

Appendix H:

Outcomes to Inform Clinical Care

The outcomes below were derived from workshop attendees' responses to the following question: "For studies that address the prioritized questions, are there specific outcomes that would particularly inform clinical care?" These outcomes include those that are typically reported as well as beyond what is typically reported. This list was iteratively modified by the workshop organizers and co-chairs.

Note: This list is not comprehensive.

Anthropometrics
Weight (kg)
Height (cm)
Body mass index (BMI; kg/m ²)
Change in BMI (absolute (kg/m ²); relative (%))
% change in BMI as a percentage of the 95th percentile (%BMIp95)
Change in BMI standard deviation score (e.g., extended BMI z-score; absolute or relative (%))
Change in body weight (absolute (kg) or relative (%))
% participants with reduction in bodyweight or BMI (#participants/total #)
Linear growth, height velocity, and attainment of expected growth targets
Waist circumference (cm)
Change in waist circumference (cm)
Waist-to-hip ratio
Bone age
Body Composition
Total fat mass, kg (mean; % change)
Visceral fat area, cm ² (mean; % change)
Visceral adipose tissue, kg (mean; % change)
Subcutaneous adipose tissue, kg (mean; % change)
Lean body mass, kg (mean; % change)
Muscle quality (e.g., strength, fat infiltration)
Organ fat infiltration
Bone mineral density
Vital Signs
Blood pressure, mmHg (systolic/diastolic), percentile, and/or pediatric BP category
Heart rate, beats/min

Laboratory Values
Lipids: total cholesterol, LDL-C, HDL-C, non-HDL-C, and triglycerides (mg/dL)
Absolute and % change in lipid levels
Free fatty acids
Apolipoprotein A, mg/DL
Apolipoprotein B, mg/DL
% change in Apolipoprotein A or B, mg/DL
Glucose, mg/dl (fasting)
Insulin, μ IU/mL (fasting)
Hemoglobin A1C (HbA1C) %
Percent change in hemoglobin A1C level %
β -cell function on HOMA (HOMA-B)
Insulin resistance on HOMA (HOMA-IR)
C-peptide (fasting)
C-reactive protein
AST (U/L)
ALT (U/L)
GGT (U/L)
% change in ALT, AST, or GGT level
Enhanced Liver Fibrosis
Complete blood counts (e.g., white blood cell, platelets)
Renal function metabolic labs (e.g., creatinine, BUN, electrolytes)
Inflammation markers (e.g., high-sensitivity CRP)
Micronutrient status (e.g., iron panel, zinc, vitamin D, calcium, thiamine, folate, 25-hydroxyvitamin D, vitamin C, copper)
Sex hormones (e.g., total and free testosterone, LH, follicle-stimulating hormone (FSH), estradiol, SHBG)
Pregnancy testing - HCG level
Broad genetic testing, when indicated, such as testing for Prader-Willi syndrome, Melanocortin 4 Receptor pathway variants, or other monogenic and /syndromic disorder causes of obesity
Detection of leptin resistance
Historical lab values related to comorbidities
Liver Imaging Variables
VAT, cm ³ (visceral adipose tissue)
SAT, cm ³ (subcutaneous adipose tissue)
Liver fat content, %

Mental & Behavioral Health History and Assessment
Eating disorders – validated screening tools when available (such as EAT-26, EDE-Q)
Disordered eating
Body dysmorphia
Body image
Mood disorders/symptoms (e.g., depression, anxiety)
Suicidality
Self-harm
Substance use
Victim of psychological bullying
Child executive functioning
Social, Emotional, Psychological Conditions or Factors
Social connectedness
Self-esteem
Social confidence
Stress
Peer relationships, bullying
Peer support
Risk-taking behavior
Resilience and coping skills
Weight-related stigma and/or internalized weight bias
Cognitive function
Parent/Caregiver
Parent/caregiver BMI
Parent/caregiver overall psychological health
Parent/caregiver stress
Family chaos or household organization
Parent/caregiver sleep measures
Parent/caregiver nutrition and eating behavior measures
Parent/caregiver nutrition literacy
Parent/caregiver physical activity and sedentary behavior measures
Family functioning
Education
School attendance
School performance
Home school, homebound, or alternative schooling
School participation, accommodations, or individualized education supports when relevant
Sleep health
Sleep duration
Sleep quality
Obstructive sleep apnea diagnosis, symptoms, severity, or treatment status

Nutritional Intake, Status, and Eating Behaviors
Macronutrient/micronutrient intake and status (e.g., insufficiency or deficiency assessed at baseline and throughout treatment)
Hydration status
Diet quality using validated screening tools, such as Healthy Eating Index
Eating patterns (e.g., meal skipping; duration between meals, timing of eating)
Measures of appetite, satiation (e.g., fullness during a meal/snack), and satiety (e.g., fullness between eating episodes)
Food noise (cravings, thinking about food without the sensation of hunger, bored eating, etc.)
Physical activity, fitness, function and behaviors
Physical function and mobility
Pain (e.g., muscular, joint, back)
Frequency, intensity, time, and type (FITT) of physical activity, using FITT principles
Habitual activity patterns
Cardiorespiratory fitness
Muscular strength
Flexibility
Functional capacity, such as walk test performance
Fitness relative to body size or lean mass, when appropriate
Enjoyment of physical activity
Sedentary activity (e.g., screen time, phone use, schoolwork, or television viewing)
Developmental
Pubertal status (e.g., Tanner staging)
Sexual maturation (e.g., nocturnal emissions, facial/body hair, true gynecomastia)
Developmental assessments (e.g., cognitive, gross motor, social-emotional)
Menstrual history, menstrual regularity, and symptoms of hyperandrogenism or PCOS when relevant
Medical and psychological history
History of prediabetes or diabetes, hypertension, dyslipidemia, metabolic dysfunction-associated steatotic liver disease (MASLD), obstructive sleep apnea, PCOS, and other obesity-related comorbidities and/or baseline obesity associated nutritional deficiencies (e.g., vitamin D, folate, iron)
Mental and behavior health history (e.g., eating disorders, anxiety, depression)
History of pregnancy
Medication history (such as antipsychotics, glucocorticoids, insulin, or other weight-promoting medications)
Polypharmacy, medication-medication interactions
Quality-of-Life Measurements
Total score on Impact of Weight on Quality of Life-Kids (IWQOL-Kids questionnaire)
Change in IWQOL-Kids questionnaire score (by domain: physical comfort, body esteem, social life, family relations; total score)

Global Health and Function Assessment (Mental, Physical, and Social Well-Being)
Patient-Reported Outcomes Measurement Information System (PROMIS)/patient-centered outcomes
Clinical condition status (e.g., improvement or worsening) – Clinical Global Impression of Change
Activities of daily living (ADLs)
Loneliness assessment
Treatment/Intervention-Related Delivery and Implementation
Engagement in intervention (such as treatment attendance or visit completion, dose of intervention received, intervention fidelity, participant engagement, and retention)
Implementation and dissemination outcomes (such as acceptability, adoption, appropriateness, feasibility, fidelity, penetration, cost, and sustainability)
Sustainability of effects
Adherence, such as persistence of pharmacotherapy use
Attrition, such as discontinuation of pharmacotherapy use
Parent and child expectations
Medication-specific outcomes: dose escalation, maximum tolerated dose, discontinuation, side effects, adherence, persistence, and weight regain after discontinuation.
MBS-specific outcomes: referral completion, surgical evaluation completion, procedure type, perioperative complications, micronutrient monitoring, remission/improvement of comorbidities.
Patient/family-centered outcomes: treatment satisfaction, decisional regret, family burden, caregiver confidence, child readiness, shared decision-making quality.
Safety outcomes & reporting: growth/puberty effects, hypoglycemia, GI adverse effects, gallbladder disease, pancreatitis, mood changes/suicidality monitoring, eating disorder emergence or worsening.
Adverse events reporting: including serious adverse events and poison control contacts
Health Care Quality, Coverage and Costs
Health care utilization (such as outpatient visits, emergency department visits, urgent care visits, hospitalizations, and subspecialty referral)
Insurance coverage, approval/denial, prior authorization, out of pocket costs
Medication availability and/or shortages
Cost-effectiveness
Contextual Factors
Family history (e.g., history of obesity, obesity medicine use, metabolic and bariatric surgery)
Adverse childhood experiences (ACEs)
Social determinants (or drivers) of health (SDOH)
Food insecurity
Nutrition insecurity
Degree of family involvement
Family dynamics (perceived improvement)
Insurance type
Socioeconomic status
Rurality
Race and ethnicity
Language