



Guide to the Premature Babies  
Resource Centre on AboutKidsHealth

# INTRODUCTION

The following pages were prepared to assist community health representatives (CHR) with accessing information about 'Premature Babies' that is available at The Hospital for Sick Children's (SickKids) website, [www.AboutKidsHealth.ca](http://www.AboutKidsHealth.ca). The evidence-based health information was created in collaboration with expert health professionals at SickKids. AboutKidsHealth is the world's leading non-profit information source for children's health. Its purpose is to improve the health and well-being of children in Canada and around the world by making child health care information available around the globe in multiple languages via the Internet.

The information gathered at AboutKidsHealth is structured in resource centres, online interactive textbooks. Many of the resource centres are hundreds of pages in length, and therefore not easily accessible without a thorough review. Furthermore, moving around in the resources centre can be challenging without a fast internet connection speed.

## INDEX

### The goals of the index area:

- To enable readers of a print copy to view the sequence of the information without requiring them to search online. Once a subheading of interest is found, the reader can direct their online search to the specific online page.
- To enable readers, while they are online at [www.aboutkidshealth.ca/inuithealthmatters](http://www.aboutkidshealth.ca/inuithealthmatters) to access the information directly by clicking the link of interest.

## SUMMARY PAGES

Often, material relevant to a specific topic is spread across a number of areas in a resource centre. To assist health care providers access all the relevant information about a particular topic, for example respiratory distress syndrome, the topic is summarized onto a one-page document (a PDF) and includes any relevant links to additional information. Information may be printed and given to a patient after it has been explained by the care provider.

Active links to the summary pages are embedded in the online content from our Inuit Health Matters homepage <https://www.aboutkidshealth.ca/inuithealthmatters>

# DETAILED INDEX: PREMATURE BABIES

[www.aboutkidshealth.ca/prematurebabiesihm](http://www.aboutkidshealth.ca/prematurebabiesihm)

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# ABOUT PREMATURE BABIES

[www.aboutkidshealth.ca/PrematureBabiesIHM](http://www.aboutkidshealth.ca/PrematureBabiesIHM)

## **What is a premature baby?**

Normally, a fetus spends 40 weeks growing and developing in the womb before birth and entry into the world. This length of time is called term or full-term. According to the World Health Organization (WHO), babies born before completing 37 weeks in the womb are referred to as preterm or premature. Premies, as premature babies are sometimes called, can be perfectly healthy at birth and may develop normally both in body and mind. However, almost all will require some form of specialized supportive medical care after birth. Some will have continuing problems that will affect their growth and development.

Often, when premature babies require medical support following birth, it is not necessarily that there is something “wrong” with the baby. In many cases, the problem is simply that he is in the wrong place. Instead of spending more time developing in his mother’s womb, he is out in the world, somewhat unprepared for an environment that requires a degree of independence. In the womb, the fetus is protected from temperature changes and physical contact, and is provided for in terms of nutrition and oxygen by the mother. This environment is vastly different from the outside world where a baby must breathe air to get oxygen into the blood, where he is susceptible to cold, and where he must use his digestive system to get the nutrition needed to grow and develop.

The gestation period, or the time the fetus spends in the womb, is essentially preparation for the outside world. It is the amount of time a fetus needs to develop the organs and mechanisms needed to deal with the challenges of living outside the womb. For this reason, the amount of time a baby has spent in the womb will largely determine the types and severities of problems that he has at birth and beyond.

## **How will prematurity affect my baby?**

Although the majority of premature babies develop into healthy children, there are many different types of problems associated with prematurity. Even when everything is “normal,” prematurity itself has many challenges. Many of the body’s organs function differently in the womb than in the outside world. They may not be fully ready to make the switch. A premature baby’s lungs, though on the road to developing normally in the womb, may not have developed enough to breathe without some form of assistance. Similarly, a premature baby will have an immature heart, gastrointestinal tract, kidneys, and so on, and may also require assistance in these areas until he is more mature. Additionally, premature babies are somewhat more fragile than term babies. Some parts of an immature body, for example the brain, are more vulnerable to injury as a result of their immaturity. Though this is not usually a problem while the baby is protected in the womb, a premature birth exposes the baby to more injury sources, including possibly the birth itself.

## **What causes premature birth?**

There are a number of reasons why some babies are born premature. Some have to do with the condition of the mother, others with the condition of the fetus. Causes related to the condition of the mother include: high blood pressure; infection; substance abuse; trauma; or chronic illness. Premature birth can also come as a result of complications with either the uterus or the placenta. These include: cervical incompetence, or an early opening of the cervix; malformation of the uterus; an excess of amniotic fluid, which can cause pressure in the uterus, resulting in early contractions and birth; malformations; or early detachment of the placenta. Premature birth can also be the result of fetal causes, which include: infection; fetal malformation; and chromosomal abnormalities.

# RESPIRATORY DISTRESS SYNDROME (RDS)

[www.aboutkidshealth.ca/BreathingIHM](http://www.aboutkidshealth.ca/BreathingIHM)

## What is RDS?

Normally, when the lungs initially inflate with the baby's first breath, the air sacs called alveoli expand, fill with air, and remain open. Because the sacs remain open, the surface area within the lungs becomes quite large. The larger the surface exposed to the air coming into the lungs, the more opportunity oxygen has to pass from the alveoli into the blood. A substance called surfactant is an essential part of the process allowing alveoli to remain open. Surfactant is a kind of foamy, fatty liquid that acts like grease. Without it, the air sacs open but have difficulty remaining open because they stick together. Surfactant allows the sacs to remain open.

Surfactant usually appears in the fetus's lungs at about the 24th week of pregnancy and gradually builds up to its full level by the 37th week. Additionally, when labour begins, the mother's body produces a type of natural steroid that makes its way to the baby through the placenta and umbilical cord. This steroid initiates or speeds up production of surfactant in the lungs in preparation for a baby's first breath.

Babies born without enough surfactant are said to have RDS. They have difficulty breathing

## Treatment of RDS

Surfactant replacement therapy, as it is called, acts to keep the alveoli from sticking together in the same way as naturally produced surfactant does. In either case, the baby's breathing will usually need to be stabilized, either with supplemental oxygen or some form of ventilation that assists the baby with her breathing.

## Will there be any side effects?

Once these measures have been taken, RDS needs time to resolve. The overwhelming majority of premature babies recover from RDS without major complications or adverse effects as the child grows older. However, newborns with severe cases of RDS, usually the smallest and most premature babies, are at risk for breathing difficulties, including chronic lung disease and respiratory infections.

## More information:

Diagnosis of RDS

[www.aboutkidshealth.ca/DiagnoseRDS](http://www.aboutkidshealth.ca/DiagnoseRDS)

Treatment of RDS

[www.aboutkidshealth.ca/TreatRDS](http://www.aboutkidshealth.ca/TreatRDS)

The immature lung

[www.aboutkidshealth.ca/PrematureLungs](http://www.aboutkidshealth.ca/PrematureLungs)



# INTRAVENTRICULAR HEMORRHAGE (IVH)

[www.aboutkidshealth.ca/IVH](http://www.aboutkidshealth.ca/IVH)

## What is IVH?

Intraventricular hemorrhage (IVH) is bleeding into the ventricles of the brain. One characteristic of the immature brain is a weakness of the blood vessels next to the ventricles. The ventricles are cavities that store cerebrospinal fluid (CSF) which nourishes the brain. Of particular concern is a collection of tiny and fragile blood vessels in a part of the brain near the floor of the ventricles. These blood vessels are thin and vulnerable to fluctuations in blood flow through them, which can cause them to rupture and bleed. The younger and smaller the baby, the higher the risk these blood vessels may be ruptured, usually in the first few days of life. A rupture causes blood to flow into a ventricle or ventricles of the brain.

IVH is categorized into grades of severity: grade I is considered mild, grade II moderate, and grade III & IV severe. About 50% of extremely premature babies will have an IVH, whereas only about 15% of older premature babies will have an IVH. The bleeding of IVH occurs typically within the first 48 hours following birth, and it is very unlikely to occur again at a later date.

## How can IVH affect my baby?

There are two main ways in which IVH can cause damage:

- IVH may affect the flow of CSF in the ventricles.
- IVH may cause damage to brain tissue adjacent to the ventricles.

Once damage has occurred to brain tissue, it cannot be reversed. However, physical damage to brain tissue does not necessarily mean damage to brain function. The areas of the brain that are often affected by an IVH are those responsible for motor functions.

Commonly, problems with vision and hearing,

and other higher cognitive functions are associated. The extent of any long-term effect will often depend on the severity of the bleeding: babies with severe IVH are likely to develop some kind of neurological disability. Cerebral palsy (CP), a condition that interferes with motor coordination, is frequent. There is however, a wide range of disability with CP: those with hemiplegia are affected on one side of body only and children with milder forms of spastic diplegia, affecting only the legs, are usually able to walk with minimal supports. Luckily, many babies who have a mild IVH go on to develop normally or with only minimal disabilities associated with learning.

## More information:

Diagnosis of IVH

[www.aboutkidshealth.ca/DiagnoseIVH](http://www.aboutkidshealth.ca/DiagnoseIVH)

Treatment of IVH

[www.aboutkidshealth.ca/TreatIVH](http://www.aboutkidshealth.ca/TreatIVH)

Who is at risk for long-term effects?

[www.aboutkidshealth.ca/LongTermIVH](http://www.aboutkidshealth.ca/LongTermIVH)

# CONSTIPATION

[www.aboutkidshealth.ca/NewbornDigestion](http://www.aboutkidshealth.ca/NewbornDigestion)

## What is constipation?

Many parents think their newborn baby is constipated if he is not passing bowel movements as frequently as they think he should. However, constipation is not defined by how frequently your baby passes stool. Rather, constipation is when the baby's bowel movements are hard and cause pain or bleeding. The baby will groan or strain when trying to pass stool. Other common symptoms of constipation are as follows:

- stool streaked with blood, if there are cracks in the baby's anus caused by the passing of hard stool
- abdominal pain
- irritability

Newborn babies who are breastfed exclusively are very rarely constipated. Constipation is more common in bottle fed babies.

## Is there treatment for constipation?

If your newborn baby is having difficulty passing a bowel movement, try moving his legs in a bicycle fashion. Sometimes other treatments are needed to help your baby have a bowel movement, such as water or diluted prune juice. These treatments should first be discussed with your doctor.

## More information:

Constipation (for children)

[www.aboutkidshealth.ca/ConstipationInfo](http://www.aboutkidshealth.ca/ConstipationInfo)

# DIARRHEA

[www.aboutkidshealth.ca/NewbornDigestion](http://www.aboutkidshealth.ca/NewbornDigestion)

## What is diarrhea?

Diarrhea is when the newborn baby passes very runny, liquidy stools, sometimes at an increased frequency or more volume than normal. There may be mucus in the stool. Diarrhea is sometimes associated with vomiting. Diarrhea is often caused by a bacterial or viral infection. The infection is transmitted to the newborn baby through contaminated foods or if there is contact with contaminated stool. Diarrhea may be due to another type of illness. Less frequently, it may be due to sensitivity to something in the baby's diet or feeding intolerance. Diarrhea may also be a side effect of antibiotic medication in some babies.

## When to see a health care provider

Diarrhea can be very serious in newborn babies. If you notice any change in your newborn baby's bowel movements, make sure to mention it to your health care provider. If your baby has diarrhea and vomiting, it is most likely a sign of infection. If your baby shows any signs of dehydration, such as dry mouth, less than six wet diapers per day, sunken eyes, a sunken fontanelle, or dry skin, it could potentially be very dangerous.

Bring your newborn baby to a health care provider as soon as possible if he has loose, watery stools for 24 hours, or if diarrhea is accompanied by any of the following symptoms: dehydration; vomiting; fever; or blood in stool.

## Treatment of diarrhea

The treatment of diarrhea depends on its cause. Sometimes a dietary change is made, and sometimes medication is required. Do not give your newborn baby any medication unless it is prescribed by your health care provider.

Here are a few tips:

- If your newborn baby is breastfeeding, continue to feed him as normal.
- If your baby is vomiting, you may need to feed

him in smaller amounts but more frequently. If you are breastfeeding, this means keeping your baby at the breast for a shorter amount of time at each feeding.

- To protect against dehydration, you might need to give your baby an electrolyte solution such as Pedialyte in between feedings. Alternately, you may need to replace the feedings entirely with the electrolyte solution.
- If you are bottle feeding and your baby's diarrhea continues for more than two weeks, you may need to make a change in formula. You should discuss this with your baby's health care provider.

Diarrhea and vomiting are sometimes signs of infection. In newborn babies and young infants, infections can become serious very quickly, and dehydration from diarrhea and vomiting can develop quickly. It is important to have your baby treated as soon as possible if an infection is suspected. Special diagnostic tests may be required, and your baby may need to be treated in the hospital with intravenous fluids.

## More information:

Diaper rash

[www.aboutkidshealth.ca/DiaperRashIHM](http://www.aboutkidshealth.ca/DiaperRashIHM)

# SKIN PROBLEMS IN NEWBORN BABIES

[www.aboutkidshealth.ca/NewbornSkin](http://www.aboutkidshealth.ca/NewbornSkin)

## Skin conditions:

Below is a description of the most common skin conditions that newborn babies have:

- **Cradle cap:** This is peeling skin on your newborn baby's head. Mild cradle cap should respond to a massage with mineral oil or petroleum jelly to loosen up the peeling scales. Then you can wash off the scales with baby shampoo. If the peeling is heavy, your doctor may recommend the use of a special shampoo or ointment. With treatment, cradle cap usually clears up within a few weeks; without treatment, it lasts for months.
- **Erythema toxicum:** These are yellow-white bumps surrounded by red splotches. These lesions may be anywhere on the skin except the palms of the hands and the soles of the feet. They should disappear within the first week or two. This is one of the most common rashes of the newborn baby.
- **Milia:** These are small, pearly, white spots on the newborn baby's forehead, cheeks, and nose. They look like whiteheads, and although they appear to be raised bumps, they are actually smooth. Milia form when a skin lubricant called sebum builds up within the newborn baby's skin. Within the first couple of weeks of life, the baby's oil glands and pores will become more mature, and the milia will disappear. It is best to leave these spots alone and let them disappear naturally.
- **Miliaria:** This is a raised rash consisting of little blisters filled with fluid. The fluid is milky white or clear, and it contains normal skin secretions. Miliaria is due to obstruction of sweat glands leading to the build-up of sweat. The rash will eventually disappear on its own.
- **Newborn acne:** These are red spots with yellow centres, also called neonatal urticaria, which occur when the pores in the newborn baby's skin do not yet work efficiently.

Although they may look like an infection, they are not, and they do not need any treatment. Neonatal urticaria will go away on its own.

- **Pustular melanosis:** These are small blisters on the skin. They quickly dry out and fall off, leaving little dark-coloured freckles underneath. The freckles will eventually disappear. This is more commonly seen in dark-skinned newborn babies.

## Birthmarks:

Some newborn babies are born with birthmarks that can be a bit alarming at first. Some birthmarks disappear after a few years, and others remain throughout the child's lifetime. Here is a list of the most common types of birthmarks:

- **Café au lait marks:** These are tan coloured patches – hence the name café au lait – that can occur anywhere on the newborn baby's body. They do not disappear over time. If your baby has many café au lait marks, let your doctor know, as it may be a sign that your baby needs further investigations.
- **Strawberry marks:** Also called a capillary hemangioma, this is a red, raised blotch with a soft texture. It may be as small as a kernel of corn or larger than a baseball. Strawberry marks form when there is an abnormal blood supply to a part of the skin, which causes the skin to swell and turn red. They usually increase in size after birth but are expected to disappear by about five to 10 years of age. If the strawberry hemangioma is close to the eye and interferes with vision, it may need to be treated.
- **Cavernous hemangioma:** This is like a strawberry hemangioma, except that it involves deeper layers of tissue and it has a lumpy texture. Cavernous hemangiomas typically grow during the first year of life, and then disappear between five and 12 years. Sometimes they can be removed surgically.
- **Moles:** Also called congenital pigmented nevi,



moles can range from light to dark, and they may have hair growing from them. Moles are not usually a cause for concern. However, if your newborn baby's mole is very large, starts bleeding, or changes colour, shape, or size, there could be a chance of skin cancer, and it should be brought to your doctor's attention.

- **Port wine stains:** These are large, flat, dark red or purple spots on the skin, caused by too many blood vessels under the skin. Port wine stains do not disappear over time.
- **Skin tags:** These are soft, little skin growths. If they are unattractive or uncomfortable, they can be removed by the doctor.
- **Stork bites:** These are pink, irregular-shaped patches on the neck or face, which disappear over time.

# EFFECTS OF PREMATURITY ON BEHAVIOUR AND INTELLECTUAL ABILITY

[www.aboutkidshealth.ca/PrematureAbility](http://www.aboutkidshealth.ca/PrematureAbility)

Although great advances in skill and technology have allowed many more premature babies to survive than in previous decades, some of those who live do so disabled to some degree. These disabilities can take many forms, be they physical, intellectual, or behavioural. The bad news is that in general, some premature babies are negatively affected intellectually by the complications associated with their early birth. The good news is that, for many, this intellectual impairment is not profound and, with the proper intervention and attention, these intellectual impairments can be minimized to the point that they should not be a major hindrance to a reasonably “normal” life. Parents of premature babies should also understand that intellectual impairments happen to full-term babies as well as premature babies. In many cases, premature babies experience delays in their development that appear to disappear over time. Catchup growth and development may be seen throughout the first year of life.

## **How will an intellectual disability affect my baby?**

In general, premature babies score lower on a variety of tests that measure intellectual ability. How much lower they score is in direct relation to how premature and small they were at birth, and if they suffered complications affecting the brain immediately following birth. Mildly premature babies tend to have only slightly lower scores than full-term babies. Extremely premature babies have more significantly lower scores than full-term babies. While many premature babies “catch up” physically in terms of their growth as time goes by, it appears that this is not the case for most who have an intellectual disability. While the newborn brain is considered “plastic” in the sense that it can have an incredible ability to recover following injury, there are limits to this ability. The effects of an intellectual impairment tend to remain through childhood, although there is some evidence to suggest that girls may be affected to a lesser extent intellectually

than are boys. Although less well studied, it is likely that these impairments remain into adulthood.

## **How will an behavioural disability affect my baby?**

There are standardized questionnaires to measure concerns with behaviour in children. They are usually completed by a parent or teacher. In general, there is a greater likelihood that the behavioural ratings on these questionnaires, in children born prematurely, will show problems with behaviours such as inattention or non-compliance, or problems with emotions. In similar fashion to the risk of cognitive deficits, discussed above, the greater the risk associated with the premature baby, in terms of length of pregnancy or complicating factors, in particular those affecting the brain, the greater the risk of behavioural problems. Although many premature babies “catch up” physically in terms of their growth as time goes by, it appears that behavioural issues do not dissipate; they tend to remain through childhood. Although less well studied, it is likely that these impairments also remain into adulthood. It is important to note that some of these problems can be treated effectively with early behavioural intervention.

Behaviour problems are generally categorized into two groups: externalizing behaviours and internalizing behaviours. Examples of externalized behaviours include: defiance, impulsivity, hyperactivity, and aggression. Withdrawal and anxiety are considered internalizing behaviours. How these behaviours manifest themselves depends on the age of the child. Babies born prematurely are at a greater risk of problems with focusing attention, including development of signs and symptoms associated with Attention Deficit/Hyperactivity Disorder (ADHD). These signs and symptoms can have negative impact on their social, intellectual, and academic development. Behavioural problems should be viewed and treated in the largest frame possible, taking into account the fact that, in all probability, there can be widespread consequences.



# PREMATURE BABIES: LEARNING DISABILITIES

[www.aboutkidshealth.ca/LearningIHM](http://www.aboutkidshealth.ca/LearningIHM)

## **What are learning disabilities (LD)**

There are three types of LDs. These are reading, writing, and math disabilities. There are learning problems that do not meet any specific criteria for a learning disability. Children born prematurely are more at risk for having a LD. Parents and other caregivers including health professionals should keep an eye out for possible problems, especially in children who were born extremely premature, who are more at risk than children born mildly or moderately premature.

## **How does LD affect my child?**

Although there are many different types of LDs, children born prematurely seem to be susceptible to some more than others. Children born prematurely are often late to talk, and a significant number have trouble understanding what they hear. For some children, these language difficulties persist to school-age and affect their ability to learn to read, spell, and write stories. Many children born prematurely have problems with visual and motor processing, which hamper their ability to learn to print and write legibly and automatically. Children born prematurely also often have working memory and attention problems. Working memory is the ability to hold information in mind for a short period of time. Difficulties in math are frequently observed by the middle elementary grades.

## **How is LD assessed?**

The earlier that a child is evaluated for LD, the sooner intervention can begin. Early intervention gives a child the best chance at minimizing the effect of a learning disability. Getting help early also means there is a smaller gap between a child and her peers, which makes it easier to catch up, and minimizes problems with self-esteem and anxiety over failure. LDs do not go away on their own. They can be treated, and leaving them untreated

only exposes a child to failure and self-esteem problems. An early diagnosis and intervention reduces the length of time that a child spends wondering why she is failing at something others do easily.

There are several types of assessment that may take place. These may include a psychoeducational assessment, focusing on learning skills, interviews with the child, parents, and teachers as well as psychological tests and brain imaging. These results help guide interventions and provide a starting point for measuring progress.

Neurodevelopmental assessments measure the basic brain processes that affect learning: attention, learning and memory, language, visual and spatial processing, higher-order thinking, social thinking, and neuromotor skills as well as academic abilities. Knowing that there is a specific problem is the first step towards some adjustment in teaching that can help the child work around the difficulty.

# DEVELOPMENT OF SPEECH AND LANGUAGE

[www.aboutkidshealth.ca/SpeechAndLanguage](http://www.aboutkidshealth.ca/SpeechAndLanguage)

It is helpful to know the usual developmental stages a child goes through when learning speech and language. Keep in mind that these stages are ranges, and the ranges are approximate. Individual babies, toddlers, and children achieve different skills at different times within the range. Some characteristic features of language development are listed below for each developmental stage.

Language is generally divided into two categories: receptive and expressive. Receptive language is the understanding of the expressions and words of others. Children develop this skill first. Expressive language is the child's ability to express himself. As children improve their language skills, they tend to understand more than they can say. In other words, their receptive language is almost always better than their expressive language.

## Speech and language at eight to 13 months

- points at objects he wants
- shakes head to indicate "no"
- waves good-bye
- uses sounds as if they were words
- uses jargon
- imitates adult's sounds

## Speech and language at 12 to 18 months

- begins to develop a receptive vocabulary of words he understands, for example, he is able to point to objects when named by an adult
- understands a number of single words and short phrases
- uses approximately 10 to 20 words for objects

## Speech and language at 18 to 24 months

- understands simple questions and commands
- begins to combine two words to form a sentence
- the child's expressive vocabulary, or the words

he uses when speaking, increases to about 200 words

- begins to use negatives: "no juice"

## More information:

Resources for speech and language

[www.aboutkidshealth.ca/SpeechAndLanguageResources](http://www.aboutkidshealth.ca/SpeechAndLanguageResources)



# SMALL FOR GESTATIONAL AGE

[www.aboutkidshealth.ca/PrematureIHM](http://www.aboutkidshealth.ca/PrematureIHM)

Although the size of a baby at birth is usually related to his gestational age, there are situations where babies are unusually small for their gestational age (SGA). Babies can be born SGA for any of several reasons:

- a lack of nutrients and oxygen. This might be due to a poorly functioning placenta or the mother's own illnesses.
- infections such as cytomegalovirus (CMV) or rubella
- chromosomal or other congenital abnormalities
- limits to how much the uterus can expand, which restricts fetal growth. Nature solves this problem by early delivery: twins tend to be born between 37 and 40 weeks, triplets between 34 and 37 weeks, and quadruplets between 28 and 32 weeks, or earlier.
- the pregnant mother's lifestyle: smoking cigarettes, taking drugs, and consuming alcohol during pregnancy are also risk factors for SGA births

Although most babies are born with a weight that is considered appropriate for their gestational age, medical professionals are always on the look out for SGA babies because they generally will require more interventions and a longer stay in the hospital's neonatal intensive care unit (NICU). The SGA condition, especially combined with extreme prematurity, makes babies more at risk for certain medical conditions, especially neurological problems such as cerebral palsy.

## More information:

Transport to specialized neonatal facilities

[www.aboutkidshealth.ca/PrematureTransportation](http://www.aboutkidshealth.ca/PrematureTransportation)

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