**Supplemental Table 1. Criteria used to define conditions.**

|  |  |
| --- | --- |
| **Condition** | **Criteria** |
| Clinical ASCVD (defined as one or more of the following criteria)  | * Stable or unstable angina, based on and answer of "yes" to the question "Has a doctor or other health professional ever told you that you had angina, also called angina pectoris?" or on responses to the Rose questionnaire criteria, see: <https://wwwn.cdc.gov/NCHS/Nhanes/2011-2012/CDQ_G.htm>
* Coronary heart disease, based on an answer of "yes" to the question "Has a doctor or other health professional ever told you that you had coronary heart disease?"
* Acute myocardial infarction (heart attack), based on an answer of "yes" to the question "Has a doctor or other health professional ever told you that you had a heart attack (also called myocardial infarction)?"
* Stroke, based on an answer of "yes" to the question "Has a doctor or other health professional ever told you that you had a stroke?"
 |
| Severe hypercholesterolemia | * Fasting LDL-c ≥190 mg/dL
 |
| Diabetes | * Includes diagnosed and undiagnosed diabetes.
* Diagnosed diabetes is defined as an answer of "yes" to the question "Other than during pregnancy, have you ever been told by a doctor or health professional that you have diabetes or sugar diabetes?" or an answer of "yes" to the questions "Are you now taking insulin?" or "Are you now taking diabetic pills to lower your blood sugar?"
* Undiagnosed diabetes is defined as a fasting plasma glucose ≥126 mg/dL or an HbA1c ≥6.5%. Fasting plasma glucose was calibrated to the Cobas C311 analyzer used in the 2015-2016 and 2017-2018 cycles.
 |
| ASCVD risk enhancers (include one or more of the following): | * Primary hypercholesterolemia:
* LDL-c 160-189 mg/dL
* non-HDL-c 190-219 mg/dL
* Metabolic Syndrome (≥3 of the following 5 conditions)
* Waist circumference (Men: ≥102 cm; Women: ≥88 cm)
* Serum Triglycerides (≥150 mg/dL)
* Low HDL-c (Men: <40 mg/dL; Women: <50 mg/dL)
* Hypertension (Systolic blood pressure (BP) ≥140 mmHg, Diastolic BP ≥90 mmHg, or BP-lowering medication use)
* Fasting Plasma Glucose (≥100 mg/dL or medication)
* Chronic Kidney Disease (CKD), defined as either of the following:
	+ - * Estimated Glomerular Filtration rate (eGFR) <60 mL/min/1.73m2 (eGFR calculated using CKD-Epi equations.1
			* Albuminuria: urinary Albumin/Creatinine Ratio >30 mg/g
* Premature menopause (<40y), defined as an answer of 20-39 years to the question "About how old were you when you had your last menstrual period?"
* Chronic inflammatory disorders:
	+ - * Rheumatoid arthritis, defined as an answer of "yes" to the question "Has a doctor or other health professional ever told you that you had arthritis?" and an answer of "Rheumatoid arthritis" to the question "Which type of arthritis was it?"
* HIV, defined by positive HIV antibody test
	+ - Persistent Hypertriglyceridemia (≥175 mg/dL and taking Fibrates or Niacin ≥3 months)
		- Apolipoprotein B ≥130 mg/dL
 |
| **Abbreviations:** ASCVD, Atherosclerotic Cardiovascular Disease; BP, Blood Pressure; LDL-c, low density lipoprotein cholesterol;HDL-c, high density lipoprotein cholesterol;1. CKD-Epi Equations from: Levey AS, Becker C, Inker LA. Glomerular filtration rate and albuminuria for detection and staging of acute and chronic kidney disease in adults: a systematic review. JAMA. 2015;313(8):837-846. doi:10.1001/jama.2015.0602)
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**Supplemental Table 2. 2013 and 2018 Cholesterol Guidelines Risk Enhancing Factors, High-Risk Conditions, and Risk Enhancing Factor\* availability in NHANES** (2011-2018)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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| --- | --- | --- | --- |
| **Patient Management Group** | **NHANES** | **Availability†** | **Data File Name** |
| **Risk Factors/High-Risk Conditions/Risk Enhancers**  | **Y/N/I/P** | **Component** |
| **1) Secondary ASCVD Prevention -- Very high ASCVD Risk** |  |  |   |
| Major ASCVD Events | P |   |   |
| Recent acute coronary syndrome (ACS) | P | QUEX | Medical Conditions (Heart attack, Angina) |
| History of MI (other than recent ACS event listed above) | Y | QUEX | Medical Conditions |
| History of ischemic stroke | P | QUEX | Medical Conditions (all Stroke) |
| Symptomatic peripheral arterial disease (PAD) | N |   |   |
|  High-Risk Conditions | P |   |   |
| Age ≥65 y | Y | DEMO | Demographic Variables and Sample Weights |
| Heterozygous familial hypercholesterolemia | N |   |   |
| History of prior CABG or PCI | N |   |   |
| Diabetes mellitus (FPG >125 mg/dL, HbA1c ≥6.5%, or self-reported diabetes or medications) | P | QUEX | Diabetes (no data on type) |
| LAB | Glycohemoglobin, Plasma Fasting Glucose |
| Hypertension (SBP ≥140 mmHg, DBP ≥90 mmHg, or BP-lowering medication use) | Y | QUEX | Blood Pressure and Cholesterol |
| EXAM | Blood Pressure |
| eGFR 15-59 mL/min/1.73m2 (CKD-Epi equations) | Y | LAB | Standard Biochemistry Profile |
| Current smoking (self-report or serum creatinine >10mg/dL) | Y | QUEX | Smoking - Cigarette Use |
| LAB | Cotinine and Hydroxycotinine - Serum |
| Persistently elevated LDL-C (LDL-c ≥100, with Statin+Ezetimibe ≥3 months) | Y | LAB | Cholesterol - Low - Density Lipoprotein (LDL) & Triglycerides |
| QUEX | Prescription Medications |
| History of congestive HF | Y | QUEX | Medical Conditions |
| **3) Diabetes -- Diabetes-specific Risk Enhancers** | **P** |  |   |
| Long diabetes duration (≥10 years for type 2 diabetes or ≥ 20 years for type 1 diabetes) | P | QUEX | Diabetes (no data on type; defined as diabetes duration ≥10y) |
| Albuminuria (urine albumin/creatinine >30 mg/g) | Y | LAB | Albumin & Creatinine - Urine  |
| eGFR <60 mL/min/1.73m2 | Y | LAB | Standard Biochemistry Profile |
| Retinopathy | Y | QUEX | Diabetes |
| Neuropathy | N |   |   |
| **4) Primary Prevention** |   |   |   |
| **4a) LDL-c levels** | P |   |   |
| Family History premature ASCVD | P | QUEX | Medical Conditions (Immediate family member with MI or Angina <50y) |
| **4b) ASCVD Risk -- Risk-Enhancing Factors** | **P** |  |   |
| Family History premature ASCVD | P | QUEX | Medical Conditions (Immediate family member with MI or Angina <50y) |
| Primary hypercholesterolemia: | Y |   |   |
| LDL-c 160-189 mg/dL | Y | LAB | Cholesterol - Low - Density Lipoprotein (LDL) & Triglycerides |
| non-HDL-c 190-219 mg/dL | Y | LAB | Cholesterol - Total, Cholesterol - High-Density Lipoprotein (HDL)  |
| Metabolic Syndrome (≥3/5) | Y |   |   |
| Waist circumference (Men: ≥102 cm; Women: ≥88 cm) | Y | EXAM | Body Measures  |
| Serum Triglycerides (≥150 mg/dL) | Y | LAB | Cholesterol - Low - Density Lipoprotein (LDL) & Triglycerides |
| Low HDL-c (Men: <40 mg/dL; Women: <50 mg/dL) | Y | LAB | Cholesterol - High-Density Lipoprotein (HDL)  |
| Hypertension (SBP ≥140 mmHg, DBP ≥90 mmHg, or BP-lowering medication use) | Y | QUEX | Blood Pressure and Cholesterol |
| EXAM | Blood Pressure |
| Fasting Plasma Glucose (≥100 mg/dL or medication) | Y | LAB | Plasma Fasting Glucose |
| CKD (eGFR <60 mL/min/1.73m2 or albuminuria and not treated with dialysis or kidney transplantation) | Y | LAB | Standard Biochemistry Profile |
| Y | LAB | Albumin & Creatinine - Urine  |
| P | QUEX | Kidney Conditions - Urology |
| History of preeclampsia | N |   |   |
| Premature menopause (<40y) | Y | QUEX | Reproductive Health |
| Chronic inflammatory disorders | P |   |   |
| Rheumatoid arthritis | Y | QUEX | Medical Conditions |
| Psoriasis | I | QUEX | Medical Conditions (question dropped after 2013-2014) |
| Chronic HIV | P | LAB | HIV Antibody Test (HIV-positive yes/no only) |
| High-risk Race (South Asian) | N |   |   |
| Lipid/Biomarkers | P |   |   |
| Persistent Hypertriglyceridemia (≥175 mg/dL and Fibrates or Niacin ≥3 months) | Y | LAB | Cholesterol - Low - Density Lipoprotein (LDL) & Triglycerides |
|   | QUEX | Prescription Medications |
| Apolipoprotein B ≥130 mg/dL | I | LAB | Apolipoprotein B (11-12 through 15-16 cycles only) |
| hsCRP ≥2.0 mg/dL | I | LAB | High-Sensitivity C-Reactive Protein (15-16 and 17-18 only) |
| Ankle-brachial Index (ABI) <0.9 | N |   |   |
| Lipoprotein A (Men: ≥50 mg/dL; Women ≥50 mg/dL with hypercholesterolemia) | N |   |   |
| Abbreviations: |
| ASCVD: Atherosclerotic Cardiovascular Disease |
| CABG: Coronary Artery Bypass Graft |
| PCI: Percutaneous Coronary Intervention |
| eGFR: estimated Glomerular Filtration Rate |
| HF: Heart Failure |
| CKD: Chronic Kidney Disease |
| HIV: Human Immunodeficiency Virus |
| hsCRP: High-Sensitivity C-Reactive Protein |
| NHANES availability: |
| Y= Yes: available across all cycles 2011-2018 |
| P= Partial or proxy data available  |
| I= Intermittent data available across cycles |
| N =No: data not available |

 |

**Supplemental Table 3. Concordance and Discordance between Statin Therapy Recommendations: 2013 & 2018 Guidelines -- NHANES 2011-2018**

|  |  |  |  |
| --- | --- | --- | --- |
| Concordance | % | (se) | N |
| Concordant | 75.8  | (0.7) | 175.4 |
| Neither Recommended | 73.8  | (0.9) | 129.5 |
| Both Recommended | 26.2  | (0.9) | 45.9 |
| Discordant | 24.2  | (0.7) | 56.2 |
| Statin Recommended in 2013 | 56.8  | (1.5) | 31.9 |
| Consider Statin in 2018 | 46.4  | (1.5) | 26.0 |
| No Recommendation in 2018 | 10.5  | (1.0) | 5.9 |
| No Statin Recommended in 2013 | 43.2  | (1.5) | 24.2 |
| Consider Statin in 2018 | 42.8  | (1.5) | 24.0 |
| Recommended in 2018 | 0.4  | (0.1) | 0.2 |

Includes non-pregnant fasting adults age ≥20y, with complete data on risk factors and statin use

Statin use identified using the NHANES prescription medication data files.

Statin Recommended and Consider statin groups are mutually exclusive.

The 2013 ACC-AHA Guidelines recommended statin therapy for adults ≥21 years who fall into any of the following 5 groups:

1) Clinical ASCVD: Criteria used to define ASCVD are found in Supplemental Table 1.

2) Severe hypercholesterolemia: fasting LDL-c ≥190 mg/dL, no clinical ASCVD (as defined above), and age 40-75 y

3) Diabetes, no clinical ASCVD or severe hypercholesterolemia, age 40-75 y; Criteria used to define Diabetes are found in Supplemental Table 1.

4) ASCVD risk ≥7.5%, no clinical ASCVD, severe hypercholesterolemia, or Diabetes, age 40-75 y

ASCVD risk score is calculated based on the equations published in: Goff DC Jr, Lloyd-Jones DM, Bennett G, Coady S, D’Agostino RB Sr, Gibbons R, Greenland P, Lackland DT, Levy D, O’Donnell CJ, Robinson JG, Schwartz JS, Shero ST, Smith SC Jr, Sorlie P, Stone NJ, Wilson PWF. 2013 ACC/AHA guideline on the assessment of cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Circulation. 2014;129(suppl 2): S49-S73.

5) Current statin use: identified using the NHANES prescription medication data files.

The 2018 ACC-AHA Guidelines recommend statin therapy for adults 20-75 years who fall into any of the following 4 groups:

1) Clinical ASCVD (as defined above) and age 20-75 years

2) Severe hypercholesterolemia: fasting LDL-c ≥190 mg/dL, no clinical ASCVD, and age 20-75 y

3) Diabetes, no clinical ASCVD or severe hypercholesterolemia, and age 40-75 y

4) Primary prevention (no clinical ASCVD, severe hypercholesterolemia, or Diabetes, age 40-75y): ASCVD risk ≥20%

Not shown is the category for current statin use among adults who do not fall within any of the management groups. The 2013 Guideline recommended continued therapy for all adults currently treated; the 2018 Guideline recommend considering continued therapy only within the management groups.

Does not include those for whom statin therapy should be considered according to the 2018 Guideline.

N: Population N in millions, calculated from the 2011-2012, 2013-2014, 2015-2016, 2017-2018 American Community Survey data released by NCHS, averaged across the 4 cycles. For additional information, see: http://www.cdc.gov/nchs/nhanes/response\_rates\_cps.htm.