Circulation

CORRECTION

Correction to: 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

In the article by Grundy 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," which published ahead of print on November 10, 2018, and appears in the June 18/25, 2019, issue of the journal (*Circulation*. 2019;139:e1082–e1143. DOI: 10.1161/CIR.0000000000000625), several corrections were needed.

1. On page e1084, in the section "Top 10 Take-Home Messages to Reduce Risk of Atherosclerotic Cardiovascular Disease Through Cholesterol Management," left column, Take Home Message 4:
   - The first sentence read, "4. In patients with severe primary hypercholesterolemia…begin high-intensity statin therapy without calculating 10-year ASCVD risk." It has been updated to read, "4. In patients with severe primary hypercholesterolemia…without calculating 10-year ASCVD risk, begin high-intensity statin therapy."
   - The third sentence read, "If the LDL-C level on statin plus ezetimibe…and economic value is low at mid-2018 list prices." It has been updated to read, "If the LDL-C level on statin plus ezetimibe…and economic value is uncertain at mid-2018 list prices."
2. On page e1089, in the section "2.2. Measurements of LDL-C and Non–HDL-C," recommendation table:
   - Recommendation 2 read, "2. In adults who are 20 years of age or older and in whom an initial nonfasting lipid profile reveals a triglycerides level of 400 mg/dL (≥4.5 mmol/L) or higher, a repeat lipid profile in the fasting state should be performed for assessment of fasting triglyceride levels and baseline LDL-C." It has been updated to read, "2. In adults who are 20 years of age or older and in whom an initial nonfasting lipid profile reveals a triglycerides level of 400 mg/dL or higher (≥4.5 mmol/L), a repeat lipid profile in the fasting state should be performed for assessment of fasting triglyceride levels and baseline LDL-C."
   - Recommendation 3 read, "3. For patients with an LDL-C level less than 70 mg/dL (<1.8 mmol/L), measurement of direct LDL-C or modified LDL-C estimate is reasonable to improve accuracy over the Friedewald formula." It has been updated to read, "3. For adults with an LDL-C level less than 70 mg/dL (<1.8 mmol/L), measurement of direct LDL-C or modified LDL-C estimate is reasonable to improve accuracy over the Friedewald formula."
3. On pages e1091–e1092, in the section "4.1. Secondary ASCVD Prevention," recommendation table:
   - Recommendation 4 read, "4. In patients with clinical ASCVD who are judged to be very high risk and who are on maximally tolerated LDL-C

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lowering therapy with LDL-C 70 mg/dL (≥1.8 mmol/L) or higher or a non–HDL-C level of 100 mg/dL (≥2.6 mmol/L) or higher, it is reasonable to add a PCSK9 inhibitor following a clinician–patient discussion about the net benefit, safety, and cost." It has been updated to read, "4. In patients with clinical ASCVD who are judged to be very high risk and who are on maximally tolerated LDL-C lowering therapy with LDL-C 70 mg/dL or higher (≥1.8 mmol/L) or a non–HDL-C level of 100 mg/dL or higher (≥2.6 mmol/L), it is reasonable to add a PCSK9 inhibitor following a clinician–patient discussion about the net benefit, safety, and cost."

- Recommendation 5 read, "5. In patients with clinical ASCVD who are on maximally tolerated statin therapy and are judged to be at very high risk and have an LDL-C level of 70 mg/dL (≥1.8 mmol/L) or higher, it is reasonable to add ezetimibe therapy." It has been updated to read, "5. In patients with clinical ASCVD who are on maximally tolerated statin therapy and are judged to be at very high risk and have an LDL-C level of 70 mg/dL or higher (≥1.8 mmol/L), it is reasonable to add ezetimibe therapy."
- Recommendation 9 read, "9. In patients with clinical ASCVD who are receiving maximally tolerated statin therapy and whose LDL-C level remains 70 mg/dL (≥1.8 mmol/L) or higher, it may be reasonable to add ezetimibe." It has been updated to read, "9. In patients with clinical ASCVD who are receiving maximally tolerated statin therapy and whose LDL-C level remains 70 mg/dL or higher (≥1.8 mmol/L), it may be reasonable to add ezetimibe."

4. On page e1093, in the left column, penultimate sentence, references S4.1–41,S4.1–42 have been updated to S4.1–42,S4.1–43.
5. On page e1094, in Table 4, row 4, reference S4.1–39 has been updated to S4.1–40.
6. On page e1094, in the right column, first paragraph ("5. In IMPROVE-IT…"), second sentence, reference 4.1–43 has been updated to 4.1–44.
7. On page e1095, in the left column, first paragraph, first sentence ("higher discontinuation rates…") reference S4.1–44 has been updated to S4.1–45.
8. On page e1095, in the left column, last paragraph, first sentence, ("10. The CORONA… Patients With Symptomatic CHF…"), reference S4.1–45 has been updated to S4.1–39.
9. On page e1095, in the section "4.2. Severe Hypercholesterolemia (LDL-C ≥190 mg/dL [≥4.9 mmol/L])," recommendation table:
   - Recommendation 1 read, "1. In patients 20 to 75 years of age with an LDL-C level of 190 mg/dL (≥4.9 mmol/L) or higher, maximally tolerated statin therapy is recommended." It has been updated to read, "1. In patients 20 to 75 years of age with an LDL-C level of 190 mg/dL or higher (≥4.9 mmol/L), maximally tolerated statin therapy is recommended."
   - Recommendation 2 read, "2. In patients 20 to 75 years of age with an LDL-C level of 190 mg/dL (≥4.9 mmol/L) or higher who achieve less than a 50% reduction in LDL-C while receiving maximally tolerated statin therapy and/or have an LDL-C level of 100 mg/dL (≥2.6 mmol/L) or higher, ezetimibe therapy is reasonable." It has been updated to read, "2. In patients 20 to 75 years of age with an LDL-C level of 190 mg/dL or higher (≥4.9 mmol/L) who achieve less than a 50% reduction in LDL-C while receiving maximally tolerated statin therapy and/or have an LDL-C level of 100 mg/dL or higher (≥2.6 mmol/L), ezetimibe therapy is reasonable."
   - Recommendation 3 read, "3. In patients 20 to 75 years of age with a baseline LDL-C level ≥190 mg/dL (≥4.9 mmol/L), who achieve less than a 50% reduction in LDL-C levels and have fasting triglycerides ≤300 mg/dL (≤3.4 mmol/L). while taking maximally tolerated statin and ezetimibe therapy, the addition of a bile acid sequestrant may be considered." It has been updated to read, "3. In patients 20 to 75 years of age with a baseline LDL-C level of 190 mg/dL or higher (≥4.9 mmol/L), who achieve less than a 50% reduction in LDL-C levels and have fasting triglycerides 300 mg/dL or lower (≤3.4 mmol/L), while taking maximally tolerated statin and ezetimibe therapy, the addition of a bile acid sequestrant may be considered."
   - Recommendation 4 read, "4. In patients 30 to 75 years of age with heterozygous FH and with an LDL-C level of 100 mg/dL (≥2.6 mmol/L) or higher while taking maximally tolerated statin and ezetimibe therapy, the addition of a PCSK9 inhibitor may be considered." It has been updated to read, "4. In patients 30 to 75 years of age with heterozygous FH and with an LDL-C level of 100 mg/dL or higher (≥2.6 mmol/L) while taking maximally tolerated statin and ezetimibe therapy, the addition of a PCSK9 inhibitor may be considered."
   - Recommendation 5 read, "5. In patients 40 to 75 years of age with a baseline LDL-C level of 220 mg/dL (≥5.7 mmol/L) or higher and who achieve an on-treatment LDL-C level of 130 mg/dL (≥3.4 mmol/L) or higher while receiving maximally tolerated statin and ezetimibe therapy, the addition of a PCSK9 inhibitor may be considered." It has been updated to read, "5. In patients 40

to 75 years of age with a baseline LDL-C level of 220 mg/dL or higher (≥5.7 mmol/L) and who achieve an on-treatment LDL-C level of 130 mg/dL or higher (≥3.4 mmol/L) while receiving maximally tolerated statin and ezetimibe therapy, the addition of a PCSK9 inhibitor may be considered."

10. On page e1100, Figure 2, "HIV," was added to the figure legend.
11. On page e1101, in the section "4.4.1.2. Pooled Cohort Equations," left column, first paragraph, the last sentence has been updated to read, "PCE estimates can be calculated from 2 online links: ACC (S4.4.1.1-1) or AHA (S4.4.1.1-2)."
12. On page e1101, in Table 6, "Risk-Enhancing Factors for Clinician–Patient Risk Discussion":
    - The third row read, "Metabolic syndrome (increased waist circumference, elevated triglycerides [>175 mg/dL…." It has been updated to read, "Metabolic syndrome (increased waist circumference, elevated triglycerides [>150 mg/dL…."
    - The penultimate row read, "3. Elevated apoB ≥130 mg/dL: A relative indication for its measurement would be triglyceride ≥200 mg/dL. A level ≥130 mg/dL corresponds to an LDL-C >160 mg/dL and constitutes a risk-enhancing factor." It has been updated to read, "3. Elevated apoB ≥130 mg/dL: A relative indication for its measurement would be triglyceride ≥200 mg/dL. A level ≥130 mg/dL corresponds to an LDL-C ≥160 mg/dL and constitutes a risk-enhancing factor."
13. On page e1103, in the section "4.4.2. Primary Prevention Adults 40 to 75 Years of Age With LDL-C Levels 70 to 189 mg/dL (1.7 to 4.8 mmol/L)," paragraph under "Synopsis":
    - The penultimate sentence read, "When there is uncertainty, consideration of risk-enhancing factors (including family history of premature ASCVD and CAC score), categorical…." It has been updated to read, "When there is uncertainty, consideration of risk-enhancing factors including family history of premature ASCVD, categorical…."
    - The last sentence read, "A CAC score… selects adults who show little benefit from starting a statin." It has been updated to read, "A CAC score… selects adults who show reduced benefit from starting a statin."
14. On page e1104, in Table 7, "Checklist for Clinician–Patient Shared Decision-Making for Initiating Therapy":
    - In the section "ASCVD risk assessment," a dagger was added to the last line. It has been updated to read, "Use decision tools to explain risk (eg, ASCVD Risk Estimator Plus,* Mayo Clinic Statin Choice Decision Aid†)."
    - In the section "Lifestyle modifications," in the second entry, "PCNA Clinicians' Lifestyle Modification Toolbox," has been updated to read, "PCNA Heart Healthy Toolbox."
    - In the section "Lifestyle modifications," several symbols were added to the second entry. It has been updated to read, "Endorse a healthy lifestyle and provide relevant advice, materials, or referrals (eg, CardioSmart‡, AHA Life's Simple 7§, NLA Patient Tear Sheets‖, PCNA Heart Healthy Toolbox¶, cardiac rehabilitation, dietitian, smoking cessation program)."
    - In the legend, a URL was added to the first sentence. The sentence has been updated to read, "*ASCVD Risk Predictor Plus is available at: http://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/ and http://static.heart.org/riskcalc/app/index.html#!/baseline-risk. Accessed September 1, 2018."
    - In the legend, several paragraphs were added to define the added symbols. The legend has been updated to read,

      †Mayo Clinic Statin Decision Aid information is available at: https://statindecisionaid.mayoclinic.org.

      ‡CardioSmart health information is available at: https://www.cardiosmart.org/About

      §AHA Life's Simple 7 information is available at: https://www.heart.org/en/healthy-living/healthy-lifestyle/my-life-check–lifes-simple-7.

      ‖NLA Patient Tear Sheets information is available at: https://www.lipid.org/practicetools/tools/tearsheets

      ¶PCNA Heart Healthy Toolbox information is available at: http://pcna.net/clinical-tools/tools-for-healthcare-providers/heart-healthy-toolbox
15. On page e1105, in the left column:
    - In Recommendation 5, the sixth sentence read, "In women, a history of pregnancy complicated by preeclampsia and premature menopause…." It has been updated to read, "In women, a history of pregnancy complicated by preeclampsia or premature menopause…."
    - In Recommendation 7, the sixth sentence read, "In patients with a family history of ASCVD, CAC score of zero and may impart less short-term benefit from statin therapy; but…." It has been updated to read, "In patients with a family history of ASCVD, CAC score of zero may impart less short-term benefit from statin therapy, but…."
16. On page e1109, in the section "4.4.4.3. Children and Adolescents," recommendation table,

Recommendation 3 read, "3. In children and adolescents 10 years of age or older with an LDL-C level persistently 190 mg/dL (≥4.9 mmol/L) or higher or 160 mg/dL (4.1 mmol/L) or higher with a clinical presentation consistent with FH (see Section 4.2.) and who do not respond adequately with 3 to 6 months of lifestyle therapy, it is reasonable to initiate statin therapy." It has been updated to read, "3. In children and adolescents 10 years of age or older with an LDL-C level persistently 190 mg/dL or higher (≥4.9 mmol/L) or 160 mg/dL or higher (4.1 mmol/L) with a clinical presentation consistent with FH (see Section 4.2.) and who do not respond adequately with 3 to 6 months of lifestyle therapy, it is reasonable to initiate statin therapy."

17. On page e1110, in Table 9, "Normal and Abnormal Lipid Values in Childhood," the measurement in the columns "Acceptable," "Borderline," and "Abnormal" read, "mmol." It has been updated to read, "mmol/L."
18. On page e1111, in Table 10, "Racial/Ethnic Issues in Evaluation, Risk Decisions, and Treatment of ASCVD Risk," the heading for the fourth column read, "Blacks." It has been updated to read, "Blacks/African Americans."
19. On page e1112, in the section "4.5.2. Hypertriglyceridemia," in the recommendation table, Recommendation 1 read, "1. In adults 20 years of age or older with moderate hypertriglyceridemia (fasting or nonfasting triglycerides 175 to 499 mg/dL [1.9 to 5.6 mmol/L]), clinicians should address and treat lifestyle factors (obesity and metabolic syndrome), secondary factors (diabetes mellitus, chronic liver or kidney disease and/or nephrotic syndrome, hypothyroidism), and medications that increase triglycerides." It has been updated to read, "1. In adults 20 years of age or older with moderate hypertriglyceridemia (fasting or nonfasting triglycerides 175 to 499 mg/dL [2.0 to 5.6 mmol/L]), clinicians should address and treat lifestyle factors (obesity and metabolic syndrome), secondary factors (diabetes mellitus, chronic liver or kidney disease and/or nephrotic syndrome, hypothyroidism), and medications that increase triglycerides."
20. On page e1113, in the section "4.5.2. Hypertriglyceridemia," in the paragraph under "Synopsis," the first sentence read, "Two categories of elevated triglycerides consist of moderate hypertriglyceridemia (fasting or nonfasting triglycerides 150–499 mg/dL…." It has been updated to read, "Two categories of hypertriglyceridemia consist of moderate hypertriglyceridemia (fasting or nonfasting triglycerides 175–499 mg/dL…."
21. On page e1118, in Table 11, "Statin-Associated Side Effects (SASE)":
    - In the section "Statin-associated muscle symptoms (SAMS)," "New-onset diabetes mellitus" row, "Frequency" column, the entry read, "Depends on population…fasting blood sugar…." It has been updated to read, "Depends on population…fasting blood glucose …."
    - In the section "Central nervous system," "Memory/cognition" row, "Frequency" column, the entry read, "Rare/unclear." It has been updated to read, "Rare."
    - In the section "Other," all entries in the "Frequency" column read, "Unclear/unfounded" or "Unclear." All entries have been updated to read, "Unfounded."
22. On page e1123, in the section "ACC/AHA Task Force Members," an asterisk was added to the listings for Dr. Ikonomidis and Dr. Mauri. They are now designated as "*Former Task Force member; current member during the writing effort."
23. On page e1123, in the section "Presidents and Staff," under "American College of Cardiology/American Heart Association," "Thomas S.D. Getchius, Manager, Guideline Operations" was added.
24. On page e1127, in the References section, references S4.1–39 through S4.1–45 have been updated to read as follows:

S4.1–39. Tavazzi L, Maggioni AP, Marchioli R, et al. Effect of rosuvastatin in patients with chronic heart failure (the GISSI-HF trial): a randomised, double-blind, placebo-controlled trial. Lancet. 2008;372:1231–9.

S4.1–40. The Long-Term Intervention with Pravastatin in Ischaemic Disease (LIPID) Study Group. Prevention of cardiovascular events and death with pravastatin in patients with coronary heart disease and a broad range of initial cholesterol levels. N Engl J Med. 1998;339:1349–57.

S4.1–41. Bonaca MP, Nault P, Giugliano RP, et al. Low-density lipoprotein cholesterol lowering with evolocumab and outcomes in patients with peripheral artery disease: insights from the FOURIER trial (Further Cardiovascular Outcomes Research With PCSK9 Inhibition in Subjects With Elevated Risk). Circulation. 2018;137:338–50.

S4.1–42. Cannon CP, Khan I, Klimchak AC, et al. Simulation of lipid-lowering therapy intensification in a population with atherosclerotic cardiovascular disease. JAMA Cardiol. 2017;2:959–66.

S4.1–43. Virani SS, Akeroyd JM, Nambi V, et al. Estimation of eligibility for proprotein convertase subtilisin/kexin type 9 inhibitors and associated costs based on the FOURIER Trial (Further Cardiovascular Outcomes Research With PCSK9 Inhibition in Subjects With Elevated Risk): insights from the Department of Veterans Affairs. Circulation. 2017;135:2572–4.

S4.1–44. Bohula EA, Bonaca MP, Braunwald E, et al. Atherothrombotic risk stratification and the efficacy and safety of vorapaxar in patients with stable ischemic heart disease and previous myocardial infarction. Circulation. 2016;134:304–13.

S4.1–45. Tikkanen MJ, Holme I, Cater NB, et al. Comparison of efficacy and safety of atorvastatin (80 mg) to simvastatin (20 to 40 mg) in patients aged <65 versus >65 years with coronary heart disease (from the Incremental DEcrease through Aggressive Lipid Lowering [IDEAL] study) Am J Cardiol. 2009;103:577–82.

25. On pages e1139–e1140, in Appendix 1, "Author Relationships With Industry and Other Entities (Relevant)," in the Employment column:
    - In the entry for Dr. Grundy, "VA North Texas Health Care System" was added. The entry has been updated to read, "VA North Texas Health Care System and University of Texas Southwestern Medical Center at Dallas—Professor of Internal Medicine."
    - The entry for Dr. Virani read, "Baylor College of Medicine, Texas Medical Center—Associate Professor…" It has been updated to read, "Baylor College of Medicine—Professor, Section of Cardiovascular Research and Director, Cardiology Fellowship Training Program; Michael E. DeBakey VA Medical Center—Staff Cardiologist and Investigator, Health Policy, Quality & Informatics Program, Center for Innovations in Quality, Effectiveness and Safety."
26. On page e1140, "VA, Veterans Affairs" was added to the legend for Appendix 1.

These corrections have been made to the current online version of the article, which is available at https://www.ahajournals.org/doi/10.1161/CIR.0000000000000625.