

Contents

Section A	Introduction	1
Chapter 1	Themes and Purpose	5
	Etiology of Childhood and Adolescent Psychopathology	6
	The Underestimated Importance of the Prenatal Environment	9
	Summary	12
Chapter 2	Prenatal Central Nervous System Development	15
	Prenatal CNS Development	15
	First Trimester Development	16
	Cell Proliferation	19
	Cell Migration	20
	Cell Differentiation	23
	Myelination	24
	Cell Death (Apoptosis)	25
	Summary	25
Section B	Perinatal Mediators and Markers of Disturbances of Fetal Development: Introduction	27
Chapter 3	Low Birth Weight and Prematurity: Effects on Child Development Outcomes	29
	Definitions	29
	Outcomes	30
	Historical Account of Adverse Outcomes	30
	Outcomes of Low Birth Weight	32
	Pathophysiological Basis of LBW	43
	Conclusion and Future Research Directions	44

Chapter 4	Pre- and Perinatal Anoxia and Hypoxia	47
	Hypoxia and the Preterm Infant	47
	Mechanisms by Which Hypoxia Produce Neurological Damage	49
	Perinatal Hypoxia/Anoxia and Developmental Outcomes	50
	Health Outcomes	50
	Neurological Outcomes	51
	Learning and Behavior Outcomes	52
	Summary and Conclusions	54
Section C	Maternal Illness: Introduction	55
Chapter 5	Prenatal Infections	57
	Influenza	58
	Influenza's Association with Congenital Anomalies	58
	Influenza's Association with Affective Disorder	59
	Influenza's Association with Schizophrenia	59
	Other Prenatal Infections	72
	Congenital Rubella	72
	Measles/Mumps	74
	Varicella-Zoster (Chicken Pox)	75
	Cytomegalovirus infection (CMV)	76
	Herpes Simplex 2 (HSV-2)	77
	Toxoplasmosis	78
	Syphilis	78
	Summary	78
	Etiological Hypotheses	79
	Neurodevelopmental Hypothesis	79
	The Immune Response to Infection	80
	Cytokine Effects	80
	Indirect Effects via Hyperthermia	82
	Autoimmune Response	83
	The Heat Shock Response	84
	Conclusion	85
Chapter 6	Maternal Chronic Illness	87
	Maternal Diabetes Mellitus	87
	Maternal Obesity	91
	Circulatory Diseases Occurring During Pregnancy	92
	Maternal Hypertension	92
	Maternal Heart Disease	95
	Pulmonary Diseases: Asthma	97
	Summary and Conclusions	98

Chapter 7 Nutrition	99
Protein-Energy Malnutrition.....	100
Iron Deficiency	102
Vitamin Deficiencies	103
Vitamin A	103
Vitamin B Complex.....	105
Vitamin C	106
Vitamin D	106
Vitamin E	110
Summary and Conclusion.....	111
Chapter 8 Maternal Stress	113
Definition	113
The Psychobiology of Stress: A Brief Overview	114
The Sociology of Stress	115
Prevalence of Stress or Distress Occurring	
During Pregnancy	115
Effects of Pregnancy Distress on Offspring: Introduction	116
Animal Studies	117
Human Research: Effects Observed During	
the Prenatal Period	118
Etiological Mechanism.....	122
Timing of Stressors During Gestation	125
Methodological Issues	126
Summary and Conclusions	127
Section D Maternal Use of Recreational Drugs	129
Chapter 9 Maternal Smoking During Pregnancy	131
Smoking During Pregnancy	132
Outcomes	132
Experimental Animal Studies	132
Human Obstetrical and Fetal Outcomes	133
Effects During Infancy	133
Effects Assessed During Childhood	135
Adolescence and Adulthood	138
Secondhand Smoke Exposure Occurring During Prenatal	
and Postnatal Life	141
Summary and Conclusions	141
Hypotheses about Causal Mechanisms.....	142
Physiological/Biological Explanations	142
Psychosocial and Environmental Explanations.....	144
The Motivation to Smoke	145
Summary and Conclusion.....	148

Chapter 10 Gestational Exposure to Alcohol	151
Fetal Alcohol Syndrome	152
Effects of Mild to Moderate Alcohol Use	
During Pregnancy	153
Cognitive Ability and Neuropsychological Outcomes	154
Neuropsychological Sequelae	155
Learning and Memory	156
Fine and Gross Motor Skills	156
Behavioral Outcomes	157
Attention and Activity Related Deficits	157
Aggression and Conduct Problems	158
Social Skills Deficit	159
Alcohol and Drug Use	159
Summary	160
Mechanisms of Teratogenesis and Resulting Brain	
Morphology	160
Summary and Conclusion	161
 Chapter 11 Maternal Use of Illicit Drugs	 163
Marijuana	163
Growth Indicators	164
Behavioral Outcomes	165
Cognitive Outcomes	165
Mechanisms	166
Summary	167
Cocaine	167
Growth Outcomes	168
Cognitive Outcomes	169
Behavioral Outcomes	169
Mechanisms of Teratogenesis	170
Summary	170
Opiates	171
Outcomes	171
Mechanisms of Teratogenesis	173
Summary	173
Amphetamine/Methamphetamine	173
Methamphetamine	173
Amphetamine	174
Mechanism of Teratogenesis	174
Summary and Conclusion	175

Section E Pollutants and the Development of the Human Fetus:	
An Introduction	177
Chapter 12 Air and Water Pollution	185
Air Pollution	185
Carbon Monoxide (CO)	186
Sulfur dioxide (SO ₂)	186
Nitrogen dioxide (NO ₂)	187
Ozone (O ₃)	187
Particulate Matter	189
Combined Effects of Various Air Pollutants	190
Outcome Studies for Pregnant Women	190
Summary	192
Water Pollution	192
Agricultural Pollutants	193
Industrial Waste	196
Water Treatment	197
Spot Sources of Pollution	199
Summary: Water Pollution	199
Chapter 13 Heavy Metals and Household Chemicals	201
Heavy Metal Pollution	201
Mercury Poisoning	201
Lead Exposure	203
Cadmium	206
Various Chemical Exposures Found in Home Products	207
Polychlorinated biphenyls	208
Fluorine-based Coatings	210
Phthalates	211
Flame-Retardant Chemicals	212
Acrylamide	212
Volatile Organic Compounds	213
Summary	213
Section F Historical Perspective and the Future	215
Appendix: Brief Medical Dictionary Related to Pregnancy	223
References	237
Subject Index	281