

# Very Low Birth Weight

## Birth weight < 1500 grams (3lbs 5 oz)

### Condition Description

Prematurity is defined both by gestational age and by birth weight criteria. The World Health Organization (WHO) defines prematurity as less than 37 weeks gestation. Birth weight has been and continues to be used as a surrogate definition of prematurity because birth weight and gestational age are closely correlated and birth weight data are readily available.

Generally, the lower the birth weight, the more immature is an infant.

The category of very low birth weight (VLBW), that is infants born at less than 1,500 grams, is well recognized to represent a population of infants, primarily premature infants, who are at increased for acute and chronic impairments related to their immaturity. (AHRQ, 2002).

An extensive review of the literature relating to developmental and educational outcomes at school age for infants of varying birth weights indicates that those born at less than 1500 grams are more likely than not to demonstrate a delay at school age.

### Range of Outcomes

VLBW infants are at high risk for developing cognitive, neuromotor and neurosensory disabilities, including blindness and hearing loss. There is strong evidence of increased incidence of speech and language delays.

Across all measures of short-term memory and language outcomes, preschoolers who were born preterm performed at a lower level than full-term counterparts. (AHRQ, 2002)

In a population based study of kindergarteners in Florida, Resnick (1998) determined that after excluding children with ADHD, 47% of children who weighed less than 1500 grams at birth were either in special education or had academic problems which included grade retention. Saigal (2000) studied children at 8 years and again in their teens and found that 58% of those born at less than 1000 grams were either receiving special education services or had repeated a grade. Kohler and Lawson (1997) found that 55% of 6 year olds with birth weight under 1500 grams had IQs more than 1 standard deviation below the mean and 12% with IQs more than 2 standard deviations below the mean.

In studies of eight and nine year old children who were less than 1250 grams at birth, Marlow et al (1993) found that 48% had learning difficulties (excluding those with cerebral palsy) in at least one subject and Hille (1994) found 55% either in special education or one grade below what would be anticipated. Doyle, Bowen (2002) and Mikkola (2005) all studied school aged outcomes related to prematurity.

Hearing loss, vision impairment, speech and language delays, behavioral disorders and learning disabilities are all identified in disproportional numbers among former VLBW infants.

### Common Complications

The likelihood of complications related to low birth weight increases as birth weight and gestational age decrease.



Minnesota Children with Special Health Needs (MCSHN)  
85 E. 7<sup>th</sup> Place, Suite 220  
P.O. Box 64882  
St. Paul, MN 55164  
1-800-728-5420 or (651) 201-3650  
[www.health.state.mn.us/mcshn](http://www.health.state.mn.us/mcshn)

### **Cerebral Palsy**

The literature overwhelmingly supports evidence that the risk of cerebral palsy and major neurologic disability is increased among VLBW infants compared to full-term infants.

### **Intellectual Disabilities and Cognitive Abnormalities**

Children who were VLBW have significantly higher rates of cognitive abnormality and a several-fold increased prevalence of IQ<70 as adults compared with those born at normal birth weight at term. Intraventricular hemorrhage (IVH) particularly grades III and IV, periventricular leukomalacia (PVL), ventriculomegaly (increased size of the ventricles in the brain) are among the strongest independent predictors of cognitive impairment.

### **Retinopathy of Prematurity**

Retinopathy of prematurity (ROP) is a potentially blinding eye disorder that primarily affects premature infants weighing about 2¾ pounds (1250 grams) or less that are born before 31 weeks of gestation (A full-term pregnancy has a gestation of 38–42 weeks). The smaller a baby is at birth, the more likely that baby is to develop ROP. This disorder—which usually develops in both eyes—is one of the most common causes of visual loss in childhood and can lead to lifelong vision impairment and blindness.

ROP occurs when abnormal blood vessels grow and spread throughout the retina, the tissue that lines the back of the eye. These abnormal blood vessels are fragile and can leak, scarring the retina and pulling it out of position. This may cause a retinal detachment. Retinal detachment is the main cause of visual impairment and blindness in ROP. (NEI, 2006)

### **Brochopulmonary Dysplasia (BPD)**

Bronchopulmonary dysplasia (BPD) is a form of chronic lung disease that develops in preterm neonates treated with oxygen and positive-pressure ventilation (PPV). BPD results from a variety of toxic factors that can injure small

airways and that can interfere with alveolarization, leading to a reduction in the overall surface area for gas exchange. Damage to the lung during a critical stage of lung growth can result in clinically significant pulmonary dysfunction. The lungs, heart, and brain are the major organs affected. Postnatal growth failure is common and may have considerable effects on long-term developmental outcomes. Strategies to optimize postnatal weight gain are important to improve pulmonary, retinal, and neurologic development. (Driscoll, 2007)

### **Problems with Growth Impairment**

VLBW infants, with or without other conditions, are at high risk for poor growth during the first years of life due to acute neonatal illnesses, developmental delays, and chronic illnesses (e.g., BPD, gastroesophageal reflux, short-gut syndrome). Understandably, the degree of prematurity and severity of the illness/hospital course have great impact and influence growth. Attaining appropriate growth and nutrition in VLBW infants continues to be a challenge during the initial hospitalization and after discharge from the neonatal unit. Long-term studies demonstrated definitive problems with postnatal growth. The is evidence that the weight and height of VLBW infants is significantly behind that of normal birth weight infants through 14 years of age, although the differences become less over time.

### **Side Effects of Treatment**

Complications of even a single organ system may have a profound impact upon other organ systems. (AHRQ, 2001) Post-natal systemic steroids used for the treatment or prevention of bronchopulmonary dysplasia (BPD) are an independent determinant associated with abnormal cognitive and neurological development. The need for supplemental oxygen can impact both vision and brain development. There is some question as to the impact the high noise environment of an isolette may have on hearing.

For More Information

**This fact sheet was developed for use in determining eligibility for early intervention services only. For more complete information, the following resources might be useful:**

### MedlinePlus

MedlinePlus brings together authoritative information from NLM, the National Institutes of Health (NIH), and other government agencies and health-related organizations. Preformulated MEDLINE searches also give access to medical journals.

<http://medlineplus.gov/>

### Agency for Healthcare Research and Quality

Under its Evidence-based Practice Program, the Agency for Healthcare Research and Quality (AHRQ) is developing scientific information for other agencies and organizations on which to base clinical guidelines, performance measures, and other quality improvement tools. Contractor institutions review all relevant scientific literature on assigned clinical care topics and produce evidence reports and technology assessments, conduct research on methodologies and the effectiveness of their implementation, and participate in technical assistance activities.

<http://www.ahrq.gov/clinic/epcsums/lbwdissum.htm>

### E-Medicine

eMedicine's clinical knowledge base contains peer reviewed articles on a number of different health conditions. There is a pediatric section available.

<http://www.emedicine.com/>

### References

Agency for Healthcare Research and Quality, Criteria for Determining Disability in Infants and Children: Low Birth Weight, 2002

Bowen, JR. Education Outcome at 8 years for Children Who Were Born Extremely Prematurely: A controlled study. Journal of Paediatric Child Health, 2002, 38, 438-444

Doyle, L et al, Outcome at 5 Years of Age of Children 23 to 27 Weeks Gestation: Refining the Prognosis. Pediatrics, 2001 108; 134-141

Driscoll, W, Bronchpulmonary Dysplasia, [www.emedicine.com](http://www.emedicine.com), last updated 4/23/07.

Hille ET, den Ouden AL, Bauer L et al. School performance at nine years of age in very premature and very low birth weight infants: perinatal risk factors and predictors at five years of age. Collaborative Project on Preterm and Small for Gestational Age (POPS) Infants in The Netherlands. J Pediatr 1994 Sep;125(3):426-34.

Marlow N, Wolke D, Bracewell M, Samara M. Neurologic and Developmental Disability at 6 Years of Age Following Extremely Preterm Birth. New England Journal of Medicine Vol 352 (1) 6 January 2005 p9-19

Marlow N, Roberts L, Cooke R. Outcome at 8 years for children with birth weights of 1250 g or less. Arch Dis Child. 1993 Mar;68(3 Spec No):286-290.

Mikkola, K., et al, Neurodevelopmental Outcome at 5 Years of Age of a National Cohort of extremely Low Birth Weight Infants Who Were Born in 1996-1997, Pediatrics 2005;116 1391-1400.

National Eye Institutes (NEI) of the National Institutes of Health (NIH), Retinopathy of Prematurity, [www.nei.nih.gov](http://www.nei.nih.gov) , last updated December 2006.

Saigal, S. et al, Psychopathology and Social Competencies of Adolescents Who Were Extremely Low Birth Weight, Pediatrics 2003;111;969-975.

Resnick, M. The Impact of Low Birth Weight, Perinatal Conditions and Sociodemographic Factors on Educational Outcome in Kindergarten. Pediatrics 1999; 75-83.