Prenatal Development

One week: a mass of 100 - 150 cells
First month: smaller than a grain of rice; mass divides into two layers of cells
Second month: 1¼ inch long; mass divides into three layers of cells
Third month: 2½ to 3 inches
Fourth month: 4 to 6 inches
Fifth month: 10 to 12 inches; one pound; cannot survive outside uterus
Sixth month: 11 to 14 inches, 1½ pounds; even with intensive medical care, about half do not survive if born now
Seventh month: 16 inches, 3 pounds
Eighth month: 18 inches, 5 pounds
Full-term: baby is ready to be born at 38 weeks. The average American baby weighs 7–8 pounds and measures about 20” long. A newborn has poor vision; clear only at about a 12” distance.

Birth defects occur about 3–4 % of the time.
75% are due to genetic, or inherited factors. The most common genetic birth defects are:

**Anencephaly**
A baby is born with a hole in the skull through which brain tissue protrudes. Most children die at birth.

**Cystic Fibrosis**
The mucus producing glands do not work properly, producing thick sticky secretions that cause problems with breathing, digestion, and reproduction. Caused by a gene mutation, its risk is highest among Caucasian and Jewish ethnic groups. (1/2 the rate in Hispanics and African-Americans and 1/4 the rate in Asians)

**Down Syndrome**
causes mental retardation and physical deformities in 1 in 1000 births. Normally a person has 21 pairs of chromosomes; a person with Down Syndrome has three on chromosome #21.

**Phenylketonuria (PKU)**
caused by an enzyme deficiency that makes the body unable to metabolize protein. Excess protein is toxic and results in mental retardation. Occurs in 1 in 10,000 births and can be controlled by diet.

**Sickle Cell Anemia**
A person’s red blood cells (RBCs) are crescent shaped instead of disk-shaped. This interferes with the ability to use oxygen, and can be fatal. Sickle Cell is found primarily in African Americans.

**Spina bifida**
Spine is incomplete and spinal cord protrudes through the opening. This often results in paralysis. Surgery is needed to repair the defect. Getting enough folic acid during pregnancy reduces the risk. 1 in 1,000 children are born with this defect.

**Tay-Sachs disease**
A gene mutation produces too much protein in the body. If onset in infancy, they do not gain motor skills, suffer paralysis, and die by about age five. If onset as child, live somewhat longer. Found primarily in Jewish and Cajun populations – 1 in 27 is carrier. 1 in 250 is carrier in general population.

continued
About 25% of birth defects occur because of damage to the fetus from environmental, or external hazards. For most of these hazards, the time when they can do significant harm is brief: the window of time when the organ they affect is being formed. For example, thalidomide only causes damage if exposure occurs in the first 52 days; rubella exposure causes damage only if it occurs in the first three months; carbon monoxide and ozone may cause heart defects, but only when exposure occurs during the second month, when the heart is forming. These hazards include exposure to:

- deprivation of nourishment (inadequate amount overall or of specific nutrients, such as folic acid)
- x-rays
- smoking (prenatally and second-hand smoke)
- heavy metals (such as lead, mercury)
- pollutants (such as dioxin, PCBs, carbon monoxide, ozone)
- drugs (such as Thalidomide, Accutane, alcohol)
- microbes (such as rubella, cytomegalovirus)
- excess of vitamins (such as vitamin A)
- high cholesterol
- loud noise - after 4-5 months (like loud music, machinery)

Overall, the greatest damage is done by lack of nourishment. It stunts growth as a child and it causes susceptibility to illness as an adult. Malnourished infants are born with fewer kidney cells, so are more likely to have kidney problems when older; they are born with fewer pancreas cells, so are more likely to develop diabetes later in life.

Brain Development

The Cortex

Prefrontal association cortex (thought, perception, reasoning, and judgement)

Sensory cortex (taste and touch)

Posterior partial cortex (association)

Visual cortex (vision)

Wernicke's area (sensory integration)

Auditory cortex (hearing)

Broca's area (speech)

Limbic association cortex (thought, perception, learning, emotions, and impulsivity)

Short-term memory

Olfactory cortex in medial temporal lobe (smell)

Prefrontal association cortex (thought, perception, reasoning, and judgement)

Brain Cell Development from Birth to Age Two

Brain Cell Development from Birth to Age Fourteen

Healthy vs. Neglected Brains

3-Year-Old Children

Emotional Intelligence

Emotional intelligence involves five competencies:

1. **Knowing one’s emotions**: recognizing a feeling

2. **Managing emotions**: handling feelings so they are appropriate

3. **Motivating oneself**: learning how to delay gratification and stifle impulsiveness

4. **Recognizing emotions in others**: empathy is the fundamental "people skill"

5. **Handling relationships**: skill in managing emotions in others

Resiliency

- The ability to bounce back stronger and more resourceful
- An active process of endurance, self-righting, and growth in response to crisis and challenge
- The capability of individuals and systems to cope successfully in the face of adversity, stress, and risk

Risk Factors

A risk factor is anything that increases the probability that a problem will occur, continue, or get worse. Risk factors are the influences that interfere with a person’s ability to cope during times of stress. Just because you are exposed to risk factors, doesn’t mean you are doomed to a life of problems. Risk factors are those things that increase the probability of a particular outcome – make it more likely, but not certain.

It doesn’t matter as much which risk factors you are exposed to but, rather, how many. It is the amount and length of exposure to stressful events that has such a damaging effect on a child’s development. Some risk factors are highly interconnected and so, they often occur together, which increases risk. For example, adolescent substance abuse often clusters with other problems such as delinquency, pregnancy, or school failure.

To offset the impact of risk factors, a person needs to possess just as many, if not more, protective factors.

Protective Factors

Protective factors are the influences that seem to buffer against the impact of risk factors. They are the strengths that help us cope with stress or trauma. Protective factors are the influences that promote hope, love, and support when there are challenges.

Many researchers now believe that if risks are removed, and if later experiences in a child’s life are positive, then adverse, traumatic or depriving experiences in early childhood may not permanently alter development.

# Risk and Protective Factors

## Risk Factors

### Early Developmental
- Premature birth or complications
- Fetal drug/alcohol exposure
- "Difficult" temperament
- Long-term absence of caregiver in infancy
- Poor infant attachment to mother
- Shy temperament
- Siblings within two years of child
- Developmental delays

### Childhood Disorders
- Repeated aggression
- Delinquency
- Substance abuse
- Chronic medical disorder
- Behavioral or emotional problems
- Neurological impairment
- Low IQ < 70

### Family Stress
- Family on public assistance or living in poverty
- Separation/divorce/single parent
- Large family, 5 or more children
- Frequent family moves

### Parental Disorders
- Parent with substance abuse
- Parent with mental disorders
- Parent with criminality

### Experiential
- Witness to extreme conflict/violence
- Removal of child from home
- Substantiated neglect
- Physical abuse
- Sexual abuse
- Negative relationship with parent(s)

### Social Drift
- Academic failure or dropout
- Negative peer group
- Teen pregnancy, if female

## Protective Factors

### Early Developmental
- “Easy" temperament
- Positive/secure attachment to mother
- First born
- Independence as a toddler

### Family/Home
- Child lives at home
- Parent(s) consistently employed
- Parent(s) with high school education or better
- Other adults or older children help with childcare
- Regular family involvement in church
- Predictable rules, routines, chores in home
- Family discipline with discussion and fairness
- Warm/positive relationship with parent(s)
- Monitoring/parent aware of child’s activities
- Monitoring, of child by adults in neighborhood

### Child Competencies
- Good reasoning, and problem solving skills
- Use of planning skills
- Good reader
- Good student
- Has skills, extracurricular activities, or hobbies
- IQ > 100

### Child Social Skills
- Gets along with other children
- Gets along with adults outside the family
- “Likable” child
- Sense of humor
- Empathy

### Extra-Familial Social Support
- Adult mentors outside immediate family
- Support for the child from someone at school
- Support for the child from peers/friends
- Involvement in church or community groups

### Outlooks and Attitudes
- Perception that parent(s) care
- Perception of skills and competencies
- Sense of internal locus of control
- Positive and realistic expectations for future
- Use of inner faith or prayer
- Independent mindedness, if female teen

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