Tõendusmaterjali kokkuvõte - EvSu

Kliiniline küsimus nr 22

Kas enneaegsete vastsündinute ravitulemi parandamiseks tuleb rakendada neonataalset intensiivravi kohapeal võrreldes vahetut sünnijärgset transporti?

Tulemusnäitajad: lapse peamised tulemusnäitajad, hingamistoetuse vajadus ja kestus, vasoaktiivse ravi vajadus ja kestus

KOKKUVÕTE:

Antud teema kohta ei leidunud ühtegi kvaliteetset süstemaatilist ülevaadet, metaanalüüsi (viimase kümnendi jooksul) ega randomiseeritud kontrollitud uuringut. Tõendusmaterjali kokuvõte on koostatud tuginedes kohortuuringutele, läbilõikelistele uuringutele, ülevaateartiklitele, viimase 15 aasta jooksul. Randomiseeritud uuringute tegemine ei ole eetilistel põhjustel võimalik.

The transfer of critically ill neonates is a nonrandomizable event, so it is not possible to design clinical trials in this field. /Longhini et al 2015.

Kokkuvõtlikult on uuringute järeldusedsarnased: vajalik on regionaliseerimine, mis parandab neonataalabi tulemusi. Patsiendid, kes geograafilisest paiknemisest tingituna (kaugus, saared, mäed) vajavad transporti, peaksid olema transporditud spetsiaalse väljaõppe saanud meeskonna poolt.

The transfer of women likely to deliver at extremely low gestation to tertiary perinatal centers is desirable. However, this is not always possible. It is known that both hypocarbia and hypercarbia are detrimental to preterm neonates. Hypocarbia has been associated with severe intraventricular hemorrhage (IVH), periventricular leukomalacia, bronchopulmonary dysplasia, and cerebral palsy. Hypercarbia has also been linked to IVH. In addition, hyperoxia is known to reduce cerebral blood flow in preterm neonates. The avoidance of hypocarbia, hypercarbia, and hyperoxia is challenging in the transport environment. /Maheshwari et al 2014.

How inter-hospital transport of very-low birth-weight (VLBW) infants correlates with their risk for IVH is not yet understood, however, multiple factors could be considered. Vigorous manipulations, kinking or obstruction of the endotracheal tube, self extubation, or iatrogenic trauma while moving the infant, should all be considered. Hypothermia and temperature instability may occur while the transported infants are riding outside the hospital, and are known not only to compromise organ perfusion but also may induce lactic acidosis. /Mohamed et Aly 2010.

The outcome for premature infants born in smaller community hospitals is worse compared with those born in larger regional centers. Higher morbidity and mortality in smaller hospitals may be related to the level of care and resources, limited availability of physician staff during non-office hours, and local resuscitation practices. Improved outcome at larger centers is related to higher patient volume, the presence of experienced and highly trained personnel, and more up-to-date patient management and equipment. /Biniwale et al 2010.

While much focus was put on optimizing the quality and availability of neonatal transfer, it is emphasized that a key factor in the long-term outcome of a sick infant is the initial care provided at the hospital of birth. Recent studies evaluating the impact of neonatal care on mortality of very low birth weight infants have witnessed a significant decline in mortality rates during the last few decades. The observed trend was attributed mainly to the increasing numbers of premature infants delivered in hospitals providing intensive care. /Arad et al 2006.

Artklite kokkuvõte:
Mohamed et Aly poolt 2010. aastal avaldatud suures (USA) rahvastikupõhises uuringus analüüsiti 67 596 enneaegselt sündinud last (< 1500 g) ja nende hilistulemeid. Tulemusena leiti, et esimese 48 elutunni jooksul transporti vajanud lastel esineb statistiliselt oluliselt enam intraventrikulaarset hemorraagiat, samuti esineb transporditud lastel enam raskema (III-IV) astme IVH-d.
Autorite sõnum ühiskonnale: *„The clinical implication of this study is to urge clinicians for more regionalisation of care and to encourage the transport of high-risk mothers to tertiary care centres. Thereby, providing these infants with a prepared environment for their preterm arrival and avoid the hazards of inter-hospital transport.“*

Chien et al 2001. aastal avaldatud, Kanada populatsioonipõhine uuring 3769 enneaegselt < 32 gestatsiooninädalal sündinud lapse seas, väidab, et transporditud lastel on suurenenud risk suremusele, III ja IV astme intraventrikulaarse hemorraagia, avatud arterioosjuha, RDSi, nosokomiaalse infektsiooni tekkeks (isegi peale andmete analüüsi kohaldamist perinataalsete riskide ja haiguse raskusastmega).

Maheshwari et al poolt 2014. aastal avaldatud artiklis on kirjeldatud retrospektiivset uuringut, milles analüüsiti 43 invasiivset ventilatsiooni vajava enneaegse patsiendi transporti ja hilistulemeid. Statistiliselt oluline tulemus leiti intraventrikulaarse hemorraagia esinemissageduse osas transporditud enneaegsete vastsündinute seas. Autorite sõnul vajab teema lisauuringuid, kuna hemoraagiate tekkes on olulised ka teised riskitegurid, mis transpordiga eelduslikult kaasnevad: hüpotermia, spetsiaalsete transportmeeskondade puudumine („kogenematud transportijad“), ebastabiilne haige.

Arad et al poolt 2006. aastal avaldatud artiklis on analüüsitud Iisraelis, Jeruusalemma linnas asuva kahe ülikooli kliinikumi tulemusi. Jeruusalemmas on kaks sünnitusmaja, millest mõlemas u 4000–4500 sünnitust aastas, kahe haigla vaheline vahemaa on 15 km, sõidukestusega u 30–40 min. Ühe sünnitusmaja juures asub kõrgema etapi vastsündinute intensiivraviosakond. Teise haigla sünnitusmaja vastsündinud, kes vajavad intensiivravi, transporditakse kõrgema etapi haiglasse. Oluline on ka fakt, et kahes sünnitusmajas töötavad neonatoloogid roteeruvad ning ka II etapi sünnitusmajas on adekvaatne stabiliseerimine (tsentraalsete kateetrite asetamine, surfaktandi manustamine, invasiivse ventilatsiooni alustamine). Uuring analüüsis kaugtulemusi (suremus, raske intraventrikulaarne hemorraagia (IVH) ja bronhopulmonaarne düsplaasia (BPD)) kahe haigla ja kahe erineva ajaperioodi võrdluses. Tulemuste osas ei leitud statistiliselt olulisi erinevusi kahe sünnitusmaja vahel – autorite järeldusena võib põhjuseks pidada adekvaatse esmase ravi rakendamist mõlemas sünnitusmajas.

Kaneko et al poolt 2015. aastal avaldatud populatsioonipõhine uuring Jaapanis, Miyazaki piirkonnas uuris erakordselt madala sünnikaaluga enneaegsete (ELBW) laste transporti ja prognoosi (suremus, neuroloogiline kaugtulem). Teadaolevalt on Miyazaki piirkond kõige

madalama perinataalse suremusega piirkond Jaapanis, kus on 34 esmatasandi naistekliinikut, 7 teise astme perinataalkeskust ja 1 kõrgema etapi perinataalkeskus. Antud piirkonnas sündis 2005–2009. aastal 50 632 last, kellest ELBW enneaegsed olid 197 last (8 perinataalkeskuses). Neist enneaegsetest 132 vajas in-utero transporti ning vaid 12 enneaegset vastsündinut transporditi peale sündi. Andmete analüüsis ei ilmnenud erinevusi prognoosis in-utero või neonataalse transpordi vahel, kuigi suremus oli suurem vastsündinute grupis, kes vajasid transporti kõrgema etapi perinataalkeskusesse (nii in-utero kui ka neonataalne transport). Autorid rõhutasid prenataalse regionaliseerimise ning neonataalse transpordi vähendamise vajalikkust.

Sarnane uuring viidi läbi Brasiilias, kus 2011. aastal Araújo et al poolt avaldatud artiklis leiti, et neonataalset transporti vajavate enneaegsete vastsündinute kohordis esines enam hüpotermiat, hüpertermiat, hüperglükeemiat ja hüpokseemiat. Transporti vajavate enneaegsete grupis oli suurem suremus, kuid statistiliselt jäi tulemus ebaoluliseks.

Goldsmit et al 2012. aastal Argentiinas avaldatud uuring (160 transporditud patsienti) väitis, et statistiliselt olulisel määral esineb transporditute grupis kliinilise seisundi halvenemist transpordi ajal (hinnati TRIPS (Transport Risk Index of Physiology Stability) skooringuga), mida seostati suurenenud riskiga suremusele.

Sama skooringu süsteemi (TRIPS) kasutasid oma 2014. aastal avaldatud uuringus Arora et al ning leidsid samuti, et transporditud laste (106 patsienti) hulgas esineb enam kliinilise seisundi halvenemist. Mida pikem oli transpordile kulunud aeg, seda suurem oli risk seisundi halvenemisele.

Costeloe et al poolt 2000. aastal avaldatud inglaste populatsioonipõhine (EPICURE) uuring leidis, et esimese 24. elutunni jooksul neonataalset tranporti vajanud lastel esines oluliselt enam raskeid kõrvalekaldeid ajuuuringutel (OR 2,61).
Soomlaste populatsioonipõhine kohortuuring, Rautava et al poolt 2013. aastal avaldatud artiklis, leidis, et transporti vajavate enneaegsete laste hulgas, keda transporditi hilisemas eas elukohajärgsesse haiglasse, esines statistiliselt oluliselt enam retinopaatiat ja astmat.

Lisaks on oluline roll vanemate arvamusel. 2015. aastal Sommer ja Cooki poolt läbiviidud uuringus hinnati vanemate eelistusi seoses vastsündinute transpordiga. Hinnati eelistusi seoses hilise ranspordiga, peale esmast ravi, elukohajärgsesse haiglasse. Vanemate hinnangul ei olnud määravaks niivõrd kaugus kodust kui teadmatus ja ebakindlus uue keskkonna ja personali ees. Vanemad eelistasid ravi jätkamist ühes asutuses.

Neonataalse transpordi ajal on vastsündinud ohustatud ka kõrgenenud müratasemest, eelkõige lennutranspordil. Sittig et al poolt 2010. aastal avaldatud artiklis uuriti vastsündinu transpordil esinevat helitugevust ning leiti, et helitugevus transpordil on 60 db ja lennukis 80 db (eelduslik helitugevus NICU-s peaks olema < 45 db), mistõttu võib kõrgem müratase ohustada kuulmist hilisemas eas. Vajalikud on lisauuringud.

Sama teema kohta leidsin 2 vastuolulist artiklit:
Esimene, USA ühe keskuse põhine uuring (Watson et al 2013) (756 enneaegset vastsündinut, < 1500 g) väidab, et neonataalse transpordi ja intraventrikulaarse hemorraagia vahel puudub seos, kui multivariatsiooni analüüsis võtta arvesse ka kliinilisi ja demograafilisi muutujaid (gestatsioonivanus, sünnikaal, sugu, ema vanus, antenataalsed

kortikosteroidid, tokolüüs, koorionamnioniit, PPROM, Apgar, hingamistoetus esmasel stabiliseerimisel jm).
Uuringu puuduseks tõid autorid välja randomiseerimise puudulikkuse ja asjaolu, et tegu on ühe keskuse põhise uuringuga.

Teine, Longhini et al poolt 2015. aastal avaldatud artikkel väidab, et neonataalne transport on ohutu ega oma riske kaugtulemile, kui see on teostatud spetsiaalse väljaõppe saanud meeskonna poolt. Hinnati transpordi kaugtulemeid kahe kõrgema etapi haigla vahel. Samas tõid autorid välja ka uuringu kitsaskohad: uuritavate suurus oli väike (75 patsienti), uuritavate hulgas oli vähe sügavalt enneaegseid ning ebastabiilseid lapsi, mistõttu selle uuringu alusel põhjapanevaid järeldusi teha ei saa.

Viited

Kokkuvõtte (abstract või kokkuvõtlikum info)	**Viide kirjandusallikale**
Background Intraventricular haemorrhages (IVH) greatly impact the outcome of very low birth weight (VLBW) infants. This study examines the correlation between inter-hospital transport and the incidence and severity of IVH in VLBW infants in a large cohort of data. **Methods** The US National Inpatient Sample Database (NIS) and its KID subportion were analysed for the years 1997–2004. Infants <1500 g were included in the study and were classifi ed into transport and inborn groups. Groups were further classifi ed according to birth weight into <1000 g and 1000–1499 g. IVH and severe IVH (grades 3–4) were compared between groups and subgroups. Adjusted OR for IVH or severe IVH in correlation with inter-hospital transport were calculated using logistic regression models while controlling for clinical and demographic confounders. We examined changing trends of the incidence of IVH, incidence of neonatal transport and OR for IVH in correlation with neonatal transport in VLBW infants over the years. **Results** A total of 67 596 VLBW infants were included in the study. Overall incidence of IVH in the sample was 14.7%; the transport group had more IVH compared to inborn group (27.4% vs 13.42%): adjusted OR 1.75 (95% CI 1.64 to 1.86; p<0.001). Severe IVH was higher in the transport group compared to the inborn group (44.1% vs 32.9%); adjusted OR 1.44 (95% CI 1.22 to 1.70, p=0.001). Similar results were demonstrated in weightbased subgroups. There was increasing trends for neonatal transport and for IVH over the years (p<0.001 for both) with no signifi cant change in the OR for IVH in transported infants. **Conclusion** Inter-hospital transport of VLBW Infants is correlated with increased incidence and severity of IVH. This correlation has remained constant over the recent years.	Mohamed MA, Aly H. **Transport of premature infants is associated with increased risk for intraventricular haemorrhage**. Arch Dis Child Fetal Neonatal Ed. 2010 Nov;95(6):F403–7.

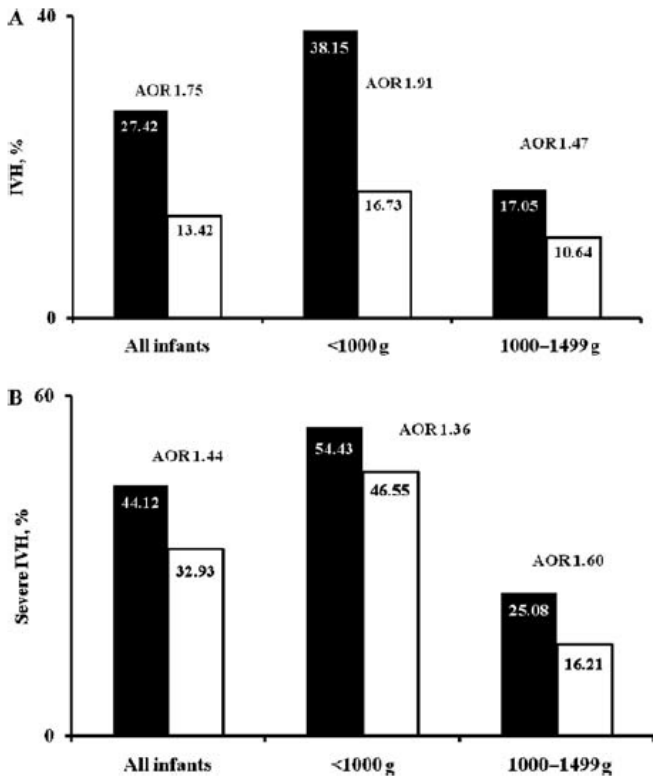


Figure 1 IVH and severe IVH in transported versus inborn groups by birthweight subgroups. (A) Intraventricular haemorrhage. (B) Severe intraventricular haemorrhage. Filled bars, transported; empty bars, inborn. AOR, adjusted OR.

Table 1 Differences between transport and inborn groups

	Transport (n= 6233)	Inborn (n=61363)	Adjusted OR	Unadjusted OR	p Value
BW <1000 g	49.1	45.7	1.15 (1.09 to 1.21)	0.96 (0.87 to 1.04)	<0.001
Female sex	46.9	49.5	0.90 (0.85 to 0.95)	1.01 (0.92 to 1.09)	0.93
White	30.0	32.2	0.90 (0.85 to 0.95)	1.05 (0.95 to 1.16)	0.38
African American	11.4	19.5	0.53 (0.49 to 0.58)	0.77 (0.67 to 0.88)	<0.001
Hispanics	17.7	11.3	1.69 (1.57 to 1.81)	2.31 (1.99 to 2.67)	<0.001
Respiratory distress syndrome	79.0	54.0	3.20 (3.01 to 3.41)	2.23 (2.02 to 2.45)	<0.001
Neonatal sepsis	42.5	32.1	1.57 (1.48 to 1.65)	1.05 (0.96 to 1.14)	0.30
Necrotising enterocolitis	7.4	4.4	1.75 (1.58 to 1.94)	1.54 (1.28 to 1.84)	<0.001
Patent ductus arteriosus	30.4	14.8	2.53 (2.38 to 2.68)	1.57 (1.41 to 1.74)	<0.001
Pulmonary haemorrhage	4.4	2.2	2.07 (1.81 to 2.36)	1.05 (0.85 to 1.3)	0.66
Apnoea of prematurity	42.6	39.1	1.16 (1.10 to 1.22)	1.39 (1.27 to 1.52)	<0.001
Perinatal asphyxia	1.9	0.9	2.25 (1.84 to 2.75)	0.90 (0.66 to 1.21)	0.47
Pneumothorax	10.8	5.4	2.11 (1.93 to 2.30)	1.35 (1.17 to 1.57)	<0.001
Persistent pulmonary hypertension	0.59	0.24	2.52 (1.76 to 3.6)	1.47 (0.74 to 2.90)	0.26
Maternal hypertension	2.4	2.3	1.05 (0.89 to 1.24)	2.70 (1.90 to 3.84)	<0.001
Chorioamnionitis	0.85	1.06	0.80 (0.60 to 1.06)	1.57 (0.97 to 2.53)	0.07
Breech delivery	0.37	0.59	0.62 (0.41 to 0.95)	0.86 (0.45 to 1.66)	0.66
Mortality	20.8	24.9	0.79 (0.74 to 0.85)	0.76 (0.70 to 0.81)	<0.001
Total IVH	27.42	13.42	2.44 (2.29 to 2.59)	1.75 (1.64 to 1.86)	<0.001
Total IVH in <1000 g	38.15	16.73	3.1 (2.84 to 3.32)	1.91 (1.76 to 2.08)	<0.001
Total IVH in 1000–1499 g	17.05	10.64	1.73 (1.56 to 1.91)	1.47 (1.33 to 1.63)	<0.001
Severe IVH*	44.12	32.93	1.61 (1.38 to 1.87)	1.44 (1.22 to 1.70)	<0.001
Severe IVH* in <1000 g	54.43	46.55	1.37 (1.13 to 1.66)	1.36 (1.12 to 1.66)	0.0023
Severe IVH* in 1000–1499 g	25.08	16.21	1.73 (1.29 to 2.32)	1.60 (1.18 to 2.18)	0.0025

*Severe IVH is presented as a proportion of the overall IVH in infants where ICD-9 code for the grade of IVH was available.

Tabelis esitatud teisi tulemusnäitajaid autorid täpsemalt ei analüüsinud.

Introduction: The objective was to evaluate the respiratory management of neonates of 23 to 26 weeks' gestation transported after birth outside a tertiary center. Another objective was to collect data regarding survival,

Maheshwari R, Luig M. **Review of respiratory**

intraventricular hemorrhage (IVH), and chronic lung disease.
Methods: This was a retrospective study of transports from a statewide dedicated neonatal and pediatric transport service over a 3-year period. Data were collected from the local databases. Neonates with and without transcutaneous carbon dioxide (TcCO2) monitoring were compared. Outcomes were compared with the inborn group from the same period.
For the purpose of this study, venous gases were excluded. Simultaneous transcutaneous CO2 (TcCO2) readings were recorded if available. A pH of less than 7.25 in arterial or capillary blood was defined as significant acidosis. Significant hypocarbia and hypercarbia were defined as PCO2 < 30 torr (=mmHg) and > 55 torr (=mmHg), respectively, in arterial or capillary blood. A pulse oximeter reading of SpO2 < 80% was defined as significant hypoxia and SpO2 > 95% while breathing supplemental O2 was defined as significant hyperoxia.
Results: A total of 43 mechanically ventilated neonates were included. Significant hypocarbia and/or hypercarbia were seen in 49%. Hyperoxia was noted in 46.5%. Despite the moderate correlation between PCO2 and TcCO2 readings, no clinical benefit was seen with TcCO2 monitoring. Survival was 65.1%. Rates of IVH were 60% for any IVH and 27.5% for severe IVH. IVH was more common in the study cohort.
Conclusions: Neonates born at 23 to 26 weeks' gestation outside tertiary centers have high rates of mortality and morbidity. The avoidance of hypocarbia, hypercarbia, and hyperoxia is challenging in the transport environment. Transcutaneous monitoring is an imperfect tool for following PCO2 levels.

Table 6. Comparison of Selected Outcomes between the Study Cohort and the Inborn Group

Outcome	Study Cohort (n = 43) (%)	Statewide Inborn Group (n = 455) (%)	*P* Value
Survival	28 (65.1)	335 (73.6)	.21
Death or CLD	31 (72.1)	311 (68.4)	.60
IVH	24/40[a] (60)	190/427[b] (44.4)	.048
Severe IVH	11/40 (27.5)	61/427 (14.3)	.01

CLD = chronic lung disease; IVH = intraventricular hemorrhage.
[a]Cranial ultrasound not available for 3 neonates in the study cohort.
[b]Cranial ultrasound not available for 28 neonates in the inborn group.

management of extremely premature neonates during transport. Air Med J. 2014 Dec;33(6):286–91.

OBJECTIVE:
Previous studies that compared outcomes of infants born outside tertiary care centers (outborn) with those born in tertiary care centers (inborn) did not account for admission illness severity and perinatal risks. The objective of this study was to examine whether outborn status is associated with higher mortality and morbidity, after adjustment for perinatal risks and admission illness severity (using the Score for Neonatal Acute Physiology, Version II [SNAP-II]) among preterm infants who were admitted to Neonatal Intensive Care Units (NICUs).
METHODS:
Logistic regression analysis was used to compare the risk-adjusted outcomes of 3769 singleton infants born at or before 32 weeks' gestation, who were admitted to 17 Canadian NICUs during 1996-1997.
RESULTS:
Outborn and inborn infants had significantly different gestational ages,

Chien LY, Whyte R, Aziz K, Thiessen P, Matthew D, Lee SK, et al. **Improved outcome of preterm infants when delivered in tertiary care centers**. Obstet Gynecol. 2001 Aug;98(2):247–52.

perinatal risk factors (maternal hypertension, prenatal care, antenatal corticosteroid therapy, 5-minute Apgar score, delivery type, small for gestational age) and admission SNAP-II. Outborn infants were at higher risk of death (adjusted odds ratio [OR] 1.7, 95% confidence interval [CI] 1.2, 2.5), grade III or IV intraventricular hemorrhage (adjusted OR 2.2, 95% CI 1.5, 3.2), patent ductus arteriosus (adjusted OR 1.6, 95% CI 1.2, 2.1), respiratory distress syndrome (adjusted OR 4.8, 95% CI 3.6, 6.3), and nosocomial infection (adjusted OR 2.5, 95% CI 1.9, 3.3), even after adjusting for perinatal risks and admission illness severity. **CONCLUSIONS:** Outborn infants were less mature and more ill than inborn infants at NICU admission. However, even after adjustment for perinatal risks and admission illness severity, inborn infants had better outcomes than outborn infants. Our results support in-utero transfer of high-risk pregnancies to a tertiary level facility.	
Background: Maternal transport, rather than neonatal transport, to tertiary care centers is generally advocated. Since a substantial number of premature deliveries still occur in hospitals with level I and level II nurseries, it is imperative to find means to improve their outcome. **Objectives:** To compare the neonatal outcome (survival, intraventricular hemorrhage and bronchopulmonary dysplasia) of inborn and outborn very low birth weight infants, accounting for sociodemographic, obstetric and perinatal variables, with reference to earlier published data. **Methods:** We compared 129 premature infants with birth weights of 750–1250 g delivered between 1996 and 2000 in a hospital providing neonatal intensive care to 99 premature babies delivered in a referring hospital. In the statistical analysis, variables with a statistical significant association with the outcome variables and dissimilar distribution in the two hospitals were identified and entered together with the hospital of birth as explanatory variables in a logistic regression. **Results:** Accounting for the covariates, the odds ratios (outborns relative to inborns) were 0.31 (95% confidence interval = 0.11–0.86, P = 0.03) for mortality, 1.37 (95%CI = 0.64–2.96, P = 0.42) for severe intraventricular hemorrhage, and 0.86 (95%CI = 0.38–1.97, P = 0.78) for bronchopulmonary dysplasia. The odds ratio for survival without severe intraventricular hemorrhage was 1.10 (95%CI = 0.55–2.20, P = 0.78). Comparing the current results with earlier (1990–94) published data from the same institution showed that mortality decreased in both the outborn and inborn infants (OR = 0.23, 95%CI = 0.09–0.58, P = 0.002 and 0.46; 95%CI = 0.20–1.04, P = 0.06, respectively), but no significant change in the incidence of severe intraventricular hemorrhage or bronchopulmonary dysplasia was observed. Increased survival was observed also in these infants receiving surfactant, more so among the outborn. The latter finding could be attributed to the early, pre-transport surfactant administration, implemented only in the current study. **Conclusions:** Our data suggest that very low birth weight outborn infants may share an outcome comparable with that of inborn babies, if adequate	Arad I, Baras M, Bar-Oz B, Gofin R. **Neonatal transport of very low birth weight infants in Jerusalem, revisited**. Isr Med Assoc J. 2006 Jul;8(7):477–82.

perinatal care including surfactant administration is provided prior to transportation to a tertiary center.	
Aim: The aim of this study was to clarify the mortality and long-term outcomes of extremely low-birthweight infants according to the process of maternal or infant transport and indications for maternal transport. ***Material and Methods:*** We conducted a retrospective cohort study based on data obtained from the Miyazaki Perinatal Data Group between 1 January 2005 and 31 December 2009 in Miyazaki Prefecture. ELBW infants and their mothers were included if the infant remained alive at delivery. ELBW infants with chromosomal abnormalities were excluded from this study. There are 34 primary obstetric hospitals, seven secondary perinatal centers and one tertiary center in Miyazaki Prefecture. The tertiary center provides comprehensive care for all ELBW infants and infants born at any gestational age or birthweight with a critical illness, with prompt and readily available access to a full range of pediatric medical subspecialists, pediatric surgical specialists, anesthesiologists and ophthalmologists and a full range of respiratory support, possibly including conventional ventilation and/or high-frequency ventilation and inhaled nitric oxide. Secondary centers provide care for ELBW infants born at 24 weeks of gestation or later weighing 500 g or more and displaying physiological immaturity and/or moderate illness with problems that are expected to resolve rapidly and not anticipated to require subspecialty services on an urgent basis as well as mechanical ventilation or continuous positive airway pressure or both. There are four medical districts, each of which has at least one secondary center. All but two primary hospitals are located within 30 minutes' access to nearby centers. There were 50 632 deliveries in Miyazaki during the study period. Eight perinatal centers treated 197 ELBW infants, 2 infants were excluded because of trisomy 18, remaining 195 infants from 189 mothers comprised our study subjects. A total of 132 neonates were born after maternal transport, there were 12 neonatal transports. The collected data included the referring and receiving hospitals, maternal age and parity, indication for transfer, maternal condition, obstetric treatment, route of delivery, neonatal characteristics and prognosis of the ELBW infants, including death and neurodevelopmental abnormalities. The prognosis of each ELBW infant was followed for at least 3 years after birth. Death included neonatal or infant death until 1 year and any death up to 3 years. Neurological complications included cerebral palsy and/or mental retardation diagnosed by independent pediatric neurologists as well as blindness or deafness. ***Results:*** There were no significant differences in the prognoses of the infants, including the rates of death and neurological impairment, between the infant groups classified according to the process of maternal transport. In the present study, 12 infants (6%) underwent transport during the neonatal period, of whom 10 were born at secondary centers. Although there were no differences in the prognosis according to the process of maternal or neonatal transport in this study, the cumulative	Kaneko M, Yamashita R, Kai K, Yamada N, Sameshima H, Ikenoue T. **Perinatal morbidity and mortality for extremely low-birthweight infants: A population-based study of regionalized maternal and neonatal transport**. J Obstet Gynaecol Res. 2015 Jul;41(7):1056–66.

survival rate was lowest among the neonates transported to tertiary centers.
Conclusion: The morbidity and mortality of extremely low-birthweight infants demonstrated a low incidence following the regionalization of high-risk pregnancies in our region. Further reductions in severe neonatal morbidities may depend on reducing the rate of neonatal transport.

Objective: To evaluate the effect of place of birth and transport on morbidity and mortality of preterm newborns in the southern region of Brazil.
Methods: This cohort study included preterm newborns transported to a reference intensive care unit (transport group = 61) and followed up until discharge. Data about care in hospital of origin and transport were obtained at admission. This group was compared with infants born in the maternity ward of the reference hospital paired according to gestational age (control group = 123). Primary outcome was death, and secondary outcomes were changes in blood glucose, temperature and oxygen saturation at admission and the incidence of necrotizing enterocolitis, bronchopulmonary dysplasia and sepsis. Relative risk (RR) was used to evaluate the association between variables and outcome. The level of significance was set at $\alpha = 5\%$ and $\beta = 90\%$.
Results: Mean travel distance was 91 km. Mean gestational age was 34 weeks. Of the neonates in the transport group, 23% (n = 14) did not receive pediatric care in the delivery room. During transportation, 33% of newborns were accompanied by a pediatrician, and the equipment available was: incubator (57%), infusion pump (13%), oximeter (49%) and device for blood glucose test (21%). The transport group had a greater incidence of hyperglycemia (RR = 3.2; 2.3-4.4), hypoglycemia (RR = 2.4; 1.4-4.0), hyperthermia (RR = 2.5; 1.6-3.9), and hypoxemia (RR = 2.2; 1.6-3.0). The percentage of deaths was 18% in the transport group and 8.9% in the control group (RR = 2.0; 1.0-2.6).
Conclusions: This study revealed deficiencies in neonatal care and transport. Perinatal care and transport should be better organized in the northeastern region of Rio Grande do Sul, Brazil.

Artikli täistekst on hispaaniakeelne.

Araújo BF, Zatti H, Oliveira Filho PF, Coelho MB, Olmi FB, Guaresi TB, et al. **Effect of place of birth and transport on morbidity and mortality of preterm newborns**. J Pediatr (Rio J). 2011 Jun 8;87(3):257–62.

Tabela 3 - Distribuição dos nascidos vivos segundo variáveis de desfecho durante a internação na unidade de terapia intensiva neonatal do Hospital Geral, Caxias do Sul, 2008-2010

Variáveis	Transporte* (n = 61) n (%)	Controles* (n = 123) n (%)	RR (IC95%)	p
HGT > 160	17 (31,5)	3 (2,9)	3,2 (2,3-4,4)	< 0,001
HGT < 40	7 (15,9)	4 (3,8)	2,4 (1,4-4,0)	0,017
Temperatura > 37,5 °C	10 (27,0)	3 (4,7)	2,5 (1,6-3,9)	0,002
Temperatura < 36 °C	24 (47,1)	50 (45,0)	1,1 (0,7-1,7)	0,472
SaO_2 < 90	19 (31,7)	5 (6,6)	2,2 (1,6-3,0)	< 0,001
DBP	2 (3,3)	9 (7,4)	0,5 (0,2-1,9)	0,341
ECN	1 (1,6)	4 (5,2)	0,4 (0,1-2,6)	0,383
Sepse precoce	2 (3,3)	9 (7,3)	0,5 (0,2-1,9)	0,230
Sepse tardia	4 (6,6)	8 (10,4)	0,7 (0,3-1,7)	0,428
Óbito	11 (18,0)	11 (8,9)	2,0 (1,0-2,6)	0,074

DBP = displasia broncopulmonar; ECN = enterocolite necrosante; HGT = hemoglicoteste; IC95% = intervalo de confiança de 95%; RR = risco relativo.
* As diferenças são decorrentes de dados sem informação.

Material and Methods. This was an observational and prospective study that consecutively included newborn infants transferred to the Neonatal Intensive Care Unit (NICU) of the Hospital Garrahan, Buenos Aires, Argentina. The TRIPS (Transport Risk Index of Physiology Stability) risk score was measured pre- and post-transport. The TRIPS score is a tool that evaluates the transport process and stability of the newborn infant during transport; it was validated in a cohort of 1723 newborn infants of various gestational ages (GA) and birth weights (BW). The TRIPS score allowed the discrimination of patients´mortality in the NICU with a relative response curve (ROC curve) of 0.83, regardless of their GA. In the original validation report, TRIPS was classified in 4 categories according to the measured value (higher numbers account for more critically ill newborn infants): low score (0-10), moderate score (11-20), high score (21-30) and very high score (> 30). Pre- and post- transport measurements allowed the detection of changes in the clinical condition during referral. In the current study the diagnosis of clinical deterioration was made when the post-transport TRIPS score was higher than the pre-transport score. Newborns characteristics, transport distance, newborns status upon admission, need for immediate cardiorespiratory support (ICRS), and death before the 7th day and at discharge were recorded. Bivariate and multivariate analyses were used to assess the associations with clinical deterioration. ***Results.*** A total of 160 transferred newborn infants were enrolled, gestational age (GA) was 35 ± 3 weeks; birth weight (BW) 2482 ± 904 g and median age 2 days. Most were referred due to cardiorespiratory (50%) or surgical (34%) illnesses. Of them, 91 (57%) had clinical deterioration and 46% hypothermia. Forty nine neonates required ICRS and 28 died (twelve before 7 days after admittance). Variables assessed were not associated with the risk of clinical deterioration. Mortality was higher in the group with clinical deterioration (OR: 3.34; 95% CI: 1.2-8.7), even when severity of the clinical picture was considered (ORA: 3; 95% CI: 1.2-8.3). Clinical deterioration during transport was associated with the need for ICRS (OR: 2.4; 95% CI: 1.2-5). ***Conclusions***. In our experience transferred newborn infants often suffered loss of stability or clinical deterioration, regardless of their characteristics, and this was related to a higher mortality. Therefore, it is critical to optimize care strategies during all neonatal transports.	Goldsmit G, Rabasa C, Rodríguez S, Aguirre Y, Valdés M, Pretz D, et al. **Risk factors associated to clinical deterioration during the transport of sick newborn infants**. Arch Argent Pediatr. 2012 Aug;110(4):304–9.

TABLE 2. *Pre-transport and post-transport TRIPS overall scores and according to risk category (assessed according to pre-transport value)*

	Pre-transport TRIPS, mean (95% CI)	Post-transport TRIPS, mean (95% CI)	p value *
Overall values, 160 newborn infants	17.57 (15.34 - 19.8)	21.38 (18.96 – 23.79)	< 0.001#
Values according to risk category			
Low (0-10) 62 newborn infants	1.67 (1.03-2.32)	5.48 (3.69-7.27)	< 0.001#
Moderate (11-20) 25 newborn infants	16.84 (15.55-18-12)	20.88 (18.08-23.07)	= 0.001#
High (21-30) 11 newborn infants	21.90 (20.51-23.30)	27.36 (21.65-34.07)	0.05
Very high (> 30) 62 newborn infants	33 (31.96-34.03)	36.41 (34.53 – 38.30)	= 0.005#

X (95% CI): mean value and 95% CI.
\# Significant.
* Wilcoxon's test for paired data.

It is not possible to state whether deterioration is secondary to progression of the condition leading to the patient's transport or whether it is related to the quality of neonatal care; however, in all cases another severity score, the SNAP, was measured, and deterioration occurred even in children with more stable conditions. SNAP II (Score for Neonatal Acute Physiology) seeks to determine the stability and severity of newborn infants, but requires to collect data for 12 hours, which hinders their use during transport.

TABLE 3. *Comparison of patients with and without clinical deterioration (CD) during transport. Bivariate analysis*

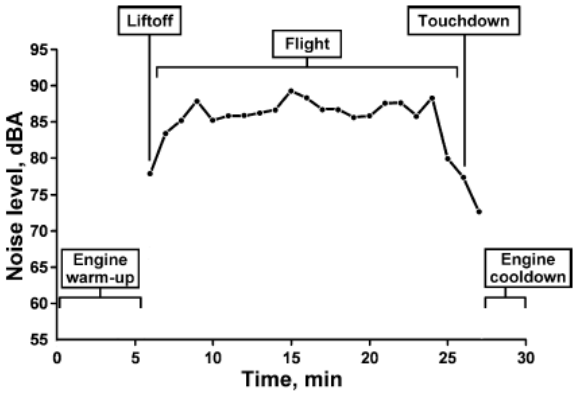
	With DC N: 91	Without DC N: 69	p value*
Days of life	10 ± 15 days	10 ± 18 days	0.88
Transport < 7 days of life	58 (64%)	51 (74%)	0.17
BW	2406 ± 926 g	2581 ± 870 g	0.22
VLBW infants (< 1500 g)	22 (24%)	10 (15%)	0.12
GA	35 ± 3 weeks	35 ± 4 weeks	0.76
SNAP	7.5 ± 5.6	6.1 ± 5.1	0.10
Pre-transport TRIPS	16 ± 13	19 ± 14	0.23
Critically ill newborn (SNAP > 14)	15 (16%)	8 (12%)	0.38
Distance > 60 km	19 (21%)	11 (16%)	0.42
Cardiorespiratory disease	48 (53%)	32 (46%)	0.42
Use of MV	50 (55%)	41 (59%)	0.57
Use of oxygen therapy	49 (54%)	29 (42%)	0.13
Use of inotropics	27 (30%)	15 (22%)	0.25
Central vascular accesses	48 (53%)	35 (51%)	0.80
Patent line	80 (88%)	60 (87%)	0.85
Antenatal diagnosis	17 (19%)	15 (22%)	0.63

t-test or Wilcoxon test- Chi-square test.
CD: clinical deterioration (post-transport TRIPS > pre-transport TRIPS).

OBJECTIVES: To evaluate the change in physiologic stability of very low-birth-weight (VLBW) infants following transport using TRIPS (transport risk index of physiologic stability) score as a measure of physiologic stability and compare changes in TRIPS score in groups of VLBW infants who underwent shorter versus longer transport. **STUDY DESIGN:** Retrospective chart review. **RESULTS:** Our cohort of 106 infants, 44 (41%) of whom were females, had a mean birth weight of 777 g (standard deviation [SD] 159) and median gestational age of 26 weeks (range 23 to 32 weeks). Mean weight at transfer was 1,610 g (SD 924) and mean postnatal age at transfer was 56 days (SD 45). Median time on transport was 15 minutes (range 10 to 85 minutes). All 106 transports were ground transports. Of the 106 infants, 57 (54%) had deterioration, 20 (19%) had improvement, and 29 (27%) had no change in their physiologic status during transport. Comparison of the two transport duration groups based on median transport time as a cutoff point (i.e., ≤ 15 minutes and > 15 minutes) revealed a higher proportion of infants with deterioration in their physiologic status in the prolonged transport (>15 minutes) group (65% versus 45%; p = 0.03). Temperature change, either alone or in combination with other indices, was responsible for change in TRIPS score (deterioration or improvement) in 79% of these infants. **CONCLUSIONS:** Interhospital transport of VLBW infants may cause deterioration in their physiologic status, the likelihood of which is increased with longer duration of transport. Better temperature regulation during interhospital transport may decrease the chances of deterioration in physiologic status of VLBW infants.	Arora P, Bajaj M, Natarajan G, Arora NP, Kalra VK, Zidan M, et al. **Impact of interhospital transport on the physiologic status of very low-birth-weight infants**. Am J Perinatol. 2014 Mar;31(3):237–44.
OBJECTIVE: To evaluate the outcome for all infants born before 26 weeks of gestation in the United Kingdom and the Republic of Ireland. This report is of survival and complications up until discharge from hospital. **METHODOLOGY:** A prospective observational study of all births between March 1, 1995 and December 31, 1995 from 20 to 25 weeks of gestation. **RESULTS:** A total of 4004 births were recorded, and 811 infants were admitted for intensive care. Overall survival was 39% (n = 314). Male sex, no reported chorioamnionitis, no antenatal steroids, persistent bradycardia at 5 minutes, hypothermia, and high Clinical Risk Index for Babies (CRIB) score were all independently associated with death. Of the survivors, 17% had parenchymal cysts and/or hydrocephalus, 14% received treatment for retinopathy of prematurity (ROP), and 51% needed supplementary oxygen at the expected date of delivery. Failure to administer antenatal steroids and postnatal transfer for intensive care within 24 hours of birth were predictive of major scan abnormality; lower gestation was	Costeloe K, Hennessy E, Gibson AT, Marlow N, Wilkinson AR. **The EPICure study: outcomes to discharge from hospital for infants born at the threshold of viability**. Pediatrics. 2000 Oct;106(4):659–71.

predictive of severe ROP, while being born to a black mother was protective. Being of lower gestation, male sex, tocolysis, low maternal age, neonatal hypothermia, a high CRIB score, and surfactant therapy were all predictive of oxygen dependency. Intensive care was provided in 137 units, only 8 of which had >5 survivors. There was no difference in survival between institutions when divided into quintiles based on their numbers of extremely preterm births or admissions. **CONCLUSIONS:** This study provides outcome data for this geographically defined cohort; survival and neonatal morbidity are consistent with previous data from the United Kingdom and facilitate comparison with other geographically based data.	
OBJECTIVE: The purpose of this study was to evaluate the relationship between intraventricular hemorrhage (IVH), inter-hospital transport and known potential risk factors for IVH. **STUDY DESIGN:** Very low birth weight (VLBW <1500 g) infants admitted to a large regional neonatal intensive care unit within 48 h of life from 2005 to 2010 were identified. Logistic regression and proportional odds logistic regression models were used to compare inborn versus outborn patients with respect to IVH (any vs none) and IVH grade, respectively. Logistic regression was used to quantify the association between outborn status and mortality. **RESULT:** A total of 758 infants were included in the study (inborn=568, outborn=190). Outborn infants were found to have greater IVH severity than inborn (odds ratio (OR): 1.52; P=0.012). After accounting for 20 clinical and demographic variables in a multivariable model, the association between outborn status and IVH lacked statistical significance (OR: 1.14; P=0.56). Significant predictors of IVH grade included vaginal delivery (OR: 2.16; P<0.001), patent ductus arteriosus (OR: 1.65; P=0.005), 5-min Apgar (OR: 0.85; P=0.005) and gestational age (OR: 0.98; P=0.012). Sixty-nine (9.1%) of the infants died. After adjusting for potential confounders, the relationship between mortality and outborn status was not significant (OR:1.26; P=0.516). Significant predictors of mortality included gestational age (OR: 1.03; P=0.04) and 5-min Apgar (OR:1.22; P=0.02). **CONCLUSION:** Although VLBW infants transported during the first 2 days of life have higher rates of IVH than infants born at a tertiary care facility, this relationship may be explained by associations with underlying clinical variables rather than transport itself.	Watson A, Saville B, Lu Z, Walsh W. **It is not the ride: inter-hospital transport is not an independent risk factor for intraventricular hemorrhage among very low birth weight infants**. J Perinatol. 2013 May;33(5):366–70.
Objective: To verify if preterm neonates transferred between tertiary referral centers have worse outcomes than matched untransferred infants. **Design:** Cohort study with a historically matched control group. **Setting:** Two tertiary-level neonatal ICUs. **Patients**: Seventy-five neonates per group. **Interventions:** Transfer between tertiary-level neonatal ICUs carried out by a fully equipped transportation team.	Longhini F, Jourdain G, Ammar F, Mokthari M, Boithias C, Romain O, et al. **Outcomes of Preterm Neonates Transferred Between Tertiary Perinatal**

Measurements and Main Results: We measured in-hospital mortality, frequency of intraventricular hemorrhage greater than 2nd grade, periventricular leukomalacia, necrotizing enterocolitis greater than or equal to grade 2, bronchopulmonary dysplasia, composite outcomes (in-hospital mortality/bronchopulmonary dysplasia, in-hospital mortality/intraventricular hemorrhage > 2nd grade, and bronchopulmonary dysplasia/periventricular leukomalacia/ intraventricular hemorrhage > 2nd grade), length of neonatal ICU stay, weight at discharge, and time spent on ventilatory support. Seventy-five similar (except for antenatal steroids administration) neonates were enrolled in each cohort. Cohorts did not differ in mortality, bronchopulmonary dysplasia, intraventricular hemorrhage greater than 2nd grade, periventricular leukomalacia, necrotizing enterocolitis greater than or equal to grade 2, any composite outcomes, neonatal ICU stay, weight at discharge, and duration of respiratory support. Results were unchanged adjusting for antenatal steroids. **Conclusions:** Neonatal transfer between tertiary-level centers does not impact on clinical outcomes, if performed under optimal conditions. Our results cannot be generalized for extremely sick neonates. In fact, our population only consisted of patients without much risk of complications (no surgery, no malformations, and few extremely preterm neonates).	**Centers**. Pediatr Crit Care Med. 2015 Oct;16(8):733–8.
Objective: The purpose of this study was to evaluate exposure of neonates to noise during air medical transport as few commercially available hearing protective devices exist for premature newborns during air medical transport. **Methods:** Sound pressure levels in an infant incubator during actual flight conditions in four common medically configured aircraft were measured. Three noise dosimeters measured time-weighted average noise exposure during flight in each aircraft. One dosimeter was placed in the infant incubator, and the remaining dosimeters recorded noise levels in various parts of the aircraft cabin. **Results:** The incubator provided a 6-dBA decrease in noise exposure from that in the crew cabin. The average noise level in the incubator in all aircraft was close to 80 dB, much higher than the proposed limits of 45 dB for neonatal intensive care unit noise exposure or 60 dB during transport. **Conclusions:** Exposure of neonates to elevated noise levels during transport may be harmful, and steps should be taken to protect the hearing of this patient population.	Sittig SE, Nesbitt JC, Krageschmidt DA, Sobczak SC, Johnson RV. **Noise levels in a neonatal transport incubator in medically configured aircraft**. Int J Pediatr Otorhinolaryngol. 2011 Jan;75(1):74–6.

 Fig. 1. Incubator Noise during BK 117 Flight Periods.	
Objective: To assess the safety of surfactant administration prior to transport of premature infants. **Design/Methods:** We performed a retrospective review of 24- to34-weeks premature infants admitted to the Newborn IntensiveCare Unit (NICU) between July 1, 1999 and September 30, 2004. Outcome measures were the presence of hyperventilation (PCO2 <40 mm Hg) and/or pneumothorax on admission to the NICU. Factors associated with the presence of hyperventilation and pneumothorax were identified. **Results:** 955 infants born at 24 to 34 weeks' gestation were admitted to the NICU during the study period. 217 (22.7%) received surfactant prior to transport within 48 hours of birth. The incidence of hyperventilation was 18.9%. Hyperventilated infants had longer transport times, lower birth weights, and lower PCO2 on blood gases obtained prior to transport. Pneumothorax occurred in six subjects (2.9%). Neonates with pneumothorax had lower APGAR scores. **Conclusions:** We found the administration of surfactant prior to transport to be safe as evidenced by a low incidence of pneumothorax. Pneumothorax was more likely to occur in infants who needed significant resuscitation at birth. The incidence of hyperventilation appeared to be high and was inversely associated with birth weight.	Biniwale M, Kleinman M. **Safety of surfactant administration before transport of premature infants**. Air Med J. 2010 Aug;29(4):170–7.
Objective: To determine whether birth and care in the highest-level hospitals (level III) compared with birth in or postnatal transfer to lower-level hospitals (level II) are associated with 5-year morbidity in very preterm children. **Design:** A cohort study. **Setting:** Finland. **Participants:** All surviving 5-year-old children born very preterm (gestational age _32 weeks or birth weight _1500 g) born in level II or level III hospitals (n=2168) and full-term (gestational age, 37-42 weeks) children (n=238 857) born from January 1, 2000, through December 31, 2004. **Main Outcome Measures:** Diagnoses issued after the first discharge home and overrepresented in very preterm compared with full-term children. Diagnoses were analyzed between very preterm children (1) born and treated in level III hospitals (group III), (2) born in level III and	Rautava L, Eskelinen J, Häkkinen U, Lehtonen L, PERFECT Preterm Infant Study Group. **5-year morbidity among very preterm infants in relation to level of hospital care**. JAMA Pediatr. 2013 Jan;167(1):40–6.

transferred to lower-level hospitals (group III/II), and (3) born and treated in level II hospitals (group II).
Results: Group III/II children had an increased incidence of retinal disorders (odds ratio, 2.43 [95% CI, 1.66- 3.56]) and asthma (1.41 [1.09-1.81]) but fewer viral infections (0.75 [0.59-0.95]) compared with group III infants. The risks for epilepsy (odds ratio, 2.71 [95% CI, 1.29-5.70]) and hyperkinetic disorders (2.19 [1.13-4.25]) were higher among group II than among group III children. No statistically significant differences between the groups for the 14 other diagnoses were found.
Conclusions: The increased incidence of retinopathy and asthma among infants transferred from level III to lowerlevel hospitals calls for analysis of the differences in treatment practices between hospital levels.

Table 3. Diagnoses Overrepresented in Very Preterm Children Compared With Full-Term Children Arranged Into 14 Groups of Diagnoses[a]

ICD-10 Code	*ICD-10* Diagnosis	No. (%) of Study Patients: All (N = 2168)	Group III (n = 686)	Group III/II (n = 1085)	Group II (n = 397)
Diagnoses likely to be influenced by the level of neonatal care					
F80	Disorders of speech	212 (10.0)	59 (8.6)	125 (11.5)	28 (7.1)
F82	Specific developmental disorder of motor function	207 (9.5)	59 (8.6)	124 (11.4)	24 (6.0)
F83	Mixed specific developmental disorders	155 (7.1)	56 (8.2)	67 (6.2)	32 (8.1)
H35	Retinal disorders (retinopathy of prematurity was diagnosed in 98% of these infants)	220 (10.1)	48 (7.0)	166 (15.3)	6 (1.5)
H50, H52, and H53	Strabismus, disorders of refraction and accommodation, amblyopia ex anopsia	391 (18.0)	142 (20.7)	190 (17.5)	59 (14.9)
G40	Epilepsy	63 (2.9)	15 (2.2)	31 (2.9)	17 (4.3)
G80	Cerebral palsy	109 (5.0)	33 (4.8)	56 (5.2)	20 (5.0)
F90	Hyperkinetic disorders	61 (2.8)	21 (3.1)	20 (1.8)	20 (5.0)
J45	Asthma	449 (20.7)	122 (17.8)	257 (23.7)	70 (17.6)
J15, J18, J20, J21, J22, J35, H65, H66, J03, J04, and J06	Upper and lower respiratory tract infections	1399 (64.5)	447 (65.2)	724 (66.7)	228 (57.4)
Any of the diagnoses likely to be influenced by the level of neonatal care		1631 (75.2)	514 (74.9)	846 (78.0)	271 (68.3)
Diagnoses overrepresented in preterm infants but not likely to be influenced by the level of neonatal care					
A08, A09, and B34	Gastroenteritis, viral infection of unspecified site	463 (21.4)	168 (24.5)	212 (19.5)	83 (20.9)
A10 and N39.0	Pyelonephritis, urinary tract infection of unspecified site	90 (4.2)	35 (5.1)	37 (3.4)	18 (4.5)
K40	Inguinal hernia	337 (15.5)	102 (14.9)	179 (16.5)	56 (14.1)
K59	Other functional intestinal diseases	113 (5.2)	35 (5.1)	59 (5.4)	19 (4.8)
Any of the abovementioned diagnoses		1760 (81.2)	561 (81.8)	889 (81.9)	310 (78.1)

Abbreviations: *ICD-10, International Statistical Classification of Diseases, 10th Revision.*
[a]Groups are described in the first footnote to Table 1. The cumulative 5-year incidence of these diagnoses is presented according to the study group.

Background: Regionalised transfer of preterm infants is routine practice in neonatal care throughout westernised countries. Regionalised transfer from high to lower acuity units occurs once infants are deemed well enough for convalescence and therefore is a sign of an infant's improving health. However, many parents find transfer a traumatic experience.
Aims: To investigate parents' perceptions of the regionalised transfer of preterm infants within the New Zealand context; to provide neonatal healthcare professionals with information regarding parental perceptions of the regionalised transfer of preterm infants with the view to optimising service provision.
Methods: Participants were mothers or fathers who were domiciled for two metropolitan hospitals, whose baby was born less than 29 weeks gestation; whose infant received care in the neonatal intensive care unit

Sommer CM, Cook CM. **Disrupted bonds: Parental perceptions of regionalised transfer of very preterm infants. A small scale study**. Contemp Nurse. 2015 Oct 30;1–26.

(NICU) and later transferred to their local hospital, within the last three years. Semi-structured interviews were conducted with six parents of infants. **Findings:** Three themes were interpreted through data analysis: NICU – incomparable haven; abandonment; and parental expertise side-lined. These themes represent a journey of interrupted identity that parents undergo when their baby is transferred to another unit. This study has highlighted how the routine transfer of babies can create significant setbacks for parents. Although these obstacles may be unintentional, their consequences, particularly disruption to parental attachment and experience, can be substantial. Nursing care may be enhanced when staff recognise how the transfer of infants translates into significant losses, changes and adjustments for families.	

Ravijuhendid

Kokkuvõte ravijuhendites leiduvast:

Sekretariaadi poolt eelnevalt hinnatud ravijuhenditest käsitlevad antud teemat põgusalt 2 ravijuhendit:

1) European Consensus Guidelines on the Management of Neonatal Respiratory Distress Syndrome (RDS) in Preterm Infants 2013

Ravijuhend soovitab raseda prenataalset transporti kõrgema etapi sünnitusmajja, postnataalset vastsündinu transporti ravijuhend ei käsitle.

Women at high risk of very preterm birth should be transferred to perinatal centres with experience in management of RDS (C).

Clinicians should consider short-term use of tocolytic drugs to allow completion of a course of prenatal corticosteroids and/or in utero transfer to a perinatal centre (B).

Grades of recommendation: GRADE

A	At least one meta-analysis, systematic review or RCT rated as 1++ and directly applicable to the target population or A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population and demonstrating consistency of results
B	A body of evidence including studies rated as 2++, directly applicable to the target population and demonstrating consistency of results or Extrapolated evidence from studies such as 1++ or 1+
C	A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating consistency of results or Extrapolated evidence from studies rated as 2++
D	Evidence level 3 or 4 or Extrapolated evidence from studies rated as 2+

GRADE = Grading of recommendations assessment, development and evaluation [5]; RCT = randomized controlled trial.

2) Care of extremely premature infants, The Swedish National Board of Health and Welfare, 2014

Where a premature birth threatens to occur before 28 weeks, provided that the birth is not immediately imminent, the expectant mother should be transported to a hospital with access to specialist obstetrics and neonatal care.

Rootsi enneaegse sünnituse ja enneaegse vastsündinu ravijuhend käsitleb transpordi teemat riigisisese Rootsi neonataalabi kvaliteediregistri põhiselt. Juhend rõhutab in-utero transpordi olulisust, kui on jätkuvalt vajalik neonataalne transport, siis seda peaks tegema spetsiaalselt väljaõppinud meeskond, kuna enneaegse vastsündinu transport on riskiteguriks aju hemorraagiate tekkeks.

OTSINGUD:

Search	Add to builder	Query	Items found	Time
#48	Add	Search ((((((((((("premature infant") OR "premature infants") OR "premature newborn") OR "premature newborns") OR "premature neonate") OR "premature neonates") OR "preterm infant") OR "preterm infants") OR "preterm newborn") OR "preterm newborns") OR "preterm neonate") OR "preterm neonates")) OR (("Infant, Premature"[Mesh]) OR "Infant, Low Birth Weight"[Mesh]))) AND transfer Filters: Systematic Reviews; Meta-Analysis; Randomized Controlled Trial; published in the last 10 years	24	05:38:16
#47	Add	Search ((((((((((("premature infant") OR "premature infants") OR "premature newborn") OR "premature newborns") OR "premature neonate") OR "premature neonates") OR "preterm infant") OR "preterm infants") OR "preterm newborn") OR "preterm newborns") OR "preterm neonate") OR "preterm neonates")) OR (("Infant, Premature"[Mesh]) OR "Infant, Low Birth Weight"[Mesh]))) AND transfer Filters: Systematic Reviews; Meta-Analysis; published in the last 10 years	11	05:37:38
#46	Add	Search ((((((((((("premature infant") OR "premature infants") OR "premature newborn") OR "premature newborns") OR "premature neonate") OR "premature neonates") OR "preterm infant") OR "preterm infants") OR "preterm newborn") OR "preterm newborns") OR "preterm neonate") OR "preterm neonates")) OR (("Infant, Premature"[Mesh]) OR "Infant, Low Birth Weight"[Mesh]))) AND transfer Filters: Systematic Reviews; published in the last 10 years	11	05:37:24
#44	Add	Search ((((((((((("premature infant") OR "premature infants") OR "premature newborn") OR "premature newborns") OR "premature neonate") OR "premature neonates") OR "preterm infant") OR "preterm infants") OR "preterm newborn") OR "preterm newborns") OR "preterm neonate") OR "preterm neonates")) OR (("Infant, Premature"[Mesh]) OR "Infant, Low Birth Weight"[Mesh]))) AND transfer Filters: published in the last 10 years	364	05:36:49
#42	Add	Search (transfer) AND neonatal Filters: published in the last 10 years	1796	05:32:52
#41	Add	Search ((((((((((((((("premature infant") OR "premature infants") OR "premature newborn") OR "premature newborns") OR "premature neonate") OR "premature neonates") OR "preterm infant") OR "preterm infants") OR "preterm newborn") OR "preterm newborns") OR "preterm neonate") OR "preterm neonates")) OR (("Infant, Premature"[Mesh]) OR "Infant, Low Birth Weight"[Mesh]))) OR neonatal)) AND (((transfer) OR transportation) OR transport) Filters: published in the last 10 years	4025	05:31:34
#40	Add	Search ((((((((((((((("premature infant") OR "premature infants") OR "premature newborn") OR "premature newborns") OR "premature neonate") OR "premature neonates") OR "preterm infant") OR "preterm infants") OR "preterm newborn") OR "preterm newborns") OR "preterm neonate") OR "preterm neonates")) OR (("Infant, Premature"[Mesh]) OR "Infant, Low Birth Weight"[Mesh]))) OR neonatal)) AND (((transfer) OR transportation) OR transport)	9520	05:31:20
#39	Add	Search ((transfer) OR transportation) OR transport	975390	05:31:07
#38	Add	Search transfer	392098	05:30:51
#37	Add	Search transportation	77950	05:30:45
#36	Add	Search transport	550123	05:30:37
#35	Add	Search ((((((((((("premature infant") OR "premature infants") OR "premature newborn") OR "premature newborns") OR "premature neonate") OR "premature neonates") OR "preterm infant") OR "preterm infants") OR "preterm newborn") OR "preterm newborns") OR "preterm neonate") OR "preterm neonates")) OR (("Infant, Premature"[Mesh]) OR "Infant, Low Birth Weight"[Mesh]))) OR neonatal	248944	05:30:28
#34	Add	Search neonatal	192365	05:30:16
#33	Add	Search ((((((((((("premature infant") OR "premature infants") OR "premature newborn") OR "premature newborns") OR "premature neonate") OR "premature neonates") OR "preterm infant") OR "preterm infants") OR "preterm newborn") OR "preterm newborns") OR "preterm neonate") OR "preterm neonates")) OR (("Infant, Premature"[Mesh]) OR "Infant, Low Birth Weight"[Mesh])	84446	05:30:08