



# Philips supports innovative care in the NICU

## Who/where

Drammen Hospital's NICU  
Drammen Hospital, part of Vestre Viken Hospital Trust

Drammen, Norway

340-bed hospital with 17-bed NICU located approximately 30 minutes from Oslo.

## Challenge

Taking the traditional, open-plan NICU unit and redesigning it so that each patient and family would have their own room.

## Solution

Adopt a Philips IntelliVue patient monitoring solution throughout the unit which flexibly supports family-centered care.

If you could design a Neonatal Intensive Care Unit from scratch, according to the best evidence-based practices of family-centered care, what would the result look like?

The caregivers at Drammen Hospital in Drammen, Norway, part of Vestre Viken Hospital Trust, redesigned their NICU to fit their vision for family-centered care. Their revamped unit, opened in early 2012, may point the way for other hospitals as they increase the ability of parents and siblings to spend more time with their preterm infants.

By putting patients and their families first, the caregivers at Drammen have seen results. According to Dr. Atle Moen, director of the NICU, parents who have spent more time with their preemies in the hospital have more confidence in their ability to care for them at home.

“When it’s time for the infants to go home, the parents are less afraid. They know their infants in a different way than they did before.”

*Dr. Moen, Director of the NICU, Drammen Hospital.*



A new mother practices Kangaroo Care with her premature infant.

# PHILIPS

“The Philips monitors help make it possible.”

*Birgitte Ekeberg, head nurse*

### Round-the-clock parenting

Dr. Moen and his team began adopting the principles of family-centered care in 2003, at the recommendation of a child psychiatrist who visited the unit. Once they began implementing family centered care, the doctors and nurses in the unit saw immediate changes in the way patients and families responded to being in the NICU.

“They were not only preemies who we were waiting to be mature, the preemies were already able to communicate with us – they had their own personalities, they were individuals like other patients,” Dr. Moen said of this initial experience.

Since then, parents in the NICU have had much greater contact with their preterm infants. Dr. Moen and his team introduced kangaroo parenting in 2006, with mothers and fathers carrying preemies on their chests with constant skin-to-skin contact. The benefits of kangaroo parenting to preterm infants have been shown to include more consistent temperature, heart rate, and respiration, as well as more sleep, less crying, greater weight gain, and earlier discharge.<sup>1</sup>

With the redesign of the NICU in 2012, Drammen has built these principles into the fundamental layout of the unit. Instead of the open floor plan of the hospital’s previous NICU, where nurses could see every patient and their monitors from wherever they stood, the new unit has a separate room for each patient. Single-patient rooms, with beds and bathrooms for parents, allow families to stay by their infant’s side 24 hours a day, taking on many of the basic caregiving tasks previously handled by the nursing staff. This allows parents to develop even stronger bonds with their tiny infants.

“The parents are the caregivers,” said Bagstevold. “That’s a big difference, because earlier the nurses had sole responsibility for the baby. Now the parents are actively involved.

## The challenge facing Drammen Hospital’s NICU

Drammen Hospital, part of Vestre Viken Hospital Trust, is a 340-bed hospital with a 17-bed NICU located approximately 30 minutes from Oslo. The care team in the Neonatal Intensive Care Unit, led by Dr. Atle Moen, had already seen success implementing family-centered care, with kangaroo parenting for preterm infants.

Dr. Moen wanted to go further by taking the traditional, open-plan unit and redesigning it so that each patient and family would have their own room. This would allow parents and siblings to stay in the hospital for longer hours, sometimes around the clock, and to forge stronger bonds with their preemies.

But Dr. Moen and the care team still needed to keep watch over their fragile patients. Their solution was to adopt a Philips IntelliVue patient monitoring solution throughout the unit which flexibly supports family-centered care.

Their monitoring solution included Philips IntelliVue MX800 patient monitors for higher-acuity patients and IntelliVue X2 monitors for intermediate-care patients, all connected to the IntelliVue Information Center. The X2 monitors allow families to spend time with their preterm infants without being tethered to a large patient monitor, supporting kangaroo care. The X2 is connected to the IntelliVue information center via the IntelliVue Telemetry infrastructure from the information center.

The IntelliSpace Event Management additionally forwards the monitoring alarms from the IntelliVue Information Center to nurses’ DECT mobile phones. “The nurses are notified about the alarms via their phones,” said Anne Bagstevold, the NICU’s nurse in charge of training.

### Philips supports family-centered care

Monitoring solutions from Philips Healthcare have helped Dr. Moen and the care team at Drammen implement their state-of-the-art, family-centered NICU. Because patients and their monitors are inside enclosed rooms and no longer visible to nurses throughout the unit, the NICU’s monitoring solution is more crucial than ever.

Dr. Moen and his team rely on Philips IntelliVue monitoring solutions to make certain their patients remain under surveillance even while families maintain their privacy.

Preemies under intensive care in the unit are monitored continuously by a Philips IntelliVue MX800, a versatile, flexible, monitoring solution. Those receiving intermediate care

are monitored on the IntelliVue MMS X2, a small, portable monitor. On the X2, preemies aren’t tethered to a large monitor with lots of cables.

Due to the X2’s small size, infants and their parents can be more mobile within their room, and helps make kangaroo parenting easy. Additionally, the portable X2 can go over a parent’s shoulder or into a purse, so parents can walk around the unit with their infants. The IntelliVue Telemetry System keeps monitoring information flowing to the central station even while patients are out of their rooms.

The IntelliVue Information Center is the central station, while three wall-mounted flat panel displays are positioned at strategic points throughout the unit so that nurses can see all their patients’ vital signs at a glance.

## Supporting privacy

If a patient's vital signs slip outside the alarm limits, the alarm message is transmitted by the IntelliSpace Event Management to the nurses' DECT phone.

When an alarm goes off, nurses are notified of the alarms and they can go to where they're needed. The use of the Philips IntelliVue Central station in conjunction with the IntelliSpace Event Management solution allows parents to have privacy with their infants in their own room, while still maintaining a close watch on the patient in case of a medical event.

When nurses arrive for their shift, they register one of the hospital's DECT mobile phones at the IIC for the patients they will be covering. The nursing staff has been impressed by the simplicity and effectiveness of the phone interface with the unit's monitors.

Philips also worked with the care team to optimize alarm limits to reduce the possibility of false alarms and alarm fatigue.

The result balances families' privacy with patient well being, according to Dr. Moen. "This system gives us control of the infant

without the nurses being physically beside the baby," he said. "You can go out of the room, close the door, still you have full control."

Dr. Moen recalled wondering whether parents in a single-patient room would trust that nurses would arrive when an alarm went off. "We were curious about what the parents would say when we leave the room, would they feel comfortable enough? Would they trust the wireless monitoring system?" Dr. Moen said.

But seeing the system at work has put parents at ease. "It increases their ability to care for their child without us hanging over their shoulder, so I think they get much more the feeling for being parents of the child," Dr. Moen said. "Parents know we are coming if anything goes wrong."

## A real family from the beginning

The transformation of Drammen's NICU from a traditional open-plan unit to one designed to accommodate family-centered care has paid off in an excellent experience for families – and exceptional patient care.

According to Dr. Moen, the care team has observed that infants with their parents present suffer from lower stress levels, leading to more stability and faster growth.

## Benefits for the staff

In addition to the benefits for patients and their families, Dr. Moen feels the changes they have implemented have improved conditions for the entire NICU staff.

More stable patients and fewer alarms mean the NICU is a quieter, calmer place to work, according to nurses and doctors. "From a doctor's perspective, having worked in different hospitals, I find it far less noisy," said Dr. Daniel Øyan, who came to the unit in early 2012.

Still, the changes in the unit have required the nurses to work differently than they did before, in tandem with the parents. "The parents need a lot of coaching and instruction," said Bagstevold. "We have to work in another way than we did earlier. It's quite challenging, but the nurses like it."

"We think that when we reduce stress by keeping parents with the babies, and decreasing the number of procedures we do on the infants, that they have more opportunity to grow," Dr. Moen said. The unit is also a quieter and more pleasant place than it used to be.

One common concern among traditional neonatologists has been the possibility of parents and siblings infecting preterm neonates with harmful microbes. This is because new preemies lack native bacterial flora in their microbiome, until they are exposed to microbes brought in by family members. But having parents and siblings present hasn't resulted in more infectious diseases, according to Dr. Moen.

On the contrary, microbes from parents and siblings may contribute to the very low rate of harmful infections seen among patients in the Drammen NICU. According to Dr. Moen, microbes shared by parents and siblings may help infants ward off dangerous, antibiotic-resistant hospital microbes.



The Philips MX800 allows nurses to access computer-based hospital systems like the electronic medical record at the baby's bedside.

“If you are born prematurely, you will be colonized with microbes whether you like it or not,” Dr. Moen said. “If you are colonized with microbes that are hospital flora, that is quite an unhealthy population of microbiology.”

Another result that the caregivers have observed is a shorter average stay for preemies in their care. Rather than staying until their normal gestation age of 40 weeks, Dr. Moen’s patients are ready to leave between weeks 34 and 37.

### Parents, not guests

Perhaps the most profound change is the way parents experience being with their child.

“All parents really want to stay (with their baby), especially fathers,” Dr. Moen said. “Fathers have traditionally been a little bit on the side when the mother and infant are in the hospital. Now, you can’t get the fathers home without the child.”

Although the new setup required flexibility from the nursing staff, parents have responded positively to the new arrangement, according to the care team.

“We have to work in another way than we did earlier,” Bagstevold said. “It’s quite challenging, but the nurses like it, and the parents are very happy to be here with their baby.”

“Now they’ve got their privacy and they feel like a family, that’s the most important thing,” said Birgitte Ekeberg, the NICU’s head nurse. “The parents are not visitors to their own child, they are family.”

## Interoperability and third-party solutions

In the NICU’s intensive care and emergency rooms, each IntelliVue MX800 has an integrated PC that allows the care team to access computer-based hospital systems – like the electronic medical record, labs, and CPOE – at the bedside.

MX800 with iPC also has the potential to expand the scope of their monitoring with innovative third-party measurements.

One of these third-party measurements in use in the Drammen NICU is the MedStorm Pain Monitor. This documented measurement, which detects sweating caused by emotional stress, may help parents and caregivers tell when a preemie is experiencing pain.<sup>2</sup> Since they are sometimes too weak to cry, finding another means to measure stress in preterm infants is crucial. There are also indices for intensive care, anesthesia, and post operative pain.<sup>3</sup>

“I think it’s a very promising technology that can give us additional info about the state of the child,” said Dr. Moen.

“We think this monitoring system will be a good supplement to the other monitoring that we have, like saturation and pulse.”

According to Hanne Storm, the designer of the MedStorm Pain Monitor, connecting to the MX800 with integrated PC allows caregivers to expand their measurements without adding another screen at the bedside.

“If the customers don’t have the Philips MX800 monitors with iPC, they have to use an additional PC,” Storm said. “That’s more expensive for the customer, and it also takes more space in the hospitals.”

The MedStorm software is easily installed and the measuring unit is connected to the IntelliVue iPC via the USB port. This allows caregivers to see all of their measurements on a single screen, so all pertinent information is available at a glance.

“The Philips monitors help make it possible,” Ekeberg added.

For his part, Dr. Moen believes that family-centered care is superior to the traditional model of neonatal care.

“I think that there is only one future for care of sick preemies and sick neonates, and that is to implement family-centered care,” he said. “It’s not possible to continue the way we have done.”

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