

Spotlight on Cholesterol Management



**NATIONAL ASSOCIATION OF
CHRONIC DISEASE DIRECTORS**

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Background

Having high blood cholesterol raises the **risk for heart disease**, the leading cause of death in the U.S., and for stroke, the fifth leading cause of death. Optimal cholesterol management is an important part of reducing atherosclerotic cardiovascular disease (ASCVD), a precursor to heart disease and stroke.

In coordination with the Centers for Disease Control and Prevention's Division for Heart Disease and Stroke Prevention, NACDD hosts fireside chats and other learning opportunities with a focus on prevention and management of heart disease and stroke. On February 28, 2019, a fireside chat focused on cholesterol and cholesterol management was moderated by Fleetwood Loustalot, PhD, FNP, FAHA, CAPT, Epidemiologist, CDC Division for Heart Disease and Stroke Prevention, and featured Adrienne Mims, MD, MPH, FAAFP, AGSF, Vice President, Chief Medical Officer at Alliant Health Solutions and Angela M. Thompson-Paul, PhD, MSPH, LCDR, Epidemiologist, CDC Division for Heart Disease and Stroke Prevention.

The panel of experts reviewed basic terminology and epidemiology of cholesterol in the U.S. The panel also discussed the 2018 Guidelines for Management of Blood Cholesterol, using standardized metrics to assess adherence to guidelines and guide quality improvement efforts, and team-based care strategies to improve cholesterol management. This Spotlight summarizes highlights from the panel discussion.

Defining Cholesterol

Cholesterol, made by the body and absorbed from animal-based foods, is essential for all cells. It is a major structural component of cell membranes and serves as a precursor for the biosynthesis of steroid hormones, bile acids, and vitamin D. Cholesterol is carried through the blood on lipoproteins. Two types of lipoproteins carry cholesterol to and from cells:

- Low-density lipoprotein cholesterol (LDL-C), often called “bad” cholesterol because it contributes to fatty buildups in arteries causing atherosclerotic cardiovascular disease (ASCVD); and
- High-density lipoprotein cholesterol (HDL-C), often called “good” cholesterol, transports LDL-C to the liver, where it is broken down and removed from the body.

Triglycerides, the most common type of fat in the body, are influenced heavily by diet. High triglyceride levels combined with high LDL (bad) cholesterol or low HDL (good) cholesterol are linked with fatty buildup within the artery walls, which increases the risk of heart attack and stroke.

A lipid profile measures total cholesterol, LDL-C, HDL-C, and triglycerides.

It is important to understand that LDL-C, HDL-C, and triglycerides all play a role in determining overall risk for heart attack and stroke.

A combination of low HDL-C, high LDL-C, and high triglycerides carries the highest risk level.

Epidemiology of Cholesterol in the United States

One in three adults in the U.S. have high levels of LDL-C, and nearly one in five adults have low levels of HDL-C.

Nearly 29 million adult Americans (more than 12%) have **total cholesterol levels higher than 240 mg/dL**. As noted in the chart, the prevalence of high total cholesterol varies by race and gender. Most people begin to develop plaque build-up in their arteries in their 20s and 30s. This process may take many years and may not have any symptoms to indicate a problem. In [familial hypercholesterolemia](#) (FH), a genetic condition, high concentrations of LDL-C in the blood are present from birth and may lead to ASCVD events much earlier in life if untreated. As many as one in 250 people in the U.S. has this condition, and family history is helpful in identifying those at risk.

High Total Cholesterol Levels Vary by Race, Ethnicity, and Sex ¹		
Prevalence of high total cholesterol (240 mg/dL or more) among adults age 20 and older in the U.S. from 2015 to 2016.		
Racial or Ethnic Group	Men %	Women %
Non-Hispanic Blacks	10.6	10.3
Hispanics	13.1	9.0
Non-Hispanic Whites	10.9	14.8
Non-Hispanic Asians	11.3	10.3

2018 Guideline on the Management of Blood Cholesterol²

In November 2018, the American College of Cardiology (ACC), the American Heart Association (AHA), and others released new clinical guidelines that provide additional specificity to the 2013 recommendations. The [2018 guideline](#) reinforces the need for appropriate-intensity statin therapy among people at risk of having an ASCVD event and emphasizes the importance of clinician-patient risk discussion for making shared decisions.

In addition to well-known risk factors used to estimate ASCVD risk, including age, sex, race, total cholesterol, HDL cholesterol, blood pressure, diabetes status, and smoking status, the 2018 guideline encourages healthcare providers to also look at **risk-enhancing** factors, such as family history and other medical conditions. Understanding these risk-enhancing factors provides a better perspective of a person's individual risk and can help determine treatment needs.

¹ Centers for Disease Control and Prevention, [High Cholesterol Facts](#), accessed March 28, 2019.

² Grundy SM, Stone NJ, Bailey AL, et al. [2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines](#). *Circulation*. 2019;139:e1082–e1143. DOI: 10.1161/CIR.0000000000000625.

A detailed risk assessment using an [ASCVD risk calculator](#) to estimate a patient's 10-year risk for a cardiovascular event can be used to establish a reference point at the initial visit, aid in discussion of treatment options, and facilitate clinician-patient shared decision-making. Not all patients require an ASCVD risk estimate prior to initiating therapy.

Three patient management groups are recommended to be on statins, regardless of their ASCVD risk estimate:

1. People aged 75 or younger with clinical ASCVD, defined as having acute coronary syndrome (ACS), those with history of myocardial infarction (MI), stable or unstable angina or coronary or other arterial revascularization, stroke, transient ischemic attack (TIA), or peripheral artery disease (PAD) including aortic aneurysm, all of atherosclerotic origin (high intensity).
2. People with severe hypercholesterolemia defined as an LDL-C \geq 190 mg/dL (high intensity).
3. People with diabetes, ages 40-75, with an LDL-C $>$ 70 mg/dL (at least moderate intensity).

Management of Cholesterol Levels

Additional recommendations for cholesterol management, including lifestyle interventions, medication management with statins, and non-statin add-on therapies are discussed in the 2018 guideline.

Lifestyle is Key

A [healthy lifestyle](#) remains the cornerstone of cholesterol management and is a critical component of preventing and treating high cholesterol. Lifestyle changes include eating a heart healthy diet, becoming more physically active, maintaining a healthy weight and quitting smoking. Resources to assist patients with lifestyle changes include:

- [Healthy diet](#)
- [Physical activity](#)
- [Healthy weight](#)
- [Tobacco cessation](#)

Medication Management

In addition to lifestyle changes, experts recommend cholesterol-lowering medications to lower risk for people with high LDL-C levels or for others at high risk for having an ASCVD event in the next 10 years. [Statins](#) remain the cornerstone of treatment when medical interventions are necessary.

The 2018 guideline does not provide ideal target blood levels for LDL-C but does note that randomized control trials of cholesterol-lowering drugs in high-risk patients show that LDL-C lowering produces marked reductions in ASCVD, confirming the general principle that “lower is

better.” A more reliable indicator of statin efficacy is percentage reduction of LDL-C. In the 2018 guideline, the percentage reduction is used in follow-up monitoring of patients to estimate the efficacy of statin therapy.

The intensity of statin therapy is divided into three categories: high-intensity, moderate-intensity, and low intensity. High intensity statin therapy typically lowers LDL-C levels by $\geq 50\%$; moderate intensity statin therapy by 30% to 49%; and low-intensity statin therapy by $< 30\%$. For more information on the specific statins, doses, and randomized controlled trials reviewed, see Table 3 in the [2018 Guideline on the Management of Blood Cholesterol](#).

Selection of patients for statin therapy is a multistep process. The first step is to categorize patients into one of four categories of risk, from high to low. The categories with highest overall risk, those with clinical ASCVD, those with extremely high LDL-C (≥ 190 mg/dL), and those who have been diagnosed with diabetes, require prompt treatment without calculating 10-year ASCVD risk.

The 2018 guideline identifies four management groups:

1. **Secondary ASCVD Prevention**
In patients who are 75 years of age or younger with clinical ASCVD, high-intensity statin therapy should be initiated or continued with the aim of achieving a 50% or greater reduction in LDL-C levels.
2. **Severe Hypercholesterolemia**
In patients 20 to 75 years of age with an LDL-C level ≥ 190 mg/dL, maximally tolerated statin therapy is recommended. In patients 20 to 75 years of age with an LDL-C level ≥ 190 mg/dL who achieve less than a 50% reduction in LDL-C while receiving maximally tolerated statin therapy and/ or have an LDL-C level ≥ 100 mg/dL or higher, ezetimibe therapy is reasonable.
3. **Diabetes Mellitus in Adults**
In adults 40 to 75 years of age with diabetes mellitus, regardless of estimated 10-year ASCVD risk, moderate-intensity statin therapy is indicated. In adults 40 to 75 years of age with diabetes mellitus and an LDL-C level of 70 to 189 mg/dL, it is reasonable to assess the 10-year risk of a first ASCVD event to help stratify ASCVD risk. In patients with diabetes mellitus at higher risk, especially those with multiple risk factors or those 50 to 75 years of age, it is reasonable to use a high-intensity statin to reduce the LDL-C level by $\geq 50\%$.
4. **Primary Prevention**
In adults 40 to 75 years of age without diabetes mellitus and with LDL-C levels ≥ 70 mg/dL and estimated 10-year ASCVD risk of $\geq 7.5\%$: start a moderate-intensity statin if a discussion of treatment options favors statin therapy. If statins are indicated, reduce LDL-C levels by $\geq 30\%$, and if 10-year risk is $\geq 20\%$, reduce LDL-C levels by $\geq 50\%$.

A [coronary artery calcium](#) (CAC) score is an option to facilitate decision-making in adults ≥ 40 years of age when risk status is uncertain.

Add-on Therapies

For very high-risk individuals who have suboptimal LDL-C levels after maximal doses of statins, or who have a problem taking statins, additional drug options are available. Add-on therapies include:

- Ezetimibe: reduces blood cholesterol by limiting the absorption of cholesterol by the small intestine.
- PCSK9 inhibitors: allow the liver to absorb more cholesterol from the blood.
- Bile-acid sequestrants: block absorption of bile acid in the stomach from entering into the blood.

The 2018 guideline recommends the following before prescribing therapy:

- Offer patients options, such as phone and calendar reminders, educational activities, and simplified medication doses to help adhere to their treatment plans.
- Allow patients to ask questions and express concerns and preferences about their ability and likelihood to follow and stick to the lifestyle and medication plan.
- Emphasize the potential for lowering the patient's cardiovascular disease risk.
- Discuss any possible drug interactions and adverse effects.
- Address issues that factor into, or may become a barrier to, a shared-decision plan, such as costs and the patient's overall health.

Before therapy is prescribed, a patient-clinician discussion should take place to promote shared decision-making and should include the potential for ASCVD risk-reduction benefit, adverse effects, drug-drug interactions, and patient preferences.

Improving Cholesterol Management

Cholesterol Clinical Quality Measures

Clinician-patient shared decision-making requires an understanding of the cultural and economic factors that determine what is important to a patient as these often impact decisions about healthcare. Dr. Mims opened with a case study to emphasize how each patient's story is unique and issues such as co-existing illnesses, transportation, socio-economic factors, and family support all can impact a patient's decisions about treatment. These factors need to be considered when looking across patient populations to assess the quality of care delivered by a healthcare provider or system.

Clinical quality measures (CQMs) are tools that help measure and track the quality of health care services provided. Cholesterol CQMs can be used to establish a baseline of performance around adherence to clinical guidelines and help in the delivery of care that is safe, effective, patient-centered, equitable, and timely.

There are differences in cholesterol CQMs used by commercial insurers (HEDIS) and those used by clinicians to report to HRSA's Uniform Data System (UDS), and numerous CMS quality reporting programs. [Million Hearts®](#), a national initiative launched in 2012, has aligned national cardiovascular disease prevention efforts around a select set of evidence-based public health and clinical goals and strategies. To reduce the reporting burden on clinicians and focus quality efforts to achieve the greatest impact on outcomes, Million Hearts® staff worked with public and private partners to [align](#) and embed a small set of clinical quality measures into major national programs, such as the CMS Shared Savings Program. Million Hearts® encourages all clinicians to use [CMS347](#) to track improvements in cholesterol management over time.

Tracking cholesterol CQMs and utilizing proven quality improvement strategies, including employing a team-based approach to care; setting SMART goals (goals that are designed to be **S**pecific, **M**easurable, **A**chievable, **R**elevant and **T**ime-bound); and using rapid cycle testing, such as [PDSA](#) cycles, can enhance delivery of high-quality care, improve health within a patient population, and accelerate progress in preventing heart attacks and stroke.

Team-based Care Strategies for Cholesterol Management

Patient-clinician shared decision-making often will include discussion of: major risk factors and risk-enhancing factors; potential benefits of lifestyle changes and statin therapies; potential for adverse effects and drug-drug interactions; consideration of costs of statin therapy; and patient preferences and values. Employing a multidisciplinary team approach can help identify how the system can be structured to support shared decision-making. Implementing [team-based care](#) in healthcare systems and practices had been shown to be a cost-effective strategy for increasing medication adherence and for lowering blood pressure among diverse populations and in various settings.³

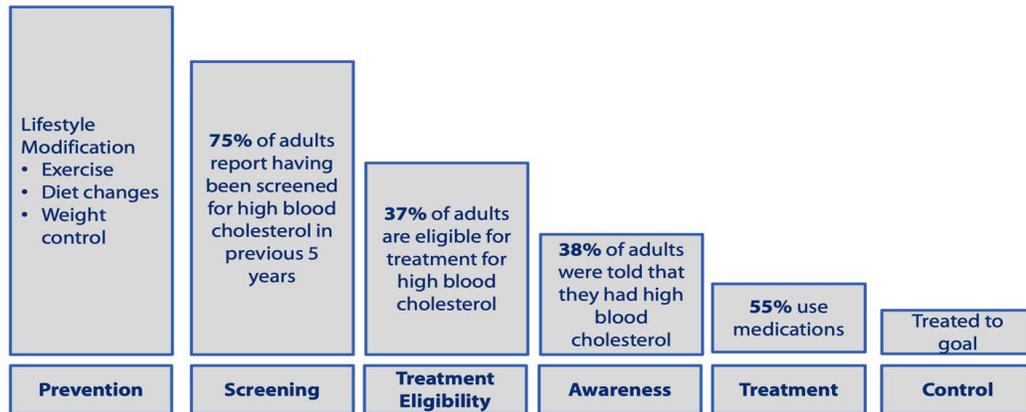
Each member of the healthcare team, from the receptionist who greets patients when they walk in the door, to medical assistants, nurses, doctors, physician assistants, nurse practitioners, pharmacists, community health workers and dietitians, all bring a unique perspective and skill set to the delivery of care. These can address potential facilitators and barriers to medication adherence and engage the patient population in healthy lifestyle choices, for example. A team-based care model can be an effective strategy to support patients in cholesterol management.

Cholesterol and Cholesterol Management Part II

At CDC's DP1815/1817 Grant Recipient Meeting on March 26-28, 2019, in Atlanta, Ga., Dr. Thompson-Paul and Dr. Mims presented Part II of the fireside chat on Cholesterol and Cholesterol Management. These presentations included an in-depth discussion of the steps to cholesterol management, outlined below, and group activities focused on brainstorming PDSA cycles to improve cholesterol CQM's in the practice setting.

³ Centers for Disease Control and Prevention. [Best Practices for Cardiovascular Disease Prevention Programs: A Guide to Effective Health Care System Interventions and Community Programs Linked to Clinical Services](#). Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services; 2017.

Steps to Cholesterol Management



Conclusion

State and local public health department staff, in collaboration with healthcare providers, health systems, insurers, and communities, have used many strategies for improving hypertension diagnosis and management. Important strategies are: supporting the use of standardized, evidence-based [protocols](#); finding patients who are recommended to be on statins but have not been given a prescription (i.e., “hiding in plain sight”); embedding the [ASCVD risk calculator](#) into the electronic health record; developing multidisciplinary teams including pharmacists for medication management; and creating community-clinical linkages to support healthy lifestyle choices.

Additional resources to support guideline implementation, such as “Strategies to Improve Guideline Implementation by Setting and Target Audience”, are available in the American Heart Association, Inc., and the American College of Cardiology Foundation [Web Supplement](#).

Key recommendations for State Health Departments working with partners to improve cholesterol management include:

- Share data from CDC’s [High Cholesterol Statistics and Maps](#) on the burden of high cholesterol and populations at high-risk to help target interventions and influence key decision-makers for program planning.
- Promote [Million Hearts® Cholesterol Management](#) tools and resources with healthcare providers and health systems to improve adherence to clinical guidelines.
- Support [community-clinical partnerships](#) to improve population health.
- Use CDC’s [Cholesterol Communications Kit](#) to raise awareness of what cholesterol is and why managing cholesterol is important for reducing the risk of cardiovascular disease.

Resources

American College of Cardiology. [Guidelines Made Simple, Updated June 2019](#) | 2018 Guidelines on the Management of Blood Cholesterol

American Heart Association. [Check. Change. Control. Cholesterol™](#)

American Heart Association. [Highlights of the 2018 Guideline on the Management of Blood Cholesterol](#)

American Heart Association, Inc., and the American College of Cardiology Foundation. [Web Supplement](#) to the 2018 Guideline on the Management of Blood Cholesterol

Centers for Disease Control and Prevention. [Cholesterol](#)

Centers for Disease Control and Prevention. [High Cholesterol Facts](#)

Grundy SM, Stone NJ, Bailey AL, et al., [Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines](#). *Circulation*. 2019;139:e1082–e1143. DOI: 10.1161/CIR.0000000000000625.

Grundy SM, Stone NJ, Bailey AL, et al. [2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol: Executive Summary](#). *Circulation*. 2019;139:e1046–e1081. DOI: 10.1161/CIR.0000000000000624

Million Hearts® [Cholesterol Management](#)