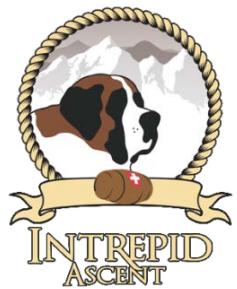


Cardiovascular Health: Treatment of Hyperlipidemia as Primary and Secondary Prevention of Cardiovascular Disease in Adults



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Introduction

Nearly one in every three adults in the United States has some form of cardiovascular disease (CVD) which includes heart disease, heart failure, stroke and hypertension.¹ Heart disease is the leading cause of death in the country and claims over 600,000 lives each year.² An estimated \$300 billion is spent annually in health care costs and lost productivity.^{3,4} Given the significant impact that CVD continues to have on public health and on health care costs, the Centers for Disease Control and Prevention (CDC) has provided funding support to state public health departments to coordinate statewide initiatives for the prevention of atherosclerotic cardiovascular disease (ASCVD) and the overall improvement of cardiovascular health.

This protocol has been developed as part of several ongoing initiatives from the California Department of Public Health (CDPH) to address the burden of CVD, which currently affects over eight million Californians.⁵ The healthcare community is concerned about high cholesterol, also referred to as hyperlipidemia, because of the well-established association for developing ASCVD.⁶ In most individuals, hyperlipidemia is not adequately controlled despite available treatment options. Combined with evidence-based practice guidelines, health IT has the potential to significantly impact the rate of cardiovascular disease.

Purpose

This document presents practice guidelines and recommendations for state and local health departments, decision makers, public health professionals, health care providers and other stakeholders serving patients who have developed or are at risk of developing CVD. This document provides population management tools to proactively monitor and manage hyperlipidemia, including evidence-based treatment guidelines from the *2013 American College of Cardiology and American Heart Association Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults*, best practices and clinical practice data to drive improvement of cardiovascular health.

¹ American Heart Association. Cholesterol Management Guide for Healthcare Practitioners. http://ahacholesterol-hcp.ksw-gtg.com/publication/?i=451475#{%22issue_id%22:451475,%22page%22:0}. Accessed September 10, 2018.

² Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2015 on CDC WONDER Online Database, released December 2016. Data are from the Multiple Cause of Death Files, 1999-2015, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/mcd-icd10.html>.

³ https://meps.ahrq.gov/mepsweb/data_stats/tables_compendia_hh_interactivejsp?SERVICE=MEPSPSocket0&PROGRAM=MEPSPGMTCSAS&File=H-C2Y2013&Table=C2Y2013%5FCNDX-P%5FC&_Debug. Accessed September 10, 2018.

⁴ Benjamin EJ, Blaha MJ, Chiuve SE, et al. Heart disease and stroke statistics—2017 update: a report from the American Heart Association. Circulation. 2017;135:e1–e458.

⁵ Centers for Disease Control and Prevention. Heart Disease Prevention. <https://www.cdpf.ca.gov/Programs/CCDPHP/DCDIC/CDCB/Pages/HeartDiseasePrevention.aspx>. Accessed September 10, 2018.

⁶ U.S. Department of Health and Human Services. A Public Health Action Plan to Prevent Heart Disease and Stroke. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2003.

What is Hyperlipidemia?

Hyperlipidemia is a medical condition where there are abnormally high levels of lipids, mainly triglycerides and cholesterol, in the blood. It is a key modifiable risk factor for atherosclerotic cardiovascular disease (ASCVD), the most common form of CVD that causes heart attacks and strokes. Other ASCVD risk factors include:⁷

Table 1. ASCVD Risk Factors

ASCVD Risk Factors	Age
	Smoking
	Family history of premature coronary heart disease <55 yo in 1st degree male <65 yo in 1st degree female
	Hypertension 130/80 or greater or on an antihypertensive therapy
	Low High Density Lipoprotein (HDL): "good cholesterol" <40 mg/dL in males <50 mg/dL in females
	Elevated Low Density Lipoprotein (LDL): "bad cholesterol" of 160 mg/dL or greater Non-HDL of 190 mg/dL or greater

Due to the high incidence of CVD in the United States, the American Heart Association strongly recommends that all Americans get screened for hyperlipidemia. Total, high-density lipoprotein (HDL), known as “good cholesterol”, and low-density lipoprotein (LDL), known as “bad cholesterol” blood cholesterol levels are determined from a lipid panel screen. There are several reasons for screening, including but not limited to, an individual who is diagnosed with diseases related to hyperlipidemia (e.g. peripheral vascular disease), has a family history of heart disease, high blood pressure or stroke, or presents with evidence of CVD such as extreme shortness of breath, chest pain or an irregular heartbeat.

⁷ Nelson, RH. Hyperlipidemia as a Risk Factor for Cardiovascular Disease. National Institute of Health. Prim Care. 2013 March ; 40(1): 195–211.

2013 ACC/AHA Cholesterol Guidelines to Reduce ASCVD Risk⁸

In 2013, the American College of Cardiology (ACC) and the American Heart Association (AHA) released an updated guideline on the treatment of hyperlipidemia to reduce the risk of ASCVD in adults by primary and secondary prevention. Primary prevention aims to prevent ASCVD before it occurs by implementing lifestyle interventions and addressing the risk factors. Secondary prevention aims to reduce the impact of ASCVD that has already occurred by implementing lifestyle interventions and initiating drug therapy. All forms of prevention have a potential to make a significant impact on the current incidence of the disease. However, primary prevention is an important public health priority.

The ACC/AHA guideline provides several key points for implementing primary and secondary prevention strategies; the assessment of cardiovascular risk (primary), lifestyle modifications (primary and secondary), and the use of statin therapy (primary and secondary).

CVD Risk Assessment for Primary Prevention

The ACC/AHA guideline includes an ASCVD Risk Calculator to help primary care providers identify patients who would benefit from primary prevention strategies.

Given the high incidence of cardiovascular disease, the AHA recommends a lipid panel screening for all individuals. Guidelines were recently published providing recommendations for screening according to age group, clinical circumstances and the health care provider's clinical judgement (Appendix I).⁹ The results from the lipid panel screening can be used to help calculate the risk of the individual developing ASCVD. The ASCVD Risk Calculator calculates the risk of developing ASCVD using the following factors: age, gender, race, total cholesterol, HDL cholesterol, systolic blood pressure, history or hyperlipidemia, smoking status, and treatment for blood pressure. The online version of the ASCVD Risk Calculator can be accessed here: <http://static.heart.org/riskcalc/app/index.html#!/baseline-risk>.

Patients who have a 10-year risk score $\geq 7.5\%$ are considered to be at elevated risk for ASCVD. Other factors need to be evaluated to help guide decision-making regarding the most appropriate and most effective treatment options to reduce ASCVD risk including lifestyle management, risk factor management, and pharmacologic treatment.

As part of the patient-centered care approach, it is critical to effectively communicate risk to patients in order to optimize clinical outcomes. The AHA has published best practice

⁸ Stone NJ, Robinson JG, Lichtenstein AH, Bairey Merz CN, Blum CB, Eckel RH, Goldberg AC, Gordon D, Levy D, Lloyd-Jones DM, McBride P, Schwartz JS, Sheri ST, Smith SC Jr, Watson K, Wilson PWF. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/ American Heart Association Task Force on Practice Guidelines. Circulation. 2014;129(suppl 2):S1–S45.

⁹ Jellinger, PS et al. CPG for Managing Dyslipidemia and Prevention of CVD, Endocr Pract. 2017;23.

recommendations to help primary care providers facilitate these discussions (Table 2),¹⁰ in addition to developing several educational resources to encourage patients to be more informed and involved in self-care (Appendices II-VI).

For patients who are considered high risk, the ACC/AHA recommend a combined approach of promoting healthy lifestyle behaviors and use of statins as the main treatment for managing blood cholesterol and decreasing the risk of heart attack or stroke.

Table 2. Best Practice for Communicating ASCVD Risk⁹

Recommendation	Rationale
Assess patient's estimated risk at baseline.	Patients may have optimistic or pessimistic biases, which may require different communication strategies.
Use round numbers; avoid decimals.	Simple numbers are easier to understand.
Maintain a consistent denominator when presenting proportions.	Larger numerators lead to higher perceived risk, regardless of the denominator: patients presented with a 1 in 10 chance may consider that lower than if it were presented as 10 out of 100.
Avoid using excessively small percentages.	Small numbers close to zero may be perceived as no risk.
Provide context for risk estimates when available, that is, "high risk is more than 7.5%."	Putting risk into context may help improve comprehension beyond just providing numeric estimates.
Consider alternatives to 10-year risk.	Lifetime or 30-year risk may be more impactful in young adults; heart age may be more motivating for behavior change.
Limit the number of statistics/graphics when discussing risk.	Providing too many estimates can lead to "information overload."
Utilize decision aids and visual graphics, but explain them.	Graphics can improve comprehension but may require explanation.
Avoid using number needed to treat (NNT).	NNT leads to poor comprehension of benefit.
Note differences in responses to relative risk and absolute risk.	Relative risk reductions are perceived as greater than when presented as absolute risk reductions. Absolute risk reductions allow for direct comparisons of risks and benefits.

¹⁰ American Heart Association. Cholesterol Management Guide for Healthcare Practitioners. http://ahacholesterol-hcp.ksw-gtg.com/publication/?i=451475#{%22issue_id%22:451475,%22page%22:0}. Accessed September 10, 2018.

Lifestyle Management for Primary and Secondary Prevention

About half of all American adults have one or more preventable chronic diseases, many of which are related to poor quality of dietary patterns and physical inactivity. A history of poor eating and physical activity patterns have a cumulative effect and have contributed to significant health problems in this country. Continued high rates of obesity and chronic diseases such as CVD require comprehensive and coordinated strategies to reverse this trend.

A heart-healthy lifestyle remains a critical component of ASCVD risk-reduction and health promotion. Adhering to a healthy diet, regular exercise habits, discontinuing use of tobacco products, and maintaining a healthy weight are key lifestyle interventions that can lead to benefits not only for hyperlipidemia but also for hypertension, diabetes, and ASCVD.

The following three-step approach can be used to help guide healthcare professionals in developing an individualized lifestyle plan with patients:¹¹

STEP 1: Identify focus areas using a Lifestyle Interview

- Use the AHA's Lifestyle Questionnaire (Appendix II)
- Help the patient fill out the questionnaire as part of the intake history
- Help the patient identify lifestyle areas to focus on
- Explore the benefits of the lifestyle areas that matter most to the patient
- Identify focus areas that the patient is most interested in addressing and that are most actionable
- Let the patient drive the action

STEP 2: Provide AHA Recommendations for Focus Areas

- Healthy Dietary Pattern and Nutrition Intake

Establishing and maintaining a heart-healthy diet is fundamental in the prevention and treatment of cardiovascular risk factors. A heart-healthy diet includes vegetables, fruit, whole grains, low-fat dairy products, poultry, fish, legumes, non-tropical vegetable oils and nuts, and limits intake of sweets, sugar-sweetened beverages, highly-processed foods, red meats, and excessive portions. Highly-processed foods contribute almost 60% of calories and 90% of added sugars in the American diet.¹² Diet modifications should take into account the patient's calorie requirements, personal and cultural food preferences, and nutritional restrictions for certain medications and/or medical conditions. Appendix I includes an infographic developed by the AHA to help patients keep track of the types and portion control of heart healthy foods.

¹¹ American Heart Association. Cholesterol Management Guide for Healthcare Practitioners. http://ahacholesterol-hcp.ksw-gtg.com/publication/?i=451475#{%22issue_id%22:451475,%22page%22:0}. Accessed September 10, 2018.

¹² American Heart Association. Can Processed Foods Be Part of a Healthy Diet? <https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics/processed-foods>. Accessed September 19, 2018.

- Physical Activity¹³

In addition to maintaining a healthy eating pattern, regular physical activity is critical in promoting good health and reducing the risk for chronic diseases. Studies show that many Americans do not meet current physical activity recommendations.¹⁴ As reported in 2014, only 51.6% of adults and 27.1% of youth are meeting the CDC recommended amounts of moderate physical activity for five days a week for 30 minutes. CDPH has recognized this as a public health priority and has released an update to their comprehensive Physical Activity Resource Guide to help public health professionals and leaders in California to plan, implement, and evaluate evidence-based physical activity programs that will lead to more active lifestyles and improved health outcomes.¹⁵

The Department of Health and Human Services (DHHS) developed a set of physical activity recommendations for patients of various age groups (Table 3).

Table 3. DHHS Physical Activity Recommendations by Age Group

Age	Recommendations
65 years and older	<ul style="list-style-type: none">● Older adults should follow the adult guidelines. When older adults cannot meet the adult guidelines, they should be as physically active as their abilities and conditions will allow.● Older adults should do exercises that maintain or improve balance if they are at risk of falling.● Older adults should determine their level of effort for physical activity relative to their level of fitness. <p>Older adults with chronic conditions should understand whether and how their conditions affect their ability to do regular physical activity safely.</p>

¹³ U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015–2020 Dietary Guidelines for Americans. 8th Edition. December 2015. Available at <http://health.gov/dietaryguidelines/2015/guidelines/>.

¹⁴ Centers for Disease Control and Prevention. State Indicator Report on Physical Activity, 2014 Atlanta, GA Department of Health and Human Services www.cdc.gov/physicalactivity/downloads/pa_state_indicator_report_2014.pdf

¹⁵ California Department of Public Health. Physical Activity Resource Guide Implementing Physical Activity Programming for SNAP Eligible Populations 2nd Edition 5 <https://www.cdph.ca.gov/Programs/CCDPHP/DCCD/NEOPB/CDPH%20Document%20Library/Final%20PARG%206.2.18.pdf>

18 to 64 years

- All adults should avoid inactivity. Some physical activity is better than none, and adults who participate in any amount of physical activity gain some health benefits.
- For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week.
- For additional and more extensive health benefits, adults should increase their aerobic physical activity to 300 minutes (5 hours) a week of moderate-intensity, or 150 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity. Additional health benefits are gained by engaging in physical activity beyond this amount.
- Adults should also include muscle-strengthening activities that involve all major muscle groups on 2 or more days a week.

STEP 3: Understand and Overcome Common Barriers to Treatment

Awareness and understanding of common barriers to treatment are important in making progress towards an actionable treatment plan.

Common barriers for patients include:^{16,17}

- Lack of education
- Too much information

¹⁶ American Heart Association. Cholesterol Management Guide for Healthcare Practitioners. http://ahacholesterol-hcp.ksw-gtg.com/publication/?i=451475#%22issue_id%22:451475,%22page%22:0. Accessed September 10, 2018.

¹⁷ Powell, LM et al. Racial/Ethnic and Income Disparities in Child and Adolescent Exposure to Food and Beverage Television Ads across U.S. Media Markets. *Health Place*. 2014 September ; 29: 124–131.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4501500/pdf/nihms609778.pdf>. Accessed September 19, 2018.

- Think cholesterol can be fixed without treatment
- Healthcare provider has not discussed risks
- Fear
- Lack of peer-to-peer support
- Social determinants such as food insecurity, the cost of healthy foods, unsafe neighborhoods, disproportionately more marketing of obesity-promoting products, cultural acceptance of sedentary lifestyles, and the normalization of obesity
- Lack of access to health care
- Affordability of medications
- Fear of, or discomfort from, side effects

Common barriers for providers include:

- Lipid disorders often undiagnosed
- Statin medication are underutilized
- Reluctance to devote sufficient time and effort to address patient concerns due to public fears regarding the use of statin medications
- Lack of provider knowledge and comfort with complicated, revised cholesterol diagnosis and treatment guidelines

Treatment with Statins for Primary and Secondary Prevention

Statins are a class of high cholesterol medications that work by inhibiting the production of cholesterol in the liver. Previous cholesterol guidelines emphasized the use of statin therapy to treat to target levels of cholesterol management. In the 2013 ACC/AHA guideline, however, statin therapy is recommended for the broader goal in the primary prevention of ASCVD. It is recommended as first line pharmacological treatment not only for patients with hyperlipidemia but also for certain patients with known ASCVD or those with elevated risk for ASCVD.

The guideline identifies high-, moderate- and low-intensity statin therapy (Appendix VII). It also provides evidence that supports the use of statin therapy in four major benefit groups of individuals (≥ 21 years old). The recommendations for use in these groups are summarized in the treatment algorithms in Appendices VIII to XI.

Before considering statin treatment for any patient, lifestyle changes should be encouraged and monitored. It is important to initiate lifestyle changes as the first line treatment and a critical component of ASCVD prevention. ASCVD risk reduction requires a comprehensive, collaborative, and patient-centered approach in addressing each of the modifiable risk factors.

Although statins are generally well-tolerated, patients should be monitored for side effects. The most common side effects of statins include muscle aches, pains, weakness, or cramps, often called myalgias. A comprehensive list of potential side effects is provided in Table 4.¹⁸

¹⁸ Fitchett, DH et al. Statin Intolerance. American Heart Association. Circulation. 2015;131:e389-e391.

Table 4. Potential Adverse Effects of Statins

<p>Adverse effects from statins for which there is strong supportive evidence:</p> <p>Myopathy (muscle aches/cramps, myositis, rhabdomyolysis)</p> <p>Increase in liver function enzymes which may be a sign of liver impairment</p> <p>Increase in blood glucose levels</p>
<p>Adverse effects from statins for which there is little or no supportive evidence:</p> <p>Cancer</p> <p>Intracerebral hemorrhage (bleeding stroke)</p> <p>Cognitive decline (Alzheimer disease)</p> <p>Lung disease</p> <p>Erectile dysfunction</p> <p>Fatigue, headaches, or dizziness</p> <p>Psychiatric illness</p> <p>Cataracts</p> <p>Rheumatoid arthritis</p> <p>Gastrointestinal upset, abdominal cramping</p> <p>Permanent liver or kidney damage</p>

Treatment with Non-Statins

There will be some cases when combinations of drugs or alternatives are used instead of statins. Examples include physicians believing that:

- low-to-moderate doses of combinations of drugs produce better LDL-C reduction with fewer side effects
- patients are on the highest dose of statin therapy but the lipid goals have not been met
- statin therapy is maximal but the lipid goals have not been met
- statins are either contraindicated or not tolerated

Second-line agents are used when first-line agents are either ineffective in meeting treatment goals or deemed inappropriate as a treatment option. A list of second-line alternatives to statins are listed in Table 5. Evidence shows only modest reductions of these second-line agents so they should only be used when statins have been considered.

Table 5. Second-line Statin Alternatives

<p>Pharmacological agents currently available:</p> <p>Cholesterol absorption inhibitors (ezetimibe)</p> <p>Bile acid sequestrants (colesevelam, colestipol, cholestyramine)</p> <p>Niacin</p> <p>Fibrates</p>
<p>Pharmacological agents under development:</p> <p>Proprotein convertase subtilisin kexin 9 (PCSK9) inhibitors</p> <p>Cholesterol ester transfer protein (CETP) inhibitors</p>

Leveraging Health IT to Improve Population Health¹⁹

Health information technology (health IT) plays an important role in improving health care quality, delivery, efficiency and safety. Combined with the ACC/AHA recommendations, health IT has the potential to significantly impact the rate of cardiovascular disease in this country. Million Hearts is a national initiative to improve the health of millions of Americans by improving the “ABCS”:

A **Aspirin Therapy When Appropriate**

B **Blood Pressure Control**

C **Cholesterol Management**

S **Smoking Cessation**

As part of the Million Hearts initiative, guidance has been developed to assist healthcare professionals in leveraging health IT, specifically their electronic healthcare record (EHR) systems, to efficiently and effectively execute on the ABCS. Providers are encouraged to use their EHRs to find, use, and improve data for the identification of at-risk patients, helping clinical teams across the country protect their patients from heart attacks, strokes, and other cardiovascular events.²⁰

¹⁹ Jameson W, Colby R, Weir J, Elson M (2018). Guide for Identifying and Engaging Patients with Prediabetes to Improve Population Health. Commissioned by the Chronic Disease Control Branch, California Department of Public Health, Sacramento, CA

²⁰ Office of the National Coordinator of Health Information Technology. Million Hearts EHR Optimization Guidelines. <https://www.healthit.gov/topic/health-it-initiatives/million-hearts>. Accessed September 12, 2018.

Because lipid disorders are often asymptomatic, patients are usually unaware of the condition and may not discuss it with their health care providers. Even while following best practices and providing the highest level of care, providers may have patients with elevated levels that have gone undetected. Therefore, it is critical that health care providers proactively identify patients with undiagnosed hyperlipidemia.

Building a Program to Address Hyperlipidemia

When planning a program to address a chronic condition such as hyperlipidemia, three major strategies must be considered: patient population identification, intervention design, and program implementation – including tracking and reporting of data. The following information is designed to help health care organizations undertake each of these steps, make key decisions along the way, and build an effective program tailored to the strengths the needs of specific organizations and communities.

Patient Population Identification

To identify and treat patients with hyperlipidemia, the primary care team should determine their own specifications for their inclusion criteria.

Who is the target population and how do we use standard automation for identification within the existing system?

1. Level of engagement with health system
 - a. Active patients? How defined?
 - b. Inactive patients?
 - c. Assigned members?
 2. Which condition(s)?
 - a. Undetected hyperlipidemia, patients diagnosed with hyperlipidemia, or both?
 3. Sub-populations by risk/level of engagement. The following are examples (not an exhaustive list):
 - a. People with potential hyperlipidemia or diagnosed hyperlipidemia who have not had a visit in >1 year.
 - b. People with potential hyperlipidemia or diagnosed hyperlipidemia with uncontrolled lipids at two separate medical visits during a defined period.
- People with elevated blood pressure and other major risk factors (such as obesity, diabetes, cardiovascular disease, or socio-demographic risk factors that may assist in reducing the risk of hyperlipidemia if identified, and counseled to reduce the risk of disease).
- NOTE: Performing an initial data analysis to determine the size of the target population can inform decision-making.*
4. Extract data on patients meeting criteria using electronic EHR, data analytics tools and/other database(s), providing visibility to data analysts and extended care team personnel.

- a. Which algorithm(s) will be adopted?
- b. How will this algorithm be converted into a data extraction report (for pulling patient lists) and/or an alert or flag in the EHR (for use at point-of-care)?
- c. What is the process for ongoing data extraction and identifying patients pre-visit who meet the criteria?

Intervention Design

1. What are best practices for detecting, treating, and partnering with patients to prevent the progression of ASCVD? e.g.:
 - a. huddles
 - b. panel management
 - c. health coaching; and/or
 - d. referral to a CDC or other-recognized lifestyle change program.
2. What resources can be deployed in this effort? e.g.:
 - a. non-physician care team members;
 - b. training on health coaching, motivational interviewing, etc.; and/or
 - c. community resources.
3. What can be tried on a small scale (e.g., Plan-Do-Study-Act cycles²¹), tested, and spread once it shows promise as an effective and feasible intervention?

Implement, Track and Report Data on Utilization and Outcomes

1. How will the interventions/best practices be rolled-out?
2. How will intervention data and effectiveness be tracked, used to make improvements, and reported?

Identifying Patients at Risk for CVD

STEP 1: Use of Guidelines to Screen Individuals at the Point-of-Care

Screening patients for potential hyperlipidemia at the point of care is an excellent strategy to uncovering a shadow population. Once the protocol is mapped out based on review of best practices and feedback from clinicians within the facility, health IT resources may use this information to identify critical parameters to be used in the automated identification of patient cohorts.

²¹ Agency for Healthcare Research and Quality. "Health Literacy Universal Precautions Toolkit, 2nd Edition: Plan-Do-study-Act (PDSA) Directions and Examples." U.S. Department of Health & Human Services. <https://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/healthlittoolkit2-tool2b.html>

STEP 2: Data Extraction from EHR or Disease Registry to Identify Patients for Outreach

Data extraction can take place using various levels of sophistication based on the capabilities and systems available to the healthcare facility. These often can be tiered into three layers:

1. **Disease registries** offer a linear view into the patients' health history using pre-determined algorithms and/or reported disease information. This can be used to track patient progress and management.
2. **Electronic Health Records** offer reporting like registries, with the addition data associated with patient comorbidities. This allows for more in-depth analysis in the event the healthcare organization has the technical wherewithal to support the reporting requirements.
3. **Data Analytics and Population Health Management (PHM)** solutions that enhance the reporting capabilities by offering a combination of on-demand reporting across multiple conditions and often the ability to establish care management protocols for tracking and monitoring patients. Further automated follow up may be performed when appointments are required or care team interaction is necessary. This often requires a level of sophistication that involves data extraction, transformation and loading of the data into the PHM tools.

While there is not one national standard algorithm for extracting data to identify patients with hyperlipidemia using EHRs, there are several algorithms available as references. The key to a successful initiative is to begin small and scale the program as resources allow. Because extracting data from the EHR may result in an overwhelming amount of information, prioritizing and narrowing the scope of the extraction and/or subsequent outreach effort can help mitigate the impact on the organization. The first and simplest dataset to examine may be patients with hyperlipidemia who have not received appropriate treatment or follow up testing.

Many tools and options exist to support extraction of actionable data. Organizations may choose to use pre-programmed population health tools such as i2itracks or the specific population health tool within the EHR. Some organizations have opted to employ a data analyst to conduct Extract, Transform, Load (ETL) programming to extract, cleanse, interpret and display the data.

When using a registry or EHR system to create reports for these algorithms, knowledge of the database structure will be necessary, unless the vendor offers a visual tool that allows for point and click functionality when generating reports. Where multiple systems may be used or more sophistication is required, often the use of Extract, Transform and Load (ETL) process are necessary as a means of creating consistency associated with data coming from a variety of sources. This is common when considering PHM tools.

STEP 3: Train Care Team Members to Identify Patients During Pre-Visit Planning

Steps 1 and 2 provide suggestions and best practices regarding the types of EHR data and clinical values an organization can use to help flag those patients who may be at risk of hyperlipidemia. The objective of Step 3 is to outline practices that should be adopted to promote and enable In-reach.

Pre-Visit Planning and Panel Management (Recall) are two tools that enable organizations to ensure that:

- Patients receive appropriate confirming diagnostic tests;
- Proper diagnoses are entered into medical record accurately;
- Patients engage in developing an updated care plan and/or receive referral to community resources to prevent further exacerbation, and proper management, of chronic diseases.

Pre-Visit Planning offers opportunities to improve patient care and to identify gaps in care for patients with upcoming visits. Common pre-visit planning steps include:

- Gathering the necessary information for upcoming visits;
- Planning the current patient visit and preparing for the next;
- Pre-populating the next day's visit notes with hyperlipidemia risks
- Arranging for pre-visit lab testing.

The American Medical Association has an interactive tool to assist practices in implementing Pre-Visit Planning, available at: <https://www.stepsforward.org/modules/pre-visit-planning>

In Panel Management (also known as 'Recall') patients are systematically identified for gaps in care, preventive services, and/or chronic condition management. Panel Management allows organizations to proactively identify and contact patients who are currently accessing the healthcare system but may be unaware of risk factors or medical conditions. This approach allows clinical staff to improve care for patients who are not necessarily in the office for a visit.

STEP 4: Train Care Team Members to Accurately and Consistently Record Data in Electronic Systems

When using automation for reporting, it is important to ensure the integrity and completeness of all data that is required to make the reporting useful. Often, with the use of faxes and paper within clinical practice, not all data may be within the systems to report effectively.

Organizations must ensure that data associated with paper-based laboratory results, manual readings associated with blood pressure and other information makes it to the electronic systems being used to complete the picture of the patient's health.

Within point of care tools, it is possible to make certain fields required, selectable from lists and dropdown values and, in many cases, codified as a means of offering consistency and ease of input, while reducing manual and free-text entry where numerical values may be required. This process is not fool-proof, for example EHRs offer considerable flexibility as to data input, including free-text note taking and scanning of documentation received by paper. However, with properly designed and effectively conducted training processes, users may be offered the understanding of acceptable data elements to use with the system and what processes should be followed to ensure that data elements are entered to the system.

This may require small tests of change that invoke the Plan-Do-Study-Act (PDSA) cycles to determine the best practices for specific clinics and how the team interact with one another and with the systems.

The process of being able to find potential hyperlipidemia starts with consistently capturing and entering lipid levels, BMI, family history, and, lifestyle information and comparing it against previous data to see if there is a trend. Taking and entering the readings at the start of the visit prior to the clinician conducting the main exam, may be a way to allow time for the clinician to see a potential issue and highlight it during the visit, instead of waiting until a later date for a report to highlight a pending problem.

EHRs also have a myriad of clinical decision support tools that offer alerts associated with certain warning signs and conditions. It is recommended that organizations coordinate their quality improvement activities with the IT capabilities to maximize the ability to flag items for clinicians to consider while ensuring that false positive alerts are not a hindrance to workflow.

For example, dashboard views of patient data may offer visibility at the point of care into blood sugar trends. This would allow the clinician to ask pertinent lifestyle questions or advise or prescribe medications or possible lifestyle changes that may aid the patient in preventing or reducing the effects of a disease.

Outreach/Panel Management/Recall

Patients and providers are both afforded greater ease of communication with each other today, helping to bridge the communication gap between clinical visits. Electronic systems may be used by clinicians to report on patients with varying risks of disease or with needs to manage specific diseases, providing them with greater sophistication in targeting outreach to patients.

Clinicians are also able to use electronic systems to intervene with patients on their behalf for low-level activities, such as reports which provide phone call reminders to patients flagged with certain risk levels or disease attributes that require extra attention. This can be particularly beneficial for patients who do not schedule regular check-ins with their providers. Through such

tools, care teams can reduce overhead associated with administrative tasks and are better able to proactively manage patients. The use of data analytics and automation can impact not only the patient but the efficiency in which the clinical team practices medicine and interacts with each other and with the patient.

A patient portal that facilitates sharing of information associated with the patient vitals and laboratory readings allows for both patient and clinicians to remain informed of status. Furthermore, such tools offer the patient access to ask questions directly with their provider, using secure email messaging. By maintaining this line of communications that historically has not always been available without the use of phone or in person visits, the clinical practice increases the quality of care and patient safety and supports improved patient outcomes.

In addition to increasing patient safety and quality of care, systems may also assist with improvements associated with the following:

*Risk Management by:*²²

- Providing clinical alerts and reminders;
- Improving aggregation, analysis, and communication of patient information;
- Making it easier to consider all aspects of a patient's condition;
- Supporting diagnostic and therapeutic decision making;
- Gathering all relevant information (lab results, etc.) in one place;
- Support for therapeutic decisions;
- Enabling evidence-based decisions at point of care;
- Preventing adverse events;
- Providing built-in safeguards against prescribing treatments that would result in adverse events;
- Enhancing research and monitoring for improvements in clinical quality.

Certified EHRs May Help Providers Prevent Liability Actions By:

- Demonstrating adherence to the best evidence-based practices;
- Producing complete, legible records readily available for the defense (reconstructing what happened during the point of care);
- Disclosing evidence that suggests informed consent.

Using EHR or healthy information exchange (HIE), practices can provide electronic referrals (also called e-Referrals) to lifestyle intervention programs. Multiple options may exist for e-Referrals based on whether referrals are being placed to internal health education specialists or

²² <https://www.healthit.gov/providers-professionals/improved-diagnostics-patient-outcomes>

external educators at community-based organizations. Depending on the model, e-Referrals may be sent one of two ways:

1. Internal referrals: Using EHR templates, the referral to the lifestyle intervention program becomes another referral type which is transmitted within the EHR.
2. External referrals: In the event referrals are sent externally from the organization's EHR, providers will most likely require the use of the Direct²³ messaging protocol which offers a secure means of transmitting protected health information. There are 2 options in this scenario, both of which rely on the use of the Direct messaging protocol for referral message transmission:
 - a. EHR to EHR: This involves using the EHR template to send a Direct message from one provider's EHR system to another EHR system. A referral template must be created within the initiating EHR and that system must have access to or store the Direct messaging address of the recipient provider(s).
 - b. EHR to HIE: This scenario most likely involves communications with a community- based organization administering the lifestyle intervention program, which may not have access to an EHR system. However, where HIE exists, the CBO may be able to gain membership to the HIE with limited access for purposes of administering data associated with the program, or the HIE may provide a Direct "inbox" to the CBO to facilitate referrals directly from participating provider organizations.

In the event e-Referrals are possible, provider practices and lifestyle intervention program staff should also work with EHR staff to incorporate tracking of attendance and compliance with the program as a means of maximizing use of the EHR.

Conclusion

As heart disease remains the leading cause of death in the U.S., implementing preventative strategies by identifying and treating at-risk patients will be critical from a public health perspective. These strategies require evidence-based practices, care coordination, patient engagement and access to patient data to have a significant impact on clinical outcomes. Furthermore, there is increasing evidence to support an even more holistic approach that goes beyond both the disease itself and specific lifestyle behaviors. Health care providers are recognizing that they must address the social determinants of health (e.g. stable and safe housing, access to transportation, access to healthy food, etc.) rather than focusing on medical conditions in isolation. Programs such as the Whole Person Care Initiative, administered by the California Department of Health Care Services, centers around this comprehensive approach to

²³ Further information about the Direct Messaging Protocol can be found at <http://wiki.directproject.org/>

coordination between physical health, behavioral health, and social services.²⁴ Health care providers and community partners will increasingly be asked to integrate important medical and social information to understand patients' needs and guide effective population health interventions.

²⁴ Data Across Sectors for Health. Coordinated Whole-Person Care that Addresses Social Determinants of Health. <http://dashconnect.org/wp-content/uploads/2017/09/DASH-care-coordination-brief.pdf>. Accessed September 19, 2018.

APPENDICES

Appendix I: Lipid Panel Screening Recommendations²⁵

Familial Hyperlipidemia: Individuals should be screened for familial hyperlipidemia when there is a family history of:

- Premature ASCVD (definite MI or sudden death before age 55 years in father or other male first degree relative, or before age 65 years in mother or other female first-degree relative) or
- Elevated cholesterol levels (total, non-HDL and/ or LDL) consistent with familial hyperlipidemia.

Adults with Diabetes

- Annually screen all adult individuals with type-1 or type-2 diabetes.

Young Adults (Men Aged 20-45 Years, Women Aged 20-55 Years)

- Evaluate all adults 20 years of age or older every 5 years as part of a global risk assessment.

Middle-Aged Adults (Men Aged 45-65 Years, Women Aged 55-65 Years)

- In the absence of ASCVD risk factors, screen middle-aged individuals for hyperlipidemia at least once every 1 to 2 years. More frequent lipid testing is recommended when multiple global ASCVD risk factors are present.
- The frequency of lipid testing should be based on individual clinical circumstances and the clinician's best judgment.

Older Adults (Older Than 65 Years)

- Annually screen older adults with 0 to 1 ASCVD risk factor for hyperlipidemia.
- Older adults should undergo lipid assessment if they have multiple ASCVD global risk factors (i.e., other than age).
- Screening for this group is based on age and risk, but not sex; therefore, older women should be screened in the same way as older men.

Children and Adolescents

- In children at risk for familial hyperlipidemia (e.g., family history of premature cardiovascular disease or elevated cholesterol), screening should be at 3 years of age, again between ages 9 and 11, and again at age 18.
- Screen adolescents older than 16 years every 5 years or more frequently if they have ASCVD risk factors, have overweight or obesity, have other elements of the insulin resistance syndrome, or have a family history of premature ASCVD.

²⁵ Jellinger, PS et al. CPG for Managing Dyslipidemia and Prevention of CVD, Endocr Pract. 2017;23

Appendix II: Patient Resources: Questions for Your Doctor²⁶



Check. Change. Control.
CHOLESTEROLTM

life is why®

QUESTIONS FOR YOUR DOCTOR

This list of common questions about cholesterol will help you discuss test results, risk factors and lifestyle changes [including medication] with your doctor.



TAKE THIS SHEET TO YOUR NEXT APPOINTMENT AND USE THE SPACE PROVIDED TO WRITE DOWN YOUR DOCTOR'S COMMENTS.

QUESTIONS	COMMENTS
<ul style="list-style-type: none">• What do my cholesterol numbers mean?• Do I have a cholesterol goal?• How long will it take to reach a healthier cholesterol level?• How often should I have my cholesterol levels checked?• Do you think my cholesterol levels are due to my lifestyle or to heredity, or a combination of both?• How do my lifestyle choices affect my cholesterol levels?• Are there other risk factors I need to watch or control because of my cholesterol levels?• What type of foods should I eat or avoid?• Do I need to lose weight and, if so, how much?• Will I need cholesterol-lowering medicine?• What resources are available to help me make lifestyle changes?• When would you like to see me next?	<hr/>

Learn more about cholesterol at: heart.org/cholesterol

National Supporter
SANOFI **REGENERON**

²⁶ American Heart Association. Cholesterol Management Guide for Healthcare Practitioners. http://ahacholesterol-hcp.ksw-gtg.com/publication/?i=451475#%22issue_id%22:451475,%22page%22:0. Accessed September 10, 2018.

Appendix III: Patient Resources – Lifestyle Questionnaire²⁷

Lifestyle Questionnaire

Physical Activity

How many steps do you take each day? _____

Do you have a regular exercise program? _____

Do you typically take elevators or escalators or climb the stairs? _____

Do you park as close as you can to your destination? _____

What limits your level of physical activity? _____

Have you been evaluated for this? _____

Would you like to become more active? _____

Nutrition

How many servings of fruits and vegetables do you eat per day? _____

How many servings of whole grains do you eat per day? _____

How many servings of fish do you eat per week? _____

How often do you eat dessert? _____

What are your favorite snack foods? _____

Do you eat because you're hungry? _____

Do you weigh the most now that you've ever weighed? _____

Are you interested in losing weight? _____

²⁷ American Heart Association. Cholesterol Management Guide for Healthcare Practitioners. http://ahacholesterol-hcp.ksw-gtg.com/publication/?i=451475#{%22issue_id%22:451475,%22page%22:0}. Accessed September 10, 2018.

Appendix IV: Patient Resources – Dietary Lifestyle Changes (1 of 2)²⁸

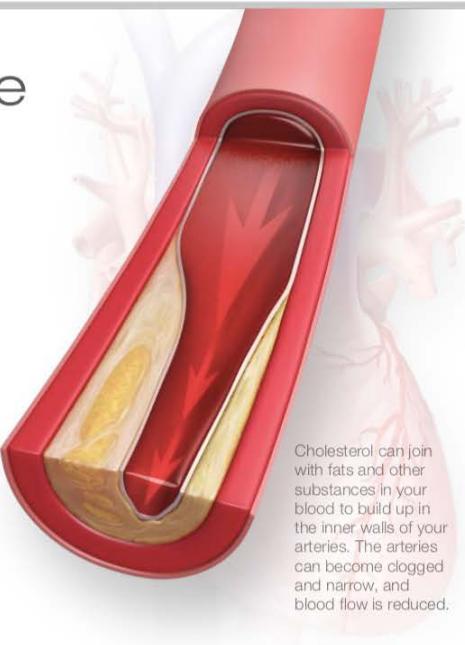
ANSWERS by heart |  Lifestyle + Risk Reduction Cholesterol


American Heart Association®
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How Can I Improve My Cholesterol?

There are lifestyle changes that you can make to improve your cholesterol. You can eat healthy foods, reach and maintain a healthy weight and be physically active. Some people also need to take medicine to lower their cholesterol because changing their lifestyle and diet isn't enough. Your healthcare providers can help you set up a plan to improve your cholesterol.

Most heart and blood vessel disease is caused by a buildup of cholesterol, plaque and other fatty deposits in artery walls. The arteries that feed the heart can become so clogged that the blood flow is reduced, causing chest pain. If a blood clot forms and blocks the artery, a heart attack can occur. Similarly, if a blood clot blocks an artery leading to or in the brain, a stroke results.



Cholesterol can join with fats and other substances in your blood to build up in the inner walls of your arteries. The arteries can become clogged and narrow, and blood flow is reduced.

What should I eat?	What should I limit?
<p>Focus on eating foods low in saturated and <i>trans</i> fats such as:</p> <ul style="list-style-type: none">• A variety of fruits and vegetables.• A variety of whole grain foods like whole grain bread, cereal, pasta and brown rice. (At least half of the servings should be whole grains.)• Fat-free, 1 percent and low-fat milk products.• Poultry without skin and lean meats. When you choose to eat red meat and pork, select options labeled “loin” and “round.” These cuts usually have the least amount of fat.• Fatty fish such as salmon, trout, albacore tuna and sardines. Enjoy at least 8 ounces of non-fried fish each week, which may be divided over two 3.5- to 4-ounce servings.• Unsalted nuts, seeds, and legumes (dried beans or peas).• Nontropical vegetable oils like canola, corn, olive, or safflower oils.	<ul style="list-style-type: none">• Foods with a lot of sodium (salt)• Sweets and sugar-sweetened beverages• Red meats and fatty meats that aren’t trimmed• Meats that have been processed with a lot of sodium• Full-fat dairy products such as whole milk, cream, ice cream, butter, and cheese• Baked goods made with saturated and <i>trans</i> fats like donuts, cakes cookies• Foods that list the words “hydrogenated oils” in the ingredients panel• Saturated oils like coconut oil, palm oil and palm kernel oil• Solid fats like shortening, stick margarine and lard• Fried foods

(continued)

²⁸ https://www.heart.org/-/media/data-import/downloadables/pe-abh-how-can-i-improve-cholesterol-ucm_300460.pdf

Appendix IV: Patient Resources – Dietary Lifestyle Changes (2 of 2)²⁹

ANSWERS
by heart



Lifestyle + Risk Reduction
Cholesterol

How Can I Improve My Cholesterol?

What are some cooking tips for me?

- Add a variety of fruits and vegetables to your meals.
- Use a rack to drain off fat when you broil, roast or bake poultry and meats.
- Look for leaner cuts if you choose to eat meat.
- Don't baste with drippings; use wine, fruit juice or marinade.
- Broil or grill instead of pan-frying.
- Cut off all visible fat from meat before cooking.
- Remove the skin from poultry pieces.
- Use a vegetable oil spray to brown or sauté foods.
- Serve smaller portions of higher-calorie dishes.
- Use low-fat, low-sodium options instead of regular cheese.



HOW CAN I LEARN MORE?

- ❶ Call 1-800-AHA-USA1 (1-800-242-8721), or visit heart.org to learn more about heart disease and stroke.
- ❷ Sign up to get *Heart Insight*, a free magazine for heart patients and their families, at heartinsight.org.
- ❸ Connect with others sharing similar journeys with heart disease and stroke by joining our Support Network at heart.org/supportnetwork.

Do you have questions for the doctor or nurse?

Take a few minutes to write your questions for the next time you see your healthcare provider.

For example:

What about eating out?

Why are weight control and physical activity important?

My Questions:

We have many other fact sheets to help you make healthier choices to reduce your risk, manage disease or care for a loved one. Visit heart.org/answersbyheart to learn more.



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²⁹ https://www.heart.org/-/media/data-import/downloadables/pe-abh-how-can-i-improve-cholesterol-ucm_300460.pdf

Appendix V: Patient Resources – Easy to Eat Healthy Infographic³⁰



³⁰ <http://www.heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics/what-is-a-healthy-diet-recommended-serving-infographic>

Appendix VI: Patient Resources – Cholesterol Lowering Medications (1 of 2)³¹



Lifestyle + Risk Reduction
Cholesterol



What are Cholesterol-Lowering Medications?

If your doctor has decided that you need to take medicine to reduce high cholesterol, it's because you're at high risk for heart disease or stroke. Usually the treatment combines healthy lifestyle changes including diet, physical activity and medicine.

Most heart disease and many strokes are caused by a buildup of fat, cholesterol and other substances called plaque in the inner walls of your arteries. The arteries can become clogged and narrowed, and blood flow is reduced. If a blood clot forms and blocks blood flow to your heart, it causes a heart attack. If a blood clot blocks an artery leading to or in the brain, a stroke results.

By following your doctor's advice, you can help prevent these diseases.



What medicine may I be prescribed?

Various medications can lower blood cholesterol levels. Statins are recommended for most patients because they are the only cholesterol-lowering drug class that has been directly associated with reduced risk for heart attack and stroke.

Statins (HMG-CoA reductase inhibitors) prevent the production of cholesterol in the liver. Their major effect is to lower LDL cholesterol. Some names are lovastatin, pravastatin, simvastatin, fluvastatin and atorvastatin.

You should talk to your doctor about the risks and benefits of statin therapy if you fall into one of the following groups:

- Adults with known cardiovascular disease, including stroke, caused by atherosclerosis
- Adults with diabetes, aged 40–75 years with an LDL

(bad) cholesterol level 70–189 mg/dL

- Adults with LDL (bad) cholesterol level of greater than or equal to 190 mg/dL
- Adults, aged 40–75 years, with LDL (bad) level of 70–189 mg/dL and a 7.5% or greater 10-year risk of developing cardiovascular disease from atherosclerosis

Some people who do not fall into these four major categories may also benefit from statin therapy.

What other drugs may be prescribed?

Your healthcare provider will monitor your progress with your statin therapy and recommended lifestyle changes. If you are having serious side effects or don't have the desired response to statin therapy and lifestyle changes alone, he or she may consider other medications as well.

Bile acid binders (resins) cause the intestine to get rid of more cholesterol. Some names are cholestyramine,

(continued)

³¹ https://www.heart.org/-/media/data-import/downloadables/pe-abh-what-are-cholesterol-lowering-medicines-ucm_300433.pdf

Appendix VI: Patient Resources – Cholesterol Lowering Medications (2 of 2)³²

ANSWERS
by heart



Lifestyle + Risk Reduction
Cholesterol

What are Cholesterol-Lowering
Medications?

cholesterol and coleselam.

Fibrates are especially good for lowering triglyceride (blood fat) levels and, to a lesser extent, raising HDL (good) cholesterol levels. Some names are gemfibrozil, clofibrate and fenofibrate.

Niacin (nicotinic acid) is a B vitamin that limits the production of blood fats in the liver. Take this only if your doctor has prescribed it. It can lower total cholesterol, LDL (bad) cholesterol and triglyceride (blood fat) levels. It can also raise HDL (good) cholesterol levels.

PCSK9 inhibitors bind to and inactivate a protein in liver in order to lower LDL (bad) cholesterol. They can be given in combination with a statin. Some names are alirocumab and evolocumab.

Selective cholesterol absorption inhibitors, like ezetimibe, work by preventing cholesterol from being absorbed in the intestine.

Your doctor will work with you to decide which medicine, or combination of medicines, is best for you.



Always follow your doctor's instructions carefully, and let the doctor know if you have any side effects. Never stop taking your medicine on your own!

How do I know if my medicine is working?

Your doctor will test your blood cholesterol level when needed. Together with your doctor, set a goal and ask how long it may take to reach that goal.

HOW CAN I LEARN MORE?

- ① Call 1-800-AHA-USA1 (1-800-242-8721), or visit heart.org to learn more about heart disease and stroke.
- ② Sign up to get *Heart Insight*, a free magazine for heart patients and their families, at heartinsight.org.
- ③ Connect with others sharing similar journeys with heart disease and stroke by joining our Support Network at heart.org/supportnetwork.

Do you have questions for the doctor or nurse?

Take a few minutes to write your questions for the next time you see your healthcare provider.
For example:

What if I forgot a dose?

Should I avoid any foods or other medicines?

My Questions:

We have many other fact sheets to help you make healthier choices to reduce your risk, manage disease or care for a loved one. Visit heart.org/answersbyheart to learn more.



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³² https://www.heartrg/-/media/data-import/downloadables/pe-abh-what-are-cholesterol-lowering-medicines-ucm_300433.pdf

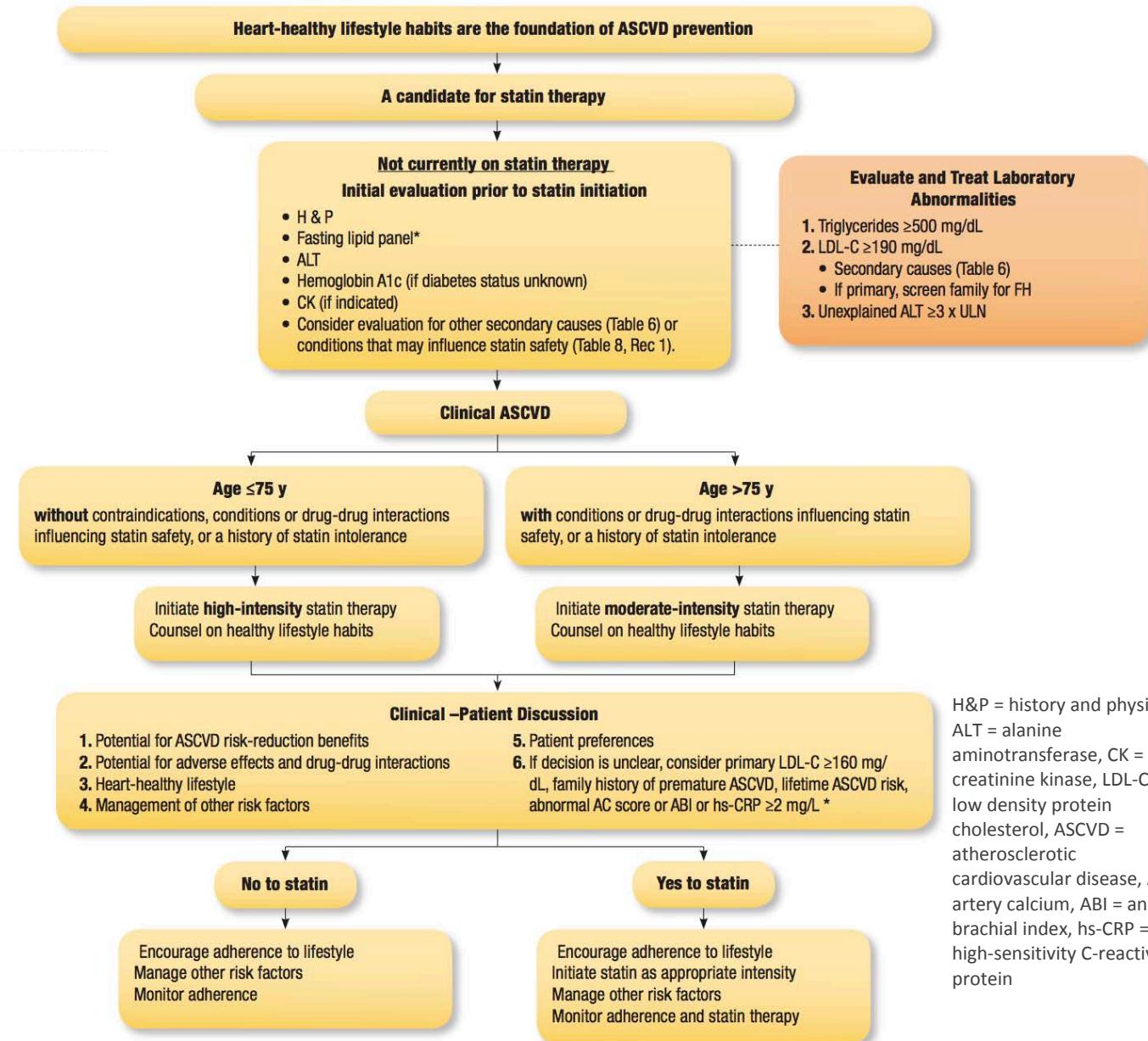
Appendix VII: High-, Moderate-, and Low-Intensity Statin Therapy³³

<i>High intensity</i>	<i>Moderate intensity</i>	<i>Low intensity</i>
Daily dosage lowers LDL-C by approximately ≥ 50% on average	Daily dosage lowers LDL-C by approximately 30% to 50% on average	Daily dosage lowers LDL-C by < 30% average
Atorvastatin (Lipitor), 40† to 80 mg	Atorvastatin, 10 (20) mg	<i>Simvastatin, 10 mg</i>
Rosuvastatin (Crestor), 20 (40) mg	Rosuvastatin, (5) 10 mg	Pravastatin, 10 to 20 mg
	Simvastatin (Zocor), 20 to 40 mg‡	Lovastatin, 20 mg
	Pravastatin (Pravachol), 40 (80) mg	<i>Fluvastatin, 20 to 40 mg</i>
	Lovastatin (Mevacor), 40 mg	<i>Pitavastatin, 1 mg</i>
	<i>Fluvastatin XL (Lescol XL), 80 mg</i>	
	Fluvastatin, 40 mg twice daily	
	<i>Pitavastatin (Livalo), 2 to 4 mg</i>	

³³ American Family Physician. ACC/AHA Release Updated Guideline on the Treatment of Blood Cholesterol to Reduce ASCVD Risk.
<https://www.aafp.org/afp/2014/0815/p260.html>. Accessed September 10, 2018.

Appendix VIII: Statin Management for Individuals with Clinical ASCVD³⁴

Clinical ASCVD: acute coronary syndromes, or a history of myocardial infarction (MI), stable or unstable angina, coronary or other arterial revascularization, stroke, transient ischemic attack (TIA), or peripheral arterial disease presumed to be of atherosclerotic origin) without New York Heart Association (NYHA) class II-IV heart failure or receiving hemodialysis



³⁴ American Heart Association. Cholesterol Management Guide for Healthcare Practitioners. http://ahacholesterol-hcp.ksw-gtg.com/publication/?i=451475#%22issue_id%22:451475,%22page%22:0. Accessed September 10, 2018.

Appendix IX: Statin Management for Individuals ≥ 21 Years of Age with LDL-C ≥ 190 mg/dL³⁵

Heart-healthy lifestyle habits are the foundation of ASCVD prevention

A candidate for statin therapy

Not currently on statin therapy

Initial evaluation prior to statin initiation

- H & P
- Fasting lipid panel*
- ALT
- Hemoglobin A1c (if diabetes status unknown)
- CK (if indicated)
- Consider evaluation for other secondary causes (Table 6) or conditions that may influence statin safety (Table 8, Rec 1).

Evaluate and Treat Laboratory Abnormalities

1. Triglycerides ≥ 500 mg/dL
2. LDL-C ≥ 190 mg/dL
 - Secondary causes (Table 6)
 - If primary, screen family for FH
3. Unexplained ALT $\geq 3 \times$ ULN

LDL-C ≥ 190 mg/dL

No diabetes

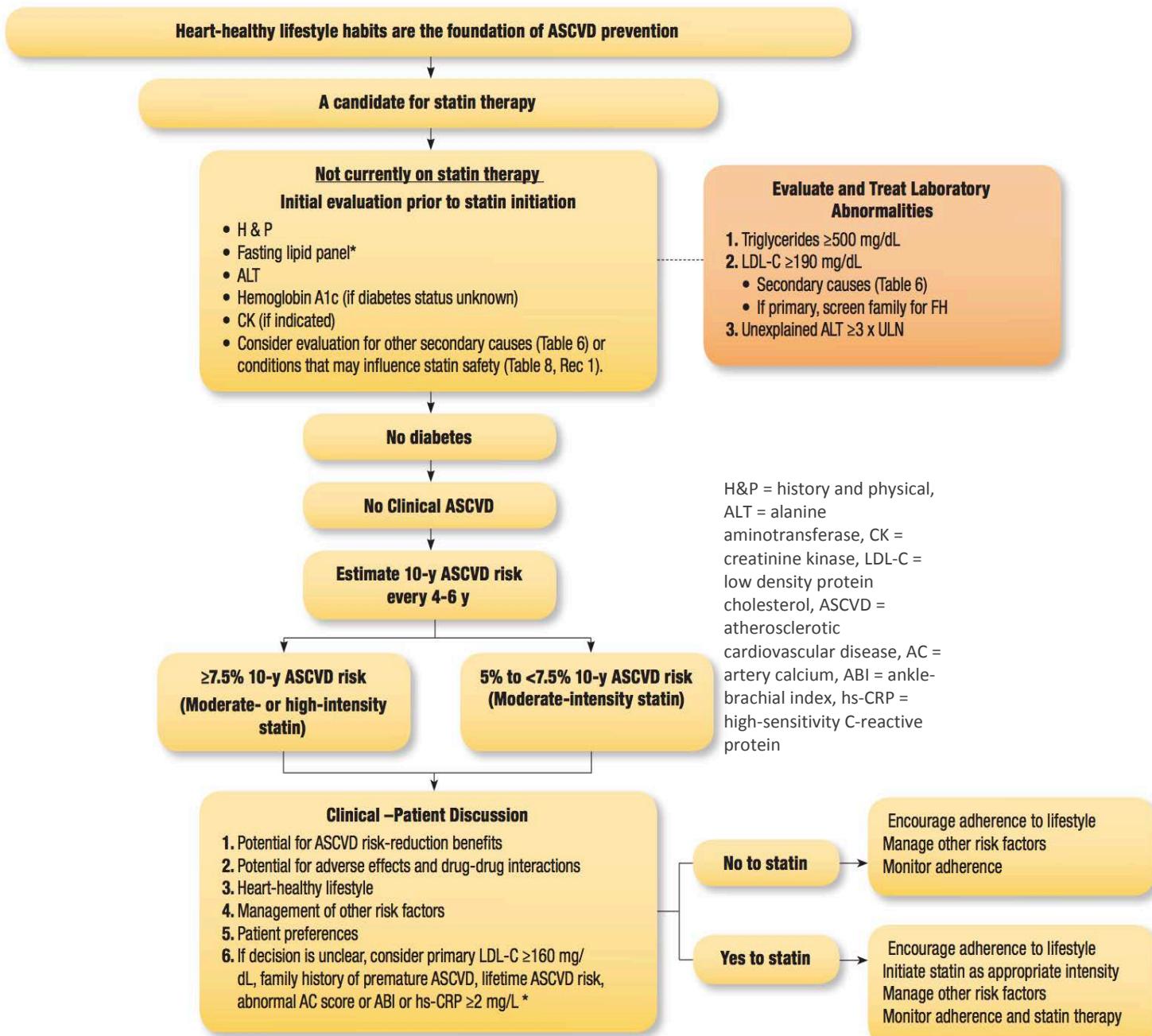
No Clinical ASCVD

High-intensity statin (Moderate-intensity if not a candidate)

H&P = history and physical, ALT = alanine aminotransferase, CK = creatinine kinase, LDL-C = low density protein cholesterol, ASCVD = atherosclerotic cardiovascular disease, AC = artery calcium, ABI = ankle-brachial index, hs-CRP = high-sensitivity C-reactive protein

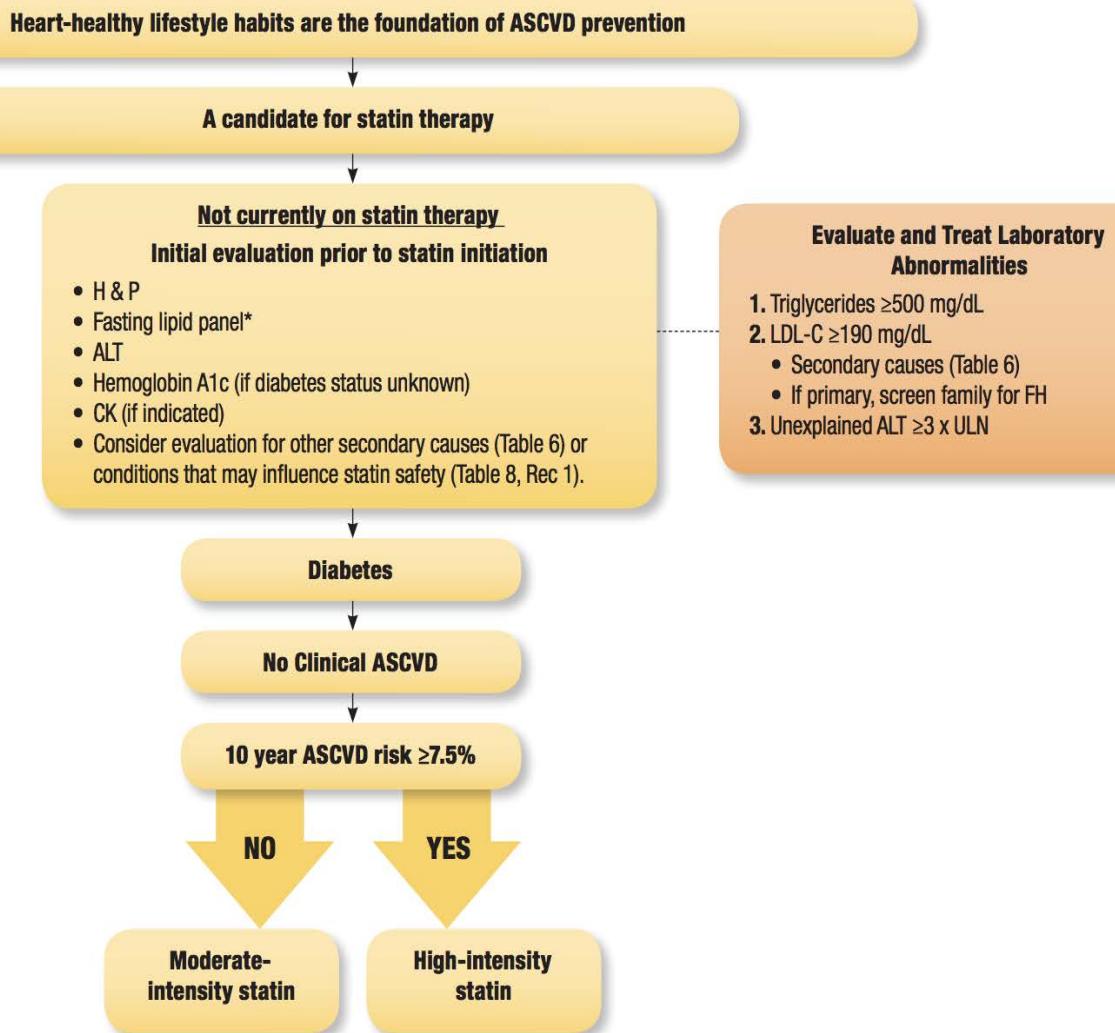
³⁵ American Heart Association. Cholesterol Management Guide for Healthcare Practitioners. http://ahacholesterol-hcp.ksw-gtg.com/publication/?i=451475#%22issue_id%22:451475,%22page%22:0. Accessed September 10, 2018.

Appendix X: Statin Management in Individuals Ages 40-75 without Diabetes and with LDL-C 70-189 mg/dL³⁶



³⁶ American Heart Association. Cholesterol Management Guide for Healthcare Practitioners. http://ahacholesterol-hcp.ksw-gtg.com/publication/?i=451475#%22issue_id%22:451475,%22page%22:0. Accessed September 10, 2018.

Appendix XI: Statin Management of Individuals Ages 40-75 with Diabetes and LDL-C 70-189 mg/dL³⁷



H&P = history and physical, ALT = alanine aminotransferase, CK = creatinine kinase, LDL-C = low density protein cholesterol, ASCVD = atherosclerotic cardiovascular disease, AC = artery calcium, ABI = ankle-brachial index, hs-CRP = high-sensitivity C-reactive protein

³⁷ American Heart Association. Cholesterol Management Guide for Healthcare Practitioners. http://ahacholesterol-hcp.ksw-gtg.com/publication/?i=451475#%22issue_id%22:451475,%22page%22:0. Accessed September 10, 2018.