



A Guide to the Newborn Intensive Care Unit (NICU) and Special Care Nursery (SCN)

LIVING AND LEARNING TOGETHER



The newborn intensive care unit (NICU) and special care nursery (SCN) provide care to babies who are premature, critically ill, or have other conditions requiring special care. When your baby needs to be in the NICU or SCN, it can be an overwhelming experience. Very quickly, the excitement you feel about the birth of your new baby can change to fear about what lies ahead. You may also feel angry or find yourself questioning whether anything is really wrong with your baby. All of these emotions are normal. However, knowing what to expect can help balance these feelings and take away some of the fear.

We hope that this booklet, along with the advice of your baby's caregivers, will help answer the many questions you may have about the care and services provided in a NICU or SCN.



What's Inside:

YOUR BABY'S CAREGIVERS 4

COMMON PROBLEMS OF PREMATURE OR SICK INFANTS 7

Breathing problems	7
Gastrointestinal problems	8
Brain problems	8
Heart problems	8
Eye problems	9
Infections	9
Jaundice	10

THE NICU AND SCN ROUTINE 11

Visiting your baby	11
Touching and holding your baby	12

MONITORS AND EQUIPMENT 13

Monitors	13
Open warmer or incubator (isolette)	14
Breathing equipment	15
Chest tubes	15
IV therapy equipment.....	16
Phototherapy lights (bililights)	18

CARE, TREATMENT, AND TESTS 19

Medicines.....	19
Nutrition and feeding.....	20
Skin care	22
Lab tests.....	23
Blood transfusions	23
Imaging studies	23

PREPARING TO GO HOME 24

Discharge criteria	24
Rooming-in	25
Preventing RSV and other respiratory illnesses	26
Home equipment use	26
Safe sleeping do's and don'ts	27
Car seats (child safety seats).....	28

GLOSSARY OF TERMS 29

WHEN TO CALL THE DOCTOR..... 35



Note: Since the use of he/she and him/her can be distracting, this booklet alternates references to the baby's gender.

Find details online at:

- intermountainhealthcare.org/services/women-newborn/treatments/nicu-care/
- Facebook.com/IntermountainMoms

Your Baby's Caregivers

Your baby will be cared for by a team of well-trained, diversely skilled staff members — any of whom will be glad to answer your questions at any time. However, it may be difficult at first to figure out who everyone is and the role they play in your newborn's care. The following pages describe some of your baby's most common caregivers.

Doctors

- A **neonatologist** [nee-oh-ney-TOL-uh-jist]— This is a doctor specially trained in newborn intensive medicine who leads the caregiver team in the NICU or SCN. (You may hear your neonatologist referred to as the **attending physician**.) All major decisions concerning your child are cleared first through this doctor. Your neonatologist may consult with surgeons and other doctors who are specialists in other areas.
- Your **pediatrician** [pee-dee-uh-TRISH-uhn]— This is a doctor who specializes in the care of infants and children) and oversees your baby's care in the hospital. You will contact your pediatrician for care (other than emergencies) after you go home.
- **Physicians in training**— Besides the neonatologist and pediatrician, a group of physicians in training may also care for your baby. This group includes neonatal fellows, residents, interns, and medical students. **Fellows** are doctors who are undergoing specialty training in newborn intensive care, and **residents** are doctors in their second or third year of pediatric specialty training. **Interns** are doctors in their first year of training after graduating from medical school, and they work with the residents and fellows to gain experience. Fourth-year **medical students** work directly under the supervision of the attending physician, residents, fellows, and interns, and may work with your child as part of their training.
- **Medical director**— The person who supervises all neonatologists and physicians in training is the **medical director**. If you have a problem that cannot be solved by speaking with your doctor, ask to speak to the medical director.



Your baby's team of caregivers is led by a neonatologist, a doctor specially trained to care for premature or sick infants.

Advanced Practice Clinicians

Neonatal nurse practitioners (NNPs) and physician assistants (PAs)— These providers work in the NICU or SCN and have advanced training in the care of newborn babies — especially babies who are ill, premature, or at high risk for complications. NNPs and PAs work closely with your baby's doctors.

Nurses

- **Registered Nurses (RNs)**— These providers, often referred to as staff nurses, are the caregivers you'll see most during your baby's stay in the NICU and SCN. They have been specially trained to care for babies like yours and will deliver the care your baby's doctor orders. Staff nurses closely monitor your baby and usually have the most recent information about your baby's progress. They can answer many of your questions and show you what care you can give your baby when you visit him in the hospital.
- A **charge nurse** (sometimes called a **shift coordinator**)— This nurse has the same special training in infant care as the staff nurses and oversees nursing care during a particular working shift in the NICU or SCN. They assign care tasks to staff nurses and help resolve problems. The charge nurse also coordinates the flow of patients in and out of the unit.
- **Nursing directors** and **nursing managers**— These professionals supervise all nurses and clerks in the NICU or SCN. If you have a problem that can't be solved by speaking with other nursing staff, ask to speak to the nursing director.

Other healthcare professionals

In addition to the doctors and nursing staff, there are a variety of other specialized professionals involved in your baby's care.

- **Patient care technician (PCT)**— Under a nurse's supervision, a PCT provides for your baby's basic needs and reports on his condition to the nurse.
- **Unit clerks** or **health unit coordinators**— These secretaries at the front desk of the NICU or SCN are responsible for answering general questions and screening visitors, and they can be a valuable source of information about your resources at the NICU or SCN.
- **Medical social workers**— These professionals are trained to listen to your concerns and can help you make arrangements for lodging, insurance, and home healthcare. They can also provide support for grieving families.
- **Respiratory therapists**— These healthcare professionals are trained in the care of your baby's lungs. They work with infants with breathing problems and help manage the equipment that helps your baby breathe.
- **Pharmacist**— This is a professional who specializes in preparing and delivering medicines.



Don't hesitate to ask your caregivers any questions. You need to know them, trust them, and work with them in caring for your baby.

- **Developmental team**—This group may include physical therapists, occupational therapists, and speech therapists who can help your baby with movement, feeding, and other developmental issues.
- **Registered dietitian nutritionist (RDN)**—This person is a healthcare professional with special knowledge about the nutrients needed for an infant’s proper growth and development.
- **Lactation consultant**—This healthcare provider has advanced training and certification in breastfeeding management. In the NICU and SCN, the lactation consultant is available to help nursing mothers establish and maintain a milk supply (by pumping) until the baby is ready to breastfeed. The consultant then helps mothers with the actual skill of breastfeeding.
- **Parent support coordinators**—These are staff members who once had a baby cared for in the NICU or SCN. They can provide information, practical suggestions, and emotional support. They may also coordinate sibling hours and parent luncheons.
- **Case managers** (also called **discharge coordinators**) —These staff members help you plan to go home. They help you understand the equipment you will take home and any home care or hospice support you might need. They can also help with your insurance.
- **Clergy**—Representatives from various faiths can support you during this time.
- **Other professionals**—This group may include a hearing specialist, wound care specialist, **enterostomal** [en-tuh-ros-TOH-muhl] specialist (someone who helps with care for a baby needing a colostomy), or car seat squad.



It’s natural to feel anxious about all the people responsible for the health and care of your baby. But be assured — the personnel in the NICU and SCN are exactly the people you want caring for your child right now. They each have a specialized job to do, and they work as a team to provide complete care for your baby. And, of course, YOU are at the center of this team. In time, you may all begin to feel like part of an extended family.

Common Problems of Premature or Sick Infants

The conditions that most often affect premature or sick newborns involve their lungs, gastrointestinal tract, brain, heart, and eyes. If your baby has these or other conditions, your baby's caregivers will discuss the risks and care with you in more detail.

Breathing problems

Many premature babies have breathing problems. This is because their lungs are not as fully developed as a full-term baby's. Many babies in the NICU and SCN will need to be put on a **ventilator**, a machine that helps with breathing.

- **Respiratory distress syndrome (RDS):** This is a breathing disorder in premature babies that is most often caused by their inability to produce **surfactant** [ser-FAK-tuhnt]. Surfactant is the fatty substance that coats the tiny sacs in the lungs to keep them from collapsing. Other causes of respiratory distress can be infection or breathing **meconium** [mi-KOH-nee-uhm] or fluid into the lungs.
- **Apnea, bradycardia, and desaturation:** Sometimes, a premature baby stops breathing for short periods of time. This is known as **apnea** [AP-nee-uh]. Apnea is often accompanied by a slower-than-normal heart rate called **bradycardia** [brad-i-KAHR-dee-uh]. Apnea and bradycardia may be associated with **desaturation** [dee-sat-yuh-REY-shuhn], which means a low level of oxygen in the blood.
- **Pneumothorax:** When a baby has trouble breathing, one possible complication is a **pneumothorax** [noo-muh-THOWR-aks]. A pneumothorax results when air leaks from the lungs and is trapped between the lungs and the chest wall. If the air collection is large, it may need to be drained with a needle or a tube. Sometimes a special ventilator will be used. In other cases, your baby can just be watched until her body reabsorbs the air and repairs the ruptures in her lungs.
- **Meconium aspiration:** Sometimes babies have breathing problems caused by aspirating (inhaling) **meconium** during labor or delivery. (Meconium is the dark green material in a baby's intestines before and just after birth — the baby's first stool.) Mild meconium aspiration usually resolves with few complications. In other cases, extensive treatment is required to address complications such as lung infection, low oxygen levels, or lung damage.
- **Pulmonary hypertension: Pulmonary** [PUHL-muh-ner-ee] **hypertension** [hahy-per-TEN-shuhn] is when the blood vessels in the lungs don't open up normally after birth. It causes poor circulation in the lungs and limits the oxygen entering the baby's bloodstream.



Having basic information about some of these conditions may help you discuss the specifics with your baby's doctor and the NICU or SCN staff.



- **Pulmonary interstitial emphysema (PIE):** Pressure from a ventilator may cause air to leak from the lungs, creating tiny air bubbles that become trapped between layers of lung tissue. This condition is called **pulmonary interstitial** [in-ter-STISH-uh-l] **emphysema** [em-fuh-SEE-muh] (PIE). It usually gets better as your baby's lungs improve and the ventilator pressure to the lungs is reduced.

Gastrointestinal problems

Gastrointestinal (GI) problems occur in the stomach or intestines. This section discusses two conditions that are most commonly seen in the NICU and SCN.

- **Reflux:** If the muscle at the entrance of your baby's stomach isn't fully developed, it may allow food to move back up into the **esophagus** [ih-SOF-uh-guhs], which is the passage leading from the mouth to the stomach). This condition is called **reflux** [REE-fluhks] and can lead to choking and increased apnea and bradycardia. Management of mild cases of reflux usually involves experimenting with feeding position, increasing feeding time, and giving smaller amounts of food. If the condition is severe, treatment may include medicine.
- **Necrotizing enterocolitis (NEC):** One of the most common gastrointestinal emergencies treated in the NICU and SCN is **necrotizing** [NEK-ruh-tahz-ing] **enterocolitis** [en-tuh-roh-koh-LAHY-tis] or NEC. It's an inflammatory bowel disease that affects premature infants but is also seen in full-term infants. With NEC, the lining of the intestinal wall dies, and the tissue sloughs off. In serious cases, the bowel wall can perforate (rupture) and lead to abdominal swelling, abnormal stools, and increased apnea and bradycardia (see page 7). Treatment varies according to the severity and extent of bowel damage. It also depends on your baby's age, health, and medical history. For some serious cases of NEC, surgery may be necessary.

Brain problems

Premature babies have very fragile blood vessels in their brains. Babies born before 30 weeks of gestation may have bleeding in the brain during labor, delivery, or the first few days after birth. This bleeding usually occurs in the fluid-filled **ventricles** [VEN-tri-kuhls]—spaces of the brain—or in the brain tissue around the ventricles. This type of bleeding is called **intraventricular** [in-tra-ven-TRIK-yuh-ler] **hemorrhage** [hem-rij], or IVH. IVH may or may not affect brain growth and development. Your baby's doctors will discuss your baby's condition with you.

Heart problems

A blood vessel located just outside of the heart, called the **ductus arteriosus** [duc-tus] [ahr-TEER-ee-oh-suh-s], allows blood to bypass the lungs while your baby is still being carried in the womb. After birth, the ductus arteriosus should close, redirecting your baby's blood flow through the lungs. If the ductus arteriosus does not close, we say it is **patent** [PAT-nt], or open. A **patent ductus arteriosus (PDA)** can place stress on your baby's heart and lungs, and it may need to be closed with medicine. If your baby has a PDA, your doctors and nurses will discuss this with you in more detail and provide you with additional information.

Eye problems

Babies born prematurely, as well as babies born with breathing or nerve problems, are more prone to certain eye problems. Although the eyes are one of the first organs in the body to begin developing, they are not completely developed until several weeks after birth, even in a baby born at full term. It is important for your newborn to have a complete eye exam by an **ophthalmologist** [off-thuhl-MOL-uh-jist], who is a medical doctor trained in diseases of the eye, as recommended by your pediatrician or neonatologist. Two common conditions are:

- **Retinopathy of prematurity (ROP):** Premature babies are at particular risk for problems with blood circulation to a part of the eye called the **retina**. The retina of the eye records what we see and sends images to the brain. When immature blood vessels to the retina develop abnormally, the condition is called **retinopathy** [ret-n-OP-uh-thee] **of prematurity (ROP)**. ROP is often mild and requires no treatment. However, more serious cases can lead to scarring or detachment of the retina and may require treatment. Most cases will not lead to blindness. A specialist will discuss this problem with you in more detail if your child develops ROP.
- **Alignment problems:** Children who are born prematurely are more prone to alignment problems of the eye, one of which is called **lazy eye** or **amblyopia** [am-blee-OH-pee-uh]. Often misalignments are not evident until the child is several months of age.



Your newborn should have an eye exam within the first few months of life.



Infections

Premature or sick newborns don't fight infections well. That's why hospital staff do everything they can to prevent your baby from being exposed to germs. However, even with all the precautions that are taken, many premature or sick babies may develop 1 or more serious infections while they're in the hospital. (See the box on the next page for tips on how you can help protect your baby from infections.) When an infection is suspected, a baby may need tests to help identify the infection. Also, a baby will usually be started on one or more antibiotics. The staff will discuss any suspected or identified infections with you in as much detail as you wish.

Jaundice

Jaundice [JAWN-dis] is a common problem in newborn babies, especially those who are premature. Jaundice causes the skin, and sometimes the whites of the eyes, to turn a yellowish color. Jaundice is usually caused by too much **bilirubin** [BIL-uh-roo-bin] in the blood. Bilirubin comes from red blood cells that have been broken down. Normally, the liver removes bilirubin from the body, but the liver of the premature infant is not mature enough to do its job completely.

Jaundice usually occurs during the first 7 days of life. During this time, your baby's blood will be checked, and the bilirubin level will be closely monitored.

YOU CAN HELP PREVENT INFECTIONS

All newborns are vulnerable to germs — and babies in the NICU and SCN are especially vulnerable. Protect your baby by doing the following:

- Be aware that your NICU or SCN may limit visitors or have special rules about sibling visits. Be sure to follow these rules. They help protect babies from illness.
- Ask friends and family not to visit the NICU or SCN if they're ill. Even parents should not visit when ill.
- Wash your hands often, carefully, and thoroughly — from fingertips to elbows. Also sanitize your hands with an alcohol-based hand rub. Every NICU and SCN has multiple dispensers.
- Keep your cell phone and other personal electronic devices in your pocket. Don't touch them while you're holding your baby. Your cell phone and other electronic devices are covered in germs that could make your baby sick.
- Don't allow anyone wearing rings, watches, bracelets, or artificial nails to touch your baby unless they're wearing gloves.
- Once you go home, continue to practice prevention. Wash and sanitize your hands, and ask others to do the same. Continue to protect your baby from people who are ill.
- Make sure that people who come into contact with your baby are all up to date on their vaccines. (Note that people who've had the flu mist should wait 7 days before seeing the baby.)

The NICU and SCN Routine

The NICU or SCN environment can be unsettling, especially when it's unfamiliar. Learning the NICU and SCN routine can help you plan your day and be part of your baby's care team. Nurses and other care providers record information as often as every 5 minutes. Most NICU and SCN nurses work 12-hour shifts. During shift changes, nurses give a report about your baby to the next nurse coming on duty. There are also daily rounds during which members of your child's care team discuss your baby's condition and record information in your baby's chart. Your baby will be frequently fed, weighed, bathed, and given developmental therapy based on his condition and how well he is tolerating stimulation.

Visiting your baby

Each NICU and SCN has a visiting policy in place to help protect your baby from unnecessary exposure to germs and infections — and to enable the best possible care for both your baby and your family. Your baby's caregivers will explain the visiting policy of the specific NICU or SCN caring for your baby.

As a parent, you can usually visit your baby anytime, night or day. You may be asked to leave the bedside during emergencies or some special procedures.

Also, for your own health, we encourage you to take breaks. Don't expect to be by your baby's side 24 hours a day. You should take time out to eat, go home, take care of errands, or spend some time with other family members. There is no food except covered drinks allowed by the baby's bedside, but most hospitals have a cafeteria, snack shop, or hospitality cart.

As a vital member of your baby's caregiving team, your involvement is part of the NICU and SCN routine.

So when you're visiting, please feel free to **ask questions, offer observations, and participate in caregiving activities.**



THINGS YOU CAN DO FOR YOUR BABY:

- Talk softly and in a gentle voice. You are welcome to make tapes for your baby — record your voice telling a story or some of your favorite soft music.
- Read to your baby.
- Keep a diary or scrapbook for your baby.
- Participate as much as you feel comfortable in your baby's care.
- Label any clothing, toys, tapes, books, and other belongings that you leave with your baby.
- Be patient. Your baby needs time to get better.

ABOUT THAT CELL PHONE...

Cell phones are a great way to keep in touch with people and share news about your baby. But cell phones — and other electronic devices — also pose challenges in the NICU and SCN. The list below offers a few things to consider:

- **Your phone is covered with germs.** It's best not to handle it when you're also handling your baby.
- **Your phone is distracting — to you and to your baby.** Keep your ringer turned off while in the NICU or SCN. Limit your time talking, texting, or playing games on your phone. You need to focus on your baby, and your baby needs quiet and rest.
- **Your phone may invade someone else's privacy.** The pictures or videos you take with your phone may include other babies and families. Please help the NICU or SCN staff honor patients' privacy. Refrain from skyping or recording if they ask you not to.



A CALM ENVIRONMENT

To help babies better cope with their surroundings, each NICU and SCN tries to keep environmental stimulation to a minimum. Some ways to reduce environmental stimulation are:

- Dimming the lights
- Keeping the noise level down (by lowering the volume on phones and beepers, avoiding loud talking, etc.)
- Clustering care (grouping basic care activities to allow rest periods)
- Positioning infants with rolls and bedding

Your baby gives cues that help you know how he's tolerating the amount of stimulation he's getting. Your baby's caregivers or a developmental specialist will go over these cues with you to help you better understand what your baby is trying to communicate.



Touching and holding your baby

Even though your baby is in the hospital, you can still give him your love and attention. All the technology in the world can't provide the love and support of caring parents. Research shows that the parent's voice and touch are familiar to the baby and can enhance bonding. Initially, you may not be able to hold your baby, but you'll be allowed to touch him and watch how he moves and acts. It is important to observe how your baby responds to certain kinds of touch and verbal stimuli. Too much stimulation uses up precious energy your baby needs to breathe, digest food, and grow. As your baby grows and becomes more stable, you'll be encouraged to hold him and help care for him more and more. It's difficult not to hold your baby whenever you want, but try to be patient. Your baby needs time to get better including a lot of uninterrupted sleep.

Skin-to-skin care

Skin-to-skin care means holding your baby closely, with your bare skin touching. As soon as your baby's nurse tells you your baby is ready, you can start to do skin-to-skin care. It's a wonderful way to be close, and recent studies have shown that skin-to-skin care has these important health benefits:

- Calms and soothes your baby
- Helps your baby maintain a healthy body temperature
- Helps regulate your baby's heart rate, blood sugar, and breathing
- Helps your baby's brain develop
- Improves your baby's sleep
- Helps your baby breastfeed
- Lowers parents' stress and helps them bond with their newborn
- Helps nursing mothers produce breast milk and know when the baby is ready to nurse

Both parents can give skin-to-skin care. It's a good way to be close to your newborn — and studies show that it's good for both babies and parents.

Monitors and Equipment

Your baby will be closely monitored throughout her stay in the NICU or SCN. This means wires, tubes, patches, probes, and machines — which can all be scary. It can be difficult to watch your little one being poked and prodded and hooked up to machines. Knowing that it's all for her own good, and understanding a little bit about what you're seeing and hearing, may help to ease some of the fear.

Monitors

Your baby will be attached to one or more monitors that record and show her **vital signs** — heart rate, breathing rate, blood pressure, and the amount of oxygen in her blood—such as:

- Small monitoring pads, called **electrodes** [ih-LEK-trohds], which detect chest movement as your baby breathes. They also pick up the impulses of her heartbeat. Wires attached to the electrodes send the information to the monitor by your baby's bed.
- A blood pressure monitor that checks periodically via a small cuff placed around your baby's arm or leg. Blood pressure may also be monitored continuously through a small catheter in your baby's artery.
- A **pulse oximeter** [awk-SIM-i-ter], which is also known as an **oxygen saturation monitor**. This device measures the amount of oxygen in her tissues. The oximeter shines a small red light through your baby's hand or foot to register the amount of oxygen in the blood. This number is recorded on one of the monitors by your baby's bed.
- Electrodes placed on his head to monitor his brain. This type of monitoring is called **amplitude-integrated electroencephalography** [ih-lek-troh-en-SEF-uh-lah-graf-ee] or **aEEG**.
- A **transcutaneous** [trans-kyoo-TEY-nee-uhs] **monitor** or **TCM**, which can measure oxygen and carbon dioxide through the skin. A small circular piece attaches to the skin with adhesive. This piece heats up a tiny area of skin and can measure the oxygen and carbon dioxide levels. A tiny cord travels from the circular piece to a machine that displays the information. The oxygen measurement from this piece is different from that measured by the pulse oximeter and is usually lower. Because the skin is heated, the circular piece may leave a red spot. The location of the piece is changed regularly. The red spots will fade over time.
- Other monitors in the NICU or SCN that are not listed here. If you have questions about any equipment used to care for your baby, ask your baby's caregivers.

If any of your baby's vital signs become abnormal, an alarm will sound to alert the NICU or SCN staff. Sometimes a monitor may alarm for a non-emergency reason, such as a loose electrode, an extra heart beat, hiccups, or increased muscle activity when your baby moves. The NICU and SCN nurses are trained to know which alarm sounds require immediate response.



Monitors help the staff see your baby's vital signs such as heart rate, breathing rate, blood pressure, and the amount of oxygen in the blood.

ALARMS SHOULD NOT ALARM YOU....

Please remember that not all alarms signal an emergency. Your baby's caregivers can hear the alarms from other beds, and their training teaches them to tell the difference in alarms by their tones. If staff don't immediately rush to your baby's bedside, that doesn't mean they're ignoring the alarms.



Your baby may be placed in an incubator — an enclosed bed with an internal heat source.

Open warmer or incubator (isolette)

When your baby is transferred to the NICU or SCN, he may be placed in an **open warmer**, an **incubator** [IN-kyuh-bey-ter], or a combination bed that can function as both an open warmer and an incubator (the **Giraffe OmniBed**).

An open warmer is an open table that allows easy access to the baby and equipment. The heat comes from a lamp heater above the baby's mattress.

An incubator is an enclosed clear-plastic, box-like bed with an internal heat source. (An incubator is also called an **isolette** [ahy-suh-LET].)

These pieces of equipment give your baby a controlled environment in which to grow and get better. A coated wire, called a **temperature probe**, is placed on your baby's skin and is covered with an adhesive patch. The wire measures the baby's temperature. This information is used to help regulate the amount of heat from the overhead warmer or incubator.

Breathing equipment

A variety of devices can help your baby breathe better or give your baby additional oxygen. These may include the following:

- **Nasal cannula** [KAN-yuh-luh]: This is a flexible, hollow tube with two small prongs that fit just below the baby's nose to deliver a steady stream of oxygen.
- **Nasal prongs**: A tube with two prongs attached to it, these are placed inside your baby's nostrils to provide a steady stream of oxygen. If the oxygen is delivered under pressure, it is known as **CPAP** (continuous positive airway pressure).
- **Suction catheter**: This small tube is used to remove mucus from your baby's nose, throat, or windpipe. It helps keep the baby's breathing tubes clear.
- **Ventilator**: A **ventilator** (sometimes called a **respirator**) is a machine that provides additional breaths and oxygen to your baby as needed. A ventilator is attached to your baby by a small, plastic tube leading from the baby's mouth to the windpipe. This tube is called an **endotracheal** [en-doh-TREY-kee-uhl], or **ET, tube**. The ventilator sends air through this tube into your baby's lungs. Since the tube passes through your baby's vocal cords, no sound will come out when your baby cries. There are several types of ventilators. Some make it look as if your baby is vibrating slightly.

Chest tubes

Your baby may need one or more chest tubes, especially if he has chest surgery, has a **pneumothorax** (air or gas in the membranes surrounding the lungs), or has fluid accumulation in the membranes surrounding the lungs. A chest tube is a tube inserted in the space between the ribs and the lungs. Its purpose is to drain excess air or fluid out of the chest to allow your baby's lungs to expand, which will help him breathe easier.

IV Therapy Equipment

Babies who are premature, have breathing problems, or are too sick or stressed to receive medicine and nutrients by mouth will have **intravenous** [in-truh-VEE-nuhs], or **IV, therapy**. Intravenous means "within a vein." IV therapy involves putting a small, flexible tube (called a **catheter**) into your baby's vein to deliver fluids, nutrients, medicines, or blood. Your baby may also have an **arterial** [ahr-TEER-ee-uhl] **line**. An arterial line is similar to an IV line, except it goes into an artery instead of a vein. This line can be used to measure blood pressure or draw blood.

The IV pump

The IV catheter may be hooked up to an **IV pump**. An IV pump is a machine that allows caregivers to program the exact amount of nutrients or other fluids delivered to your baby. An alarm on the IV pump may be set to go off at regular intervals to remind your baby's nurse to check that everything is working correctly.



A steady stream of oxygen can be delivered to your baby through a flexible, hollow tube called a nasal cannula.



A ventilator sends air through a tube into your baby's lungs, helping him breathe.



The type of IV catheter your baby has depends on the types of fluids your baby needs and the length of time IV therapy will be needed.

Umbilical catheters

An umbilical catheter is inserted through the end of the baby's umbilical cord into either an artery—an **umbilical [uhm-BIL-i-kuhl] artery catheter** or **UAC**—or a vein (an **umbilical vein catheter** or **UVC**). The umbilical catheter is secured to the baby's tummy with tape. You may also notice a small stitch at the base of the line. This stitch secures the line to the edge of the umbilical cord. The stitch won't hurt your baby because there are no pain receptors or nerves in the umbilical cord.

The umbilical catheter has some advantages:

- Blood samples can be painlessly drawn directly from either type of umbilical catheter for lab tests. This eliminates the need for your baby to be stuck with a needle each time he needs to provide a blood sample.
- With a UAC, the doctors and nurses can constantly monitor your baby's blood pressure from within his body.

Peripheral lines

A **peripheral [puh-RIF-er-uhl] line** is an IV placed into the arm, hand, leg, foot, or scalp. To place a peripheral line, a small needle is inserted into a vein that is close to the skin's surface. Once in place, the needle is removed, and a catheter (small hollow tube) remains in place. The catheter will be secured so that the baby can't pull it out. If the IV is placed in the arm or leg, it may be secured with an **armboard**—a small splint that helps prevent the IV from being accidentally pulled out. The site of a peripheral line needs to be changed frequently.

Central lines

Unlike peripheral lines — which are inserted into a surface vein in the arm, hand, leg, foot, or scalp — a **central line** is placed in the blood vessel that leads directly to the heart. A central line must be placed by a doctor or a specially trained nurse. The baby may be given pain medicine before the catheter is placed to make the baby more comfortable.

A common type of central line is a **PICC line**. PICC stands for **peripherally inserted central catheter** — meaning a central catheter that is inserted through the skin and into a vein. It is then guided into a larger vein. An x-ray is taken to ensure that the catheter is in the correct position. Complications that may occur with insertion of a PICC line include infection, an irregular heartbeat, bleeding, and breaking or plugging of the catheter. The line may need to be removed if any of these occur.

A PICC line has advantages over a peripheral line:

- It allows higher concentrations of nutrients and medicines to be given with less irritation to the veins.
- When IV therapy is needed for a long time, the PICC line eliminates the need for multiple attempts to place IVs for nutrition, fluids, or medicines.





Phototherapy Lights (Bililights)

Phototherapy lights (often called **bililights**) are used to treat a condition called **jaundice**. Jaundice is a condition where too much bilirubin in the blood turns your baby's skin and the whites of his eyes yellow.

If your baby's bilirubin level rises too high, he'll be placed under phototherapy lights. These are specially designed lights that help break down the bilirubin so it's easier for your baby's body to get rid of it. The lights can be applied in different ways including beds, cases, or blankets.

Your baby's eyes will be covered to protect them from the lights. Your baby will be undressed to allow as much of the skin as possible to absorb the light rays. The lights won't burn or harm the skin. If your baby is undergoing phototherapy, you should limit the time you hold him to allow maximum exposure to the lights.



Phototherapy lights help treat a condition called jaundice, which is common in premature babies.

Care, Treatment, and Tests

It may seem that babies in the NICU or SCN are almost always receiving some sort of test or treatment — including medicines, feedings, lab tests, or x-rays. Yet, you should know that each baby is treated as an individual. Doctors try to keep lab draws and other tests and procedures to a minimum, while meeting your baby's specific needs. Feedings are also decided and adjusted according to your baby's cues. Following is an explanation of what to expect.

Medicines

The most common medicines given to your baby in the NICU or SCN are for pain, infection, or sedation.

Antibiotics for infection: If an infection is suspected, your baby will be started on an antibiotic. Your baby will be given an antibiotic that effectively gets rid of the most common kinds of bacteria seen in the NICU and SCN. A **blood sample (culture)** will be taken to identify the type of infection present. The antibiotics will be stopped, kept the same, or changed depending on your baby's clinical condition and what the blood culture shows after 48 to 72 hours.

- **Pain medicines:** Your caregivers will use several tools to help determine if your baby is in pain. These tools are based on factors such as your baby's vital signs, facial expression, body movements, skin color, and level of activity. The staff will evaluate and record this information at least every 4 hours. If they feel your baby is in pain, the staff may try comfort measures such as rocking, music, firm touch, repositioning, or offering a pacifier. They may also give your baby sucrose solution to soothe him. Your baby's physician will choose a pain medicine that will be the most effective for your baby. Pain medicines will be gradually reduced and stopped as your baby gets better and no longer needs them. If you feel your baby is in pain, please tell the nurse.
- **Sedation:** If your baby is on a ventilator or has a chest tube in place, he may require a sedative — a medicine that will keep your baby calm. The amount of sedation your baby needs will depend on his condition. Sedation medicine will be weaned gradually as your baby's condition permits.





Your baby's caregivers use several tools to help determine if your baby is in pain. These tools are based on your baby's vital signs, facial expression, body movements, skin color, and level of activity.

Nutrition and feeding

Babies in the NICU and SCN often need extra help getting the nutrition they need to grow and develop.

- **NPO and IV line:** At first, your baby may be too small or too sick to take in any food by mouth — this is called **NPO**. When your baby is NPO, she receives all her nutrition through an IV line. In a day or two, your baby will receive solutions consisting of sugar (dextrose) and protein, vitamins (which give the fluid a yellow color), minerals, and salts dissolved in water. This is called **total parenteral nutrition (TPN)** or **hyperalimentation (HAL)**. Parenteral fat, a white fluid called intralipid, is usually given as well. These solutions can contain all the nourishment that your baby needs to grow until oral feedings are established.

- **Gavage feedings:** Even when your baby is able to take food by mouth (is no longer NPO), she may still be on a ventilator or may not have enough sucking strength to breastfeed or bottle-feed. If this is the case, she may be put on **tube feeding** — also called **gavage feeding**. For gavage feeding, a tube will be placed through your baby's nose or mouth, and guided down her throat into the stomach. Feedings of breast milk, formula, or a combination of these can be put through the tube into the baby's stomach. This will provide nutrition and help the baby's digestive system start working. To help promote the sucking response, your baby may be given a pacifier while being gavage-fed.



- **Oral feedings:** When your baby is ready, she will be started on oral feedings by breast, bottle, or a combination of the two. Babies need to learn to coordinate their feeding skills. It is important that they learn how to suck, swallow, and breathe at the proper times. This comes with maturity and practice. Your nurses will help you learn the cues and skills you'll need to help your baby coordinate feedings.



When your baby is ready to eat

When your baby wants to eat, he will give you cues to show you how hungry he is. It's best to feed your baby when he is ready to eat rather than trying to follow a set schedule. Babies who are premature or sick need extra attention at feeding time. They may eat less than you think they should. They may get tired or stressed while feeding and need to take a break.

Feeding Cues

When your baby starts to get hungry, he may move around a little, open his mouth, and turn his head as if rooting for the breast. If he's very hungry, he may put his hand in his mouth, stretch, and move a lot. Babies who are not fed when they show hunger will become agitated or upset and cry hard. If your baby is upset, you should calm him down before breastfeeding. Cuddle him to your chest and talk to him. Skin-on-skin cuddling may work well to calm your baby so you can feed him.



Hungry baby



Upset and hungry baby

Stop Feeding Cues

When your baby gets full or needs to take a break, he may fall asleep, refuse to open his mouth, or stop sucking and let the breastmilk or formula run out of his mouth. He may get hiccups, breathe faster, spit up, or drool. He may look worried or splay his hands (spread all his fingers)



Worried baby



Sleepy baby

WEIGHT CHANGES

It is very normal for a baby to lose weight right after birth. In the NICU or SCN, your baby is started on IV fluids to make sure she doesn't lose too much weight. The NICU or SCN staff closely monitors your baby's weight. The nurses will measure and record the exact amount of fluid and nutrients your baby gets. They will record her stool output and weigh her diapers to measure urine output. As your baby grows and matures, she'll need more calories. Feedings will be adjusted to give your baby the calories she needs to continue to gain weight.



BEST NUTRITION FOR ALL BABIES

National health organizations recommend mother's milk for all newborns including premature and sick infants. You can give your baby mother's milk by breastfeeding or by pumping your milk and giving it to your baby in a bottle. Talk to your NICU or SCN staff and lactation consultants about finding the best way to give your baby the best nutrition.



Skin care

Premature babies have fragile skin that is very thin and absorbent. Until the skin matures, it doesn't offer a good protective barrier for your baby and needs to be handled with care to prevent tearing or bruising.

- **Nutrition and water loss:** Your baby's nutrition plays a big role in healthy skin development and optimal healing. Your baby's nutrition will be carefully watched. To help prevent water loss, humidified air may be delivered into your baby's bed.
- **Lotions and creams:** Dry, flaky skin is normal for premature babies. However, lotions and creams should not routinely be used. If the skin becomes too dry or starts to crack, a tiny amount of prescribed cream that does not contain fragrances or alcohol may be used to condition the skin.
- **Bathing:** Your baby will be bathed only when necessary. A heat lamp may be used during the bath to keep your baby's temperature from dropping.
- **Use of tape:** Premature skin is very sensitive to tape and can be easily irritated or torn when tape is removed. Therefore, tape will be used only when necessary. The tapes and adhesives that are used have been chosen because they are best tolerated and least damaging to your baby's fragile skin.



Lab tests

Many lab tests will be performed to give your baby's caregivers information about your baby's condition. Blood samples may be taken and sent to the lab to measure the following:

- Complete blood count (CBC) to measure the level of different cells in your baby's blood
- Newborn screening tests to check for some inherited disorders such as PKU and cystic fibrosis
- Blood gases to check levels of oxygen, carbon dioxide, and acids in the blood
- Blood cultures and C-reactive protein (CRP) to help check for infection
- Chemical (electrolyte) balance
- Blood sugar (glucose) level
- Bilirubin level to check for jaundice
- **Hemoglobin** [HEE-muh-gloh-bin] or **Hematocrit** [hi-MAT-uh-krit] to check for **anemia** (an abnormally low number of oxygen-carrying red blood cells in the blood). If the number is low, your baby may require a blood transfusion.

Blood transfusions

A blood transfusion is a procedure to put blood or blood products from a donor into your baby's body. The donor blood comes from a blood bank and is tested to make sure it's right for your baby. If your baby needs a blood transfusion, your doctor will give you more information.

Imaging studies

Your baby may have occasional imaging studies while she is in the NICU or SCN. Imaging procedures allow your doctor to track your baby's progress and be aware of any special conditions that may be present. Some common imaging studies involve.

- **X-rays:** An x-ray is the most common type of imaging scan. An x-ray can show the condition of the lungs and other organs and check the positions of any tubes or catheters inside your baby's body.
- **Ultrasound:** An ultrasound picture is somewhat like an x-ray, except that it's made by using sound waves that are directed at organs in the body. The sound waves produce different images that tell your doctor more about your baby's tissues. Ultrasound scans are simple, painless procedures that use no radiation.
- **MRI:** MRI (magnetic resonance imaging) uses a large magnet, radio frequencies, and a computer to create highly detailed images of internal organs and structures. Because a baby must stay completely still during an MRI study, sedative medicine is sometimes given.



For some conditions, your baby may have several x-rays a day. This may make you feel concerned, but there's no need to worry. An x-ray is painless for your baby, and experts agree that the amount of radiation used is too low to harm your baby.



NEWBORN HEARING SCREENING

Good hearing is important for a baby's learning and speech development. For this reason, state law requires every baby to have a hearing screening test. At Intermountain, we check newborns' hearing before they go home with their families.

Preparing To Go Home

Planning for discharge is an ongoing process that begins as soon as your baby is admitted to the NICU or SCN.

Discharge criteria

Your baby will be discharged from the NICU or SCN when he meets discharge criteria based on his age, size, and condition. In addition, you must be prepared and comfortable to assume care of your baby at home. You and your baby's medical team will determine together when the time is right for your baby to leave the hospital and if you need the help of a home health services provider. Before your baby is ready to go home, these milestones must be reached:

- **Graduation to a crib:** Your baby must be able to maintain his body temperature in a regular crib.
- **Consistent breathing and heart rate:** Your baby must be able to breathe on his own and can't have periods of apnea (not breathing) or bradycardia (too slow a heart rate). When your baby has 5 to 7 straight days of consistent, steady breathing with or without oxygen, it's a sign that he may be ready to go home.
- **Feeding and gaining weight:** Your baby must be able to take in enough calories to be gaining weight. This is usually from breastfeeding or a bottle.
- **Parent skills:** Before you go home with your baby, the NICU or SCN staff will help you learn these skills:
 - ✓ Well baby care
 - ✓ Feeding
 - ✓ Giving medicine
 - ✓ Using home equipment
 - ✓ Performing CPR
 - ✓ Fitting your baby in your car seat

WHY THE WAIT?

Like many new parents, you're probably eager to take your baby home. And like many other parents, you might be wondering, "What's taking so long?"

The most common answer is the baby's ability to eat. Learning to eat is a skill like any other, and it takes time for a baby to acquire it. This learning process can be slow, uneven, and unpredictable. Your baby may be eating very well for a few days, then seem to forget how it all works, then start eating like a champ again. This is completely normal (if a little frustrating). Try to be patient. Understand that for your baby's safety, the NICU or SCN staff will let your baby set the pace.

Rooming-in

During your baby's stay in the NICU or SCN, the staff will work with you to teach you how to care for your baby at home. Shortly before you go home, you may have the opportunity to share a room with your baby ("room-in") for a determined amount of time. This rooming-in period is like a dress rehearsal for going home. It gives you a chance to practice all you've learned with a nurse close by for help and advice. During the rooming-in period, the nursing staff is available to take your baby's vital signs, to answer questions, and to assume care of your baby in case of an emergency situation.

Rooming-in is intended to resemble a home-like atmosphere in that parents assume total responsibility for the physical care and supervision of their child. The rooming-in period is usually 12 to 48 hours. Ideally, both the mother and father are involved as well as other adult family members who may be involved in your infant's care. You must remain with your baby, or have another caregiver remain with your baby, during the entire rooming-in period. During the rooming-in period, you use any monitoring or other equipment you will need to use at home.

Suggestions for what to bring from home for rooming-in:

Parents

- ✓ Comfortable clothing
- ✓ Toothbrush, comb, personal grooming items
- ✓ Snacks
- ✓ Alarm clock
- ✓ Note pad for writing down questions and taking notes on your infant's care

Infants

- ✓ Going home clothing including hat and coat
- ✓ Blankets for wrapping, positioning, etc.
- ✓ Car seat (this is a must!)
- ✓ Any special equipment



DURING THE ROOMING-IN EXPERIENCE, YOU WILL BE RESPONSIBLE FOR:

- Providing all care according to physician orders and the home care plan
- Arranging for relief periods with your co-caregiver(s) or hospital staff
- Notifying the bedside nurse for help if you have questions or problems
- Giving a complete report to the next caregiver, which will include the child's status and needs

DURING THE ROOMING-IN EXPERIENCE, HOSPITAL STAFF WILL BE RESPONSIBLE FOR:

- Monitoring medicine use according to physician's orders
- Making regular visits to the room to document the child's status according to hospital policies and procedures
- Providing oral instructions if called about a problem
- Intervening and providing care for the child if a problem or emergency is identified

RSV occurs in seasonal outbreaks, usually from fall to spring in most areas of the United States. However, a person can catch RSV any time of the year. Each year in the U.S., about 90,000 babies have to be in the hospital because of RSV. About 2% of these babies will die.

Parents of premature infants should know as much as possible about RSV disease and how to prevent it.



Preventing RSV and other respiratory illnesses

RSV stands for **respiratory syncytial** [sin-SISH-uh] **virus**, a common virus that affects people of all ages. Most of the time, RSV causes only cold-like symptoms in infants and children. However, in premature infants or infants with lung problems, RSV infections can be a bigger problem. They can result in serious lung disease, sometimes requiring or prolonging hospitalization. Premature babies are most affected because their lungs have not yet fully developed. These babies also have not yet received natural virus-fighting substances from their mothers.

How RSV is spread

- By touching, kissing, or shaking hands with an infected person
- Through the air by sneezing or coughing
- From counter tops, used tissues, towels, sheets, blankets, or toys (because RSV can live on these things for several hours)
- In crowded households and day care centers

How you can prevent RSV infection

- Wash your hands with soap and warm water before touching your baby, and ask others to do the same.
- Keep people who have colds away from your baby including brothers and sisters. Parents or other caregivers who feel ill should wear a mask and refrain from kissing the baby.
- Don't smoke near the baby because exposure to tobacco smoke increases the severity of an RSV infection.
- Avoid taking your baby to crowded locations, such as shopping malls.
- Ask your baby's doctor about a medicine that can help prevent your baby from getting severe RSV disease.

What to look for

Symptoms of RSV can worsen rapidly in some children. **Call your doctor if your child has any of the following symptoms:**

- Fever
- Trouble breathing (rapid breathing, gasping for breath)
- Wheezing or coughing
- Blue or gray skin color

Home equipment use

Some babies will need to go home with monitors or equipment. The most commonly used home equipment is oxygen and a cardiac and apnea monitor. Before you go home, a home health agency will deliver your equipment to you and teach you how to use it. The rooming-in experience described earlier will give you the opportunity to practice using this equipment before your baby goes home.

Safe sleeping Do's and DON'Ts

NICU babies have a higher risk of sleep-related accidents such as SIDS (sudden infant death syndrome). The table below provides some DO's and DON'Ts to help you create a safer sleep environment. **Follow these guidelines — and make sure your baby's caregivers do, too.**



Sleeping DO's	Sleeping DONT's
<p>Consider using a sleeper or other sleep clothing as an alternative to blankets.</p> <p>If you're using a blanket, put your baby with his feet at the foot of the crib. Tuck the blanket around the crib mattress, reaching only as far as your baby's chest.</p> <p>Dress your baby in the type of clothing (or cover with the amount of blankets) that you would find comfortable for sleeping.</p> <p>Keep the room temperature about 70°F.</p> <p>Be sure your baby's crib is in good repair and has fixed railings, not drop-down sides.</p> <p>Make sure crib slats are no more than 2 3/8 inches apart to prevent the baby's head from getting stuck. If you can put a soda can between the bars, they are too far apart.</p> <p>Make sure the railing is at least 26 inches higher than the lowest level of the mattress support, so your growing baby can't climb over it easily.</p> <p>Make sure the mattress is firm and fits the crib. The space between the mattress and the crib should not allow more than 2 finger widths.</p> <p>Make sure the crib has smooth surfaces, sturdy hardware, and a secure teething rail.</p> <p>Place the crib next to an inside wall rather than near an outside wall or window. Keep the crib away from radiators and hot or cold air ducts. A baby can receive a burn from a radiator. The forced air ducts can dry out your baby's nose and throat, increasing her susceptibility to respiratory problems.</p>	<p>DON'T place your baby to sleep on any soft, loosely filled surface such as comforters, pillows, sheepskins, or cushions filled with polystyrene beads. These surfaces can mold to your baby's face and interfere with breathing.</p> <p>DON'T use bumper pads in your baby's crib. They don't prevent injuries — and they do pose a risk to your baby, who could suffocate or get caught in the pads.</p> <p>DON'T allow hanging crib toys (mobiles, crib gyms) within your baby's reach. Remove any hanging crib toy when your baby begins to push up on her hands and knees or when she is 5 months old, whichever comes first. These toys can strangle your baby.</p> <p>DON'T let your baby sleep on a waterbed. Babies can become trapped and suffocate.</p> <p>DON'T use an infant sleep positioner. Positioners are mats with soft, wedge-like sides meant to keep a baby on his back during sleep. Tragically, positioners have caused several deaths. Government and consumer agencies warn against the use of infant sleep positioners.</p> <p>DON'T use thin plastic wrapping materials, such as cleaning bags or trash bags, as mattress covers. Do not allow these things near your baby. The baby may suffocate if these items are near the face.</p> <p>DON'T allow your baby's head to become covered during sleep.</p> <p>DON'T allow cords from drapes or window blinds near the crib. Do not place any items with strings or small parts near the crib. These things can strangle or choke the baby.</p> <p>DON'T leave the baby alone on a couch or a bed.</p> <p>DON'T use a car seat or bouncy chair as your baby's crib. Too much time in these seats can flatten your baby's head. Always put your newborn to sleep on his back (unless he has special needs and your doctor has advised against this). Alternate which side of the head your baby lies on each time. When your baby can roll over on his own, he can choose his own sleeping position.</p>

TIPS FOR TUMMY TIME

Once home — when your baby is awake and being watched — give her some play time on her tummy. “Tummy time” helps your baby's muscles develop, and it helps her more quickly gain the skills to roll over, crawl, pull to a stand, and walk. Tummy time can also help prevent your baby's head from flattening, which can happen if your baby spends all her time on her back. Follow these tips:

- **Do it early.** Begin giving your baby some tummy time on his first day home from the hospital.
- **Do it regularly.** Put your baby on his tummy 2 to 3 times each day for a few minutes. As your baby grows, increase the amount of time he plays on his tummy.
- **Do it with your baby.** Get down on the floor with your baby. Give him some toys to reach for, or lie down on your back and put him on your chest. Your baby will learn to enjoy playing with you in this position.
- **And remember,** if your baby falls asleep, gently place him on his back. For sleep, back is best.

MONITORS AND TRAVEL

Because babies on cardiac and apnea monitors need to use this same equipment during travel, you will need a portable, self-contained power source for this equipment. Power should last twice your expected travel time.

Systems for securing portable medical equipment (such as monitors and oxygen tanks) are not all designed for use in motor vehicles. Buckle or wedge your equipment on the vehicle floor — not under the front passenger seat — and cover it with a blanket or pillow to help prevent movement in case of a crash or sudden stop.

Remember, if an alarm sounds or your baby cries, pull over before caring for your baby.



Car seats (child safety seats)

Very small or sick babies have special considerations when being fitted in a car seat (or a car bed). While it's best to limit travel with your newborn, use the following guidelines to help keep your child safe when travel is necessary. You'll receive more detailed instructions from your providers.

Before you buy

Before you buy a car seat, make sure it's suitable for a smaller baby. Don't buy a used car seat, and make sure the one you're using is less than 6 years old.

Before you leave the hospital

Bring the car seat to the NICU so the staff can examine its design and condition and make sure it fits. The staff will also give your baby a car-seat trial to make your baby can tolerate being in the car seat. During the car-seat trial, staff will put your baby in the car seat for at least 90 minutes and monitor their heart rate and breathing.

CAR SAFETY SEAT CHECK LIST

Installing a car seat can take some practice. And keep in mind that not all car seats fit all cars. Before traveling with your newborn:

- Read the safety labels and instruction manual. (If the safety labels are missing, don't use it.)
- Check the car seat's expiration date. (If the seat is has expired, don't use it.)
- Check for damage. (If the seat is damaged or missing parts, don't use it.)
- Make sure the car seat is the right size for your child's height and weight, and that:
 - The seat can be installed rear-facing. (Children should remain rear facing until at least age 2.)
 - Harness straps sit at or below shoulder height.
 - Harness straps can be snugged up against your child.
 - Chest clips sits at armpit or nipple level.
- Install the car seat safely:
 - Install the seat rear facing and at the correct recline angle.
 - Use the seat belt OR anchor system (not both).
 - Tighten the seat belt or anchor straps so that the base of the seat moves no more than 1 inch in any direction when pushed or pulled on.

FOR CAR SAFETY SEAT HELP

For questions about your car seat, call Primary Children's Car Seat Team at **801-662-6583**. In Utah, visit ClickIt.Utah.gov for information on having your car seats checked at an approved site in your area. In Idaho, visit ltd.Idaho.gov/safety.

Infants and young children



harness straps

chest clip

INFANTS AND YOUNG CHILDREN *Rear-facing as long as possible — at least until they reach the maximum height or weight allowed in your car seat manufacturer’s guidelines. (AAP)*

<p>Car seat</p>	<ul style="list-style-type: none"> • Always read the car seat instructions! Follow the manufacturer’s guidelines. • Most “rear-facing-only” car seats are used for infants weighing between 5 and 30 pounds. Check the owner’s manual for specific height and weight requirements for your car seat. You can use some rear-facing-only seats with or without the base. • Read the car seat instructions to determine where the car seat handle should be during use in the vehicle. Some seats allow it to be up over the seat, but others require it to be behind the baby’s head. • “Convertible” seats can be used in a rear-facing position for most infants.
<p>Placement</p>	<ul style="list-style-type: none"> • The back seat, especially the center back seat, is usually the safest place for a car seat. • The American Academy of Pediatrics advises parents to keep their babies and toddlers in rear-facing car seats until age 2 or until they reach the maximum height and weight for their car seat. • NEVER put a rear-facing seat in the front passenger seat of vehicles with air bags.
<p>Car seat harness straps</p>	<ul style="list-style-type: none"> • Do not wrap the infant in blankets or extra clothing. Fasten harness straps on the infant first. Cover the infant with a blanket last. • On the back of the seat, place harness straps in the slots that position them level with or below the baby’s shoulders. • Fasten the harness snugly. At your baby’s collarbone, you should not be able to pinch up any of the excess harness strap webbing between your fingers. • Always use the chest clip to hold the shoulder straps in place. Position the clip at armpit level (see the picture above).
<p>Safety belts</p>	<ul style="list-style-type: none"> • If installed properly using the safety belt or the Lower Anchors and Tethers for Children (LATCH) system, the car seat should move very little: 1 inch or less from side to-side and from front to back (where the safety belt attaches to the car seat). • Always read your vehicle manufacturer’s instruction manual to learn how to use your safety belt or LATCH system. Use either the safety belt or the LATCH system to install the car seat. Don’t use both.
<p>Special considerations</p>	<ul style="list-style-type: none"> • Limit car travel time with your newborn. If you can’t avoid a long car trip, take frequent rest stops. • Watch your newborn closely in the car seat. When possible, have an adult sit in the back seat next to the safety seat and observe the baby for breathing or other problems. • If your baby cries while you’re driving, pull over to care for her. Remember to feed and diaper your baby before you travel. • Make sure the rear-facing seat is reclined enough to keep the baby’s head from falling forward. If not, adjust the recline angle on the seat (30° to 45° is usually about right). Check the car seat manual for other options. • If needed to prevent slouching or sliding in the seat, place rolled-up diapers or blankets on both sides of the baby’s body. Do NOT put padding under the baby’s bottom or behind the back. Use ONLY the inserts that come with the safety seat. • In an emergency, remove the entire seat from the car — with the baby in it — by releasing the safety belt or lower anchor straps. This is often faster than trying to unbuckle the baby.

Glossary of Terms

A

AMBLYOPIA [am-blee-OH-pee-uh] **OR LAZY EYE**

An eye alignment problem.

ANEMIA [uh-NEE-mee-uh]

An abnormally low number of red blood cells (the cells that carry oxygen) in the blood.

ANOMALY [uh-NOM-uh-lee]

A congenital malformation of a part of the body.

ANOXIA [an-AWK-see-uh]

A lack of oxygen.

APNEA [AP-nee-uh]

A temporary stop or pause in breathing.

ARMBOARD

A splint that helps prevent IV lines from being knocked out.

ARTERIAL LINE

A catheter placed in the baby's artery to monitor blood pressure and obtain blood samples.

ASPIRATION

Inhalation of a material (such as formula, meconium, stomach contents, or blood) into the lungs. May cause aspiration pneumonia.

ATELECTASIS [at-l-EK-tuh-sis]

A condition in which part of the lungs have collapsed.

ATTENDING PHYSICIAN

The physician in charge of your baby's care. In the NICU and SCN, the attending physician is a neonatologist.

B

BAGGING

Pumping air and/or oxygen into the baby's lungs by squeezing a bag attached to a mask that covers the baby's nose and mouth.

BILIGHTS

Special lights placed above a baby's bed to treat jaundice.

BILIRUBIN [BIL-uh-roo-bin]

A yellowish-red pigment produced when red blood cells break down. Too much bilirubin in the blood causes jaundice.

BLOOD GAS

A sampling of blood from an artery for its oxygen, carbon dioxide, and acid content.

BRONCHOPULMONARY [brong-koh-PUHL-muh-ner-ee]**DYSPLASIA** [dis-PLYE-zhuh] **(or BPD)**

A lung problem that occurs in some premature babies and requires treatment with oxygen or a breathing machine for a long time.

BRADYCARDIA

[brad-i-KAHR-dee-uh]

A slower-than-normal heart rate, usually less than 100 beats per minute for infants. Bradycardia usually occurs with apnea.

C

CATHETER [KATH-i-ter]

A thin tube used to administer fluids to the body or drain fluids from the body.

CENTRAL LINE

An intravenous (IV) line that is threaded through a vein until it reaches a position as close as possible to the heart.

COMPUTED TOMOGRAPHY [tuh-MOG-ruh-fee] **(or CT) SCAN**

A type of imaging study that produces pictures that give a 3D view of the body's organs and structures.

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

Pressurized air, sometimes with added oxygen, that is delivered to the baby's lungs to keep the lungs expanded as the baby inhales and exhales.

CYANOSIS [sahy-uh-NOH-sis]

A blue or "dusky" color of the skin caused by poor circulation or low oxygen levels in the blood.

D

DUCTUS [duc-tus] **ARTERIOSIS** [ahr-TEER-ee-oh-sus]

A blood vessel located just outside the heart, which allows the blood to bypass the lungs while the baby is still in the womb. After birth, the ductus arteriosus should close, directing the blood flow through the baby's lungs.

DYSPNEA [disp-NEE-uh] Difficulty breathing.

E

EDEMA [ih-DEE-muh]

Fluid retention in the body tissues, which causes puffiness or swelling. Often seen in the baby's eyelids, feet, and hands.

ELECTRODES

Devices attached to adhesive pads that are placed on a baby's body to conduct the electrical impulses of the heart and breathing motions to a monitoring machine.

ESOPHAGUS [ih-SOF-uh-guh s]

The passage leading from the mouth to the stomach.

ENDOTRACHEAL [en-doh-TREY-kee-uhl] **(OR ET) TUBE**

A thin, plastic tube inserted into the baby's windpipe to allow the delivery of air and/or oxygen to the baby's lungs.

F

FELLOW

A doctor undergoing specialty training in a specific area of medicine, such as newborn intensive care.

G

GASTROENTEROLOGIST [guh-troh-en-tuh-ROL-uh-jist]

A doctor who specializes in disorders of the digestive system.

GAVAGE [guh-VAHZH] FEEDING

Feedings given through a tube passed through the baby's nose or mouth and into the stomach.

GENETICIST [juh-NET-uh-sist]

A doctor who specializes in the study and treatment of disorders or conditions that tend to run in families.

GESTATIONAL [je-STEY-shuh-nuhl] AGE

The baby's age (in weeks) from the first day of the mother's last menstrual period until the baby is born.

GLUCOSE [GLOO-kohs]

A type of sugar that circulates in the blood and provides the body with energy.

GRAM

A unit for measuring weight (1 gram equals 1/28 of an ounce, and 1 pound equals 454 grams).

H

HEEL STICK

The procedure of pricking a baby's heel to obtain small amounts of blood for testing.

HEMATOLOGIST [hee-muh-TOL-uh-jist]

A doctor who specializes in the treatment of blood problems.

HYALINE [HAHY-uh-leen] MEMBRANE DISEASE

See RDS (respiratory distress syndrome).

HYPERALIMENTATION [hahy-per-al-uh-men-TAY-shuhn] (or HAL)

A method of providing a solution containing essential nutrients (sugar, protein, vitamins, and minerals) through an IV line to supplement a baby's intake by mouth.

HYPERGLYCEMIA [hahy-per-glahy-SEE-mee-uh]

Abnormally high glucose (sugar) levels in the blood.

HYPOGLYCEMIA [hahy-poh-glahy-SEE-mee-uh]

Abnormally low glucose (sugar) levels in the blood.

HYPOVOLEMIA [hahy-poh-voh-LEE-mee-uh]

An abnormally low volume of blood in the body.

HYPOXIA [hahy-pok-SEE-mee-uh] Not enough oxygen.

I

IMAGING STUDIES

Tests and exams that involve taking pictures of the body's internal organs. Includes x-rays, ultrasound exams, CT scans, and MRIs.

IMMATURE

Used to describe a baby born before 37 weeks' gestation and weighing less than 2,500 grams (about 5½ pounds).

INCUBATOR (OR ISOLETTE)

A small bed enclosed in plastic, which keeps the baby's body warm and at an even temperature.

INFECTIOUS [in-FEK-shuh] DISEASE SPECIALIST

A doctor who specializes in the treatment of contagious diseases.

INFILTRATED IV

An accumulation of IV fluids in the tissues surrounding the vein.

INFUSION PUMP

A pump attached to an intravenous (IV) line to deliver IV fluids to the baby in tiny, precisely measured amounts.

INTERN

A doctor undergoing specialty training in neonatal intensive care.

INTRAVENOUS [in-truh-VEE-nuhs] (or IV)

IV stands for intravenous, meaning "into a vein." Both nutrients and medicine can be delivered through an IV.

INTUBATION

The insertion of a tube into the baby's windpipe to allow air to reach the lungs.

INTRAVENTRICULAR [in-truh-ven-TRIK-yuh-ler]

HEMORRHAGE [HEM-rij] (or IVH)

Bleeding into the brain.

IV PUMP

A machine that allows your caregivers to program the exact amount of nutrients or other fluids delivered to your baby. The pump is placed on the counter or attached to a pole by your baby's bed. An alarm on the IV pump may be set to go off at regular intervals to remind your baby's nurse to check that everything is working correctly.

J

JAUNDICE [JAWN-dis]

Yellowing of the skin and whites of the eyes caused by excessive levels of bilirubin in the blood.

K

KANGAROO CARE

Holding your baby next to your body, skin to skin.

L

LACTATION CONSULTANT

Healthcare provider with advanced training and certification in breastfeeding management.

LANUGO [luh-NOO-goh]

The fine, downy hair that covers the unborn baby from about the 4th or 5th month in the womb and disappears toward full term. Lanugo is often still present on premature babies.

LAZY EYE

See amblyopia (page 29).

LOW BIRTH WEIGHT

A weight at birth of less than 2,500 grams (about 5½ pounds).

LUMBAR PUNCTURE

A procedure involving the insertion of a hollow needle between the bones of the lower back to withdraw spinal fluid. May be performed to reduce pressure or to check for the presence of an infection.

LUNG INFILTRATES

Fluid or other foreign substances in the **alveoli** [al-VEE-uh-lahy] of the lungs, which are seen as fuzzy areas on a baby's chest x-ray.

M

MAGNETIC RESONANCE IMAGING (MRI)

A type of imaging study taken when doctors need to learn more than they can learn from an x-ray or an ultrasound.

MATURE

Used to describe a baby born at 37 to 42 weeks gestation and weighing more than 2500 grams (about 5½ pounds).

MECONIUM [mi-KOH-nee-uhm]

A dark green material in the intestine at birth. The first stool the baby passes.

MECONIUM ASPIRATION

When the baby inhales meconium in the **amniotic** [am-nee-OT-ik] fluid (which surrounds the baby during pregnancy). May result in lung problems.

MENINGITIS [men-in-JAHY-tis]

Inflammation or infection of the membranes surrounding the brain and spinal cord.

MURMUR

Sound made by abnormal blood flow through the heart or blood vessels. A murmur is often heard with a patent ductus arteriosus (PDA).

N

NASAL CANNULA [KAN-yuh-luh]

A flexible, hollow tube with two small prongs that fit below the baby's nose and deliver a steady stream of oxygen.

NASAL PRONGS

A tube with two small prongs that fit inside the baby's nostrils to deliver a steady stream of oxygen.

NECTROTIZING [NEK-ruh-tahy-zing]

ENTEROCOLITIS [en-tuh-roh-koh-LAHY-tis] (or NEC)

A problem with the intestines (part of the digestive system), for which the cause is not really known. With NEC, the lining of the intestinal wall dies and the tissue sloughs off.

NEONATAL [nee-oh-ney-TOL] “Near the time of birth.”

NEONATAL NURSE PRACTITIONER (NNP)

A nurse with advanced training in the care of newborn babies, especially ill, premature, or high-risk newborns.

NEONATOLOGIST [nee-oh-ney-TOL-uh-jist]

A pediatrician with specialty training in the care of sick newborns.

NEUROLOGIST [noo-ROL-uh-jist]

A doctor who specializes in disorders of the brain and nervous system.

NASOGASTRIC [ney-zoh-GAS-trik] (or NG)

FEEDINGS/TUBE

Feedings that are given through a small, flexible tube (an NG tube) inserted through the nose and down the esophagus into the stomach.

NPO

Means “nothing by mouth.” If a baby is too small or sick to take in food by mouth, he is referred to as “NPO.” In this case, the baby will need to receive nutrition through an IV line.

O

OPEN WARMER

A heated table that helps keep the baby warm.

OR

Operating room.

OROGASTRIC [or-oh-GAS-trik] (or OG) FEEDINGS/TUBE

Feedings that are given through a small, flexible tube (an OG tube) inserted through the mouth and down the esophagus into the stomach.

OTOLOGIST [oh-TOL-uh-jist] A doctor who specializes in disorders of the ear.

OXYGEN SATURATION MONITOR

See pulse oximeter (page 33).

OXIMETER

See pulse oximeter (page 33).

OXYGEN MASK

This mask is placed over the baby's nose and mouth. Oxygen flows through a tube and into the mask at a constant rate.

OXYGEN HOOD/HEAD BOX

A clear plastic box placed over a baby's head to provide extra oxygen. Oxygen flows into it from a tube attached to an oxygen source. This hood is used for babies who can breathe on their own, but still need extra oxygen.

P**PATENT [PEYT-nt] DUCTUS [duc-tus] ARTERIOSUS [ahr-TEER-ee-oh-sus] (or PDA)**

An open (patent) ductus arteriosus. If the PDA doesn't close, the baby may need fluid restrictions, medicine, or repair surgery.

PEDIATRICIAN [pee-dee-uh-TRISH-uh n]

A doctor who specializes in the care of infants and children.

PERIPHERAL [puh-rif-er-uh l] LINE

An IV that is placed into an arm, hand, leg, foot, or scalp. To place a peripheral line, a small needle is inserted into a small vein that is close to the skin surface. Once in place, the needle is removed, and a catheter (small hollow tube) remains in place.

PERINATAL [per-uh-NEYT-l]

A term used to describe the period shortly before and after birth.

PERINATOLOGIST [per-uh-ney-TOL-uh-jist]

A doctor who specializes in complicated pregnancies and deliveries.

PERIODIC BREATHING

Breathing interrupted by pauses as long as 10 to 20 seconds. Periodic breathing is common in both premature and full-term newborns.

PHARMACIST [FAHR-muh-sist]

A specialist in preparing and delivering medicines.

PHOTOTHERAPY

Treatment of infants with jaundice by exposing them to bright lights called "bililights."

PERIPHERALLY INSERTED CENTRAL CATHETER (PICC)

A common type of central line that is inserted through the skin, usually through a vein in the neck or in the bend of the arm. It is then guided into a large vein that takes it directly into the heart. (See page 17 for complications that may occur.)

PNEUMOGRAM [noo-MOH-gram]

A study that involves monitoring of a baby's breathing and heart rate during sleep to detect abnormal breathing patterns.

PNEUMONIA [noo-MOHN-yuh]

A lung infection that causes fluid to collect, making breathing difficult.

PNEUMOTHORAX [noo-muh-ThAWR-aks]

A collection of air in the chest resulting from a rupture in the lung.

POSITIVE END EXPIRATORY PRESSURE (PEEP)

A treatment used to prevent parts of the lung from collapsing when a baby exhales.

POSTPARTUM

After delivery.

PREMATURE

A term used to describe a baby born before 37 weeks gestation.

PRENATAL

Before birth.

PULMONARY HYPERTENSION [hahy-per-TEN-shuhn]

An inability of the blood vessels in the baby's lungs to relax and open up normally after birth, resulting in poor circulation through the lungs and not enough oxygen in the blood.

PULMONARY INTERSTITIAL [in-ter-STISH-uhl]**EMPHYSEMA [em-fuh-SEE-muh] (OR PIE)**

A condition in which air bubbles are forced out of the lung's tiny air sacs (alveoli) and in between the layers of lung tissue.

PULSE OXIMETER [awk-SIM-i-ter]

A probe that is placed on a baby's foot or hand with a sticker to measure how well your baby is moving oxygen through his body. An alarm sounds if the oxygen level (called "sats" for "saturation") is too low or too high, which tells the nurse if your baby needs more or less oxygen.

R**RADIOLOGIST [rey-dee-OL-uh-jist]**

A doctor with special training in the use of x-rays and other imaging studies for diagnosis and treatment.

RED BLOOD CELLS (RBCS)

The cells in the blood that contain a substance called **hemoglobin** [hee-muh-GLOH-bin], which carries oxygen.

REFLUX

When food in the baby's stomach backs up into the esophagus.

REGISTERED DIETITIAN NUTRITIONIST (RDN)

A health care professional with special knowledge about the nutrients required for healthy growth and development.

RESIDENT

A doctor in the 2nd or 3rd year of pediatric specialty training.

RESPIRATOR

See ventilator (page 34).

RESPIRATORY DISTRESS SYNDROME (RDS)

A disorder in which there is a tendency for the **alveoli** [al-VEE-uh-lie] or tiny air sacs in the lung to collapse as the baby exhales. This was previously called hyaline membrane disease (see page 30). This condition is common in premature babies because their lungs haven't developed enough to work on their own.

RESPIRATORY SYNCYTIAL [sin-SISH-uhl] VIRUS (RSV)

A common virus that can result in serious lung disease for premature infants or infants with lung problems.

RESPIRATORY THERAPIST

A health care professional trained in the care of the lungs.

RETINA

The part of the eye that records what we see and sends images to the brain.

RETINOPATHY [ret-n-OP-uh-thee] OF PREMATURITY (ROP)

An eye problem in which the back of the eye (the retina) may be injured and special treatment needed.

RETRACTIONS

When the lungs fail to fully inflate as the baby inhales. The chest wall is pulled in as the baby uses chest and abdominal muscles to breathe.

S**SATURATION MONITOR**

See pulse oximeter (at left).

SEIZURES

A condition in which the brain's electrical impulses "short-circuit," causing the body to tense up. The baby may lose consciousness for a few moments during a seizure. Seizures have a variety of causes.

SEPSIS

An infection in the blood and other tissues that can affect the baby's whole body.

SMALL FOR GESTATIONAL AGE (SGA)

A baby who is born under the normal weight range for his gestational age (see page 30).

SUCTION CATHETER

A small tube used to remove mucus from the nose and throat, or from an ET tube (see page 30).

SURFACTANT [ser-FAK-tuh nt]

A substance formed in the lungs that helps keep the small air sacs (alveoli) from collapsing and sticking together.

T**TACHYCARDIA [tak-i-KAHR-dee-uh]**

An abnormally fast heart rate, usually greater than 160 beats per minute in infants.

TACHYPNEA [tak-ip-NEE-uh]

An abnormally fast breathing rate, usually above 60 breaths per minute in infants.

TOTAL PARENTERAL [pa-REN-ter-uhl] NUTRITION (TPN)

A method of providing a solution containing essential nutrients (sugar, fat, protein, vitamins, and minerals) through an IV line to supplement a baby's intake by mouth.

TRACHEA [TREY-kee-uh]

The windpipe — the tube that extends from the throat to the lungs.

TRACHEOSTOMY [trey-kee-OS-tuh-mee]

A surgical opening in the trachea, below the voice box, made to allow air to enter the lungs when the throat becomes obstructed.

TRANSCUTANEOUS [trans-kyoo-TEY-nee-uhs] MONITOR (TCM)

A machine that measures the concentration of oxygen and carbon dioxide in the baby's blood through the skin.

TUBE FEEDING See gavage feeding (page 30).

U**ULTRASOUND**

A type of imaging study that uses echoes of sound waves to produce a picture of the body's tissues.

UMBILICAL [uhm-BIL-i-kuh l] ARTERY CATHETER (UAC)

A catheter placed in the baby's artery to monitor blood pressure and obtain blood samples.

UMBILICAL VEIN CATHETER (UVC)

The same as an umbilical artery catheter (UAC), except in a vein rather than an artery. It can be used to obtain blood samples, provide nutrition, administer blood and medicine, and monitor blood pressure.

V**VENTILATOR**

A machine that helps a person breathe.

VENTRICLES [VEN-tri-kuhl s] Fluid-filled spaces of the brain.

VITAL SIGNS

Heart rate, breathing rate, blood pressure, and amount of oxygen in the blood.

X**X-RAY**

The most common type of imaging scan, which can show the condition of the lungs and other organs and can check the positions of any tubes or catheters inside the baby's body.



When to call the doctor

Once home, call your baby's doctor if your baby has any of the following:

- Unstable or abnormal temperature — a baby's normal temperature (armpit) is 97.7°F (36.5°C) to 99.5°F (37.5°C)
- Decreased temperature where baby does not warm up with swaddling and holding
- Sunken fontanels (fontanels are the "soft spots" on a baby's skull)
- Listlessness or weakness, and baby not very responsive
- Jitteriness or shakiness
- Extreme irritability or inability to be calmed for long periods
- Decrease in appetite
- More than 1 dry diaper in a row (in about 6 hours)
- Significantly fewer messy diapers than usual
- Diarrhea, or stool that's watery, green, foul-smelling, or contains mucus or blood
- Increase in respiratory effort (breathing fast, wheezing, coughing, or having any difficulty breathing)
- Increase in apnea (temporary pauses in breathing) and bradycardia (slow heart rate)
- Bad choking episode
- Vomiting more than occasionally or vomit that is green or bloody
- Increased oxygen needs
- Discoloration of the skin, especially blue, gray, or yellow discoloration
- Thrush (white spots in mouth that look like formula but won't come off with your finger)



Get emergency care in the following cases:

- Bluish lips or skin
- Excessive sleepiness, floppiness, or difficulty rousing
- Poisoning or suspected poisoning — call Poison Control Center first 1-800-222-1222
- Trouble breathing or chest sinking in with breathing



To find other resources for moms and babies, go to:
intermountainhealthcare.org/mombaby



facebook.com/intermountainmoms



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