Annual report 2016

NEONATAL CARE
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Unit presentation

The neonatal units handle the care of sick neonates and preterm infants born at Helsinki and Uusimaa Hospital District (HUS). The unit also provides care for neonates in the HUS catchment area who require university hospital care due to their prematurity or disease. Full-term neonates requiring surgical care are primarily treated at pediatric surgery wards.

At Helsinki University Hospital (HUH), neonatal care is provided at the Children’s Hospital K7 Neonatal Intensive Care Unit, Women’s Hospital N7 Neonatal Observation Ward, Jorvi Hospital L2 Neonatal Ward and Kätilöopisto Maternity Hospital LV37 Neonatal Ward. In addition, care for healthy neonates is provided in the Women’s Hospital, Jorvi Hospital and Kätilöopisto Maternity Hospital maternity wards. Neonatal Care Unit physicians also assess all children born in these hospitals before their discharge. Outpatient care is provided at the Women’s Hospital K7AVO, Kätilöopisto Maternity Hospital LV37AVO and Jorvi Hospital pediatric outpatient clinic. In 2016, there were 13,588 births at HUH and 17,299 at HUS. There were 17,543 children born at HUS, which accounts for a 31% of all children born in Finland in 2016. 965 children (5.5%) were born before 37th week of gestation.

The K7 Neonatal Intensive Care Unit provides care for the most acute and severe cases of neonatal disease and prematurity, such as all neonates born earlier than the 31st week of gestation, children requiring mechanical ventilation, therapeutic hypothermia and infants suffering from difficult infections. The N7 Neonatal Observation Ward and LV37 and L2 Neonatal Wards provide care for less acute cases of prematurity and other neonates requiring hospital care as well as convalescent care for patients coming from intensive care.

The Neonatal Unit has a staff consisting of 14 neonatologists, a specialist in pediatrics, 1–2 residents in neonatology, physicians specializing in pediatrics, over 200 nurses and other specialists, such as rehabilitation counselors, hospital pharmacists, ward secretaries, social workers, physiotherapists, hospital chaplains, supply technicians and ward domestics. All unit specialists are Medical Doctors and three are docents in neonatology. In 2016, there were 3,957 in-patient days in the Neonatal Intensive Care Unit, 10,639 in the neonatal wards and 4,361 visits in outpatient clinics.

Käytetyt lyhenteet

BPD Bronchopulmonary dysplasia - a chronic lung disease of preterm infants
NEC Necrotising enterocolitis
IVH Cerebral intraventricular hemorrhage
ROP Retinopathy of prematurity
RDS Respiratory distress syndrome

Cover image: HUS photography
Neonatal intensive care

The Neonatal Intensive Care Unit K7 provides intensive care for preterm and full-term neonates born in the Hospital District of Helsinki and Uusimaa and its catchment area. The most common reasons for admission to the unit are preterm birth, infections, delivery complications, birth defects, neonatal neurological disorders and problems caused by a disease in the mother. The unit has a neonatology staff on call 24 hours a day and is prepared to receive neonates requiring intensive care.

There are 15 intensive care beds in the unit. In 2016, the unit treated 421 neonates, 108 of which were under 1500 g (very low birth weight) and 47 under 1000 g (extremely low birth weight) at birth. Approximately two-thirds of the neonates treated in the unit are nearly full-term. The average length of stay in 2016 was 10.4 days, but the smallest preterm babies may need to stay in the unit for several months. The number of in-patient days totaled 3,957 and the ward's bed occupancy rate was 75%. The number of in-patient days decreased by 4.5% compared to the year 2015.

Neonatal intensive care is being developed continuously, with excellent treatment results in international comparisons. In addition to skilled personnel, neonatal intensive care requires advanced machinery, including ventilators, incubators, monitoring equipment and infusion (IV) machines. A large percentage of the examinations and surgical procedures required by neonates can be performed at the unit.

Encouraging early bonding with the baby and supporting parenting are essential parts of neonatal intensive care. Unit personnel provide parents with support and guidance in participating in the care of their baby right from the start. The unit organizes parent and father groups, in which parents are given information on special-needs babies as well as peer support.

Neonatal wards

N7 Neonatal Observation Ward

Because HUS has only one Neonatal Intensive Care Unit, centralizing high-risk pregnancies and deliveries into the Women’s Hospital is essential for best results. Thus children born in the Women’s Hospital have a greater, more acute need for monitoring than children born in other HUS hospitals.

The N7 Neonatal Observation Ward is located directly adjacent to the delivery rooms and OR’s in Women’s Hospital. The ward provides care for neonates requiring postnatal treatment and observation, due to preterm birth, respiratory difficulty, infections or hypoglycemia. The ward provides acute care and short-term intensive observation for neonates. Resuscitation and ventilator support for neonates requiring intensive care is also administered in the N7 emergency room. After initial assessment and acute treatment, these children are transferred to the Children’s Hospital K7 Neonatal Intensive Care Unit for follow-up care. If it is already known or discovered at birth that the child has, for example, a disease that requires surgical treatment, he or she can also be transferred to the Children’s Hospital K9 Intensive Care Unit, K6 Neonatal and Infant Surgery Ward or the K4 Pediatric Cardiac Ward.

The unit physicians work in close cooperation with obstetricians. The acute treatment of neonates with severe diseases is planned in cooperation with pediatric surgeons, pediatric cardiologists, anesthesiologists, radiologists and clinical geneticists. The ward nurses are trained in neonatal resuscitation and the treatment of problems arising during the early neonatal phase. If necessary, the nurses will assist labor ward midwives in caring for infants.

The N7 Ward has five patient beds and provided treatment for 1,077 children in 2016. There were 1,074 net in-patient days and an average length of stay was 0.98 days. Children were transferred from N7 to the Women’s Hospital Postpartum ward S2 or one of the local hospitals’ neonatal wards for convalescent care. N7 handles the antibiotic treatment of children in Postpartum S2.

Women’s Hospital N7 Neonatal Observation Ward in-patient days, intensive observation and in-patient periods in 2013–2016. It should be noted that, on May 6th 2013, the number of ward beds dropped from 8 to 5.
L2 Neonatal Ward

3,710 infants were born in Jorvi Hospital in 2016 with 83 infants (2.2 %) born before 37th week of gestation. The threshold for planned preterm deliveries in Jorvi hospital is 35 weeks.

Operational focus areas in the L2 ward:

- Convalescent care for preterm infants after intensive care.
- Diagnostics and in-patient care for neonates not requiring intensive care.
- Treatment of neonates suffering from withdrawal symptoms passed on from mothers with substance abuse.

In 2016, a total of 578 infants were treated in the 15 beds of the L2 ward. The average ward length of stay was 7.6 days, with a total of 3,889 in-patient days logged. Although the ward case load per hospital bed was 71 %, the utilization rate of intensive observation beds was 208 %. The ward also had 610 outpatient clinic visits.

<table>
<thead>
<tr>
<th>Ward</th>
<th>Number of patients</th>
<th>Length of stay (days)</th>
<th>Net in-patient days</th>
<th>Total ward bed occupancy rate (%)</th>
<th>Occupancy rate of beds in intensive monitoring (%)</th>
<th>Outpatient visits at the ward</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2</td>
<td>578</td>
<td>7.64</td>
<td>3889</td>
<td>71</td>
<td>208</td>
<td>610</td>
</tr>
</tbody>
</table>

The number of patients has stayed at the same level, but length of stay and net in-patient days have reduced, resulting in lower ward case load per hospital bed.

Distribution of patients by major diagnostic categories

25 % of 678 infants treated in ward L2 in 2016 had birth weight less than 2500 g. 55 % had acute respiratory disorder, 24 % neonatal sepsis or suspected infection, 11 % neonatal hypoglycemia and 11 % birth asphyxia. Single infant could have diagnosis from several diagnostic categories. The most common major diagnostic category was acute respiratory disorder.

Peer support

A group for parents and group for fathers meet weekly at the ward. The group for fathers was formed in 2014 and, in 2016, 72 fathers participated in the group. The group received positive feedback from the participating fathers. The group for parents is active, with group meetings addressing prescribed topics organized by specialists from different fields. Under the direction of a music therapist, the ward hosts a “music playschool”, where parents are taught how to sing to their newborn babies. Hospital musicians who perform at Jorvi Hospital also regularly visit the ward. The ward holds a November market each year. Preterm infants who were treated at the ward and their families are invited to the market. In 2016, the event was attended by 38 adults and 46 children.
LV37 Neonatal Ward

The Kätilöopisto Maternity Hospital is the largest maternity hospital in Finland. In 2016, 7,294 children were born, 2.5% of which were born before 37 weeks of gestation. At the Kätilöopisto Maternity Hospital, children are born on 32 weeks of gestation or later.

Since 2015, all women in labour are screened for Group B Streptococcus by using rapid testing. If the rapid test proved positive, an antibiotic treatment was administered. In 2016, not a single case of blood culture verified, early-onset sepsis caused by Group B Streptococcus was observed in neonates whose mothers were screened for Group B Streptococcus and administered antibiotics when needed.

Neonatal Ward LV37 has 21 beds, 4 of which are intensive observation beds. 5 of the beds are in family rooms on the 9th floor. Full-term and moderate preterm neonates born in the Kätilöopisto Maternity Hospital are treated in LV37. In addition, small preterms and other neonates who received intensive care are transferred from the Children’s Hospital K7 unit for convalescent care. Neonates treated in other Children’s Hospital wards are also transferred to LV37 for convalescent care. In 2016, there were 1029 in-patient periods. The corresponding figure for LV37B (family rooms) was 369. The average length of stay was 5.3 days. The hospitalization time for small preterm neonates transferred from K7 for convalescent care is several weeks. The in-patient periods for neonates suffering from withdrawal symptoms are also several weeks in duration. Although the total ward bed occupancy rate was 71%, the utilization rate of intensive observation beds was 151%. There were 5,663 in-patient days. Approximately half of the patients admitted to ward LV37 in 2016 came directly from the delivery room or dedicated obstetric OR.

A majority of the patients were discharged straight away or through the maternity wards.

K7AVO

K7AVO is a follow-up clinic for monitoring growth and development for infants being cared for in the Children’s Hospital Neonatal Intensive Care Unit K7 and Women’s Hospital Neonatal Observation Ward N7.

The patients being followed-up include preterm infants born before 32 weeks of gestation or very low birth weight (VLBW) infants (birth weight < 1500 g) and infants which have been in intensive care and/or have developmental risk factors, such as cerebral hemorrhage or periventricular leukomalacia, birth asphyxia, severe bronchopulmonary dysplasia (BPD), severe necrotising enterocolitis (post-NEC), severe nutritional problems (poor growth, severe vomiting, major eating problems), significant fetal growth restriction, severe/prolonged hypoglycemia during the neonatal period, severe infections and congenital defects.

K7AVO care is multidisciplinary - the team consists of a neonatologist, child neurologist, nurse, physiotherapist, rehabilitation counsellor, social worker, child psychiatric nurse and, if necessary, other experts. In addition, a pediatrician working as a resident in neonatology also works at the follow-up clinic weekly. Among others, Palivizumab injections are given at the nurse reception for at-risk infants in order to prevent serious RSV infections.

At the K7AVO most doctors’ visits are carried out by a neonatologist. A child neurologist is present in 31.5% of the patient visits. A physiotherapist participates in 90% of the physician consultations.

Infants with developmental risks are checked every 3-6 months at K7AVO follow-up clinic for the first year of life. Preterm infants are followed until the developmental age of 12 months. If there is any evidence of a major delay or abnormality in development, the child will begin a physical therapy program, which is carried out at home. In 2016, 60 children (19%) underwent physical therapy.
Jorvi Hospital Neonatal outpatient clinic

The Jorvi Hospital Neonatal outpatient clinic focuses on the following:

- Developmental follow-up and ophthalmologist control of preterm neonates (birth weight over 1500 g)
- Developmental follow-up of at-risk children (major neonatal growth restriction, hypoglycemia, sepsis, post-intensive care monitoring, asphyxia or neurological abnormalities)
- Follow-up of children from at-risk families (parental substance abuse, mental disorders or interactivity problems)
- Nursing neonates referred from a public health service for specialist medical treatment, with the exception of allergy diagnostics on its own.

In 2016, the pediatric outpatient clinic logged 755 physician consultations. The nurse outpatient clinic also works in close cooperation with the physician reception, which logged 41 visits.

LV37AVO outpatient clinic visits

LV37AVO, neonatal follow-up clinic in Kätilöpistomaternity Hospital, had 2,937 visits in 2016. Of these, 1,483 infants visited a neonatal nurse and 1,454 neonatologist or pediatrician. Of all physician’s visits, 35 % were patients discharged early (502/1454). The team of LV37AVO consists of 2 nurses, 1 neonatologist, 1 social worker and 1 physiotherapist. In addition a child neurologist and a resident in child neurology make weekly consultation visits.

Visits are divided into two types: short consultations for patients being discharged from the maternity ward and consultations following treatment in LV37. Additionally, infants with low or moderate developmental risks, are monitored according to the follow-up program.

LV37AVO

Vermont-Oxford Network

The treatment of small neonates is monitored using the Vermont Oxford Network. The network is an international comparative database, which includes nearly 1,000 hospitals all over the world that provide care for small neonates. A majority of the hospitals are located in the United States. All five of Finland’s university central hospitals are part of the network. Data on all preterm neonates with a birth weight of less than 1500 g or born before the 32nd week of gestation is collected for the database. In 2015, data on over 56,000 preterm neonates was entered into the database.

The comparative database makes it possible to monitor diseases and complications affecting the mortality and morbidity among small neonates, and it allows organizations to compare their own results with those of the network.

The results for K7 are of a high international standard. In comparison for 2008-2010, K7 placed in the top 6 % in terms of the survival of small neonates and discharging without any disease presenting in the patient. Comparative data for 2016 is not yet available.

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
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<tbody>
<tr>
<td>Preterm neonates with a low birth</td>
<td>114</td>
<td>56421</td>
<td>118</td>
<td>56121</td>
</tr>
<tr>
<td>Deaths</td>
<td>12</td>
<td>9</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Deaths %</td>
<td>10,5</td>
<td>12</td>
<td>7,6</td>
<td>11,8</td>
</tr>
<tr>
<td>Death or serious disease (%)</td>
<td>38,6</td>
<td>41,9</td>
<td>39,8</td>
<td>41,6</td>
</tr>
<tr>
<td>In-hospital sepsis (%)</td>
<td>23,4</td>
<td>12</td>
<td>20,7</td>
<td>12,2</td>
</tr>
<tr>
<td>NEC %</td>
<td>7,1</td>
<td>5</td>
<td>6,9</td>
<td>5,4</td>
</tr>
<tr>
<td>BPD &lt; 33 Weeks (%)</td>
<td>19,7</td>
<td>25,7</td>
<td>15</td>
<td>26,3</td>
</tr>
<tr>
<td>Pneumothorax (%)</td>
<td>3,6</td>
<td>3,6</td>
<td>12,1</td>
<td>4,3</td>
</tr>
<tr>
<td>Severe IVH (%)</td>
<td>7,1</td>
<td>7,1</td>
<td>7,0</td>
<td>7,9</td>
</tr>
<tr>
<td>Cystic PVL (%)</td>
<td>0,9</td>
<td>2,9</td>
<td>0</td>
<td>2,8</td>
</tr>
<tr>
<td>Severe ROP (%)</td>
<td>16,1</td>
<td>5,8</td>
<td>6,1</td>
<td>5,9</td>
</tr>
</tbody>
</table>


*Severe ROP% has been highly variable depending how many patients stay long enough for ophthalmologist to diagnose ROP. 2016 severe ROP was diagnosed in 4/35 patients.
Perinatal mortality

In 2016, there were 13,817 children born in the HUH area, 59 of which were stillborn and 16 expiring during the first week. The perinatal mortality rate is thus 5.4 deaths per 1,000 births. In 2015, the perinatal mortality rate at HUH was 4.6 deaths per 1,000 births. The perinatal mortality rate for all of Finland was 3.9 deaths. When considering perinatal mortality, it should be noted that known congenital heart defects and some severe congenital anomalies, such as diaphragmatic hernia, are concentrated within the HUS area out of Finland as a whole.

Treatment-related infections 2016

Since the new instructions and practices of hygiene from 2015 at Neonatal Intensive Care Ward K7, the incidence of hospital-acquired infections has decreased remarkably. In 2015 there were 25 hospital-acquired infections and 2016 the number of infections was 7. Infections / 1000 days of treatment was 6.4 in 2015 and 1.9 in 2016.

At Neonatal Observation Ward N7 there were no blood culture positive infections, at Kätilöopisto Maternity Hospital LV37 Neonatal Ward there were three early onset infections and at Jorvi Hospital L2 Neonatal Ward there were two early-onset infections and one treatment-related infection.

In 2016, two MRSA carrier states were encountered in neonatal units, one at ward L2 and the one at ward LV37. At ward K7, one ESBL positive Klebsiella pneumoniae sepsis was found, and one ESBL E.coli was found in the infected eye. ESBL E.coli positive sepsis and ESBL positive carrier state of Klebsiella pneumoniae were found at ward LV37. There was no spread of infection to the wards.

The use of vancomycin/1000 days of treatment at ward K7 has decreased from 173 and 154 in 2013 and 2014 to 127 and 73 in 2015 and 2016.

Quality of treatment and patient safety

The neonatal wards use an anonymous online reporting system called the Haipro system for reporting adverse events and close-call situations.

Research projects

Clinical research plays a major role in neonatal care unit operations. In 2015, there were 8 research projects underway.

Caffeine study

This study examines the impact that caffeine and supplemental oxygen have on the sleep and breathing of preterm neonates.

TOIBILAS

This study examines how early examination of sight or early cognitive assessment based on eye movement examination are suitable to be used in clinical work.

Vauras study

This study examines how cerebral hemorrhages affect the networking of brain functions, and attempts to prove the effect of synchrony to the development of the brains.

In 2016, physicians published a total of 22 papers.
New in 2016

Group B Streptococcus is the most common cause for early-onset sepsis in newborn babies. In 2014, Kätilöopisto Maternity Hospital piloted a screening program for women in labour using the GBS rapid test (Xpert GBS). In 2015, all women in labour at Kätilöopisto Maternity Hospital were screened for GBS and, if they tested positive, antibiotics were administered. Jorvi Hospital and Women's Hospital began screening in late 2015. In 2016, four blood culture confirmed, early-onset sepsis cases caused by group B Streptococcus were diagnosed in HUH hospitals. Three of the mothers of these children tested positive in the screening test, but for two of them antibiotics were not administered early enough. One of the mothers tested negative in the screening.

In September 2016, Finnish language web pages Keskosena kotiin (Going home with a premature baby) and Vastasyntynyt (Newborn baby) were launched in the Naistalo segment of the information portal Health Village (https://www.terveyskyla.fi/naistalo/raskaus-ja-synnytys/keskosena-kotiin and https://www.terveyskyla.fi/naistalo/raskaus-ja-synnytys/vastasyntynyt).

The Keskosena kotiin pages offer information about going home with a premature baby, and practical guidance and information about the first year of a premature baby’s life. The pages provide information regarding breastfeeding a premature baby and the importance of skin-on-skin contact and interaction for a premature baby’s development. The instructions regarding life at home are applicable to both premature babies with very low birth weight and bigger premature babies. The Vastasyntynyt pages contain information about the most common problems that may arise in the examination performed before discharge and about the most common treatment-requiring diseases newborn babies face. The content is compiled by HUH experts specialized in the treatment of premature babies.

In addition to guiding parents and improving the quality of treatment, we have also set a goal to improve collaboration with child health clinics. In 2017, a collection of pages called “Vastasyntynyt tehoidossa” (A Neonate in Intensive Care) will be added to the Lastentalo web pages currently under development.

Jorvi Maternity Ward began administering sugar gel for hypoglycemic neonates in addition to additional milk. Sugar gel treatment has been proven to reduce the need for inpatient treatment in neonates and to improve breastfeeding.

Summary

With regard to the incidence of disease, disability and death, the neonatal phase is the most high-risk stage of life. Expert, focused neonatal care makes it possible to diagnose children in need of treatment as early as possible and is cost-effective. The HUH Neonatal Care Unit cares for one out of every four neonates born in Finland and is the largest unit of its kind in the country. The size of the unit allows for continuous neonatal care and the development of specialized expertise by dividing areas of responsibility.

The unit is divided among four hospitals, which have a total of 15 intensive care beds and 41 beds in neonatal wards. The unit logged more than 14,000 in-patient days and nearly 4,000 outpatient visits. The outcome of small neonates was of a high international standard and the perinatal mortality rate is low. Neonatal care is being developed by both conducting extensive research and actively adopting new forms of treatment.
Neonatology
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N7 Neonatal Observation Ward, Women’s Hospital
L2 Neonatal Ward, Jorvi Hospital
LV37 Neonatal Ward, Kätilöopisto Maternity Hospital

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