Supplemental Material

Descriptions and Definitions of Obesity, Cardiometabolic Risk, and Metabolic Syndrome Classification Tools

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| **Screening Tool or Classification Measurement** | **Description and Definition of Risk** |
| *Obesity Classification* | |
| BMI ≥30 (WHO)1 | BMI ≥30  Indicates classification of obesity |
| Adjusted BMI (Ayas)2 | BMI ≥25.3  Indicates classification of obesity in the SCI population |
| Adjusted BMI (Laughton)3 | BMI > 22  Indicates classification of obesity in the SCI population |
| Ideal Body Weight (IBW) Equation (Hamwi)4,5 | 106 + (6 x every inch over height of 60 inches)  Predicts the ideal body weight (pounds) with lowest associated mortality |
| Adjusted Ideal Body Weight (IBW)6,7 | 106 + (6 x every inch over height of 60 inches)  Subtract 10-15 pounds (paraplegia)  Subtract 15-20 pounds (tetraplegia)  or  Subtract 5-10% (paraplegia)  Subtract 10-15% (tetraplegia)  Predicts the ideal body weight (pounds) with lowest associated mortality for the SCI population |
| Waist Circumference (WC)8 | WC > 40” or 102 cm (men)  WC > 35” or 88 cm (women)  Indicates increased body fat and increased risk for obesity-related comorbidities |
| Adjusted WC (Ravensbergen)9 | WC ≥ 94 cm  Indicates increased CVD risk in individuals with SCI |
| *Metabolic Syndrome (MetS) Classification* | |
| MetS – International Diabetes Federation (IDF)10 | WC\* ≥ 94 cm (males), WC ≥ 80 cm (females) or BMI >30 kg/m2 PLUS any 2 of the following:  ●TG ≥ 150 mg/dL or specific treatment for this lipid abnormality  ●HDL < 40 mg/dL (males) or <50 mg/dL (females) or specific treatment for this lipid abnormality  ●SBP ≥ 130 mm Hg or DBP ≥ 85 mm Hg or treatment of previously diagnosed HTN  ●FBG ≥100 mg/dL or previously diagnosed type 2 diabetes  \*For the purpose of this study, only Europid WC was used |
| MetS – National Cholesterol Education Program (NCEP)11 | Presence of 3 or more of the following:  ●WC > 102 cm (males) or > 88 cm (females)  ●TG ≥ 150 mg/dL  ●HDL <40 mg/dL (males) or <50 mg/dL (females)  ●SBP≥130, DBP ≥ 85  ●FBG ≥ 110 mg/dL |
| MetS – National Heart, Lung, and Blood Institute and American Heart Association (NHLBI/AHA)12 | Presence of 3 out of the 5 following:  ●WC ≥ 102 cm (males) or ≥ 88 cm (females)  ●TG ≥ 150 mg/dL or on drug treatment  ●HDL <40 mg/dL (males) or <50 mg/dL (females) or on drug treatment  ●SBP ≥ 130 mm Hg or DBP ≥ 85 mm Hg or on drug treatment  ●FBG ≥ 100 mg/dL or on drug treatment |
| MetS – World Health Organization (WHO)13 | Fasting glucose ≥ 110 mg/dL or diagnosis of type 2 diabetes PLUS any two of the following:  ●BMI >30 kg/m2  ●TG ≥ 150 mg/dL  ●HDL ≤ 0.9 mmol/L (males) or ≤ 1.0 mmol/L (females)  ●SBP ≥ 140 mm Hg or DBP ≥ 90 mm Hg or on drug treatment |
| *Cardiometabolic Risk Screening Tools* | |
| Framingham Coronary Heart Disease Risk Score (FRS)14 | CVD Points for Women   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **Points** | **Age**  **(years)** | **HDL** | **T.Chol** | **SBP**  **Not Treated** | **SBP Treated** | **Smoker** | **DM** | | **-3** |  |  |  | <120 |  |  |  | | **-2** |  | 60+ |  |  |  |  |  | | **-1** |  | 50-59 |  |  | <120 |  |  | | **0** | 30-34 | 45-49 | <160 | 120-129 |  | No | No | | **1** |  | 35-44 | 160-199 | 130-139 |  |  |  | | **2** | 35-39 | <35 |  | 140-149 | 120-129 |  |  | | **3** |  |  | 200-239 |  | 130-139 | Yes |  | | **4** | 40-44 |  | 240-279 | 150-159 |  |  | Yes | | **5** | 45-49 |  | 280+ | 160+ | 140-149 |  |  | | **6** |  |  |  |  | 150-159 |  |  | | **7** | 50-54 |  |  |  | 160+ |  |  | | **8** | 55-59 |  |  |  |  |  |  | | **9** | 60-64 |  |  |  |  |  |  | | **10** | 65-69 |  |  |  |  |  |  | | **11** | 70-74 |  |  |  |  |  |  | | **12** | 75+ |  |  |  |  |  |  |   Points for Women [Points (Risk %)]  ≤ -2(<1), -1(1.0), 0(1.2), 1(1.5), 2(1.7), 3(2.0), 4(2.4), 5(2.8), 6(3.3), 7(3.9), 8(4.5), 9(5.3), 10(6.3), 11(7.3), 12(8.6), 13(10.0), 14(11.7), 15(13.7), 16(15.9), 17(18.5), 18(21.5), 19(24.8), 20(28.5), 21+(>30)  CVD Points for Men   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **Points** | **Age (years)** | **HDL** | **T.Chol** | **SBP**  **Not Treated** | **SBP Treated** | **Smoker** | **DM** | | **-2** |  | 60+ |  | <120 |  |  |  | | **-1** |  | 50-59 |  |  |  |  |  | | **0** | 30-34 | 45-49 | <160 | 120-129 | <120 | No | No | | **1** |  | 35-44 | 160-199 | 130-139 |  |  |  | | **2** | 35-39 | <35 | 200-239 | 140-159 | 120-129 |  |  | | **3** |  |  | 240-279 | 160+ | 130-139 |  | Yes | | **4** |  |  | 280+ |  | 140-159 | Yes |  | | **5** | 40-44 |  |  |  | 160+ |  |  | | **6** | 45-49 |  |  |  |  |  |  | | **7** |  |  |  |  |  |  |  | | **8** | 50-54 |  |  |  |  |  |  | | **9** |  |  |  |  |  |  |  | | **10** | 55-59 |  |  |  |  |  |  | | **11** | 60-64 |  |  |  |  |  |  | | **12** | 65-69 |  |  |  |  |  |  | | **13** |  |  |  |  |  |  |  | | **14** | 70-74 |  |  |  |  |  |  | | **15** | 75+ |  |  |  |  |  |  |   Points for Men [Points (Risk %)]  ≤-3 (<1), -2(1.1), -1(1.4), 0(1.6), 1(1.9), 2(2.3), 3(2.8), 4(3.3), 5(3.9), 6(4.7), 7(5.6), 8(6.7), 9(7.9), 10(9.4), 11(11.2), 12(13.2), 13(15.6), 14(18.4), 15(21.6), 16(25.3), 17(29.4), 18+(>30)  >20% indicates high risk of developing CVD |
| Cardiometabolic Disease Staging System (CMDS)15 | **Stage 0 (Metabolically Healthy)**: No risk factors  **Stage 1 (One or Two Risk Factors)**: 1-2 of the following risk factors:  ●High waist circumference (≥112cm in men and ≥88 cm in women)  ●Elevated blood pressure (systolic ≥ 130 mmHg and/or diastolic ≥ 85mmHg) or on antihypertensive  medication  ●Reduced serum HDL cholesterol (<40 mg/dL in men; < 50 mg/dL in women) or on medication  ●Elevated fasting serum triglycerides ≥ 150 mg/dL) or on medication  **Stage 2 (Metabolic Syndrome or Prediabetes)**: Have only one of the following 3 conditions:  ●Metabolic Syndrome based on 3 or more of 4 risk factors (high waist circumference, elevated blood  pressure, reduced HDL-C, and elevated triglycerides)  ●Impaired fasting glucose (IFG ≥ 100 mg/dL)  ●Impaired glucose tolerance (IGT; 2-h glucose ≥ 140 mg/dL)  **Stage 3 (Metabolic Syndrome + Prediabetes)**: Have any two of the following three conditions:  ●Metabolic syndrome  ●IFG  ●IGT  **Stage 4 (T2DM and/or CVD)**: Have T2DM and/or cardiovascular disease (CVD)  ●T2DM (fasting glucose ≥ 126 mg/dL or 2-h glucose ≥ 200 mg/dL or on antidiabetic therapy)  ●Active CVD (angina pectoris, or status post a CVD event such as acute coronary artery syndrome,  stent placement, coronary artery bypass, thrombotic stroke, non-traumatic amputation due to peripheral  vascular disease) |
| Edmonton Obesity Staging System (EOSS)16 | **Stage 0**: No apparent obesity-related risk factors (e.g. blood pressure, serum lipids, fasting glucose, etc. within normal range), no physical symptoms, no psychopathology, no functional limitations and (or) impairment of well-being  **Stage 1**: Presence of obesity-related subclinical risk factors (e.g. borderline hypertension, impaired fasting glucose, elevated liver enzymes, etc.), mild physical symptoms (e.g. dyspnea on moderate exertion, occasional aches and pains, fatigue, etc.), mild functional limitations, mild psychopathology and (or) mild impairment of well being  **Stage 2**: Presence of established obesity-related chronic disease (e.g. hypertension, type 2 diabetes, sleep apnea, osteoarthritis, reflux disease, polycystic ovary syndrome, anxiety disorder, etc.), moderate limitations in activities of daily living and (or) moderate impairment of well being  **Stage 3**: Established end-organ damage (e.g. myocardial infarction, heart failure, diabetic complications, incapacitating osteoarthritis, etc.), significant psychopathology, significant functional limitations, and (or) significant impairment of well being  **Stage 4**: Severe (potentially end-stage) disabilities from obesity-related chronic diseases, severe disabling psychopathology, severe functional limitations, and (or) severe impairment of well being |
| Abbreviations: BMI, body mass index; CVD, cardiovascular disease; DBP, diastolic blood pressure; FBG, fasting blood glucose; HDL, high-density lipoprotein; HTN, hypertension; IBW, ideal body weight; IFG: impaired fasting glucose; IGT, impaired glucose tolerance; SBP, systolic blood pressure; SCI, spinal cord injury; T2DM, type 2 diabetes mellitus; TG, triglycerides; WC, waist circumference; WHO, World Health Organization | |

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