycerides, < 100 mg/dl for LDL-C, and < 200 for total cholesterol. Table 7 identifies the percentage of correct answers per specialty for questions pertaining to the nationally recognized guidelines. Table 8, identifies strategies that have been implemented by the respondents to improve their patients compliance.
Discussion

The purpose of this study was to identify and illustrate deficiencies that exist between national guidelines and providers’ practice behaviors, as well as the variance between provider disciplines in North West Ohio and South East Michigan. This deficiency is illustrated by the 2003 NCQA report. Data for this project was collected via a mail survey, asking the respondents for their demographic information, their patient population, their knowledge of the guidelines, and implementation strategies used to improve patient compliance and awareness of their cholesterol abnormality.

Results indicated that 61.5% of practitioners that replied have a significant population ranging 11-50% of patients with heart disease, which is of no surprise when over 500,000 deaths occur each year due to heart disease (Fruchart, 2003). All but one of the 52 respondents to this survey stated that they are familiar with the nationally recognized cholesterol guidelines. Their familiarity with lipid guidelines is demonstrated by the majority of respondents correctly indicating that LDL-C is the major cause of CHD and when lowered reduces cardiac mortality. Also, 92 % of the providers correctly chose an LDL-C level of 101-130 mg/dl as the most appropriate of the given survey lipid ranges that should prompt drug therapy in a person with a history of CHD, further demonstrating their familiarity with the most recent national guidelines.

Of the providers that replied to this survey, 63.5% believe that the greater than 50% of their patients are compliant with cholesterol medication use and regular cholesterol testing. This is alarming, in that the many of the providers surveyed have patients with heart disease, yet providers often fail to promote the use of regular cholesterol testing or stress the importance of cholesterol medication compliance, which
if taken as recommended may improve lipid control and possibly reverse existing disease. Unfortunately, the data collected via the NCQA 2003 report demonstrate this deficiency with an average of 60.5% of patients with heart disease getting an annual cholesterol screening exam, and an even lower outcome of appropriate LDL-C management (< 130 mg/dl) averaging 48% (NCQA Quality Compass 2003).

To evaluate this disparity, the survey contained questions regarding; when is the proper time to perform cholesterol screening and what are the desirable values of each cholesterol marker (HDL-C, Triglycerides, LDL-C, and TC) as indicated by the national guidelines. Results of the survey demonstrated that only 40% of providers correctly chose the proper testing time of “upon admission to 24 hours after admission,” for patients with a hospital admission diagnosis of coronary heart disease. The guidelines indicate that this is the proper time to begin testing and cholesterol lowering medication to improve compliance with medications and promote regular testing (National Cholesterol Educational Program Guidelines, 2001, p. 14). The authors of the guidelines believe that this is due to the “treatment gap” that comes with less consistent outpatient follow-up (National Cholesterol Educational Program Guidelines, 2001, p. 14).

When asked the proper value of HDL-C “Good Cholesterol” it was encouraging that only 7.6% of providers wrote in values less than the minimum acceptable level indicated by the national guidelines of > 40 mg/dl for males and > 50mg/dl for females. Only 38.5% answered correctly, with the remaining 65.5% giving values that were stricter than indicated per the guidelines; also of note, only 13.5% identified males and females as having independent guideline values. When broken out, 48.9% of the family practice providers indicated the correct answer. It would appear that the majority of
health care providers surveyed believe that the higher the HDL-C level is, the better, but this survey was intended to identify the practitioners’ knowledge of the guidelines, not their own beliefs of the values.

Responses to the survey question regarding appropriate triglyceride level target, demonstrated a 61.5% correct (value of <150 mg/dl) response rate from the general population and 57.4% correct out of the Family Practitioners subset, 21.3% suggest values above the recommended value, 11.4% gave values less than the 150 level, and the remaining 5.8% did not answer this question.

The respondents demonstrated some understanding of the Total Cholesterol levels with 67.3% indicating <200 mg/dl as per the NCEP Guidelines, with another 23.1% suggesting values < 150-180 mg/dl for optimum control. This indicates that 90.4% of providers that replied to this question understand that “lower is better” and that the value of Total Cholesterol must be below 200 mg/dl. Fortunately, only one of the respondents gave a value greater than 200 mg/dl, and the remaining 7.7% of respondents did not answer this question.

The majority of providers (85.5%) correctly identified that national guidelines recommend LDL cholesterol be lowered below 100mg/dl in patients with cardiac or cardiac equivalent disease. Those that seem to have a more knowledge in cholesterol management (3.8%) answered with values of < 70-80 mg/dl, these individuals have a cardiology background. Unfortunately, there still remains a population of health care providers that believe the LDL-C value to be greater than recommended, with 9.5% of respondents offering values < 110-160 mg/dl.
The variability of answers regarding nationally recommended guidelines for cholesterol markers suggests that more education such as provider feedback and information sessions needs to be given to the health care providers. Although, many of the respondents are demonstrating the knowledge that “lower is better” for LDL and Total Cholesterol, and a higher value for HDL is more desirable, they failed to demonstrate that they understand the recommended values per the nationally recognized guidelines. Regarding HDL cholesterol, many of the respondents to this survey indicated values that ranged from greater than 40 mg/dl to 65 mg/dl, there have been many studies that indicate the increase of HDL will reduce CHD risk, but there is insufficient evidence to specify a goal. The desirable level per the NCEP Guideline is to be greater than 40 mg/dl due to a value of less than this increasing CHD risk (National Cholesterol Educational Program Guidelines, 2001, p. 19).

When comparing data from the different specialties it was noted that family practice practitioners appeared to be the least knowledgeable regarding national cholesterol guidelines. Although, there were an insufficient amount of respondents for IM, Cardiology, PA’s, and NP’s to give a true representation of these populations. Table 7 is a display of the percentage of correct answers per specialty regarding the questions of when to measure; major cause of mortality; range to implement drug therapy; and lipid/cholesterol markers. Family practice respondents including physicians, nurse practitioners, and physician assistants, were the majority of respondents at 90.4%; they demonstrated the lowest percentage of correct answers for many categories. Of most concern, was the question regarding when to measure an individual’s cholesterol level when hospitalized for heart disease? Only 38.3% of family practice professionals
answered correctly, Cardiology was 67% and IM was 50%. This comes as no surprise, although the guidelines recommend testing to be done at this time, they also recognize that LDL-C levels begin to decline in the first few hours after an event and remain significantly lower for several weeks, but nonetheless they encourage testing and the beginning of treatment at this time testing (National Cholesterol Educational Program Guidelines, 2001, p. 14).

With regards to implemented strategies to improve compliance by the patient and reach goal, 92.3% of all providers stated they often reinforce the medical need for treatment, and 86.5% provide explicit instruction and good counseling to their patients. Unfortunately, only 40.4% encourage the use of a support group such as family and friends, as indicated by the ATP III guidelines, adherence issues have to be addressed in order to attain the highest possible level of CHD risk reduction, the involvement of family and friends have been shown to improve compliance with diet and exercise regimens (National Cholesterol Educational Program Guidelines, 2001, p. 22). Additionally, only 30.8% provide the use of a patient reminders and regular follow up visits to assist in reaching goal. As noted in several of the studies listed above, one of the major problems with patients reaching goal is due to a lack of titration of cholesterol lowering medication such as statins. With only 30.8% of all respondents indicating that they use patient reminders and regular follow up visits, it is not surprising that many providers are unable to achieve national lipid goals for their patients. It should be noted that all patients starting or changing a cholesterol lowering medication must have regular follow up office visits. At these visits the patients must be educated and encouraged on
therapeutic lifestyle changes, the role of the cholesterol lowering medication and to be aware of any side effects of the medication so that they do not stop it on their own.
Conclusion

In conclusion, these results suggest that there is a need for more education of the NCEP Guidelines among all health care professionals, most importantly among primary care providers. Educational programs alone will not likely provide the motivation needed to improve the NCQA results regarding proper lipid testing and compliance with national guideline lipid targets. Several of the studies reviewed indicated that the best improvements in medical compliance (patients reaching goal) were with the use of timely expert feedback on the use of cholesterol lowering medications and timing of laboratory orders (Headrick, Speroff, Pelecanos, Cebul, 1992).

The results of this survey are similar to the studies mentioned earlier indicating that health care professionals overestimated their knowledge of the NCEP national lipid guidelines. This is demonstrated by the NCQA results, and the low percentage of correct answers throughout this survey, showing a weak understanding of the guidelines.
References

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6. Fruchart, J.C., Handbook of Dyslipidemia and Atherosclerosis. 2003, Department of Atherosclerosis, Pasteur Institute of Lille, University of Lille II: Paris, pp. iv-v, 62-75


23. Yarzebski J, Bujor CF, Goldberg RJ, Spencer F, Lesser D, Gore JM. A community wide survey of physician practices and attitudes toward cholesterol management in patients with recent acute myocardial infarction. Department of Medicine, Division of Cardiovascular Medicine, university of Massachusetts Medical School.
Dear Health Care Professional,

Several days ago you received a phone call explaining that you have been randomly selected to voluntarily participate in academic research, included in this packet is the survey with a stamped return envelope. Please keep in mind that the deadline to return this survey is March 30th.

The purpose of this survey is to assess practice guidelines among health care providers regarding cholesterol screening and management after the following cardiovascular events, acute myocardial infarction (AMI), coronary artery bypass graft (CABG), or percutaneous transluminal coronary angioplasty (PTCA).

You participation in this survey is greatly appreciated but also voluntary. If you wish to participate, you should understand that all information will be kept confidential, and that there will be no publication of the mailing list. In addition, all returned surveys will have only the investigators address on them, and will be kept in a secure location within the investigators office. Once all information has been analyzed, the surveys will be kept for five years in a locked and secured location, unable to be accessed by anyone other than the investigators.

The only foreseeable risk in the participation of this survey is the possibility of loss of confidentiality if you attempt to contact the investigators.

If you have any questions or comments regarding this survey please contact the investigators via email at afarah@mco.edu, or mguerra@mco.edu.

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Survey

The following survey is to assess the knowledge of practice guidelines among health care providers regarding cholesterol screening and management after the following cardiovascular events, acute myocardial infarction (AMI), coronary artery bypass graft (CABG), or percutaneous transluminal coronary angioplasty (PTCA). Your assistance in this academic research is greatly appreciated. Please fill in the blanks or check the appropriate box/boxes.

1. Male ☐ Female ☐

2. What is your age?
   - ☐ 25-35
   - ☐ 36-45
   - ☐ 46-55
   - ☐ 56-65
   - ☐ 65+

3. How many years have you been in clinical practice? ______________

4. What is your Medical Training?
   - ☐ M.D.
   - ☐ D.O.
   - ☐ P.A.
   - ☐ N.P.

5. What is your medical specialty?
   - ☐ Family Practice
   - ☐ Internal Medicine
   - ☐ Cardiology
   - ☐ Other ______________

6. What is the setting you practice in?
   - ☐ Office
   - ☐ Hospital
   - ☐ Community Clinic
   - ☐ Academic
   - ☐ Group
   - ☐ Single

7. Please estimate the percentage of patients in your practice that have heart disease (defined as CAD, CABG, PTCA, and AMI)?
   - ☐ 1-10%
   - ☐ 10-25%
   - ☐ 26-50%
   - ☐ 51-75%
   - ☐ 76-100%
   - ☐ Don’t’ Know

8. Are you familiar with the nationally recognized lipid management guidelines?
   - ☐ YES
   - ☐ NO
9. If you are familiar with the Guidelines, how did you learn about them?
   - Health Care Organization
   - Medical Journal
   - Website
   - CME Presentation
   - Directed Mailer
   - Patient Interest
   - Other

10. An individual hospitalized for a cardiovascular event (AMI, CABG, PTCA) should have their cholesterol measured?
   - Upon admission – 24 hours
   - 24-48 hours
   - 2 weeks post discharge
   - 4 weeks post discharge

11. What is the major cause of Coronary Heart Disease (CHD)?
   - Low levels of High Density Lipoprotein Cholesterol (HDL-C)
   - Elevated levels of Triglycerides
   - Elevated levels of Low Density Lipoprotein Cholesterol (LDL-C)
   - Elevated levels of Total Cholesterol (TC)

12. What are the desirable levels of the following cholesterol/lipid markers for patients who have had a cardiovascular event (AMI, CABG, PTCA)?
   - HDL-C ____________
   - Triglycerides________
   - LDL-C ____________
   - TC ______________

13. Which cholesterol/lipid marker when lowered reduces total mortality, coronary mortality, major coronary events, coronary artery procedures, and stroke in persons with established CHD?
   - HDL-C
   - Triglycerides
   - LDL-C
   - TC

14. Which range would prompt you to implement cholesterol/lipid lowering drug therapy in a patient with known CAD?
   - HDL-C of 41 - 50 mg/dl
   - Triglycerides of 101 - 140 mg/dl
   - LDL-C of 101 - 130 mg/dl
   - TC of 101 - 180 mg/dl

15. What percentage of your patients do you believe are compliant with their cholesterol medications?
   - < 25%
   - 25-50%
16. What percentage of your patients do you believe are compliant with their cholesterol testing?
- < 25%
- 25-50%
- 51-75%
- 75-100%

17. Have you implemented any of the following intervention to improve patient compliance? (Please mark all that apply)
- Provide explicit instructions and good counseling
- Encourage the use of patients reminders for follow up
- Encourage the support of family and friends
- Reinforce the medical need of treatment

Thank you, for your time in completing this survey as honestly and completely as you could.
Sincerely,
Ajwad Farah, MS, PA-S
Physician Assistant Student
Medical College of Ohio

Reminder Post Card

Dear Health Care Professional,

About a month ago you received a survey regarding cholesterol screening and management in patients with a history of cardiovascular events.

If you returned the survey thank you for your time.
If you have not returned the survey as of yet please take the time to complete and return it. Please feel free to contact the investigators if you need another copy.

Ajwad Farah, MS, PA-S
Physician Assistant Student
Medical College of Ohio
afarah@mco.edu

Thank you for your time and assistance,
Ajwad Farah, MS, PA-S
Appendix B

Tables and Figures

Figure 1: National Best Practice vs. West North Central Region (Including Michigan and Ohio)
Figure 2: Percentage of Respondents Interpretation of NCEP Lipid Criteria
### Table 1: Codes used in the identification of AMI, PTCA and CABG

<table>
<thead>
<tr>
<th>Description</th>
<th>CPT Codes</th>
<th>ICD-9-CM Codes</th>
<th>DRG’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMI (inpatient only)</td>
<td>410.x1</td>
<td>121, 122, 516</td>
<td></td>
</tr>
<tr>
<td>PTCA</td>
<td>33140, 92980-92982, 92984, 92995, 92996</td>
<td>36.01, 36.02, 36.05, 36.09</td>
<td>516-518</td>
</tr>
<tr>
<td>CABG (inpatient only)</td>
<td>33510-33514, 33516-33519, 33521-33523, 33533-356</td>
<td>36.1, 36.2</td>
<td>106, 107, 109</td>
</tr>
</tbody>
</table>

### Table 2: Codes to identify LDL-C Screening

<table>
<thead>
<tr>
<th>CPT Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>80061, 83715, 83716, 83721</td>
</tr>
</tbody>
</table>

### Table 3: Descriptive Data of Provider Subjects

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age</th>
<th>Years of Practice</th>
<th>Training</th>
<th>Specialty</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>69% M</td>
<td>48.1% = 25-35</td>
<td>Mean = 9.7</td>
<td>78.8% MD</td>
<td>90.4% FP</td>
<td>43 Office</td>
</tr>
<tr>
<td>31% F</td>
<td>23.1% = 36-45</td>
<td>SD = 10.8</td>
<td>17.3% DO</td>
<td>3.8% IM</td>
<td>33 Hospital</td>
</tr>
<tr>
<td></td>
<td>21.1% = 46-55</td>
<td></td>
<td>1.95% NP</td>
<td>5.8% CARD</td>
<td>17 Community clinic</td>
</tr>
<tr>
<td></td>
<td>5.8% = 56-65</td>
<td></td>
<td>1.95% PA</td>
<td></td>
<td>27 Academic</td>
</tr>
<tr>
<td></td>
<td>1.9% = 66+</td>
<td></td>
<td></td>
<td></td>
<td>28 Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Single</td>
</tr>
</tbody>
</table>
Table 4: Providers’ responses to selected survey questions.

<table>
<thead>
<tr>
<th>#7 Percentage of patients with Heart Disease</th>
<th>#15 Percentage of patients believed to be compliant with Cholesterol Medications</th>
<th>#16 Percentage of patients believed to be compliant with Cholesterol Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.1% 1-10%</td>
<td>1.9% &lt;25%</td>
<td>3.8% &lt;25%</td>
</tr>
<tr>
<td>34.6% 11-25%</td>
<td>34.6% 25-50%</td>
<td>32.7% 25-50%</td>
</tr>
<tr>
<td>26.9% 26-50%</td>
<td>55.8% 51-75%</td>
<td>48.1% 51-75%</td>
</tr>
<tr>
<td>1.9% 51-75%</td>
<td>7.7% 75-100%</td>
<td>15.4% 75-100%</td>
</tr>
<tr>
<td>5.8% 76-100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.8% Don't Know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9% unanswered</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5: Health Care Providers’ Knowledge of NCEP Guidelines

<table>
<thead>
<tr>
<th>#10 When to Measure</th>
<th>#11 Major cause of CHD</th>
<th>#13 Which marker reduces Coronary Mortality</th>
<th>#14 Which range would prompt implementation of drug therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.4% Admission-24hr</td>
<td>5.8% Low HDL-C</td>
<td>0% HDL</td>
<td>1.9% HDL-C 41-50 mg/dl</td>
</tr>
<tr>
<td>17.3% 24-48 hours</td>
<td>90.4% High LDL-C</td>
<td>1.9% Triglycerides</td>
<td>3.8% Trigs 101-140 mg/dl</td>
</tr>
<tr>
<td>25% 2 weeks post d/c</td>
<td>3.8% High TC</td>
<td>98.1% LDL-C</td>
<td>92% LDL-C 101-130 mg/dl</td>
</tr>
<tr>
<td>15.4% 4 weeks post d/c</td>
<td>0% Total Cholesterol</td>
<td>0% TC 101-170 mg/dl</td>
<td></td>
</tr>
<tr>
<td>1.9% Unanswered</td>
<td>1.9% Unanswered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#8 Familiarity Guidelines</td>
<td>#9 Source of Guideline information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>98.1% Yes</td>
<td>13.5% Health Care Organization</td>
<td>38.5% CME Presentation</td>
<td></td>
</tr>
<tr>
<td>1.9% No</td>
<td>63.5% Medical Journal</td>
<td>17.3% Directed Mailer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25% Website</td>
<td>5.8% Patient Interest</td>
<td></td>
</tr>
</tbody>
</table>
Table 6: #12 Providers’ responses regarding desirable lipid levels in patients known to have had a cardiovascular event.

<table>
<thead>
<tr>
<th>HDL-C mg/dl</th>
<th>Triglycerides mg/dl</th>
<th>LDL-C mg/dl</th>
<th>Total Cholesterol mg/dl</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.8%</td>
<td>1.9%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>3.8%</td>
<td>1.9%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>38.5%</td>
<td>1.9%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>30.8%</td>
<td>1.9%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>15.4%</td>
<td>1.9%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>5.8%</td>
<td>1.9%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>7.7%</td>
<td>1.9%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>5.8%</td>
<td>1.9%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>13.5%</td>
<td>1.9%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

Note: Separate values M/F.
### Table 7: Percentage of correct provider responses to selected survey questions per specialty

<table>
<thead>
<tr>
<th>Specialty</th>
<th>#5 % Distribution By Specialty</th>
<th>#10 When to Measure</th>
<th>#11 Major cause of CHD</th>
<th>#13 Which marker reduces Coronary Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM</td>
<td>3.8%</td>
<td>50.0%</td>
<td>50.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>CARD</td>
<td>5.8%</td>
<td>67.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>FP</td>
<td>90.4%</td>
<td>38.3%</td>
<td>91.5%</td>
<td>97.9%</td>
</tr>
<tr>
<td></td>
<td>Which range would prompt implementation of drug therapy</td>
<td>HDL-C</td>
<td>Trigs</td>
<td>LDL-C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 40 mg/dl M</td>
<td>&lt; 150 mg/dl</td>
<td>&lt; 100 mg/dl</td>
</tr>
<tr>
<td>IM</td>
<td>100.0%</td>
<td>50.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>CARD</td>
<td>100.0%</td>
<td>0.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>FP</td>
<td>91.5%</td>
<td>48.9%</td>
<td>57.4%</td>
<td>85.1%</td>
</tr>
</tbody>
</table>

### Table 8: #17 Percentage distribution of providers reporting implemented intervention strategies.

<table>
<thead>
<tr>
<th>Intervention Strategy</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforce the medical need for treatment</td>
<td>92.3%</td>
</tr>
<tr>
<td>Provide explicit instruction and good counseling</td>
<td>86.5%</td>
</tr>
<tr>
<td>Encourage the support of family and friends</td>
<td>40.4%</td>
</tr>
<tr>
<td>Encourage the use of patient reminders and follow up</td>
<td>30.8%</td>
</tr>
</tbody>
</table>
Appendix C

Definition of terms

1. NCQA – National Committee for Quality Assurance is an independent 501 (c)(3) non-profit organization whose mission is to improve health care quality everywhere.

2. HEDIS – Health Plan Employer Data and Information Set
   HEDIS is a set of standardized performance measures designed to ensure that purchasers and consumers have the information they need to reliably compare the performance of managed health care plans. The performance measures in HEDIS are related to many significant public health issues such as cancer, heart disease, smoking, asthma and diabetes. HEDIS also includes a standardized survey of consumers’ experiences that evaluates plan performance in areas such as customer service, access to care and claim processing. HEDIS is sponsored, supported and maintained by NCQA.

3. NCEP – National Cholesterol Education Program – A subset of the National Heart, Lung, and Blood Institute that has developed Guidelines regarding the Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults.

4. CHD – Coronary Heart Disease

5. AMI – Acute Myocardial Infarction – Rapid Onset of a heart attack

6. PTCA – Percutaneous Transmural Coronary Angioplasty – The passing of a catheter with a balloon on it into the arteries of the heart to open a constricting blood vessel.

7. CABG – Coronary Artery Bypass Graft – A surgery of bypassing an occluded artery of the heart.

8. LDL-C – Low Density Lipoprotein Cholesterol

9. Primary Prevention – Prevention before one is diagnosed with a medical condition.

10. Secondary Prevention – Prevention after one has been diagnosed with a medical condition, CHD or CHD risk equivalent.
Abstract

Objectives: The goal of this study was to identify and explain causes for the failure among healthcare providers in North West Ohio and South East Michigan to implement nationally recommended NCEP guidelines.

Methods: A review of the literature regarding the importance of secondary prevention for hypercholesterolemia, benefits of medical intervention, and interventions to improve provider compliance with NCEP guidelines. A survey was distributed among 316 health care professionals in primary care, internal medicine and cardiology within the northwest Ohio and Southeast Michigan area.

Results: Sixteen percent response rate with the majority from primary care settings. A 98.1% overall provider familiarity with NCEP LDL-C recommendations was demonstrated. Variable deviations from NCEP guidelines for TC, HDL-C, and triglycerides were demonstrated among the providers.

Conclusion: Health care providers in the surveyed geographical region do not have a uniform understanding of the National Cholesterol Education Program Guidelines.