Chapter 5: Developmental Disabilities: Causes and Classifications
Prepared by Debbie Laffranchini, Instructor
Questions Without Consensus Answers

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 Factors

• 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
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
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 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
Abnormal Gene Disorders

- **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 Sach’s Disease

Symptoms:
- deafness
- decreased eye contact
- decreased muscle tone
- loss of motor skills
- delayed mental & social skills
- irritability/listlessness
- 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 vs. Airway with cystic fibrosis

Airway wall
Airway lined with a thin layer of mucus
(Airway in cross-section)

Airway with cystic fibrosis

Widened airway
Blood in mucus
Bacterial infection
Cystic Fibrosis: Gene Disorder

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

**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
- Causes red blood cells to become sickle-shaped

Normal Red Blood Cells
- Compact and flexible
- Squeeze through small capillaries

Sickled Red Blood Cells
- Stiff and angular
- Become stuck in small capillaries

Red blood cells
Sickle cells
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
Lead Poisoning

- 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

**Symptoms**
- Irritability, sluggishness, fatigue, unusual paleness, anemia, learning difficulties
- In time it attacks central nervous system
- Loss of appetite, weight loss
- Abdominal pain, vomiting, constipation

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

**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

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**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**
- 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, 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*


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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
Number of Children Less Than Six Years Who Were Tested During Year and Had Blood Lead Level of 10 mcg/dL or Greater

Source: WCLPP, 2008
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
# Well-Child Checkups and Immunizations/Vaccinations

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Hepatitis B</th>
<th>Rotavirus</th>
<th>Diphtheria, Tetanus, Pertussis</th>
<th>Haemophilus Influenzae Type B</th>
<th>Pneumococcal</th>
<th>Polio</th>
<th>Influenza</th>
<th>Measles, Mumps, Rubella</th>
<th>Varicella</th>
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<td>Varicella</td>
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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*

<table>
<thead>
<tr>
<th>Vaccine ▼ Age ▼</th>
<th>Birth</th>
<th>1 month</th>
<th>2 months</th>
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**Range of recommended ages**

**Certain high-risk groups**
• 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 care actually harms children’s development
- 10% of child care in the 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
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
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
Hearing Loss

• 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
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