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Learning Objectives

often want to know what they should expect if their baby is in the NICU, and especially if born preterm. We can't predict exactly the challenges your baby will face, but we can introduce the NICU to you and help you understand the common problems of very preterm infants. The purpose of this booklet is to help you understand what it might be like to have a baby in the NICU at the Minneapolis Campus of Children's Hospitals and Clinics of Minnesota.

This booklet focuses on the outcomes of infants born from 22 to 29 weeks gestation and are at greatest risk for complications. We enjoy taking care of all newborns and their

quadruplets. We use these patients' data to measure and improve the care we deliver. We want to make this experience the best possible one for your baby and your family. Communication is key to a positive experience in the NICU. We welcome your questions. Please talk to your baby's attending

and their

quadruplets. We use these patients' data to measure and improve the care we deliver. We want to make this experience the best possible one for your baby and your family. Communication is key to a positive experience in the NICU. We welcome your questions. Please talk to your baby's attending

The Vermont Oxford Network

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Entering the NICU

The NICU is located on the third floor of the Children’s Hospitals and Clinics – Minneapolis Campus building. From the elevators, you enter the NICU through the hallway shown at right. Along the left side of the hall, you’ll see a display of former patients, each frame showing the patient when they were in the NICU and years later.

You will be greeted by the unit coordinator at the desk just to left of the entrance to the NICU.

Each patient has his or her own room, which also has space for family members to stay overnight. Private rooms allow for family privacy during consultations with your baby’s doctor and during all of your visits.



Thanks to the doctors and surgeons who attended to my son, and to the nurses who worked for his fast recovery.

Translated from Spanish





Parents' First Question

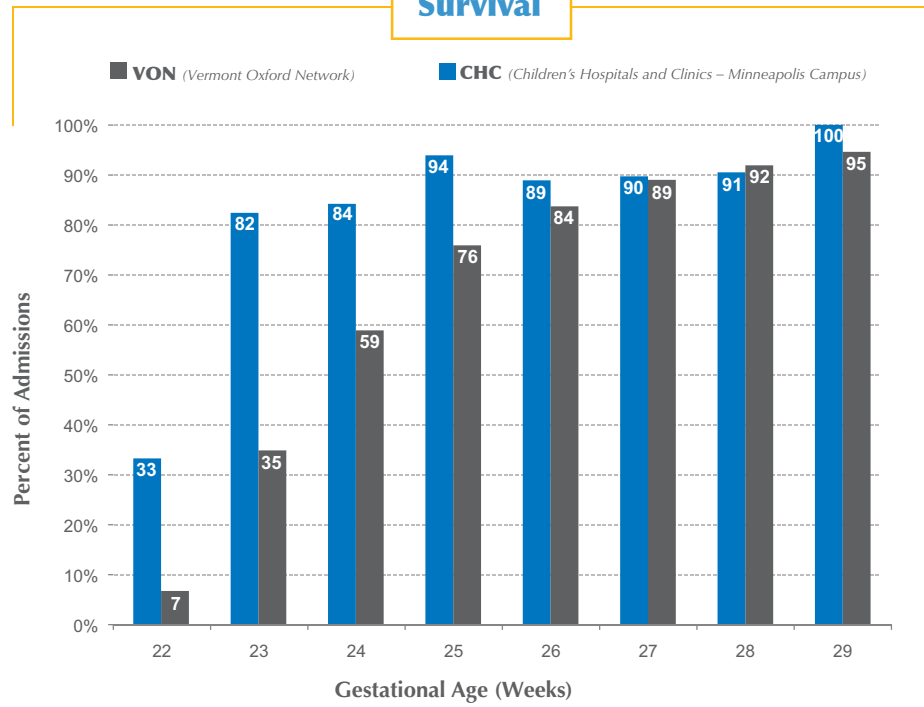
Parents' usual first concern is "will my child survive?" The overall survival among NICU patients is 95% (data from 2000-2009), but it is somewhat less at the lowest gestational ages.

The graph below shows the survival for our smallest patients, those with gestational ages 22-29 weeks (born 11-18 weeks before due date). We compare our most recent outcomes (2009 data) to a national benchmark, also from 2009, the VON (for a description of the VON, see www.vtoxford.org/about/about.aspx). Our survival compares favorably with the national benchmark.

“ Our son received phenomenal care. Dr. Barthell and nurses Gail, Diane, Marie, Jennifer and Michelle along with other great staff made us feel as if he was exactly where he needed to be to receive the care he needed. Thank you! ”



Survival



Possible Complications

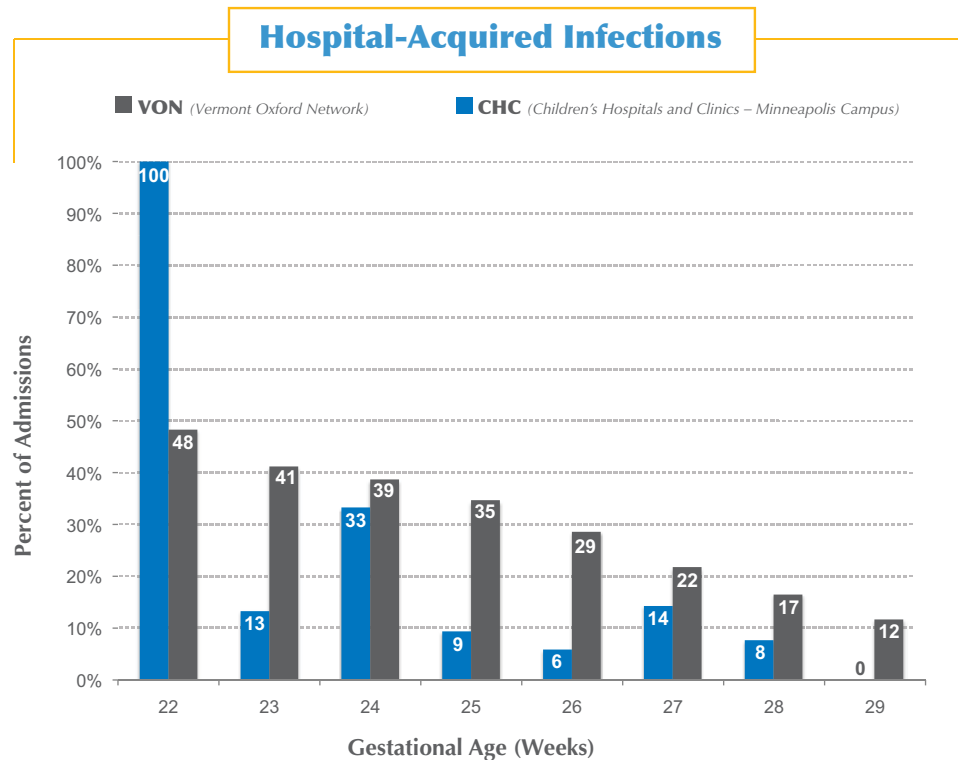
The lower the gestational age the higher the risk of complications during the hospitalization. Below we present rates for some of the more common complications. We have worked very hard to reduce these complications.

Hospital-Acquired Infections

One common complication has been infections that develop in very preterm infants while they are in the hospital (see graph below). Very preterm infants have immature immune systems and require invasive procedures and intravenous lines, which can make it easier for bacteria to reach a baby's bloodstream. These infections increase care requirements and can also increase the risk of long-term developmental problems.

“*Dr. Landrum was excellent, and very compassionate. I also found the lactation consultant to be incredibly helpful.*”

Our quality improvement teams have worked for several years to reduce infections in our smallest patients. We have implemented numerous practices to reduce infections. Nurses, doctors, respiratory therapists, pharmacists, and many others have collaborated to decrease these infections. Since 2005, the infection rate has fallen remarkably, by about 50%. Our rates of hospital-acquired infection are among the lowest in the world.







Bronchopulmonary Dysplasia

Another complication commonly seen in very preterm infants is bronchopulmonary dysplasia (BPD). Also referred to as scarring in the lung, BPD occurs in very preterm infants due to their lung immaturity and their need for breathing tubes and machines. Although infants mostly grow out of this problem, BPD can prolong hospitalization and affect long-term development.

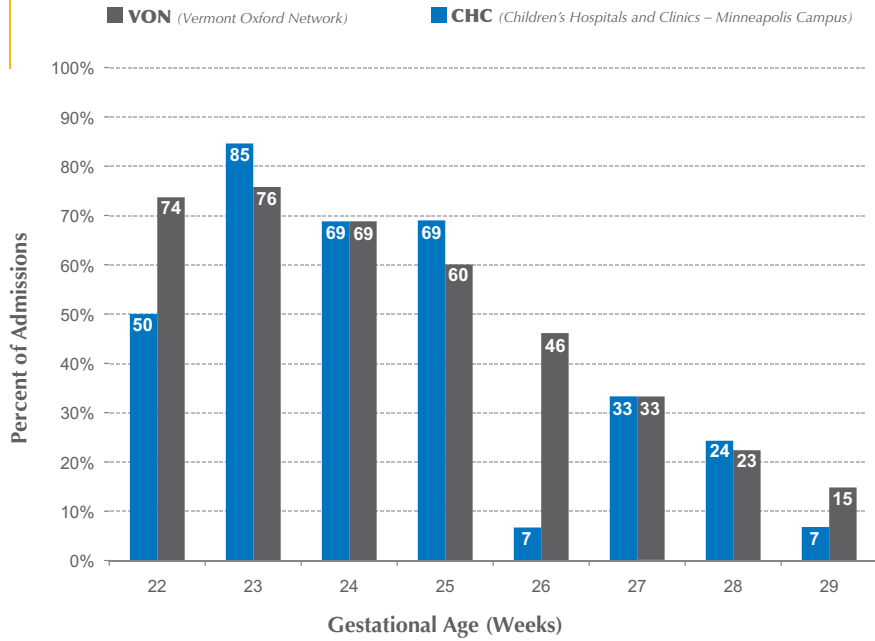
About 23% of very preterm babies will still require extra oxygen when they go home. After they are home, they may remain on this extra oxygen for a few months.

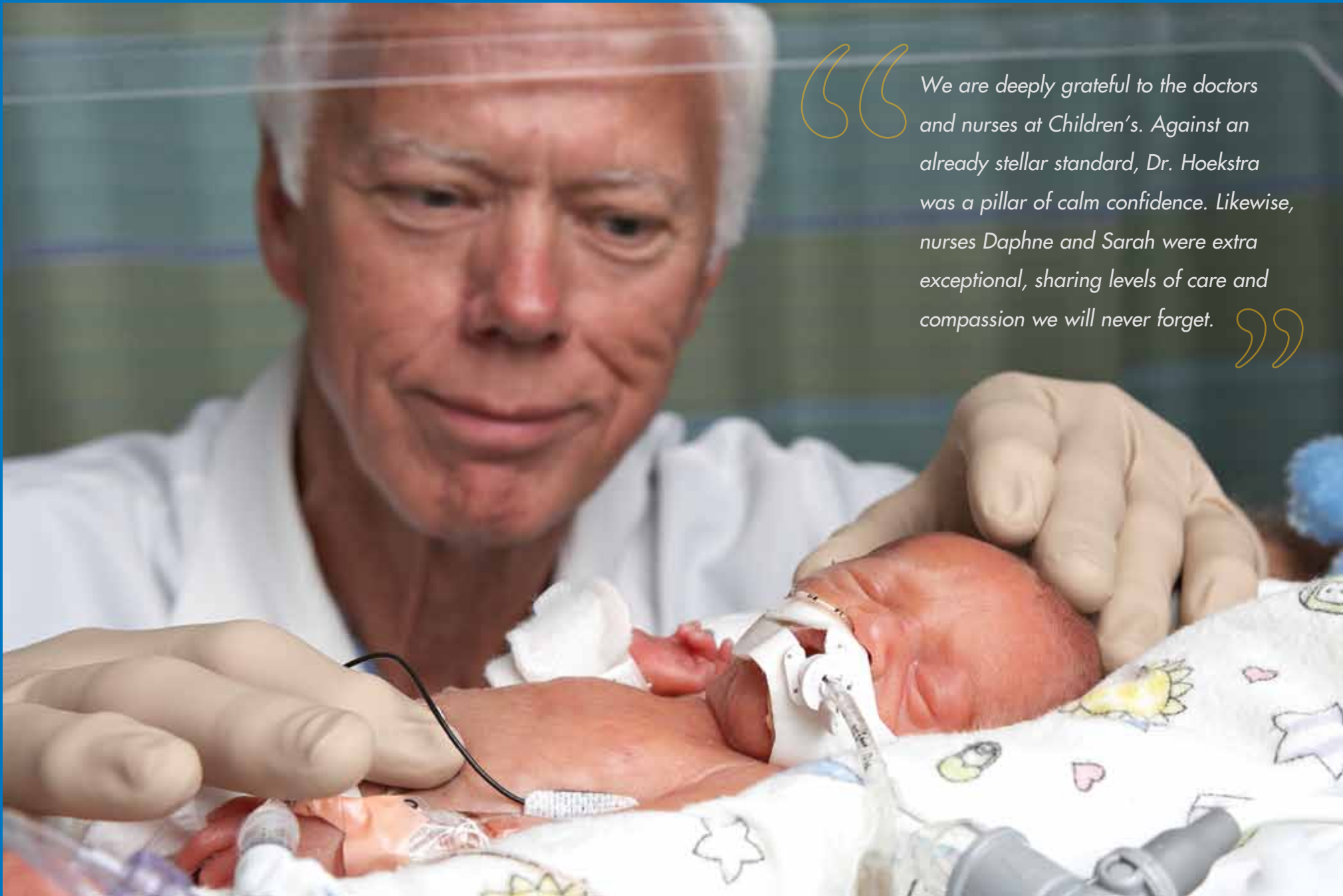
We sometimes give steroid medications to reduce the severity of BPD. Steroids decrease inflammation within the lung and allow the lung to function more effectively.

“ We had a good experience and great outcome for our child, which I attribute to the wonderful Dr. Bendel-Stenzel and nursing staff. Thank you! ”



Bronchopulmonary Dysplasia





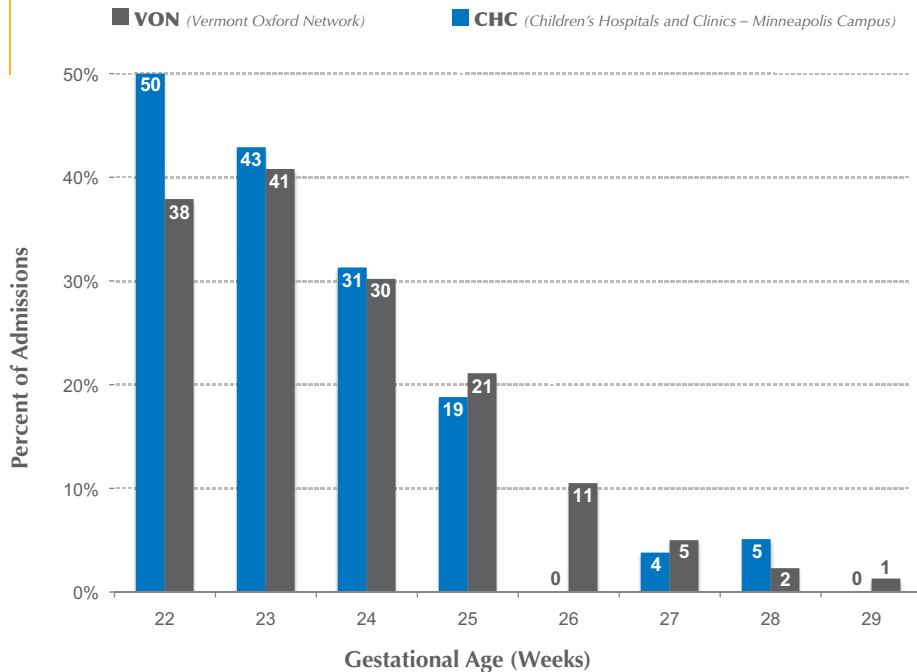
“ We are deeply grateful to the doctors and nurses at Children’s. Against an already stellar standard, Dr. Hoekstra was a pillar of calm confidence. Likewise, nurses Daphne and Sarah were extra exceptional, sharing levels of care and compassion we will never forget. ”

Retinopathy

At birth, the eyes of very preterm babies are still developing. The back of the eye or retina has not yet developed its final blood supply. After birth and for the next 6–12 weeks, the blood supply of the retina continues to develop. The stresses of preterm birth and its treatment can interfere with this normal blood vessel development. Some blood vessels stop growing and others grow abnormally into the clear gel that fills the back of the eye. This abnormal growth of blood vessels into the retina is called retinopathy of prematurity,

often abbreviated as ROP. Severe ROP interferes with vision and in extreme cases can cause blindness or require laser surgery to prevent additional eye injury. Very preterm infants should be checked for the development of ROP starting at about six weeks after birth, depending on the baby's gestational age. The only way to assess ROP is for a specially trained ophthalmologist to examine the back of the eye.

Severe Retinopathy of Prematurity

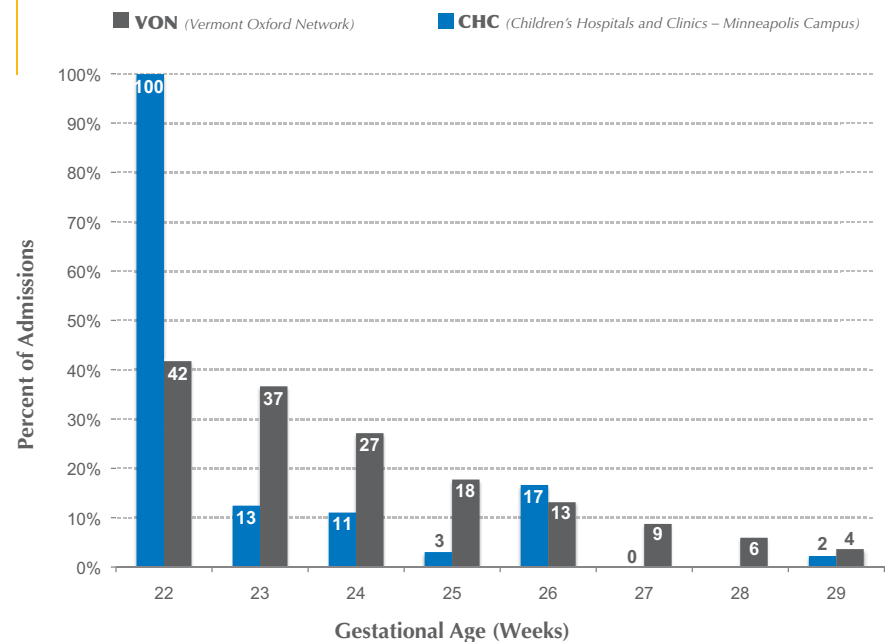




Intraventricular Hemorrhage

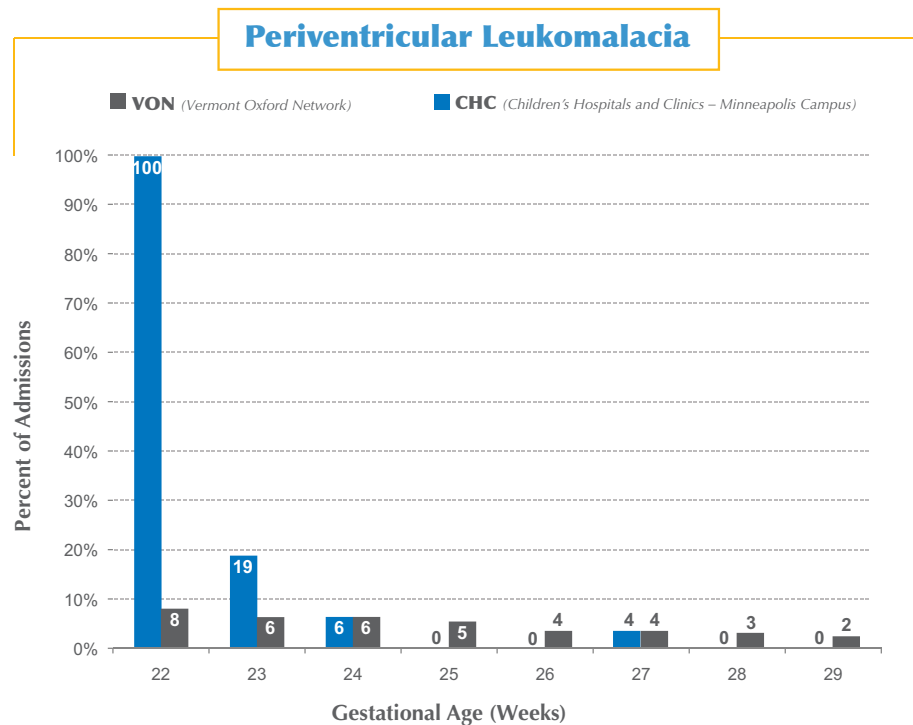
Very preterm babies are born with fragile blood vessels in their brains. Sometimes these blood vessels rupture before, during or shortly after birth. Small amounts of bleeding do not injure the brain, but large amounts increase the risk of long-term developmental problems. This bleeding (hemorrhage) is called intraventricular based on the location within the brain. Intraventricular hemorrhage is abbreviated as IVH, and graded into four grades (I-IV). The doctors will obtain an ultrasound to determine if this bleeding is present. The rates of severe IVH (Grade III or IV) are presented at right.

Severe Intraventricular Hemorrhage



Periventricular Leukomalacia

Periventricular leukomalacia (PVL) is a long name for injury to the white matter of the brain. PVL is identified using the head ultrasound or less often, an MRI scan of the brain. The white matter represents the nerves that send signals to the muscles and other parts of the brain. Depending on the amount of white matter injury or PVL, the risk of cerebral palsy may be increased. We do not know exactly what causes this injury, but decreased blood supply to the white matter is probably the cause. We don't know how to prevent PVL, and unfortunately it can occur before birth. If your baby has PVL, the neonatologist will discuss this with you in detail.



Necrotizing Enterocolitis and Spontaneous Perforations

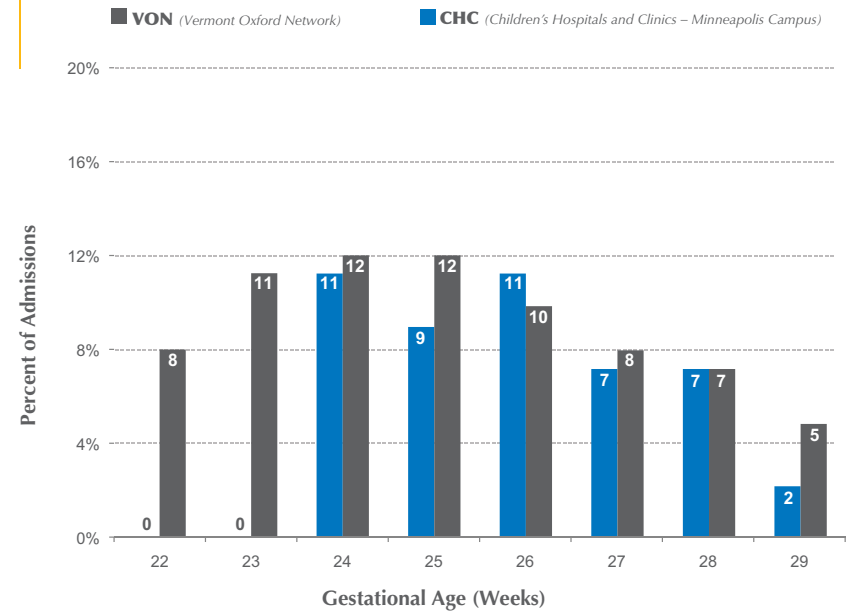
When babies are born very preterm, many organs including the intestines are immature and do not always function well. To help the intestines develop, we start feedings as soon as possible. We start slowly to allow the baby's intestines to adjust to digesting food. However, sometimes the intestines develop an infection despite our efforts. This infection can injure the intestinal wall and is called necrotizing enterocolitis or NEC. The name comes from the fact that this infection can actually destroy tissue (necrotizing means destroying tissue) and often occurs in the colon (hence, the word "colitis") or large intestine. We present our data compared with that from the VON at the right.

Reducing NEC is our number one quality improvement goal for the next two years. We have joined a national quality improvement collaborative and are working with other NICUs from across North America to eliminate this complication. One of the measures we are already taking to prevent NEC is to provide only breast milk feedings for our most at-risk patients. Breast milk reduces the risk of NEC. For babies whose mothers don't produce enough milk for them, we purchase donor breast milk.

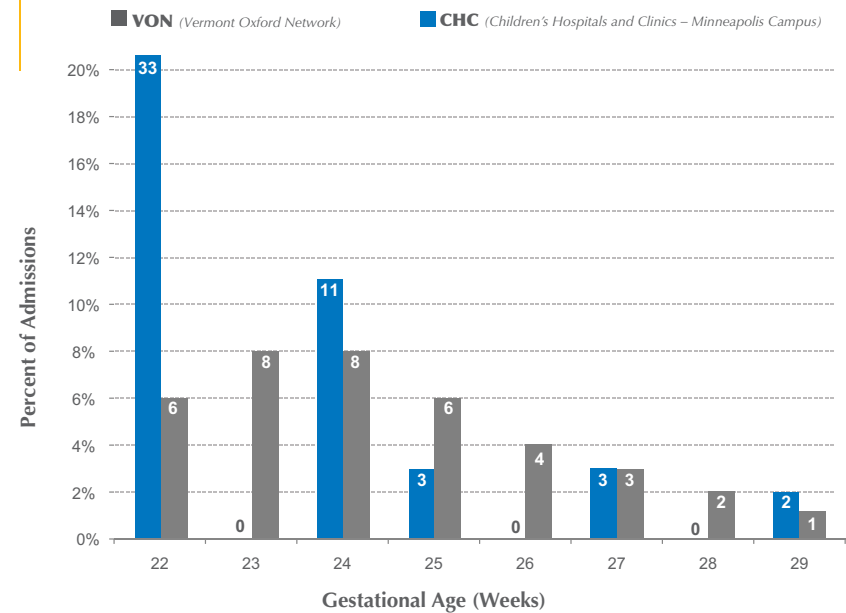
Spontaneous Perforations

Very preterm infants sometimes develop small holes in their intestine. Although we do not fully know the reason for this, it seems to be related to the delicate blood supply to the intestines. Spontaneous perforations occur about 5–10 days after birth. These small holes can make a baby quite ill and require surgery to repair the hole. The rates of intestinal perforation are shown at the right.

Necrotizing Enterocolitis

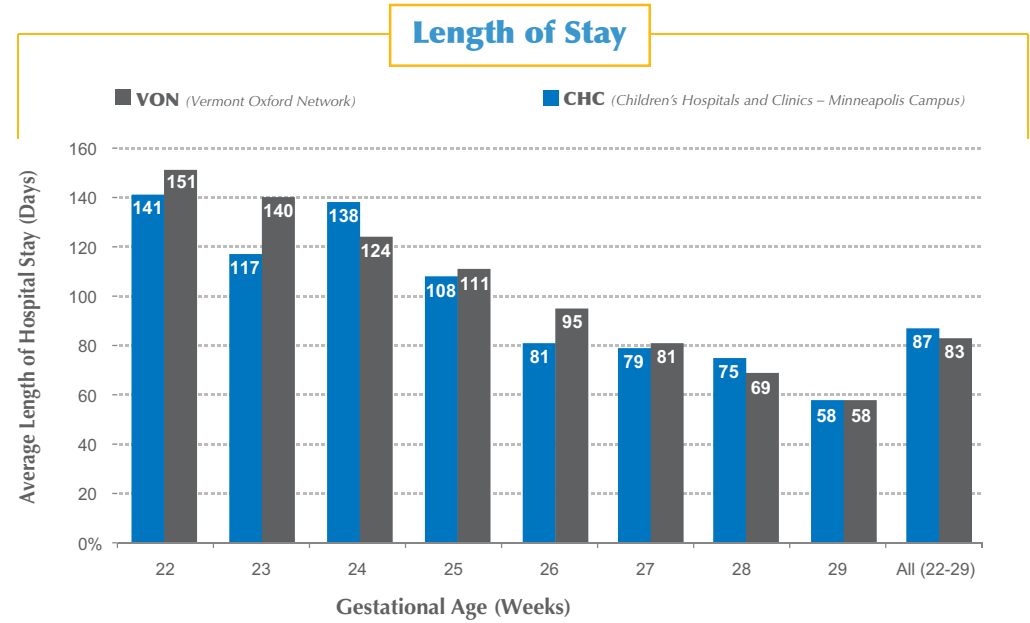


Spontaneous Perforations



Length of Hospital Stay

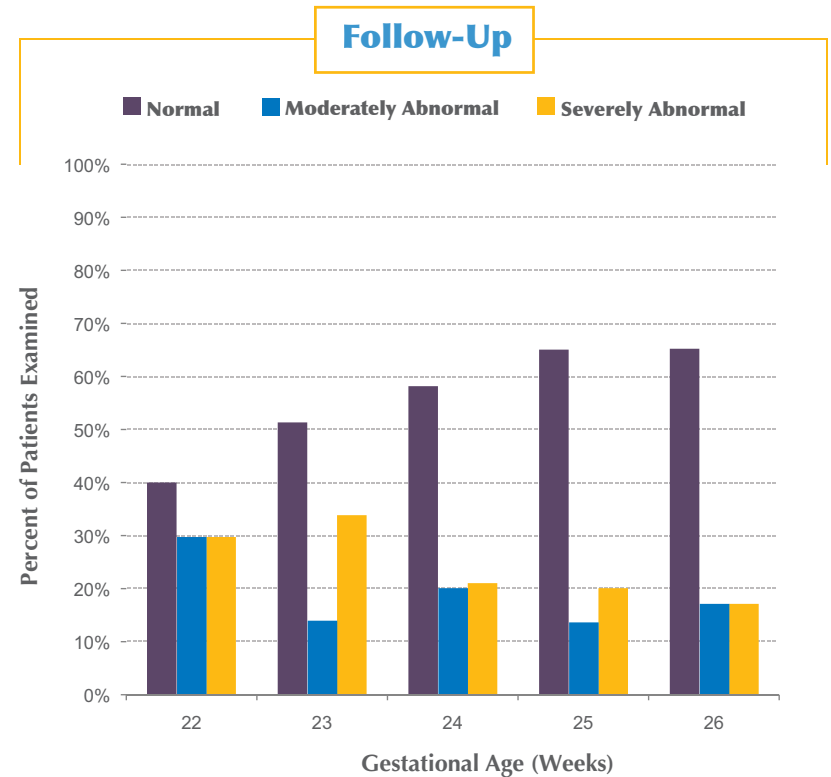
Parents often ask how long their preterm baby will be in the hospital before discharge. Babies can go home when they are taking all of their feedings by mouth, maintain their temperature in an open crib, and are breathing easily and regularly. The length of time required to achieve these objectives varies from baby to baby. In general, the more preterm an infant, the longer the hospitalization. The average length of hospital stay for very preterm infants is presented at right.





Long-Term Outcomes

Families need to have some idea of how their baby will do over the years of childhood and into adulthood. The more mature an infant at birth, the better the likelihood of a good long-term outcome. The graph at right is from our NICU Follow-Up Clinic and shows the developmental outcome at about 4 years of age. Although a child born very preterm may appear “normal” at 4 years, these children are at high risk for learning problems in school. Data for the graph come from our published report (Hoekstra, et al. Pediatrics 2004;113:e1-e6) for infants born at 23–26 weeks gestation and from our NICU Follow-Up database for infants born at 22 weeks gestation.





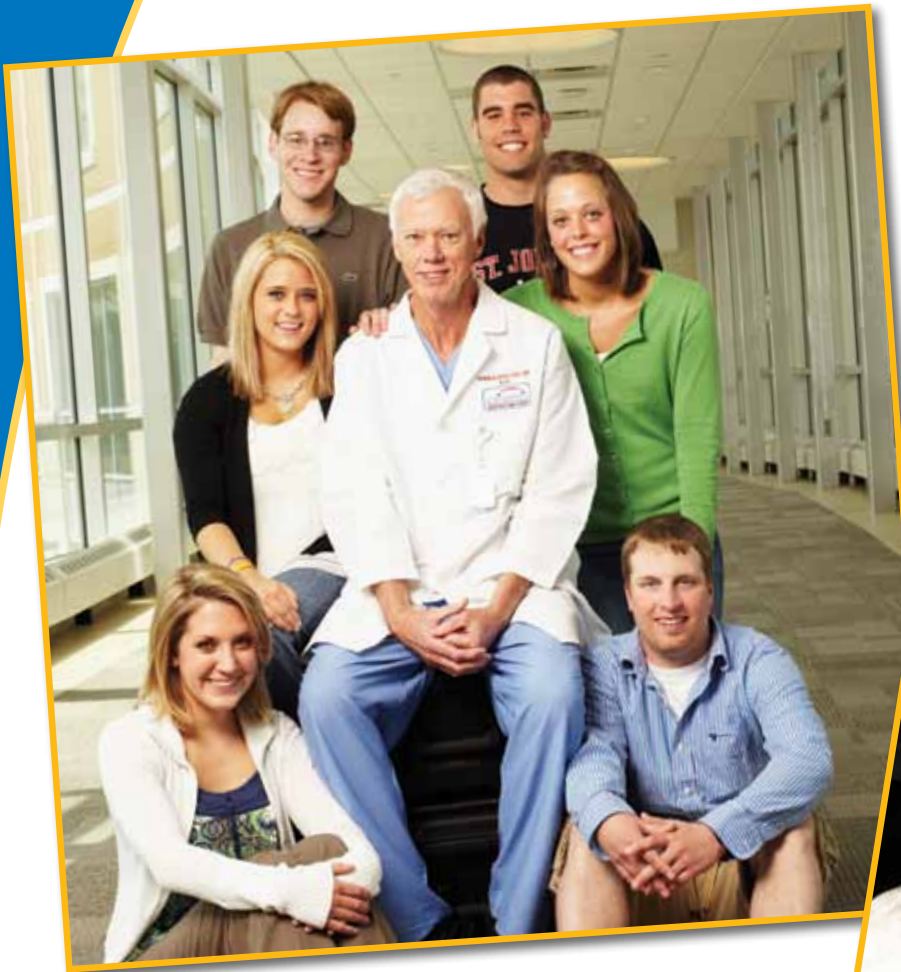
We had a great experience, and all of the nurses and doctors were wonderful. We loved Dr. Ferrara, and Nurse Karen, who we had for a lot of the time during our visit, was also especially helpful.



Minnesota **Neonatal** Physicians, P.A.

Our Mission

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