Chapter 4: Developmental Disabilities: Causes and Classifications
Prepared by Debbie Lafffranchini, Instructor
1. What causes developmental problems?
   - No easy answer
   - Combination of interacting events
     - Heredity
     - Biology
     - Temperament
     - Environmental factors
       - Including poverty
   - Conclusion: humans develop and learn through the interplay between nature and nurture

2. Should we assign a disability category to young children with atypical developmental patterns?
   - Answer is controversial
   - Most young children experience one or more developmental irregularity that may or may not require special attention
   - More harm than good comes from prematurely classifying or labeling a child
Causes of Developmental Differences

- **Congenital**
  - Present at birth
  - May or may not be genetic
  - Some may not be detected at birth
    - Deafness
  - The more severe the disability, the earlier it is recognized
  - Biology and environment act together
    - Sickly infant may not interact and “hook” the parents
• Biological insult
  • Interference with or without damage to physical structure or functioning
  • Insult may occur at time of conception
    • Genetic disorders
  • Insult may be during pregnancy
    • Often within first trimester
    • May be related to health problems of mother
  • Insult may occur during birth
Biological Factors

- Genetic disorders
- Syndromes
- Down syndrome
- Fragile X syndrome
- Metabolic disorders
Biological Factors (cont)

- Genetic disorders
  - Autosomal dominant genes
    - First 22 pair of chromosomes
    - One copy only
    - Single gene defects often show racial variations
  - Autosomal recessive gene disorders
    - Two copies required
  - Sex-linked gene disorders
    - Located on 23rd pair of chromosomes, sex chromosomes
Biological Factors (cont)

• Syndromes
  • Major class of genetic abnormalities
  • Grouping of similar physical characteristics called stigmata
    • Identifying mark or characteristic, diagnostic sign of a disease or disability
  • Down syndrome
  • Fragile X syndrome
**Down syndrome**

- Most widely recognized syndrome
- Trisomy 21 (one form)
  - Extra chromosome can come from egg or sperm, usually egg
  - Occurs approximately 1 in 700 births
  - Risk is for older women (and very young women)
- Stigmata:
  - Small round head, flat in back
  - Flat mid-face
  - Epicanthal folds
  - Small, low-placed ears
  - Short stature
  - Short fingers with little fingers curving inward
  - Simian crease on palms of one or both hands
- 50% of children with Down syndrome have congenital defects
  - Heart abnormalities
  - Intestinal abnormalities
  - Hearing impairments from frequent ear infections
  - Cognitive delays
    - Mild to severe
- 50% of children with Down syndrome have congenital defects
  - Heart abnormalities
  - Intestinal abnormalities
  - Hearing impairments from frequent ear infections
  - Cognitive delays
    - Mild to severe
Fragile X

- Chromosomal defect on sex chromosome
- Boys more severely affected
- Children diagnosed with autism frequently tested for Fragile X because behaviors look very similar
- Symptoms:
  - Language delays
  - Behavioral problems
  - Autism or autism-like behaviors
  - Poor eye contact
  - Hand flapping
  - Large or prominent ears
  - Hyperactivity
  - Delayed motor development
  - Poor sensory skills
Fragile X
Fragile X

- 30 Hand Markers

- normal structure
- broad forehead
- elongated face
- large prominent ears
- strabismus (crossed eyes)
- highly arched palate
- hyperextensible joints
- hand calluses (from self-abuse)
- pectus excavatum (indentation of chest)
- mitral valve prolapse (benign heart condition)
- enlarged testicles
- hypotonia (low muscle tone)
- soft, fleshy skin
- flat feet
- seizures (in about 10 percent)
Fragile X
Metabolic Disorders

- Cause breakdown in complex chemical activities needed to metabolize food
  - Breakdown can destroy, damage, or alter cells
- Single-gene defects
  - PKU
    - Lacking enzyme that breaks down amino acid in milk, wheat, eggs, fish, and meat
    - Need special diet
    - In 1 in 10,000
    - Newborns routinely tested
      - If PKU found, special diet
        - Followed throughout developing years
        - Women with PKU need to follow diet throughout child-bearing years or child will be severely brain damaged
Tay Sachs

- Rare autosomal recessive disorder
- Occurs most commonly in children of Eastern European Jewish descent
- Faulty enzyme
- Fatty accumulations in the brain interfere with neurological processes
- Rapid degeneration
- Leads to death in early childhood
Tay Sachs: Gene Disorder

Tay Sach’s Disease

Symptoms:
- deafness
- decreased eye contact
- decreased muscle tone
- loss of motor skills
- delayed mental & social skills
- irritability/tirelessness
- paralysis or loss of muscle function
- dementia
- seizures
- increased startle reaction
- death

Chromosome Number: 15
 Autosomal or Sex-linked: autosomal
 Dominant or Recessive: recessive
 Can be Diagnosed: before birth
 Group Most at Risk: Jews of Eastern European descent (Ashkenazi Jews)
 Life Expectancy of Patient: Death by age 5

Above: Two children affected by Tay Sach’s Disease

Left: An embryo affected by Tay Sach’s Disease (cherry red spot means it is affected)
Cystic Fibrosis: Gene Disorder

Cystic fibrosis is a hereditary disorder characterized by lung congestion and infection and malabsorption of nutrients by the pancreas.
Cystic Fibrosis: Gene Disorder

A. Organs affected by cystic fibrosis:
   - Sinuses: sinusitis (infection)
   - Lungs: thick, sticky mucus buildup, bacterial infection, and widened airways
   - Skin: sweat glands produce salty sweat
   - Liver: blocked biliary ducts
   - Pancreas: blocked pancreatic ducts
   - Intestines: cannot fully absorb nutrients
   - Reproductive organs: (male and female) complications

B. Normal airway:
   - Airway wall
   - Airway lined with a thin layer of mucus
   (Airway in cross-section)

C. Airway with cystic fibrosis:
   - Thick, sticky mucus blocks airway
   - Widened airway
   - Blood in mucus
   - Bacterial infection
Cystic Fibrosis: Gene Disorder

**CYSTIC FIBROSIS (CF)**

**Treatment**
- Diet: ↑CAL ↑Protein
- Pulmonary Therapy
  - Chest Physiotherapy
  - Postural Drainage
- Breathing Exercises
- Aerosol Therapy
- Meds
  - Antibiotics
  - Supplemental Vitamins
  - Aerosol Bronchodilators
  - Mucolytics
  - Pancreatic Enzymes

**Symptoms**
- Fatigue
- Chronic Cough
- Recurrent URI's
- Thick, Sticky Mucus
- Chronic Hypoxia:
  - Clubbing, Barrel Chest
- ↓ Absorption of Vitamins and Enzymes
- Abdominal Distention
- ↓ Digestive Enzymes
- Rectal Prolapse
- Fatty, Stinky Stools (Steatorrhea)
- Meconium Ileus in Newborn

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**Cystic Fibrosis**

- Common autosomal recessive disorder
- Causes buildup of mucus in lungs, digestive system, and other organs
- Chronic health disorder
- Interferes with learning because of frequent absences from school
- Life expectancy is lowered, but into adulthood as result of medical interventions
Sickle-cell Anemia

Normal hemoglobin: forms long, inflexible chains

Sickle Cell hemoglobin: forms long, inflexible chains

Normal Red Blood Cells: are compact and flexible, enabling them to squeeze through small capillaries

Sickled Red Blood Cells: are stiff and angular, causing them to become stuck in small capillaries
Sickle-cell Anemia

• Autosomal recessive disorder
• Mostly affects African descent
• Symptoms:
  • Painful joints
  • Ulcers
  • Susceptibility to infections
Duchenne Muscular Dystrophy
Duchenne Muscular Dystrophy

- Sex-linked
- Occurs in males
- Muscles waste away
- Progressive
- Degenerative
- Increased physical disability and eventual death
Prenatal Infections and Intoxicants

- **Rubella (German measles or three-day measles)**
  - CMV virus
    - In pregnancy, can cause serious harm to unborn
    - 90% of infants with CMV are asymptomatic
    - Later: mental retardation, deafness, diseases of the eyes, other disabilities
  - Herpes simples
    - Incurable viral disorder
    - In remission, woman can pass on to unborn
    - Results can be devastating, fatal
    - Can cause inflammation of infant’s brain and spinal cord
  - AIDS
  - Diabetes
    - Developmental problems
  - Preeclampsia (toxemia)
    - Occurs after 20 weeks
    - High blood pressure
    - Excess protein in urine
    - Can lead to complications and death for mother and infant
Prenatal Intoxicants

- Alcohol
- Other drugs
- Poor nutrition
Complications Following Birth

- Meningitis
  - Virus or bacterial infection
  - Inflammation of protective covering of the brain
  - Can cause death in newborn
    - Cause from organisms in intestine or birth canal of mother
  - Results: unpredictable from no damage to neurological damage and hearing problems
Encephalitis

- **Symptoms in young children:**
  - Irritability
  - Fever
  - Poor appetite
- **Causes:**
  - Viral (rabies, polio, herpes, measles, West Nile)
  - Bacterial (syphilis, parasites, toxoplasmosis, malaria {mosquitos}, lyme, strep)
  - Limbic system (emotional part of brain)
  - Autoimmune
  - Epidemic
Grave damage to developing young children
- Put everything in their mouths
- 10% of young children in US absorb excessive lead
  - Old, dilapidated housing contributes disproportionately
- Low levels can be damaging
  - Lowers IQ
  - Lower levels now identified as dangerous
- Causes:
  - Speech delays
  - Hyperactivity
  - ADD/ADHD
  - Learning disabilities
  - Behavioral disorders
  - Neurological damage
  - Renal damage
  - Stunted growth
  - Anemia
  - Hearing loss
  - Cognitive deficits
**Lead poisoning**

- No immediate symptoms
- Can lead to learning disabilities, behavioral problems, malformed bones, slow growth
- Very high levels can cause seizures, coma, death
- Children absorb up to 70% of lead, adults about 20%; removed from body extremely slowly; 95% deposited in bones

**Contaminants**
- Lead-based paint, contaminated dust in homes built before 1978
- Drinking water from lead pipes
- Contaminated food
- Soil (lead does not biodegrade, decay)

**Symptoms**
- Irritability, sluggishness, fatigue, unusual paleness, anemia, learning difficulties
- Loss of appetite, weight loss
- Abdominal pain, vomiting, constipation

In time it attacks central nervous system

**What parents can do**
- Have child screened if there is concern of lead exposure
- Frequently wash child’s hands, toys, pacifiers
- Only use cold tap water for drinking, cooking
- Test paint and dust in home if it was built before 1978

**Lead exposure**

About 310,000 U.S. children ages 1 to 5 have elevated blood lead levels, which can accumulate over months and years and cause serious health problems.

**Effects on children**
- Kids absorb up to 70 percent of lead, adults about 20 percent
- Often undetected; no obvious symptoms
- Can lead to learning disabilities, behavioral problems, malformed bones, slow growth
- Very high levels can cause seizures, coma, death

**Sources**
- Lead-based paint, contaminated dust in homes built before 1978
- Drinking water from lead pipes
- Contaminated food
- Soil (lead does not biodegrade, decay)
- Toys

**What parents can do**
- Frequently wash child’s hands, toys, pacifiers
- Only use cold tap water for drinking, cooking
- Test paint, dust in home if it was built before 1978

*Old toys with lead paint a known risk, but new toys from China now have come under scrutiny*

Source: U.S. Centers for Disease Control and Prevention, U.S. Department of Health and Human Services

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Lead poisoning

Lead buildup in the body causes serious health problems

**Symptoms**
- Headaches
- Irritability
- Reduced sensations
- Aggressive behavior
- Difficulty sleeping

- Abdominal pain
- Poor appetite
- Constipation
- Anemia

**Additional complications for children:**
*Lead is more harmful to children as it can affect developing nerves and brains*
- Loss of developmental skills
- Behavior, attention problems
- Hearing loss
- Kidney damage
- Reduced IQ
- Slowed body growth

Source: MedlinePlus/Mayo Clinic
BRAIN
Adult: Headache, memory loss
Child: Encephalopathy, mental deterioration

GINGIVA
Lead line

BLOOD
Anemia, red cell basophilic stippling

PERIPHERAL NERVES
Adult: Demyelination

KIDNEY
Chronic tubulointerstitial disease

GASTROINTESTINAL TRACT
Abdominal pain

BONES
Child: Radiodense deposits in epiphyses

SOURCES

OCCUPATIONAL
Spray painting
Foundry work
Mining and extracting lead
Battery burning

NONOCCUPATIONAL
Water supply
Paint dust and flakes
House dust
Urban soil
Newsprint
Automotive exhaust
Number of Children Less Than Six Years Who Were Tested During Year and Had Blood Lead Level of 10 mcg/dL or Greater

Source: WCLPPP, 2008

Year | Children With BLL >= 10 mcg/dL
---|---
2000 | 5291
2001 | 5105
2002 | 4423
2003 | 3651
2004 | 3278
2005 | 2770
2006 | 2085
2007 | 2087
About 15 million children, one out of every four, live below the official poverty line.

At least 22% of Americans under the age of 18 and 25% under age 12 are hungry or at the risk of being hungry.

Everyday 2,660 children are born into poverty; 27 die because of it.

Children and families are the fastest growing group in the homeless population, representing 40%.
Poverty

- Many developmental problems occurring before, during, or after birth can be directly or indirectly related to poverty
- Families living in poverty experience:
  - Higher rates of infant death
  - Higher rates of failure to thrive
  - Higher rates of birth defects
  - Children with higher rates of intellectual disability
  - Children with higher rates of learning disabilities
  - Children with higher rates of social and emotional deviations
Nutritional Deficiency

- Substandard nutrition is associated with poverty
- WIC formed in 1970’s
  - Provides nutritious food to pregnant/breastfeeding mothers and children to age 5
  - Link food distribution to other health services
    - Prenatal care
  - Reduces high-risk women delivering prematurely or low birth-weight by 25%
- For every $ spent, many times more are saved
  - Medical treatments/hospitalizations
  - Special education
- Only able to serve 1/3 of women who would benefit from services
Food Guide Pyramid

The Five Food Groups are the building blocks of the Food Guide Pyramid.

- milk group
- meat group
- vegetable group
- fruit group
- grain group

others category
Inadequate Health Care and Education
Inadequate Health Care and Education

- Prevention of developmental problems begins with adequate health care
  - Prenatal
    - 25% of women do not receive adequate checkups, growing numbers receive no care
    - Risk categories of not receiving adequate care:
      - Young, poor, unmarried, uneducated, uninsured, either inner city or rural area
  - Postnatal
  - Well-baby checks
  - Immunizations

SCHEDULE OF VISITS

1: Hospital Newborn Exam
2: 3-5 Days
3: 1-3 Weeks of Age if Necessary
4: 2 Months
5: 4 Months
6: 6 Months
7: 9 Months
8: 12 Months
9: 15 Months
10: 18 Months
11: 2 Years
12: Yearly visits Ages 3-21 Years
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<th>Vaccination Schedule</th>
<th>Birth</th>
<th>1 Month</th>
<th>2 Months</th>
<th>4 Months</th>
<th>6 Months</th>
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Shaded boxes indicate the vaccine can be given during shown age range.
# Recommended Immunization Schedule for Persons Aged 0 Through 6 Years—United States 2010

For those who fall behind or start late, see the catch-up schedule

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Homelessness and Substand

• 41% of homeless are families with children
  • 73% of those families are single-parents

• Homelessness is on the rise

• Primary cause of homelessness is lack of affordable housing, poverty, and unemployment
Single Parent Families

• Single-parent families overrepresented in poorest families
  • Especially teen girls
• Low-income noncustodial parents (usually fathers) with low wages, unemployment, are unable to pay child support
  • Half of those parents are themselves under the poverty level
• Non-resident fathers who pay child support are more involved with their children, emotionally and financially
  • 79% of fathers who pay court-ordered child support to the unmarried mother see their children regularly
  • 43% of fathers who are not court ordered and do not pay support do not see their children regularly
Child Care

- Decent, affordable child care continues to be in critically short supply, particularly the poor
- 40% of child actually harms children’s development
- 10% of child care in US is quality
- “In Our Hands”
Combating Poverty

- Milwaukee Project
  - Two groups of mothers with:
    - Low IQs
    - Living in poverty
    - Control group
      - No special services
    - Experimental group
      - Good nutrition
      - Medical care
      - Parent education
      - Stimulating infant and child care
  - At four years of age, experimental group scored significantly higher than control group in developmental, intellectual, and language assessments
    - Exceeded the norms of peer groups of the majority culture
  - At nine years of age, gains held
    - Siblings also scored higher on standardized tests even though they had not been in the program
    - Mothers were more employable
    - Mothers earned substantially more than mothers in control group
Combating Poverty (cont)

- Carolina Abecedarian Project, Chapel Hill, North Carolina
  - Low income families
  - From 1972 – 1985
  - Early childhood educational interventions
    - Beginning services 6 weeks – 3 months through early elementary years
  - Services:
    - High-quality, full-day child care for preschoolers
    - Support and education for parents of school-age children
    - Children received medical treatment
  - Results:
    - Higher academic achievement
    - Higher intellectual development
      - IQ scores at age 12 were 5.3 higher than comparison group
    - By 15 years 50% fewer special education placements
Carolina Abecedarian Project, Chapel Hill, North Carolina Outcomes

Perry Preschool Project (A)  Carolina Abecedarian Project (B)
Red: Intervention Group  Blue: Control Group

A  academic outcomes  economic outcomes

Percent of Children

Special Ed.  >10th percentile achievement  HS Grad.  Earn $2000+ per month  Own Home  Never on Welfare as adult

B  academic outcomes

Percent of Children

Special Ed.  Grade Repeater  HS Grad.  4 Year College  Non-smoker  Skilled Job or higher education
Classification of Developmental Disabilities

- Conversation is: should we categorize children in terms of impairment?
- Benefits of categorizing children:
  - Know how many have impairment
  - Know how widespread problem is
  - Identify clusters geographically and by group
  - Is problem increasing or decreasing?
  - How many teachers, clinicians, special facilities are needed?
  - Are the available funds shared equitably according to the numbers of children in each disability category?
  - Who is eligible for SSI and other benefits?
- Negatives of categorizing children:
  - When young, child may get locked into categories that are developmentally unsuitable or put into programs that compound their disability
  - There is potential harm in classifying children under age 6
  - Categorical funding
    - Discontinued in the birth – 6 years group
Categorical Systems

- Classifying children is used to allocate federal funding for educational services
- 12 categories of disabilities
  - Specific learning disabilities
  - Speech or language problems
  - Mental retardation (intellectual disability is new language)
  - Emotional disorders
  - Multiple disabilities
  - Hearing impairments
  - Orthopedic impairments
  - Other health impairments
  - Visual impairments
  - Autism
  - Deaf-blindness
  - Traumatic brain injury
In-Class Activity

- In groups of no more than three, write one paper with each member's name.
- For each of the twelve categories, write or bullet key features for each category.
- 15 points possible.
- Points will be awarded on thoroughness of your description.
- 45 minutes to complete this assignment.
Specific Learning Disabilities

- Not defined in universally accepted way
- Label is often a label of exclusion, when the child is not:
  - Not mentally retarded (intellectually disabled)
  - Not hearing impaired
  - Not visually impaired
  - Not displaying identifiable neurological problems such as cerebral palsy
- Normal or above-normal IQ
- Problems learning to read, write or do math
- Reading: dyslexia
- Printing/writing: dysgraphia
Speech and Language Problems

• Second-largest category of educational disabilities of children 6 – 21 years

• Factors affecting speech and language:
  • Rate of overall development
  • Temperament
  • Opportunity to hear language and talk to others
  • Cultural expectations and values
  • General health and well-being

• Speech and language problems often accompany other developmental disorders
  • Cerebral palsy
  • Hearing loss
  • Severe emotional disturbance
  • Down syndrome
  • Autism
Mental Retardation

- Term is controversial
Emotional Disorders

- No agreed upon definition
  - Very debatable
- Characterized by behavioral or emotional responses that are different from others their age, ethnic or community norms, and affect educational performance
  - Academic
  - Social
  - Vocational
  - Personal skills
- Referring to young children as emotionally disturbed is developmentally inappropriate
- Children’s behavior is heavily influenced by:
  - Child-rearing practices (aggressive parents tend to have aggressive children)
  - Cultural values
  - Expectations of family and community
  - Stages of development
    - Younger children demonstrate different types of aggression lacking intent
    - Behavior difficulties arise from frustration as young child attempts to master skill
Multiple Disabilities

• 20 – 50% of children with serious hearing deficits have additional problems
  • Language delays
• Many syndromes are characterized by several problems occurring together
  • Children with cerebral palsy may have speech delay, fine or gross motor difficulties, and feeding problems
Deafness is hearing loss so severe that spoken language cannot be processed
  • Even with hearing aid or other amplification
Hard of hearing is a loss that has a negative effect on education
Hearing loss affects cognitive, social, and language development
  • Degree depends on severity of loss
  • Degree depends on age of onset (later the loss the better outcome)
  • Degree depends on timing and quality of intervention
Label depends on when damage occurred
  • Congenital deafness
  • Adventitious deafness (through injury or disease)
Orthopedic Impairments

- Developmental problems that interfere with walking or other body movements are orthopedic impairments or physical impairments.
- Orthopedic problems and neurological problems are closely related in many instances.
- Federal regulation states orthopedic impairments refer to impairments caused by congenital anomalies and structural deformities.
  - Club foot
  - Absence of a limb
  - Paralysis
  - Polio
  - Neurological and spinal cord damage ending in paralysis of major muscles
  - Impairments from other causes
    - Severely fractured bones
    - Amputations
    - Burns
- May not be observable at birth through first year of life.
  - When early reflexive behaviors don’t emerge on schedule.
  - When reflexive behaviors interfere with acquiring new and more mature responses.
Health Impairment

- Severe health problems can create:
  - Limited strength
  - Limited vitality
  - Limited alertness
  - Pain
  - Discomfort much of the time
  - Frequent hospitalizations
  - Intensive medical treatment

- Health disorders include:
  - Heart problems (weak or damaged)
  - Leukemia (cancer of one marrow)
  - Asthma (respiratory system)
  - Sickle-cell anemia (red blood cell malformation)
  - Hemophilia (bleeding disorder)
  - Diabetes (faulty metabolism of sugar and starch)
  - Cystic fibrosis (lung and digestive problems)

- Chronic (can go to acute)
- Acute
Visual Impairment

• No clear-cut definition
• National Society for Prevention of Blindness:
  • Blind: visual acuity of 20/200 or less in better eye with best possible correction OR much reduced field of vision (<20 degrees)
  • Partially sighted: visual acuity of 20/70 – 20/200 in better eye with best possible correction
• Range from mild to severe
• Education definition of vision impairment from American Foundation for the Blind:
  • Blind: visual loss severe enough that not possible to read print, requiring education through Braille and other tactile and auditory materials
  • Partially seeing: residual vision sufficient to allow child to read large print or regular print under special condition and use other visual materials for education purposes
• Frequently problem does not appear until time for child to read and write
Combined Deafness and Blindness

- Requires highly specialized intervention programs
- Usually results in problems with language in cognitive and social development
- Until 1960s, education offered only in private institutions
  - 1968, Federal legislation authorized eight model centers for educating children with deafness and blindness
Autism

- First described in 1940s
- Originally blamed on lack of affection and responsive parenting
  - “Refrigerator mother”
- Behaviorally defined
- Reduced head size at birth followed by excessive increase in head size between one and two months and six to fourteen months may be common
  - May be early warning sign
- Autism occurs with other disorders
  - Fragile X
  - Tuberous sclerosis
- Book says some cognitive delay is present in 75% of children with autism
**Traumatic Brain Injury**

- Either open- or closed-wound
- Nerve fibers in brain tear
- Bruising of brain against skull
- Bruising of brain stem
- Most common consequences for learning:
  - Confusion in spatial orientation and directionality
  - Marked distractibility and short attention span
  - Problems in short- and long-term memory
  - Impulsivity and sometimes aggressiveness
YOUR CHILD IS CAPABLE OF THINGS NO ONE CAN PREDICT.

- Natan Gendelman, D.O.M.P

www.enabledkids.ca

From the blog, Having the first signs of cerebral palsy doesn’t set your child’s future in stone