



# Birth & transfer



european standards of  
care for newborn health

**EFGNI** european foundation for  
the care of newborn infants



*Topic Expert Group*

**Birth & transfer**

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## *Topic Expert Group: Birth & transfer*

### **Overview**

Pregnancy and childbirth represent a critical time period requiring proper counselling about potential pregnancy complications. Women – especially those at risk – can be supported by a broad range of interventions that aim at reducing the risk of preterm birth and improving the health of mother and infant.

One aspect is that the regional organisation of perinatal care needs to be based on designated centres of care, categorised as specialist or non-specialist centres, specifying activity that is appropriate in each (1–5). In order to manage women at risk, to prevent preterm birth, and to ensure appropriate care for preterm infants, differentiation between low-risk and high-risk pregnancies is important. One essential component of obstetric care is the education of pregnant women about signs and symptoms of preterm birth (6–9), as it fosters the early identification of women at risk for pregnancy complications and preterm birth.

In critical situations during the ante-, intra- and post-partum period, maternal and/or neonatal transfer may be required, as provision of specialist care may reduce the incidence of preterm birth and the associated fetal/neonatal and maternal complications.(5,10,11) As newborn infants born to women transferred antenatally have better outcomes than those transferred postnatally, the primary goal of perinatal centralisation is that women and newborn infants receive obstetric and neonatal care in appropriate facilities.(5,10,11) It is important to recognise that neonatal transports, when necessary, are a critical phase with specific needs for a specialised team and equipment to ensure maximal safety and efficiency.(12) Both maternal and neonatal transfer should be carried out in a timely, safe, and efficient manner, following the aim to avoid separation of mother and baby.

The Topic Expert Group on Birth and transfer develops standards on organisational aspects of perinatal care, including antenatal transport of the mother with her baby in the womb and adequate intra- and inter-hospital transport of the newborn baby. Furthermore, the standards focus on information provision and counselling about potential risk factors for preterm birth.

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## **Collaboration with parents in ante- and perinatal care**

Schlembach D, Simeoni U, Nagy Bonnard L, Bernloehr A, Cetin I, Gente M, Grosek S, Jourdain G, Rossi R, Roth-Kleiner M

### *Target group*

Pregnant women, their partners, and families

### *User group*

Healthcare professionals, neonatal units, hospitals, and health services

### *Statement of standard*

Pregnant women and their partners receive complete and accurate personalised information and support during pregnancy and childbirth to achieve efficient, optimal and respectful collaboration.

### *Rationale*

In order to achieve efficient and effective collaboration, parents must receive accurate and understandable information during pregnancy and birth. Better collaboration with parents will be achieved by timely and interdisciplinary counselling in a language they can easily understand. (1–5)

This should comprise of a comprehensive counselling/advice on pre-conceptual and maternal issues, sexual and reproductive health, healthy lifestyle, healthy pregnancy, and place and mode of delivery. (1,3–20)

Pregnancy and childbirth represent a critical time period when a woman can be supported through a variety of interventions aimed at reducing the risk of preterm birth and improving her health and that of her unborn infant. (8,10–23) This includes basic antenatal care, identification of women at risk for pregnancy complications and preterm birth, allowing preventive measures and therapeutic interventions to be implemented in cases of threatened preterm delivery (i.e. tocolytics, antibiotics, antenatal corticosteroids for lung maturation, and magnesium sulphate for neuroprotection). (1–28)

### *Benefits*

- Better informed pregnant women and their partners (3–10,12,13,16–20)
- Reduced risk and early recognition of pregnancy complications allowing earlier prophylactic and therapeutic treatments (1,11–15,23–28)
- Better informed parents in situations necessitating consensual decisions such as preterm labour or preterm delivery and/or postnatal care (1–20)
- Improved parental confidence when interacting with healthcare professionals (2–20)
- Reduced stress and anxiety for parents (2–20)



### *Components of the standard*

<b>Component</b>	<b>Grading of evidence</b>	<b>Indicator of meeting the standard</b>
<b>For parents and family</b>		
1. (Pregnant) women are informed by healthcare professionals about risk factors, symptoms/signs for impending pregnancy complications and information on patient organisations. (1,3,4,9,16)	A (High quality) B (High quality)	Patient information sheet
2. Parents are informed by healthcare professionals about available techniques and procedures for diagnosis, and therapies, including associated risks. (1,9)	A (High quality) B (High quality)	Patient information sheet
3. Parents receive timely counselling with trained and experienced multidisciplinary staff to discuss their fears and concerns and to make informed decisions about the pregnancy and their infant. (1,3,5,6,8)	A (High quality) B (High quality)	Clinical records, parent feedback, patient information sheet, training documentation
4. Parents have access to psychological support during pregnancy and during their time on the neonatal unit. (29,30) (see TEG Follow-up & continuing care, see TEG Infant- and family-centred developmental care)	A (High quality) B (High quality)	Parent feedback
5. Expectant parents with high-risk pregnancies can visit the neonatal unit and get to know the team. (5) (see TEG Infant- and family-centred developmental care)	A (High quality) B (High quality)	Parent feedback
<b>For healthcare professionals</b>		
6. A unit policy on collaboration with parents in ante- and perinatal care is adhered to by all healthcare professionals.	B (High quality)	Audit report
7. Training on communicating clinical information to parents to ensure they receive relevant information is attended by all healthcare	A (High quality) B (High quality)	Parent feedback, training documentation



professionals. (31,32)

8. Data used to counsel parents set local specific data in context of national outcomes.	B (High quality)	Audit report, guideline
<b>For neonatal unit</b>		
9. A unit policy on collaboration with parents in ante- and perinatal care is available and regularly updated.	B (High quality)	Audit report
10. The neonatal and obstetric teams work together to produce information for mothers with high-risk pregnancies and jointly counsel parents.	B (High quality)	Clinical record, parent feedback
<b>For hospital</b>		
11. Training on communicating clinical information to parents in ante- and perinatal care is ensured.	B (High quality)	Training documentation
12. Accommodation is available for the partner in the hospital or nearby and other family members are allowed to visit. (5,33–35)	A (High quality) B (High quality)	Audit report
13. Satisfaction with parent information and communication are regularly audited.	B (High quality)	Audit report, parent feedback
<b>For health service</b>		
14. A national guideline on collaboration with parents in ante- and perinatal care is available and regularly updated.	B (High quality)	Guideline
15. Parent representatives contribute to the development of a guideline for high-risk pregnancies and infants.	B (Moderate quality)	Guideline



### *Where to go – further development of care*

<b>Further development</b>	<b>Grading of evidence</b>
For parents and family	
<ul style="list-style-type: none"><li>Women of reproductive age are informed about healthy lifestyle in preparation for pregnancy by healthcare professionals.</li></ul>	B (Moderate quality)
For healthcare professionals	
<ul style="list-style-type: none"><li>Offer second opinions for important decisions.</li></ul>	B (Moderate quality)
For neonatal unit	
N/A	
For hospital	
N/A	
For health service	
<ul style="list-style-type: none"><li>Provide public information concerning management, survival and outcomes for infants born at extremely low gestation deliveries or with major anomalies.</li></ul>	B (Moderate quality)

### *Getting started*

#### **Initial steps**

##### For parents and family

- Parents are verbally informed about the importance of healthy pregnancy and about the risks and symptoms of preterm birth by healthcare professionals.

##### For healthcare professionals

- Attend training on communicating clinical information to parents in ante- and perinatal care.
- Establish joint counselling between the neonatal and obstetric teams.
- Develop strategies to allow parents to take their parental role.

##### For neonatal unit

- Develop and implement a policy on collaboration with parents in ante- and perinatal care.
- Develop information material on pregnancy complications and preterm birth including relevant support groups.
- Facilitate prenatal visits to NICU.

##### For hospital

- Support healthcare professionals to participate in training on communicating clinical information to parents in ante- and perinatal care.
- Develop strategies and resources to support parents in their wider societal context.

##### For health service

- Develop and implement a national guideline on collaboration with parents in ante- and perinatal care.
- Engage parent representatives in perinatal healthcare planning.



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## **Information provision for women about the risk for preterm birth (PTB)**

Schlembach D, Simeoni U, Nagy Bonnard L, Bernloehr A, Cetin I, Gente M, Grosek S, Johnston L, Jourdain G, Kainer, Ratnavel N, Rossi R, Roth-Kleiner M, Visser G

### *Target group*

Pregnant women and their partners

### *User group*

Healthcare professionals caring for women, perinatal units, hospitals, and health services

### *Statement of standard*

All (pregnant) women receive timely information and counselling about potential risk factors for and signs and symptoms of preterm birth and how to find appropriate healthcare advice. (see TEG Follow-up & continuing care)

### *Rationale*

Risk identification and education regarding the signs and symptoms of preterm birth are essential components of obstetric care. They should be a routine part of obstetric care, since counselling of women and their partners and early intervention may be effective in reducing the risk of preterm birth. Healthcare providers (be it a midwife, general practitioner or an obstetrician/gynaecologist) should be able to advise and appropriately triage patients at risk for preterm birth. (1–10)

Differentiation between low risk and high risk pregnancies is important to assess the best strategy of preventing preterm birth or managing women at risk. Specific standards of care should be applied to women with known risk factors for preterm birth. Early detection and provision of specialist care may reduce the incidence of preterm birth and the associated fetal/neonatal and maternal complications. (1–10) Although for the majority of preterm births the cause may be uncertain, there are specific risk constellations that women and healthcare professionals should be aware of.

Criteria/risk factors for preterm birth include pregnancy related factors, demographic and behavioural factors, underlying medical conditions of the mother and fetal conditions (detailed information see table at “description”). (1–10)

### *Benefits (4,7,11–22)*

#### *Short-term benefits*

- Better informed women and partners (6,11–14,17,20–24)
- Improved pregnancy follow-up (4,11,15,17,20,21)
- Earlier recognition of impending complications (4,11,15,19–21)
- Earlier transfer/referral to a specialist (4,11,15,17,19–21)
- Better and earlier initiation of prophylactic or therapeutic regimens (4,11,15,17–21)
- Reduced perinatal mortality and morbidity (12,15–21,24)
- Reduced maternal mortality and morbidity (12,17–19,23,24)
- Reduced healthcare costs (12,17)



### *Long-term benefits*

- Improved short- and long-term outcomes (mother and infant/child) (consensus)
- Reduced healthcare costs (consensus)
- Increased population awareness about pregnancy complications (consensus)

### *Components of the standard*

<b>Component</b>	<b>Grading of evidence</b>	<b>Indicator of meeting the standard</b>
<b>For parents and family</b>		
1. (Pregnant) women are informed by healthcare professionals about risk factors and also symptoms and/or signs for impending pregnancy complications. (13,14,20–24)	A (High quality) B (High quality)	Patient information sheet
2. Accurate communication (all essential information) is provided. (13,14)	A (High quality) B (High quality)	Parent feedback
<b>For healthcare professionals</b>		
3. Training on the risks and signs of preterm birth and tools for assessment of risk for impending preterm birth is attended by all responsible healthcare professionals. (25–30)	A (High quality) B (High quality)	Training documentation
4. Professional and empathic communication is provided. (13,14)	A (High quality) B (High quality)	Healthcare professional feedback, parent feedback
5. Women at risk for very preterm birth are cared for exclusively in specialist centres. (31–33)	A (High quality) B (High quality)	Audit report
<b>For perinatal unit</b>		
6. A unit guideline on procedures and algorithms for the management of threatened preterm birth and underlying conditions is available and regularly updated. (34)	A (High quality) B (High quality)	Guideline
7. Women at risk for very preterm birth are referred and transferred to appropriate delivery clinic in a timely fashion. (31–33)	A (High quality) B (High quality)	Audit report



For hospital		
8. Training on the risks and signs of preterm birth and tools for assessment of risk for impending preterm birth is ensured.	B (High quality)	Training documentation
9. Continuous quality improvement programme is in place. (35)	A (High quality) B (Moderate quality)	Audit report
For health service		
10. A national guideline on procedures and algorithms for the management of threatened preterm birth and underlying conditions is available and regularly updated.	B (High quality)	Guideline
11. Regional networks for perinatal care are established. (36)	A (High quality)	Regional network
12. Risk reduction programmes are in place.	B (Moderate quality)	Audit report
13. An appropriate working environment for pregnant women is provided by employers. (37)	C (High quality)	Workplace legislation

*Where to go – further development of care*

Further development	Grading of evidence
For parents and family	
<ul style="list-style-type: none"> <li>Advocate for enhanced maternity and paternity leave benefits.</li> </ul>	B (High quality)
For healthcare professionals	
<ul style="list-style-type: none"> <li>N/A</li> </ul>	
For perinatal unit	
<ul style="list-style-type: none"> <li>N/A</li> </ul>	
For hospital	
<ul style="list-style-type: none"> <li>N/A</li> </ul>	
For health service	
<ul style="list-style-type: none"> <li>Encourage or promote increase in funding of research on the causes and prevention of preterm birth.</li> </ul>	B (Moderate quality)



## *Getting started*

### **Initial steps**

#### For parents and family

- Parents are verbally informed in a timely manner on healthy pregnancy and pregnancy complications by healthcare professionals.

#### For healthcare professionals

- Attend training on the risks and signs of preterm birth and tools for assessment of risk for impending preterm birth and pregnancy complications.
- Counsel women/couples (e.g. by midwives, general practitioners, obstetricians/gynaecologists).

#### For perinatal unit

- Develop and implement a unit guideline on procedures and algorithms for the management of threatened preterm birth and underlying conditions.
- Distribute information material on healthy pregnancy and pregnancy complications for parents.

#### For hospital

- Support healthcare professionals to participate in training on the risks and signs of preterm birth and tools for assessment of risk for impending preterm birth.

#### For health service

- Develop and implement a national guideline on procedures and algorithms for the management of threatened preterm birth and underlying conditions.
- Develop information material on healthy pregnancy and pregnancy complications for parents.

## *Description*

### *Risk factors for preterm birth (3–10)*

#### Pregnancy related conditions

- Reproductive history: history of (spontaneous) preterm birth or abortion
- Preterm labour: may be caused by several conditions: multiples, hydramnios, infection, ...
- Multiple pregnancy
- Pregnancy complications: Gestational diabetes, hypertensive disorders (preeclampsia), intrauterine growth restriction, vaginal bleeding in early pregnancy, cervical insufficiency
- Assisted reproduction techniques: higher number of multiples and increased risk of pregnancy complications
- Uterine/cervical infections

#### Fetal conditions

- Fetal malformations
- Intrauterine growth restriction



#### Underlying medical conditions

- Uterine or cervical abnormalities
- Chronical medical disorders: hypertension, renal insufficiency, diabetes mellitus, autoimmune diseases, anemia

#### Demographic factors

- Age: particularly young (<17 years) or older women (>35 years)
- Ethnicity: higher risk for preterm birth in black women
- Socioeconomic background: low education level, low income, little social support does play a role for preterm birth
- Genetic influence: Specific fetal and maternal genotypes

#### Modifiable lifestyle risk factors

- Short inter-pregnancy interval
- Smoking or substance abuse
- Exposure to environmental pollutants
- Under- and overweight (obesity)
- Unbalanced diet
- High stress level
- Suboptimal prenatal care

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## **Maternal transfer for specialist care**

Cetin I, Schlembach D, Simeoni U, Nagy Bonnard L, Bernloehr A, Gente M, Grosek S, Jourdain G, Kainer F, Radzeviciene L, Ratnavel N, Rossi R, Roth-Kleiner M

### *Target group*

Pregnant women and their partners

### *User group*

Healthcare professionals, perinatal units, hospitals, and health services

### *Statement of standard*

Transfer of pregnant women for specialist care (for mother and/or newborn infant) is an essential component of perinatal care and is carried out in a timely, safe and efficient manner.

### *Rationale*

As newborn infants born to women transferred antenatally have better outcome than those transferred postnatally, the primary goal of perinatal centralisation is that women and newborn infants receive obstetric and neonatal care in appropriate facilities. Maternal transfer refers to the transfer of a pregnant woman during the ante-, intra- and occasionally also postpartum period for special care of the woman, the newborn infant, or both. (1–15)

Antepartum transfer avoids separation of mother and the newborn infant in the immediate postpartum period, allows mothers to communicate directly with neonatal intensive care unit (NICU) healthcare providers, and supports the goal of family-centred care. (16) Establishing uniform indications and contraindications for maternal transfer and formal transfer agreements (emphasising needs and requirements and capacity of local resources and facilities) will help to ensure safe transfer. (12,15)

The main factor to consider when deciding the need for maternal transfer is that expected benefits outweigh potential risks of maternal transfer. (12,15) The condition to be ultimately avoided is a birth occurring during maternal transfer. In case this is foreseen, and the centre does not have the appropriate level of care for that birth, neonatal transfer has to be organised immediately, according to the clinical, structural and geographical situation already before birth. (1,2,12–15,17,18)

### *Benefits*

- Improved medical care for pregnant women and their infants (2,19,20)
- Improved neonatal, maternal and family outcome (2–8,10,11,15,19,20)
- Improved long-term maternal and child health (consensus)
- Improved education/training for healthcare professionals (1,21,22)
- Improved organisation of perinatal care (1,2,18,20,21,23,24)
- Reduced healthcare costs (4)



### *Components of the standard*

<b>Component</b>	<b>Grading of evidence</b>	<b>Indicator of meeting the standard</b>
<b>For parents and family</b>		
1. Expectant parents are referred prenatally to the appropriate centre. (11,25–29)	A (High quality) B (High quality)	Audit report, clinical records
2. Expectant parents are counselled about the reasons for maternal transfer by healthcare professionals.	B (High quality)	Patient information sheet
<b>For healthcare professionals</b>		
3. A unit guideline on maternal transfer identifying different degrees of urgency is adhered to by all healthcare professionals.	B (High quality)	Guideline
4. Training on the indications and contraindications for maternal transfer is attended by all responsible healthcare professionals. (12,15,30)	A (High quality) B (High quality)	Guideline, training documentation
5. Training on neonatal life support is attended by all responsible healthcare professionals. (see TEG Education & training)	B (High quality)	Training documentation
<b>For perinatal units</b>		
6. A unit guideline on maternal transfer identifying different degrees of urgency is available and regularly updated.	B (High quality)	Guideline
7. Step down care and transfer back to referring hospital is provided as soon as clinically indicated. (25)	A (Low quality) B (High quality)	Audit report, clinical records
8. Adherence to the requirements and boundaries of the assigned level of care is ensured.	C (Moderate quality)	Audit report guideline
9. Units are part of a regional perinatal network.	B (Moderate quality) C (Moderate quality)	Audit report



For hospital		
10. Training on the indications and contraindications for maternal transfer as well as neonatal life support is ensured.	B (High quality)	Training documentation
11. Appropriate resources necessary to facilitate maternal transfer are available, including an appropriately trained team. (12,14,15)	A (High quality) C (Moderate quality)	Audit report, training documentation
For health service		
12. A national guideline on maternal transfer identifying different degrees of urgency is available and regularly updated.	B (High quality)	Guideline
13. A real-time system to identify availability of beds (maternal/neonatal) is established.	B (Moderate quality)	Audit report
14. A regional perinatal transfer network according to the local necessities (distance, geographic peculiarities, communication) in order to ensure safety requirements for maternal/neonatal transfer is designed and quality is regularly controlled. (23,31)	C (Low quality)	Audit report

*Where to go – further development of care*

Further development	Grading of evidence
For parents and family N/A	
For healthcare professionals N/A	
For perinatal unit N/A	
For hospital	
<ul style="list-style-type: none"> <li>Have a sufficient number of trained healthcare professionals (midwives, obstetricians, anaesthesiologists) in maternal transfer available.</li> </ul>	B (Moderate quality)
<ul style="list-style-type: none"> <li>Provide appropriate facilities including parking for families who are separated in emergency situations.</li> </ul>	B (Moderate quality)
For health service	
<ul style="list-style-type: none"> <li>Build communication tools between hub and sub centres with dedicated phones and web services (eHealth regional/national database for perinatal units).</li> </ul>	B (Moderate quality)



## Getting started

### Initial steps

#### For parents and family

- Parents are verbally informed by healthcare professionals about indications for maternal transfer to the appropriate level of care.

#### For healthcare professionals

- Attend education and training about indications, contraindications, and necessities for maternal transfer.
- Be aware of and follow protocols for maternal transfer.
- Attend specialty training through on-the-job training or through professional education programmes.

#### For perinatal unit

- Develop and implement a guideline on maternal transfer.
- Develop information material on maternal transfer for parents.
- Establish perinatal networks.

#### For hospital

- Support healthcare professionals to participate in training on the indications and contraindications for maternal transfer as well as neonatal life support.
- Provide perinatal units with appropriately trained healthcare professionals and equipment for transfer.
- Identify and provide resources for establishing and maintaining or cooperating with ambulance services.

#### For health service

- Develop and implement a national guideline on maternal transfer.
- Provide regional/national eHealth databases for perinatal units.

## Description

When preterm or medical complications are anticipated, early consultation with and transfer to the appropriate centre as necessary is mandatory.

### *The most common obstetric indications for maternal transfer\** (12,14,15)

- Preterm labour
- Preterm rupture of membranes
- Severe hypertensive disorders (preeclampsia/HELLP syndrome)
- Antepartum haemorrhage (controlled haemorrhage and stable maternal condition)
- Medical disorders complicating pregnancy (such as diabetes, renal disease...)
- Multiple gestation
- Intrauterine growth restriction
- Fetal abnormalities
- Maternal trauma

\*Usually for gestational ages below 32 or 34 weeks, depending on the health service structure



Under some circumstances, maternal transfer is not possible, such as: (12,14,15)

- Unstable condition of the pregnant woman
- Uncontrolled haemorrhage
- Unstable fetal condition, threatening to deteriorate rapidly
- Imminent delivery
- No experienced attendants available to accompany the woman
- Too risky weather conditions

#### *Consent for transfer*

Appropriate time should be dedicated to explaining to the mother and the family the reasons for transfer and provide adequate directions for the family to the new centre.

#### *Equipment for maternal transfer (14,15)*

- Vehicles are equipped as for every high risk/emergency patient with an additional “Emergency Birth Kit” (a sealed kit should be available in every vehicle used for transfer of a pregnant woman):
  - Tocolytic drugs
  - Magnesium sulphate (for eclampsia prophylaxis)
  - Antihypertensive drugs
  - In case of unexpected birth: Cord clamps, scissor, warm blanket for the newborn infant (space blanket), uterotonic drugs, container for placenta, retaining system (to secure the newborn infant with the mother during skin to skin during journey)
  - If the delivery occurs in the ambulance, in most cases only initial steps of resuscitation may be needed (for about 99% of the newborn infants step A and B of ILCOR will be sufficient) – figure; someone skilled in neonatal life support should travel with the mother if she is in active labour. (32) (see TEG Medical care & clinical practice)
  - Equipment: neonatal bag/mask (sizes 0 to 2) system, neonatal laryngoscope, battery-powered suction device, suction catheter (size 8, 10 and 12 CH), Guedel airways (size 4, 5 & 6), SpO<sub>2</sub> probe, orogastric feeding tube

Appropriate transfer protocols should be available, in particular for emergency events occurring during transfer such as eclamptic fits, placental abruption, cord prolapse, delivery during transfer, neonatal resuscitation, post-partum haemorrhage, sepsis, maternal cardiac arrest

Drugs with the best safety profile should be utilised during transfer, i.e. tocolytics with less maternal side effects. MEOWS (maternal early warning signs) charts should be filled in during transfer. (33,34)

#### *Source*

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european standards of  
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## Neonatal transport

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### *Target group*

Infants and parents

### *User group*

Healthcare professionals, neonatal units, hospitals, health services, and regional neonatal transport services

### *Statement of standard*

Infants are transferred by a dedicated, specialised medical service that offers a quality of care similar to that promoted in a NICU.

### *Rationale*

The regional organisation of perinatal care based on primary, secondary and tertiary care (see TEG Birth & transfer) mandates the provision of infant transport services to facilitate the flow of patients through the system when antenatal transfer is impossible. (1) Neonatal transport is a critical phase of perinatal care, with specific needs for a specialised team and equipment to ensure maximal safety and efficiency. (2–5) Consensus guidelines and recommendations are proposed by healthcare professionals on paediatric and neonatal inter-facility transport. (1) Efficiency of specialised paediatric and neonatal transport has been evaluated in several studies. (6–15) When an infant no longer needs higher levels of care, a transfer to a hospital closer to the family's home is recommended. This also optimises the use of available cots for all levels of care and allows the local hospital staff to familiarise themselves with the patient who will be followed up locally.

A standard detailing facilities and capabilities of transport services in the special environment of an ambulance, helicopter or fixed wing aircraft is thus needed throughout Europe.

Inter-hospital communication and regulation of transfers are complex and time consuming tasks that need to be managed by a dedicated call handling/regulation centre at the regional level, covering a sufficiently large area to reach a critical volume of activity.

Intra-hospital neonatal transfer, in particular in situations where the delivery room and the NICU are not adjacent, is also critical and warrants the same standard.

### *Benefits*

#### *Short-term benefits*

- Improved medical care and outcomes for infants needing transfer (6–15)
- Improved transfer conditions (consensus)
- Optimised use of NICU and perinatal centres resources (consensus)



### *Long-term benefits*

- Improved outcomes for infants and families (consensus)
- Improved overall performance of regional organisation of perinatal care and reduction of healthcare costs (consensus)

### *Components of the standard*

<b>Component</b>	<b>Grading of evidence</b>	<b>Indicator of meeting the standard</b>
<b>For parents and family</b>		
1. Parents and family are informed about all aspects of the transfer of the infant by healthcare professionals.	B (High quality)	Parent feedback, patient information sheet
2. Parents/one parent are able to accompany the infant during transfer.	B (High quality)	Parent feedback, patient information sheet
<b>For healthcare professionals</b>		
3. A unit guideline on neonatal transport is adhered to by all responsible healthcare professionals.	B (High quality)	Guideline
4. Education and training, including medical simulation training and continuous education/training, are attended by members of the transport team and for other neonatal and obstetric healthcare professionals involved in neonatal transport. (16) (see TEG Education & training)	A (Moderate quality) B (High quality)	Guideline, training documentation
<b>For neonatal unit and hospital</b>		
5. A unit guideline on intra-hospital neonatal transport, including transport of newborn infants in critical conditions, as part of the hospital organisation is available and regularly updated.	B (High quality)	Guideline
6. Trained and experienced healthcare professionals as well as equipment resources needed for intra-hospital neonatal transport are provided.	B (High quality)	Audit report, training documentation
7. Education and training, including medical simulation training and continuous education/training, are attended by members of the transport team and other neonatal and obstetric	A (Moderate quality) B (High quality)	Guideline, training documentation



healthcare professionals involved in neonatal transport. (16) (see TEG Education & training)

For health service and regional neonatal transport service		
8.	A regional/national guideline on inter-hospital neonatal transport is available and regularly updated.	B (High quality)      Guideline
9.	Health service is responsible for the provision of a regional neonatal transport service allowing complete preservation of life functions, such as body temperature maintenance, haemodynamic, respiratory, neurologic, metabolic functions and sepsis management (see description).	B (Moderate quality)      Audit report
10.	Nurse or midwife assisted neonatal transport of newborn infants who do not need medical assistance (e.g. transfer of newborn infants for step down care) is available.	B (Moderate quality)      Guideline
11.	A unique regional call and transfer regulation center is organised and continuously available, with a dedicated call number and real time information on the available cots in primary, secondary and tertiary centres.	B (Low quality)      Audit report

*Where to go – further development of care*

Further development	Grading of evidence
For parents and family	
<ul style="list-style-type: none"> <li>Parents are involved in the monitoring of quality of organisation of perinatal care and neonatal transport.</li> </ul>	B (Low quality)
For healthcare professionals	
<ul style="list-style-type: none"> <li>Ensure that neonatal transport healthcare professionals are trained, using real conditions and medical simulation. (17,18)</li> </ul>	A (Low quality)
For neonatal unit	
<ul style="list-style-type: none"> <li>Ensure the availability of a trained and experienced dedicated team for intra-hospital neonatal transport and for participation in regional transport.</li> </ul>	B (High quality)
For hospital	
N/A	



#### For health service and regional neonatal transport service

- Provide stringent quality improvement programmes including parental satisfaction. B (Low quality)

### *Getting started*

#### **Initial steps**

##### For parents and family

- Parents are verbally informed by healthcare professionals about the transport of their infant.

##### For healthcare professionals

- Attend continuous training on neonatal transfer.

##### For neonatal unit

- Develop and implement a unit guideline on neonatal transport.
- Develop information material on neonatal transport for parents.
- Equip and staff each neonatal unit for intra-hospital transport and eventual participation to inter-facility transport.

##### For tertiary level hospital

- Support healthcare professionals to participate in training on neonatal transport.
- Coordinate specialised inter-hospital transport service.

##### For health service and regional neonatal transport service

- Develop and implement a national guideline and/or a policy statement on neonatal transport.
- Support the development of information material on neonatal transport for parents.
- Provide and structure regional perinatal transport services, including quality control.

### *Description*

#### *Staff and equipment for neonatal transfers*

Staff and equipment should be dedicated to undertaking neonatal transport.

#### Vehicle for road transfer

- A dedicated vehicle should be reserved for neonatal transport
- Vehicles to be used for neonatal transport should conform to European Standard EN 1789 (16)
- In addition, vehicles should have
  - Seating for at least three staff/family
  - No-lifting loading & unloading of incubator equipment
  - Supplies of compressed medical gases sufficient for double the longest anticipated transfer.
  - Secure power supply such that medical equipment may be powered from the vehicle without using incubator batteries.
  - Fridge for drugs conservation



#### Air transport (helicopter or fixed wing)

- Neonatal transport service must have a structured access to air transport service and facilities.

#### Equipment

- The neonatal equipment used should conform to European Standards EN 13976-1 and EN 13976-2. (18)
- Equipment used for neonatal transport in air ambulances should additionally conform to EN 13718 - Medical vehicles and their equipment. Air ambulances. Requirements for medical devices used in air ambulances. (17)
- Equipment should be configured such that transported infants
  - Are kept in the thermoneutral temperature zone.
  - Receive the necessary respiratory support.
  - Receive the necessary fluid and drug infusions.
  - Have their vital signs monitored appropriately.
  - Who become critically unstable in transit can receive emergency care (airway, breathing, circulation).

#### Staff for transfer

- For ground transfers the drivers of vehicles should hold relevant training for driving emergency vehicles.
- The clinical team should include nurse, advanced clinical practitioner, doctor or paramedic depending on the clinical needs of the patient. Healthy infant transfers may be conducted by a nurse alone.
- The clinical team should have received neonatal transport-specific training and be supported by continuing education for transport.
- The work of the clinical team should be supported by transport-specific clinical guidelines.
- Where air transport is anticipated all the staff involved should have received air transport training and preparation and this should be refreshed annually.

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## Organisation of perinatal care

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### *Target group*

Infants, parents, and families

### *User group*

Healthcare professionals, perinatal units, hospitals, and health services

### *Statement of standard*

Perinatal care is organised in specialist and non-specialist centres to ensure access to optimal, preferably evidence-based, care with respect to medical knowledge, organisation structure, and staff.

### *Rationale*

In order to deliver the appropriate level of maternal and perinatal care tailored to the severity of risk, the regional organisation of care needs to be based on designated centres of care, categorised as specialist or non-specialist centres, specifying activity that is appropriate in each. (1–10) Establishing clear, uniform criteria for designation of maternal and perinatal centres that are integrated with emergency response systems will help ensure that the appropriate numbers of trained personnel, physical space, equipment and technology are available to achieve optimal outcomes. It will also facilitate subsequent data collection regarding risk-appropriate care and has been shown to be efficient and effective in producing the best outcome for mothers and infants. (1–35)

### *Benefits*

- Improved medical care for all pregnant women and their partners, but especially for women at risk for pregnancy complications (1,10,15,23–25,27,28,34–36)
- Improved (physical and psychological) maternal outcome (1,10,15,22,24,25,27–29,34,36)
- Improved neonatal care and outcome (1,8,10,11,13,14,16,18,19,21,23,26,30–33,36)
- Improved education/training for healthcare professionals (1,27,28,36,37)
- Increased specialist expertise (1,24,25,27,28,36,37)

### *Components of the standard*

Component	Grading of evidence	Indicator of meeting the standard
For parents and family		
1. Expectant parents are informed by healthcare professionals about the organisation of perinatal care and the importance of appropriate level of care.	B (High quality)	Patient information sheet



2. Expectant parents receive appropriate expert care. (1,5,7–10,12,13,15–17,19,22,28–37)	A (High quality) B (High quality)	Parent feedback, patient information sheet
3. Care is relocated as close as possible to home as soon as clinically indicated. (5)	A (Low quality) B (High quality)	Audit report
<b>For healthcare professionals</b>		
4. A unit guideline on the management of high risk pregnancies is adhered to by all healthcare professionals.	B (High quality)	Guideline
5. Training on the management of high risk pregnancies is attended by all responsible healthcare professionals.	B (High quality)	Training documentation
6. Healthcare professionals practice as part of a regional perinatal care network with access to agreed protocols and guidelines.	B (Moderate quality)	Audit report, training documentation
<b>For perinatal unit</b>		
7. A unit guideline on the management of high risk pregnancies is available and regularly updated.	B (High quality)	Guideline
8. Expertise in the management of high risk pregnancies is developed in specialist centres.	B (Moderate quality)	Audit report
9. Capacity planning is facilitated.	B (Moderate quality)	Audit report
10. Care is enhanced by network based education in non-specialist centres.	B (Moderate quality)	Audit report
<b>For hospital</b>		
11. Training on the management of high risk pregnancies is ensured.	B (High quality)	Training documentation
12. Appropriate resources are available for the level of perinatal care. (38)	C (Moderate quality)	Audit report, training documentation
13. A continuous perinatal care quality improvement programme is established. (38)	C (Moderate quality)	Audit report
14. Accommodation is available for the partner when required. (see TEG NICU design)	B (Moderate quality)	Audit report



For health service		
15. Regional perinatal networks are organised.	B (High quality)	Audit report
16. A national guideline on the management of high risk pregnancies is available and regularly updated.	B (High quality)	Guideline
17. Regional / national oversight is established to ensure safety requirements for pregnancy and birth. (9,36)	A (Low quality)	Audit report
18. A perinatal information system to support quality assessment, certification, and audit of network units is established and maintained. (38)	C (Moderate quality)	Audit report

### *Where to go – further development of care*

Further development	Grading of evidence
For parents and family	
<ul style="list-style-type: none"> <li>Parents are involved in the monitoring of quality of organisation of perinatal care and neonatal transport.</li> </ul>	B (Low quality)
For healthcare professionals	
N/A	
For perinatal unit	
<ul style="list-style-type: none"> <li>Ensure the availability of trained and experienced maternal-fetal specialists throughout the 24 hours.</li> </ul>	B (High quality)
<ul style="list-style-type: none"> <li>Dedicate accommodation within the hospital for expectant parents.</li> </ul>	B (Low quality)
<ul style="list-style-type: none"> <li>Benchmark services against national/international data (such as Europeristat). (38)</li> </ul>	A (High quality)
For hospital	
N/A	
For health service	
<ul style="list-style-type: none"> <li>Benchmark perinatal outcomes using European obstetric surveillance system (such as Europeristat). (38)</li> </ul>	A (High quality)
<ul style="list-style-type: none"> <li>Regional / National oversight is established to ensure safety requirements for pregnancy and birth. (9,36)</li> </ul>	A (Low quality)

### *Getting started*

Initial steps
For parents and family
<ul style="list-style-type: none"> <li>Parents are verbally informed by healthcare professionals about perinatal care.</li> </ul>



#### For healthcare professionals

- Attend training on perinatal care.
- Enhance specialty training through on-the-job training and professional education programmes.

#### For perinatal unit

- Develop and implement a unit guideline for standard and emergency care as well as transfer.
- Distribute information material for parents on perinatal care.
- Develop clinical perinatal networks.

#### For hospital

- Support healthcare professionals to participate in training on perinatal care.
- Collect information on perinatal care standards and equip perinatal units with appropriate healthcare professionals and material for patient care and training.
- Provide resources for establishing and maintaining a perinatal unit.
- Provide opportunities for on-the-job training, and experiential learning environments (clinical placements) for students undertaking professional education programmes.
- Develop clinical perinatal networks.

#### For health service

- Develop and implement a national guideline for standard and emergency care as well as transfer.
- Develop information material for parents on perinatal care.
- Submit and review perinatal data and output of surveillance systems.
- Monitor perinatal outcomes using European obstetric surveillance system (such as Europeristat).

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