

Index

- adipocytes, 108, 125, 128
 adipokines
 in T2DM, 46–47
 PE risk, 52
 adipokinins, 29
 adiponectin
 in T2DM, 46–47
 PE risk, 52
 adipose tissue, 20
 development, 124–31
 distribution, 21
 micronutrient storage in, 202–03
 adiposity, maternal, offspring obesity,
 87–88
 mechanisms, 88–89
 age, BMI and ovulatory infertility, 22
 Agouti yellow mouse, 140–41, 144
 agouti-related peptide (AgRP), 115–19
 maternal high-fat diet, 117–18
 offspring of diabetic mothers, 105,
 107–08
 America. *See* United States (US)
 American College of Obstetricians and
 Gynecologists (ACOG)
 on antenatal care, 224
 on GDM screening, 227
 on vitamin supplementation, 224
 amino acid metabolism, 180–81
 anatomic changes, micronutrient
 availability, 203
 anemia, maternal, 212
 on vitamin supplementation.
 See also iron deficiency
 anesthetics, 229
 aneuploidy, screening for, 226
 Angelman syndrome, 139
 animal models
 adipose tissue ontogeny, 127–31
 genes vs. environment, 120
 maternal nutrient deprivation, 129
 maternal obesity and offspring
 health, 100–10
 animal studies, issues, 100–01
 anorexigenic neuropeptides, 104,
 115–18
 offspring of diabetic mothers, 105,
 107–08
 anovulation, 22
 antenatal care
 congenital anomaly detection, 61, 64
 guidelines, 224
 health intervention delivery, 172–75
 antenatal mental health, 72, 76
 anthropometric measures, genetic
 variants, 12–14
 antidepressants, use in pregnancy, 71
 antidiabetic medications
 in PCOS, 29, *See also* metformin
 antioxidants, 200–01
 micronutrient status, 200, 203
 PE risk reduction, 50, 52
 antiplatelet therapy, 227
 antipsychotic drugs, 72–73
 anxiety disorders, 71
 anxiety-like traits, 108
 appetite-regulated gene expression,
 117–18
 appetite-regulating neurons, 116
 appetite-regulating pathways, 104–07,
 115–16, 118–19
 offspring of obese animals, 103–04
 arcuate axons, 120–21
 arcuate neurons, 116, 118–19
 arcuate nucleus (ARC), 104–06, 115–17
 ART. *See* assisted reproductive
 technology (ART)
 ascorbic acid status, 201–02
 aspirin therapy, 227
 assisted reproductive technology
 (ART)
 early pregnancy outcomes, 25
 live birth rates and BMI, 28
 miscarriage, 59
 obesity and outcome studies, 24–29,
 See also in vitro fertilization
 (IVF)
 assisted vaginal delivery, 230
 asymmetric dimethylarginine
 (ADMA), 50–52
 attention-deficit/hyperactivity disorder
 (ADHD), 115
 Australian Carbohydrate Intolerance
 Study (ACHOIS), 37
 Avon Longitudinal Study of Parents
 and Children (ALSPAC),
 91–96
 axonal projections, hypothalamic,
 116–17, 119
 bariatric surgery
 adverse events, 211
 as lifestyle intervention, 209
 micronutrients and, 203–04
 pregnancy after, 212–18
 pre-pregnancy, 209–18
 types, 209–11
 weight loss, 52, 210–11
 behavioral interventions
 barriers to change, 75–76, 172,
 190–93
 GWG control targets, 151–54,
 173–74
 research gap, 65–66
 behavioral traits, maternal adiposity,
 108
 biliopancreatic diversion, 209
 binge eating disorder, 70–71, 75–76
 in non-pregnant obese women, 74
 in pregnancy, 71–72
 bipolar disorder, 70
 in non-pregnant obese women,
 73–74
 in pregnancy, 71–72
 birthweight
 later adiposity, 96
 micronutrient supplementation,
 204, 205
 bisphenol A (BPA), 140–41
 blood pressure cuff sizes, 227–28
 BMI. *See* body mass index (BMI)
 body composition
 gender, 130–31
 offspring, 89
 body fat distribution
 during pregnancy, 91–96
 genetic variants, 12–13
 body fat measurements, 35, 83
 body mass index (BMI)
 calculation in antenatal care, 224
 defined, 1, 35
 fecundability ratios and, 22
 fetal and infant mortality, 60
 gestational weight gain guidelines,
 81–82

Index

- body mass index (BMI) (*cont.*)
 live birth rates, 28
 maternal and offspring associations, 91–96, 125
 maternal weight changes, 82
 ovulatory infertility, 22–23
 preconceptional, 35–36
 pre-pregnancy, GWG and, 87–88, 237, 239
 stillbirth risk, 56
 time-to-pregnancy studies, 20–21
 use in public health, 1–2
- bowel obstruction, postbariatric surgery, 215
- brain development, fetal, 108, 145–46
- breastfeeding, 231–32
 failure, 40–41
 goals, 240–41
 maternal weight, 15–16, 83, 240
- brown adipose tissue, 124
 gender and, 130–31
 in sheep, 125–26
 roles, 124
- caffeine intake, 172
- calcium status, 200–02
- caloric intake, lifestyle, 49, 190
- cancer, DNA methylation, 137
- carbohydrate metabolism, 124–25
 disturbance, 36
 low-protein intake and, 142–43
 oxidative, 180
- carbohydrate restriction
 for weight loss, 9
 in GDM, 189
- carbohydrate-rich foods
 craving for, 11
 insulin resistance, 46
- cardiovascular disease (CVD) maternal and PE risk, 50–52
 DM risk to offspring, 89–90
 GWG and offspring adiposity, 89–96
- cardiovascular disease (CVD)
 offspring, long-term effects, 83–84, 87, 90–91, 109–10
- cardiovascular fetal anomalies, 61, 63
- carotenoids
 low concentrations, 201–02
 reduced availability, 202
- CART neuropeptide, 117–18
- CCAAT/enhancer-binding proteins (C/EBP), 127, 142–43
- central nervous system (CNS), perinatal development, 115
- central obesity, 21
- cesarean section (CS), 40, 230–31
 PPH and, 40
 thrombosis risk, 228
- childbearing, obesity determinants, 14–16
- childhood, adipose tissue ontogeny, 125–27
- childhood obesity
 risk in GDM, 37
 risks to offspring, 87–88
- chromatin structure, 136, 144
- chronic disease, long-term effects of maternal obesity, 81–84
- circadian rhythm disruptions, 143–44
- clinical management, obese pregnancies, 223–32
- clinical pregnancy loss, 28
- clinical pregnancy rates, 27
- clinical recommendations, pregnancy postbariatric surgery, 216–18
- clozapine, 72–73
- cognitive behavioral therapy, 75–76
- common mental disorders, 70–71, 76
- community interventions
 GWG reduction studies, 174
 prenatal programs, 172
- conception timing, postbariatric surgery, 216–17
- congenital anomalies, 61–64
 detection, 61, 64
 heart defects, 61–63
 multivitamin protection, 205
 population impact, 64
 public health prevention, 64–65
 risk levels, 62–63
- contraception
 postbariatric surgery, 216–17
 postnatal, 232
- cortisol, 126–27
- C-peptide, 47
- CpG methylation, 137
 epigenetic changes, 135–36, 145
 in famine, 141–42
 metastable epialleles, 140
- C-reactive protein (CRP), 46–47, 51
- CS. *See* cesarian section (CS)
- CVD. *See* cardiovascular disease (CVD)
- cytokines
 adipose tissue development, 126–27
 in T2DM, 46–47
 PE risk, 51
- delivery, labor and, 40–41
- depression
 ante- and postnatal, 72
 in obesity, 12
 in pregnancy, 71–72
- depression screening scales, 71
- depressive disorders
 common, 70–71
 major, 70–71
- developing countries
 dietary changes, 10
 obesity in, 2–3, 8
- developmental origins of obesity, 115–22
- developmental plasticity,
 hypothalamus, 115–22
- diabetes mellitus (DM)
 fecundability, 29
 in offspring after maternal GDM, 89–90
 preconception, 181
 screening pre-pregnancy, 65,
See also gestational diabetes mellitus (GDM)
- diabetes mellitus type 2 (T2DM), 45–47
 after GDM, 83–84
 ectopic fat storage, 46
 fetal anomalies, 63
 prevention, 187–88
 risks for offspring, 89–90, 142–43
- diabetic phenotype, paternal epigenetic changes, 144–45
- Diagnostic and Statistical Manual of Mental Disorders (DSM), 70
- diet, 2–3, 9–10
 caloric intake, 49
 composition in animal studies, 101
 dietary fats, 9, 128, 173–74
 glucose supply to fetus, 124–25
 mental health and, 72–73
 micronutrient status, 202
 social ecological model, 172
 weight changes and, 10
- dietary interventions
 glycemic control in GDM, 189
 GWG control, 151–54
 GWG reduction, 173–74
 insulin resistance, 190
 micronutrient availability, 203–04
 PE prevention, 52
 postpartum weight loss, 16
- dietary preferences
 energy balance and hypothalamic regulation, 104–07
 offspring of obese mothers, 103–04
- dietary supplements, 199–206
- DM. *See* diabetes mellitus (DM)
- DNA methylation, 137–38
 aberrant, 139
 epigenetic modifications, 135–36, 144
 establishment of, 138
 metastable epialleles, 140
- dopamine re-uptake transporter (DAT), 106
- DSM V/VI classification, 70
- dumping symptoms, 211, 218

- Dutch famine, 125, 141–42
 dyslipidemia, 179–80
 PE risk, 50–51, 179–80
- early pregnancy, outcomes, 25, 27
 ectopic fat storage, 45–46
 efficacy vs. effectiveness, GWG
 intervention studies, 154–72
- egg fertilization, 138
 11- β -hydroxysteroid dehydrogenase
 (11 β HSD), 126–27, 130
- embryo
 development, 23, 138
 quality, 26–27
- endocrine changes, in male obesity, 24
- energy balance
 adipocyte development and
 function, 108
 CNS development, 115
 hypothalamic regulation, 104–07,
 115–16
 pathways, 107–08, 115–22
 phenotypic characteristics, 103–04
- environmental exposure, 88–89
 epigenetic modifications, 135–36
 genes vs. environment, 120
- epialleles, metastable, 140–41
- epidural anesthesia, 229
- epigenetic mechanisms, 88, 135–47
- epigenetic modifications
 chromatin structure, 136
 DNA methylation, 137–38
 health outcomes, 135–36
 maternal high-fat diet, 143–44
 maternal protein restriction, 140–43
 paternal diet, 144–45
- ethnicity
 DM risk, 48
 ectopic fat storage, 46
 fetal and infant mortality, 61
 GDM potential mechanisms, 49–50
 research gap, 65
- euchromatin, 136
- euglycemic hyperinsulemic clamp
 tests, 47
- exercise. *See* physical activity
- family history
 ectopic fat storage, 46
 GDM potential mechanisms, 49–50
 in DM, 48
- famine, 125, 141–42
- fat (dietary), 9, 128, 173–74
- fat storage
 CS risk, 40
 lipotoxicity, 45–46
 metabolism in lactation, 14–15
 perinatal period, 83
- fatty acids, dietary, 129
- fecundability
 and BMI, 22
 time-to-pregnancy studies, 20
- fecundability ratio (FR), 21
- fertility
 obesity and, 20–30
 postbariatric surgery, 210–12,
 216–17
 schizophrenia and, 72
- fertility problems. *See* infertility
- fertility treatment. *See* assisted
 reproductive technology
 (ART)
- fertilization rate, ART cycles, 26
- fetal adipose tissue, 124
- fetal anomalies, 61–64, 226
- fetal growth scans, 226
- fetal outcomes, 56–66
 growth restriction, 101–02, 180
 mortality, 56–61
 postbariatric surgery, 212, 215–16
- fetal overnutrition hypothesis, 88
- fetus
 adipose tissue ontogeny, 125–27
 glucose supply to, 124–25
 risks/benefits in maternal exercise,
 187–89
- folate/folic acid
 availability in obesity, 203–04
 community interventions, 172
 deficiency, 199–200, 202
 congenital anomalies, 63
 diet quality, 202
 maternal low-protein intake, 142
 postbariatric surgery, 212, 218
 micronutrient status studies, 200
 preconceptual, 224
 supplementation, 204–05
- folate trap, 102
- formula feeding, 15
- free fatty acids (FFAs), 51
- FTO*, 12–13
- gametes, quality, 23
- gamma-glutamyltransferase (GGT),
 203
- GDM. *See* gestational diabetes mellitus
 (GDM)
- gender, body composition and obesity,
 130–31
- gene expression
 adipocyte development and
 function, 108
 appetite-regulated, 117–18
- genetic loci, in obesity-related
 anthropometric measures, 13
- genetic predisposition
 in obesity, 12–14, 120–22
 neurotrophic response to leptin, 121
- genome-wide association studies
 (GWAS), 12–13
- genomic variation, health outcomes,
 135–36
- gestational age
 adipose tissue ontogeny, 125–26
 famine in utero, 141
 fetal death, 56, 59
- gestational diabetes mellitus (GDM),
 36, 49–50, 83–84
 and PE mechanisms, 45–53
 antenatal care, 226–27
 antipsychotic drugs risk, 72–73
 diabetes in offspring, 89
 fetal and infant mortality, 60
 fetal overnutrition, 88
 GWG reduction studies, 172–73
 intervention strategies, 179–93
 management, antenatal, 226–27
 maternal metabolism studies,
 179–81
 offspring adiposity and CVD risk,
 89–90
 patient follow-up, 227
 potential risks, 42, 48–52, 193
 pre-GDM thresholds, 182–87
 screening for. *See also* glycemic
 control; insulin resistance
 antenatal, 226–27
 guidelines, 182–87, 227
 postbariatric surgery, 218
- gestational hypertensive disease.
See hypertension (gestational)
- gestational weight gain (GWG), 14–15,
 82, 89
 antenatal care, 225–26
 BMI preconception, 35–36
 distribution during pregnancy,
 91–96
 guidelines for morbidly obese,
 241–42
 Healthy People 2020, 238–39
 IOM guidelines, 189–90, 225
 offspring adiposity, 89–96
 CVD risk, 91–96
 offspring obesity, 87–88
 optimal, 151
 postbariatric surgery, 212–15, 218
 pre-pregnancy weight, 151–54, 239
 recommended, 237
 preconceptual care, 237–38
 reduction, studies, 172–73
 strategies to improve outcomes,
 151–75
- ghrelin, 11, 105, 115–16
- glucocorticoid receptors (GRs), 126–
 27, 130, 142–43
- glucocorticoids, 126–27
- glucose homeostasis, 181

Index

- glucose metabolism
 and insulin resistance, 180–81
 maternal low-protein exposure, 142–43
 glucose supply, to fetus, 88, 124–25
 glucose tolerance, impaired, 144–45
 glycemic control
 impact on ART, 29
 intervention strategies, 187–90
 metformin in, 29, 52, 189, 227
 studies, 36
 glycemic index diets, 190
 glycemic load (GL), 9
 gonadotropins
 ovarian hyperstimulation, 24–26
 resistance to, 29
 secretion, 20, 24
 growth scans, 226
 GWG. *See* gestational weight gain (GWG)
- health care policies, 239
 health impact, of obesity, 3–5, 8–9
 Health Professionals Follow-up Study (HPFS), 10, 11
 healthy eating, community interventions, 172
Healthy People 2020, 237–39
 heart disease. *See* cardiovascular disease (CVD)
 heartburn, 228
 heparin, low molecular weight, 228–29
 hepatic epigenetic changes, IUGR or SGA infants, 145
 hepatic fat storage, 45–47
 GDM mechanism, 49–50
 post-pregnancy, 48–49
 hepcidin, 203
 heterochromatin, 136–37
 heterochromatin-associated protein (HP1 α), 146
 high-density lipoprotein (HDL), 179–80
 high-fat diets
 adipose tissue ontogeny, 127–31
 animal studies, 101, 106, 117–18, 127–31
 dietary choices of offspring, 104
 epigenetic modifications, 144
 in utero exposure, 143–44
 leptin in offspring, 127
 neuronal connectivity, 118–19
 non-alcoholic fatty liver disease, 108–09
 perinatal CNS development, 115
 high-fiber diets, 9, 190
 high-sugar diets, 101
 hippocampal development, 115
 histone proteins
 epigenetic changes, 137, 145
 fetal hepatic, 136
 in chromatin structure, 136
 maternal high-fat diet and, 143
 hormonal changes
 after bariatric surgery, 210–12
 in male obesity, 24
 hormonal signals, hypothalamic neuron sensitivity, 118
 hospitalization, prolonged, 41
 humoral link, energy balance pathways, 107–08
 hyperglycemia
 epigenetic changes, 88
 gestational, 36
 intervention strategies, 187–90
 screening and diagnosis, 183–87
 sub-GDM threshold, 181–82
 Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study, 37
 fetal overnutrition, 88
 GDM screening guidelines, 227
 oral glucose tolerance test, 181–82
 hyperinsulinemia
 fetal teratogenesis, 88
 maternal protein synthesis, 180
 third trimester, 47–48
 hyperlipidemia (gestational), 47, 179–80
 hyperprolactinemia, 72
 hypertension (gestational), 37, 42, 61
 antenatal care, 227–28
 development, 109–10
 fetal and infant mortality, 60
 maternal low-protein exposure, 142–43
 non-pregnant subjects, 50
 PE risk, 50
 hypogonadism, 22
 hypothalamic circuits
 energy balance control, 115–16
 leptin in, 20, 119
 normal development, 116–17
 hypothalamic neurons, 118
 hypothalamic–pituitary–adrenal (HPA) axis, 12, 102
 hypothalamic–pituitary–gonadal (HPG) axis, 40–41
 hypothalamus
 appetite-regulating pathways, 116
 development, 116–17
 genetic predispositions, 120–22
 neuronal connectivity, 118
 plasticity in, 107–08, 115–22
 malprogramming, 119–20
 regulation, 117–19
 developmental programming, 105
 energy balance and, 104–07
- imprinting, 138–39
 in utero changes
 chromatin structure, 144
 epigenetic changes, 140–43
 in vitro fertilization (IVF), 26–27
 individual-level behaviors, 172
 induction of labor. *See* labor, induction
 infant death, 59–61
 population impact, 64
 probability, 60
 public health implications, 64–65
 infant morbidities, postbariatric surgery, 215–16
 infant outcomes, 56–66
 infection, maternal, 40
 infertility
 ovulatory, 22–23
 unexplained, 23–24
 inflammation
 GDM potential, 49–50
 PE risk, 50–51, 180
 inflammatory cytokines, adipose tissue and, 126–27
 inflammatory markers
 adipose tissue and, 128–29
 in nutrient deprivation, 129
 nutrient excess and, 128
 inflammatory states
 in placenta, 102
 insulin resistance, 46–47
 iron deficiency, 203
 theory, 47
 influenza H1N1 infection, 228
 Institute of Medicine (IOM), guidelines, 190, 225–26
 insulin
 as satiety signal, 104–05
 carbohydrate metabolism, 36–37
 energy balance, 107–08
 hormonal signals, 118
 insulin receptor signals (IRSs), 127
 insulin resistance
 and GDM, 179–93
 ART and, 29
 gestational, 14, 36, 179–81
 glucose metabolism and, 180–81
 in lactation, 15
 intervention strategies, 179–93
 lipotoxicity, 45–46
 mechanisms, 47–50, 108–09
 non-pregnant individuals, 46
 nutrient excess and, 128–29
 PE risk, 50, 52
 perinatal period, 83
 insulin sensitivity, studies, 180–81
 insulin signaling pathway
 cardiac, 109
 hepatic, 108
 insulin-like growth factor (IGF), 127

- insulin-like growth factor-2 (IGF-2), 141
 insulin-mediated fetal growth, 88
 internal hernia, 215
 International Association of the Diabetes and Pregnancy Study Groups (IADPSG), guidelines, 182–87
 International Classification, of obesity, 1–2, 5
 interventions for pregnancy outcomes
 GDM prevention, 189–90
 GWG focus, 151–75
 GWG reduction, 174
 pre-pregnancy weight, 151–54
 targets, 173–74
 timing and duration, 174
 insulin resistance and GDM, 179–93
 micronutrients and dietary supplements, 199–206
 studies required, 110, 190,
 See also behavioral interventions; physical activity; weight management
 intra-cytoplasmic sperm injection (ICSI), 26–27
 intrapartum care, 229
 intrauterine growth restriction (IUGR), 145–46, 216
 iron deficiency, 201
 postbariatric surgery, 212
 reduced availability, 203
 supplementation, 204
 IUGR (intrauterine growth restriction), 145–46, 216
 labor
 and delivery, 36–41
 induction, 40
 antenatal care, 228
 lactation. *See* breastfeeding
 laparoscopic adjustable gastric band, 209–10, 218
 large for gestational age (LGA) babies, 40
 antipsychotic drugs and, 72
 binge eating disorder, 72
 maternal protein synthesis, 180
 risks/benefits in maternal exercise, 187–89
 large for gestational age (LGA) fetuses, placental implantation site, 40
 leptin, 11
 adipose tissue development, 127
 alteration, 203
 as satiety signal, 104–05
 hypothalamic circuits, 115–16
 programming, 119–20
 resistance, 118
 hypothalamic development, 107
 neurotrophic response to, 121
 reduced sensitivity trait, 120–21
 leptin gene DNA methylation, 88
 leptin receptors, 104–06
 LGA. *See* large for gestational age (LGA)
 lifestyle
 breastfeeding failure, 83
 GDM risk, 49
 mental health and, 72–73
 obesity and, 2–3, 10–12
 PE risk, 52
 postpartum, 15
 lifestyle interventions
 bariatric surgery as, 209
 GDM glycemic control, 189
 GDM prevention, 187–90
 GWG control, 151–54
 insulin resistance, 190–93
 obesity management, 75
 type 2 DM prevention, 188
 lipid metabolism, 179–80
 and PE risk, 51
 changes, 15
 insulin sensitivity and, 181
 lipid-lowering treatment, 51
 lipoprotein metabolism, 29
 lipotoxicity, 45–47
 live birth rates, 28
 liver
 epigenetic changes in offspring, 145
 fat storage, 45–46
 metabolic dysfunction in offspring, 108–09
 long-term effects of obesity
 mother, 81–84
 offspring, 87–97, 135–47
 low-density lipoprotein (LDL), 179–80
 low molecular weight heparin, 228–29
 low-protein diet, in utero environment, 142–44
 lysine acetylation
 epigenetic changes, 145
 histone modification, 136–37
 macaques
 issues in animal studies, 100–01
 non-alcoholic fatty liver disease, 108–09
 macronutrients
 adipocyte differentiation, 128
 epigenetic mechanisms, 135–47
 GWG reduction, 173–74
 macrophages, in adipose tissue, 130
 macrosomia
 antipsychotic drugs, 72
 delivery of infant, 230
 malabsorptive bariatric surgery, 209–11
 male obesity
 endocrine levels, 24
 reproductive capacity, 23–24
 maternal adiposity, offspring adiposity and CVD risk, 90–91
 maternal diet
 epigenetic mechanisms, 135–47
 in utero chromatin structure changes, 144
 overnutrition, and fetal growth, 88, 143–44
 maternal health
 breastfeeding benefits, 83
 long-term effects of obesity, 81–84
 maternal metabolism, studies, 179–81
 maternal obesity, pre-pregnancy and GWG compared, 102–03
 maternal outcomes, 35–42
 mortality, 36–37
 postbariatric surgery, 212–16
 potentially avoidable risks, 38–39, 41–42
 maternal weight changes, 82
 menstrual function, 20
 mental health problems, 70–76
 classification, 70–71
 management in pregnancy, 76
 non-pregnant obese women, 73–75
 obesity management, 75–76
 obstetric outcomes, 72
 prevalence in pregnancy, 71–72
 mesolimbic reward pathway, 106
 metabolic consequences, long-term effects of maternal obesity, 81–84
 metabolic dysfunction, in offspring, 108–09
 metabolic processes, obesity-specific, 202–03
 metabolic risk factors, 48, 61
 metabolic stress, in lactation, 14–15
 metabolic syndrome, 128–30
 metabolites, placental transfer, 101–02
 metastable epialleles, 140–41
 metformin, 29, 52, 189, 227
 methyl-supplemented maternal diet, 140, 144
 mice, Agouti yellow, 140–41, 144
 micronutrients, 200
 deficiencies, 129, 202–03, 211–12
 congenital anomalies, 63–64
 postbariatric surgery, 211–12
 metabolic processes in obesity, 202–03
 supplementation, 199–206
 trace minerals, 200–01
 milk (maternal), composition, 103

Index

- mineral deficiencies, postbariatric surgery, 215–16
 miscarriage, 28, 56, 59
 mitochondria, 108
 morbidities, obese pregnancies, 228
 morbidly obese women, GWG guidelines, 241–42
 multivitamin supplementation, 205–06, 218
- neonatal adipose tissue, 124–27
 neonatal deaths, 59, 72
 neural tube defects (NTDs), 61, 63
 folic acid supplementation, 205, 224
 micronutrient deficiency, 63, 203, 205
 postbariatric surgery, 212, 215
 risk levels, 62
 neuronal connectivity, hypothalamus, 116–19, 121–22
 neuropeptide Y (NPY), 115–18
 neuropeptides, 117–18
 neuroplastic response, hypothalamus, 121–22
 neurotrophic response, to leptin, 121
 nitric oxide, 51–52
 non-alcoholic fatty liver disease, 108–09
 NPY (neuropeptide Y), 115–18
 NTDs. *See* neural tube defects (NTDs)
 nuchal translucency imaging, 226
 nucleosomes, in utero assembly, 136–37
 nutrients. *See* macronutrients; micronutrients
 nutritional advice
 obesity management, 75
 pregnancy postbariatric surgery, 218
 nutritional support, WIC programs, 239–41
- obese pregnancies, 36
 antenatal care, 224–26
 clinical management, 223–32
 labor and delivery, 36–40
 minor morbidities, 228
 risks, 87–97, 223
- obesity
 demography, 1–6
 determinants, 8–16
 developmental origins, 115–22
 measurement and definition, 35
 worldwide issue, 1–5, 8–9
 obesity management
 in PCOS, 29–30
 mental disorders, 75–76
 public health implications, 64–65
 obesity surgery. *See* bariatric surgery
- ObR leptin receptor, 104–06
 obstetric care, practice level changes, 172
 obstetric events, avoidable risks, 41
 offspring adiposity
 CVD risk, 89–96
 GWG and, 89–96
 maternal GDM and, 89–90
 phenotypic characteristics, 102–04
 offspring obesity, 87–88
 epigenetic mechanisms, 135–47
 long-term risk, 87–97
 mechanisms, 88–89
 offspring outcomes
 animal models, 100–10
 breastfeeding benefits, 83
 olanzapine, 72–73
 one carbon cycle dysregulation, 102
- oocytes
 donated, 28
 mitochondrial distribution, 23
 yield in ART, 26
 oral contraceptives, postbariatric surgery, 217
 oral glucose tolerance test (OGTT), sub-GDM threshold, 181–82
 orexigenic neuropeptides, 104, 115–18
 offspring of diabetic mothers, 105, 107–08
 structural influences, 118–19
 osteomalacia, postbariatric surgery, 212, 217
- ovaries
 function and weight loss, 29–30
 gonadotropin resistance, 29
 ovulatory infertility, 22–23
 response to hyperstimulation, 24–26
 overnutrition hypothesis, fetal growth, 88
 oxidative stress, micronutrient availability, 203
- pancreas
 failure, 46
 GDM mechanism, 49–50
 paraventricular nucleus (PVN), 104–06
 arcuate axons, 120–21
 arcuate neurons, 119
 parent-of-origin genome, imprinting, 138–39
 parent-of-origin, Prader–Willi syndrome, 139
- parity
 fecundability, 21
 obesity determinant, 14
 paternal diet, epigenetic effects, 144–45
 paternal genome
 imprinting, 138–39
- methylation, 137–38
 Prader–Willi syndrome, 139
 PCOS. *See* polycystic ovary syndrome (PCOS)
 PE. *See* pre-eclampsia (PE)
 perinatal body fat measurements, 83
 peroxisome proliferator-activated receptor (PPAR)
 adipose tissue ontogeny, 127–29
 nutrient deprivation, 129–30
 preconceptual fat mass, 181
 reduction, 125–26, 130
 peroxisome proliferator-activated receptor α (PPAR α), 142–43
 personal motivation, social ecological model, 172
 phenotypic characteristics, offspring, 102–04
 phobias, 71
 physical activity, 10–11
 and caloric intake, 49
 antenatal advice, 226
 glycemic control, 189
 GWG control, 151–54, 173–74
 insulin resistance control, 190
 obesity management, 75–76
 PE risk, 52
 postpartum, 15–16
 severe mental disorders and, 73
 social ecological model, 172
 type 2 diabetes prevention, 187–89
- Pima Indians, 89–90
 placenta
 dysfunction, 60
 implantation site, 40, 52
 in animal studies, 100
 in obese pregnancies, 101–02, 128
 placental bed, atherosclerosis, 180
 placental blood flow, 51
 placental leptin gene DNA methylation, 88
 plasma volume, micronutrient distribution/utilization, 202–03
 polycystic ovary syndrome (PCOS)
 antidiabetic medications, 29
 BMI and infertility, 22
 early studies, 20
 oocyte yield, 26
 PE risk, 52
 weight loss, 29–30, 223
 polyunsaturated fatty acids (PUFAs), 129
 POMC. *See* pro-opiomelanocortin (POMC)
 population attributable risk (PAR)
 percent, 42
 population impact, adverse pregnancy outcomes, 64

- postnatal care, 231
 postnatal depression, 72
 postpartum care, 239–41
 postpartum complications, 40–41
 postpartum hemorrhage (PPH), 40
 anticipation, 231
 potentially avoidable risks, 42
 postpartum weight changes, 82
 gain, 14–15, 239–41
 loss, 82–83
 postpartum weight retention (PPWR),
 14–15, 81–83, 240
 PPAR. *See* peroxisome proliferator-
 activated receptor (PPAR)
 PPH. *See* postpartum hemorrhage
 (PPH)
 Prader–Willi syndrome, 139
 preconceptual care, 223, 237–38
 preconceptual fat mass, insulin
 sensitivity and, 181
 preconceptual weight
 BMI, 35–36
 obesity prevalence, 238
 recommended GWG, 237–38
 pre-eclampsia (PE)
 and GDM mechanisms, 45–53
 antenatal screening, 227
 causal pathways, 49–52
 dyslipidemia and, 179–80
 fetal and infant mortality, 60
 micronutrients/multivitamins,
 204–06
 risk levels, 37
 pre-GDM thresholds, IADPSG
 guidelines, 182–87
 pregnancy, after bariatric surgery,
 212–16
 pregnancy complications
 potentially avoidable, 38–39, 41–42
 risks, 223
 prediction, 193
 pregnancy loss, 27–28
 pregnancy outcomes, 56–66, 125
 gestational weight retention, 82
 GWG strategies, 151–75
 insulin resistance and GDM, 179–93
 mental health disorders, 72, 76
 postbariatric surgery, 212–16
 pregnancy planning, public health
 implications, 64–65
 pregnancy rates, clinically confirmed,
 27
 prematurity, psychotic disorders in
 pregnancy, 72
 prenatal care
 access to, 239
 postbariatric surgery, 217–18
 pre-pregnancy bariatric surgery,
 209–18
 pre-pregnancy BMI status, and GWG,
 81–83
 pre-pregnancy care, primary care
 services, 223–24
 pre-pregnancy weight, GWG and,
 102–03, 151–54, 173, 239
 preterm delivery
 antenatal care, 228
 neonatal mortality, 60–61
 postbariatric surgery, 212
 primary care services, 223–24, 237–39
 primates
 hypothalamic maturation, 117
 issues in animal studies, 101,
 See also macaques
 prolactin-raising effect, antipsychotic
 drugs, 72
 pro-opiomelanocortin (POMC), 105–
 06, 115–18
 protein restriction, in utero
 environment, 142–44
 protein synthesis, in pregnancy, 180
 proteinuria, 50
 PE risk, 37, 50
 pseudohypoparathyroidism type 1b
 (PHP1b), 139
 psychosocial factors, in obesity, 11–12
 psychotic disorders, 70, 72–74
 psychotropic medication, 76
 public health
 breastfeeding goals, 240–41
 obesity in, 1–3
 policies, 237–42
 prenatal care access, 239
 stillbirth and infant death, 64–65
 rats, 120–22
 reactive oxygen species, 203
 research gaps. *See* studies needed
 restrictive bariatric surgery, 209–11
 risks
 potentially avoidable, 38–39, 41–42
 prediction, 193
 RNA-associated gene silencing, 135
 rodents
 high-fat diet, 117–18
 histone acetylation, 144
 hypothalamic maturation, 117
 issues in animal studies, 100–01
 metastable epialleles, 140–41,
 See also mice; rats
 Roux-en-Y gastric bypass, 209, 215
 RXRA methylation, 142
 schizophrenia, 70
 in pregnancy, 72
 non-pregnant obese women,
 73–74
 obesity management, 75–76
 selenium, 201–02
 semen quality, 24
 serum markers, for aneuploidy, 226
 severe mental illness, 70, 73–74, 76
 sheep
 adipose tissue ontogeny, 125–26
 issues in animal studies, 100–01
 siblings
 birth order and obesity, 100
 diabetes incidence, 89–90
 single nucleotide polymorphisms
 (SNPs), 12–13
 skeletal muscle, epigenetic changes,
 146
 sleep curtailment, 11
 small for gestational age (SGA) babies
 epigenetic changes and, 145–46
 postbariatric surgery, 216
 psychotic disorders in pregnancy, 72
 risks/benefits in maternal exercise,
 187–89
 smoking, 21, 72
 social ecological model, obesity-related
 pregnancy outcomes, 172
 socioeconomic status
 ART outcomes, 27–28
 barriers to behavioral change, 193
 gestational weight gain, 14
 mental health and obstetric
 outcomes, 72–73
 obesity and, 2–3, 5, 12
 postpartum care, 239–41
 prenatal care access, 239
 stillbirth and infant death, 64
 spatial learning development, 115
 sperm DNA integrity, 24
 starvation, 125, 141–42
 statins, lipid-lowering treatment, 51
 stillbirth, 56, 60–61
 psychotic disorders in pregnancy, 72
 public health implications, 64–65
 risks, 57–58
 strategies to improve pregnancy
 outcomes. *See* interventions for
 pregnancy outcomes
 stress signaling pathway, cardiac, 109
 studies
 GWG control intervention, 151–54
 hyperglycemia screening and
 diagnosis, 183–87
 studies needed, 65–66
 long-term, 84
 on outcome improvements, 110, 175
 on risk prediction, 193
 studies ongoing, 191–92
 subcutaneous fat storage, 45
 sudden infant death syndrome (SIDS),
 59, 72
 superoxide dismutase (SOD), 203

Index

- T2DM (type 2 diabetes mellitus). *See* diabetes mellitus type 2 (T2DM)
- television watching, 11, 15
- teratogenesis, 88
- thiazolidinediones, 29
- thromboembolic complications, 37–40
on risk prediction. *See also* venous thromboembolism (VTE)
- time-to-pregnancy studies, 20
- trace minerals, 200
deficiency, 201
- tracheal intubation, 229
- trans fat intake, 15
- TV watching, 11, 15
- 25-hydroxyvitamin D deficiency, 201–02
- type 2 diabetes. *See* diabetes mellitus type 2 (T2DM)
- UBE3A expression, Angelman syndrome, 139
- ultrasound examination, antenatal, 217–18, 226
- uncoupling protein (UCP), 125–26, 129–30
- undernutrition, maternal, 20, 125, 141–42
- unexplained infertility, 23–24
- United Kingdom Obstetric Surveillance System (UKOSS), 40
- United States (US)
DSM V/VI classification, 70
GWG guidelines, 237
maternal mortality, 36
parity-associated weight gain, 14
public health policies. 237–42,
See also American College of Obstetricians and Gynaecologists (ACOG);
Institute of Medicine (IOM)
- vaginal delivery after cesarean section (VBAC), 231
- vaginal delivery, assisted, 230
- vascular dysfunction, 47
ectopic fat storage, 46
GDM mechanism, 49–50
PE risk, 50–52
- vascular risk changes, 48
- venous thromboembolism (VTE), 37–40, 228–29, 231
- ventromedial hypothalamic nucleus (VMN), 104–06, 116–17
- very low density lipoprotein (VLDL), 179–80
- Video Doctor, 174
- visceral fat deposits, 83
- vitamin A deficiency
fetal complications, 212
supplementation, 204, 218
- vitamin B₁₂ deficiency, 212
- vitamin C status, 201–02
dietary advice, 203–04
supplementation, 204–05
- vitamin D status
availability reduced, 202–03
deficiency, 201–02, 212
dietary advice, 204
studies, 200
supplementation, 224
- vitamin deficiencies, postbariatric surgery, 211, 215–16
- vitamin E status
 α -tocopherol status, 201–02
low concentrations, 201
supplementation, 204–05
- vitamin K deficiency, 212
- vitamin supplementation, guidelines, 224
- VTE (venous thromboembolism), 37–40, 228–29, 231
- waist-to-hip ratio (WHR), fecundability and, 21
- weight cycling, in pregnancy, 14
- weight gain during pregnancy.
See gestational weight gain (GWG)
- weight loss, postbariatric surgery, 210–11
conception timing, 216–17
PE prevention, 52
- weight management
antenatal care, 224–26
fertility and, 29–30
glycemic control in GDM, 189
public health implications, 64–65
T2DM prevention, 187
weight reduction, research needed, 65–66
- white adipose tissue
gender, 130–31
roles, 124
transition from brown, 126
- Women, Infants, and Children (WIC) programs, 239–41
- women, obesity rates, 3–5, 8–9
- World Health Organization (WHO)
GDM screening guidelines, 227
ICD classification, 70
obesity defined, 1–2, 35
obesity epidemic report, 8
- wound asepsis, 230–31
- wound infection, obesity-linked, 40
- yogurt consumption, 9
- zinc status, 201
 α -tocopherol status, 201–02
NTD reduction, 205
supplementation, 205