

**Royal Hospital for Women (RHW)**  
**NEONATAL BUSINESS RULE**  
**COVER SHEET**



**Health**  
South Eastern Sydney  
Local Health District

**Ref: T25/64321**

<b>NAME OF DOCUMENT</b>	Rickham Reservoir Management in Neonates
<b>TYPE OF DOCUMENT</b>	Clinical Business Rule
<b>DOCUMENT NUMBER</b>	RHW CLIN175
<b>DATE OF PUBLICATION</b>	October 2025
<b>RISK RATING</b>	Medium
<b>REVIEW DATE</b>	October 2028
<b>FORMER REFERENCE(S)</b>	N/A
<b>EXECUTIVE SPONSOR</b>	Sally Wise, Nursing Co-Director Neonatal Services Srinivas Bolisetty, Medical Co- Director Neonatal Services
<b>AUTHOR</b>	S Binoy (Neonatal Nurse Practitioner), S Bolisetty (Medical Co- Director), R Jackson (Nurse Educator), E Jacobson (Neurosurgeon, Sydney Children's Hospital Network)
<b>SUMMARY</b>	This CBR provides guidance on the safe performance of a Rickham Reservoir tap and the monitoring required following the tap in a neonate within the Newborn Care Centre.
<b>Key Words</b>	Rickham Reservoir Tap, Neonate, Head Ultrasound, cerebral spinal fluid, CSF, head circumference, Rickham reservoir

**Contents**

1	BACKGROUND.....	3
2	RESPONSIBILITIES .....	3
2.1	Staff	3
3	PROCEDURE .....	4
3.1	Indications.....	4
3.2	Assessment of neonate prior to Rickham tap .....	4
3.3	Contraindications to consider .....	4
3.4	Potential Complications.....	4
3.5	Equipment.....	4
3.5.1	General equipment.....	4
3.5.2	Equipment for Rickham reservoir tap (Picture 1) .....	5
3.6	Clinical Practice.....	5
3.6.1	Procedure Preparation .....	5
3.6.2	Performing Rickham reservoir tap .....	7
3.6.3	Post-Procedure Monitoring.....	8
3.7	Documentation .....	8
3.8	Education Notes.....	8
3.9	Abbreviations .....	8
3.10	Related Policies/procedures.....	9
3.11	References.....	9
4	ABORIGINAL HEALTH IMPACT STATEMENT DOCUMENTATION.....	9
5	CULTURAL SUPPORT .....	10
6	NATIONAL STANDARDS .....	10
7	REVISION AND APPROVAL HISTORY .....	10
	Appendix 1 NSW Health Consent for Medical Procedure/ Treatment (Minors) .....	11

*This Clinical Business Rule (CBR) is developed to guide safe clinical practice at the Royal Hospital for Women (RHW). Individual patient circumstances may mean that practice diverges from this Clinical Business Rule. Using this document outside RHW or its reproduction in whole or part, is subject to acknowledgement that it is the property of RHW and is valid and applicable for use at the time of publication. RHW is not responsible for consequences that may develop from the use of this document outside RHW.*

*Within this document we will use the term woman, this is not to exclude those who give birth and do not identify as female. It is crucial to use the preferred language and terminology as described and guided by each individual person when providing care.*

## 1 BACKGROUND

A Rickham reservoir is often required to decompress the Rickham system in neonates with hydrocephalus (excess cerebrospinal fluid [CSF] within the brain). The reservoir can then be used to aspirate CSF whilst the need for a more permanent ventriculoperitoneal shunt is evaluated.

This CBR aims to provide a guide for medical and nursing staff on the procedure for Rickham reservoir tap.

Terminology	Definition
Cerebrospinal Fluid (CSF)	Liquid that circulates around brain and spinal cord.
Hydrocephalus	A condition characterised by excessive accumulation of CSF within the Rickham system of the brain.
Rickham Reservoir	A type of Rickham reservoir that is surgically implanted by the neurosurgeon into the Rickham system of the brain.

## 2 RESPONSIBILITIES

### 2.1 Staff

- 2.1.1 NCC Medical (consultant, fellow, advanced trainee)/Neonatal Nurse Practitioner (NNP)- be assessed as competent to perform Rickham reservoir tap by Sydney Children's Hospital (SCH) neurosurgical consultant/fellow/registrar, inform parents and gain consent for procedure, review head ultrasound images and document findings in medical record, perform clinical assessments prior to tap, perform Rickham reservoir taps as indicated, send CSF samples to pathology, monitor and manage any complications of Rickham reservoir tap and document procedure in medical record.
- 2.1.2 SCH Neurosurgeons- train and assess NCC medical staff in how to perform a Rickham reservoir tap, inform parents and gain consent for procedure, review head ultrasound images and document findings in medical record, perform clinical assessments prior to taps, perform

**Rickham Reservoir Management in Neonates**

**RHW CLIN175**

Rickham taps as indicated, send CSF samples to pathology, and document procedure in medical record.

- 2.1.3 NCC Nursing- assist medical staff with procedure, administer appropriate pain relief as required, perform clinical assessment prior to procedure, monitor neonate for any complications, inform medical staff of any complications, perform post- procedure monitoring.
- 2.1.4 Ultrasound technician- perform head ultrasounds as requested, report on head ultrasound and document in medical record.

### **3 PROCEDURE**

#### **3.1 Indications**

- Rapidly increasing head circumference (HC) and/or,
- Signs/symptoms of raised intracranial pressure such as full or tense anterior fontanelle, split sutures, lethargy, seizures) and/or,
- Ultrasound evidence of progressive ventriculomegaly.

#### **3.2 Assessment of neonate prior to Rickham tap**

- Perform a HC prior to procedure.
- Follow Neurosurgery orders for frequency and volume of CSF to be drained.
- Perform a clinical assessment on the neonate (both medical and nursing).

#### **3.3 Contraindications to consider**

- Coagulopathy.
- Local signs of infection or skin breakdown related to reservoir.

#### **3.4 Potential Complications**

- Inform and consent parent/carers, ensuring they have been advised of the benefits and potential complications<sup>1</sup> associated with the Rickham reservoir tap:
  - Apnoea/bradycardia, pallor and hypotension: The medical officer/NNP should immediately stop aspiration and consider normal saline intravenous bolus
  - Skin break-down over reservoir site
  - Hyponatremia: Monitor serum electrolytes regularly (every second day to once a week as required) and supplement as necessary
  - Infection
  - Hypoproteinemia: ensure adequate protein intake

#### **3.5 Equipment**

##### **3.5.1 General equipment**

- Sharps disposal container
- NSW Health Consent for medical procedure/treatment (minor) form (appendix 1)
- Measuring tape for HC
- Cleaning wipes as per infection control policy

### 3.5.2 Equipment for Rickham reservoir tap (Picture 1)

- Surgical hat and mask
- Sterile gown
- Sterile gloves x 2
- Dressing Pack
- Sterile plastic drape (large) x1
- Blue Inco-pad x1
- Chlorhexidine 0.5% + Alcohol 70% antiseptic solution (e.g. SurgiPrep C pink solution)
- 25" G Butterfly needle
- 20mL intravenous syringe X1
- Container for CSF sample (number needed for amount of sample being taken)
- Tegaderm
- Procedure trolley



Picture 1

### 3.6 Clinical Practice

**Note:**

Procedure can be performed by NICU consultant/fellow/NNP/advanced trainee, and SCH Neurosurgical consultant/fellow/registrar.

#### 3.6.1 Procedure Preparation

- Before performing the procedure independently, the proceduralist must have successfully completed a minimum of two supervised taps under the guidance of a senior clinician (SCH neurosurgical registrar/fellow/consultant).
  - Once NCC medical staff are trained by SCH neurosurgical team, subsequent training of NCC medical staff can occur by NICU consultant/fellow/NNP
- Inform parent/carers of procedure including indication, contraindications and any complications that may occur.
- Gain consent from parents/carers (Appendix 1).
- Prior to procedure, confirm with neurosurgeon on the necessity, frequency, and amount of CSF to be drawn. **Maximum amount is approximately 10mL/kg.**
- Perform hand hygiene.
- Perform a HC prior to the procedure, perform hand hygiene and document in medical record.

- Document the latest ventricular index (VI), anterior horn width (AHW) and thalamo-occipital distance (TOD) reported on the head ultrasound.
  - VI and AHW are measured on a coronal view at the level of the third ventricle/foramen of Monro (Figure 1).
    - VI: Distance between the falx and the lateral wall of the anterior horn
    - AHW: Diagonal width of the frontal horn, at the widest point measured at right angles to the longest dimension.
  - TOD: Distance between the outermost point of the thalamus at its junction with the choroid plexus and the outermost part of the occipital horn in the parasagittal plane (figure 2). TOD is measured in the parasagittal plane (Fig 2)

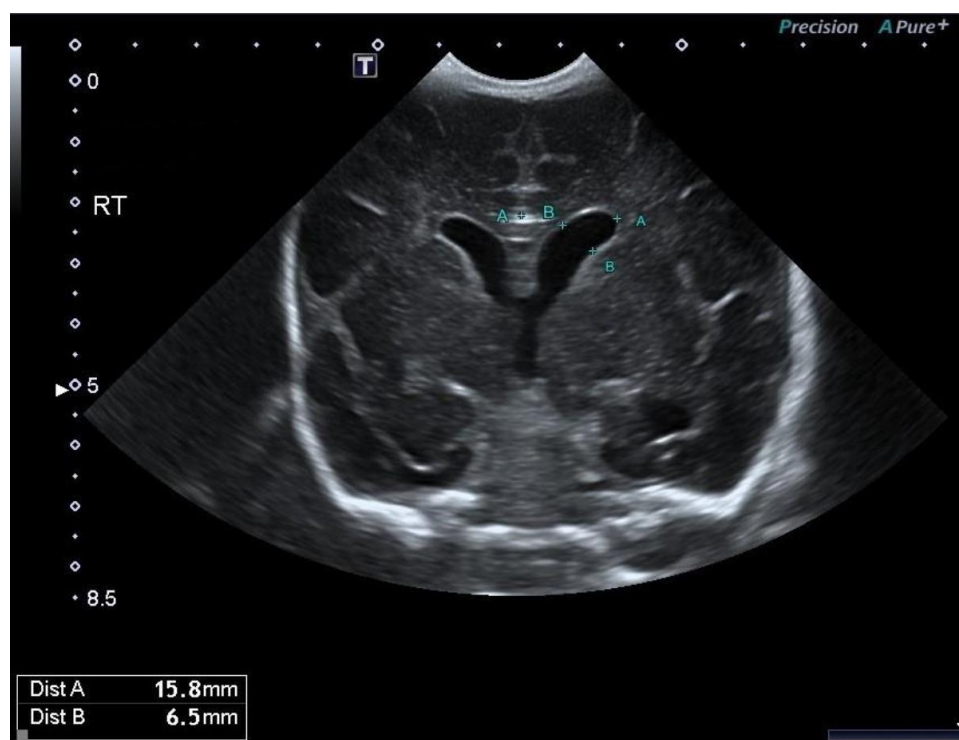


Figure 1: Ultrasound scan in the coronal plane at the level of the foramen of Monro showing the Rickham width (distance AA) and diagonal width of the frontal horn (distance B)



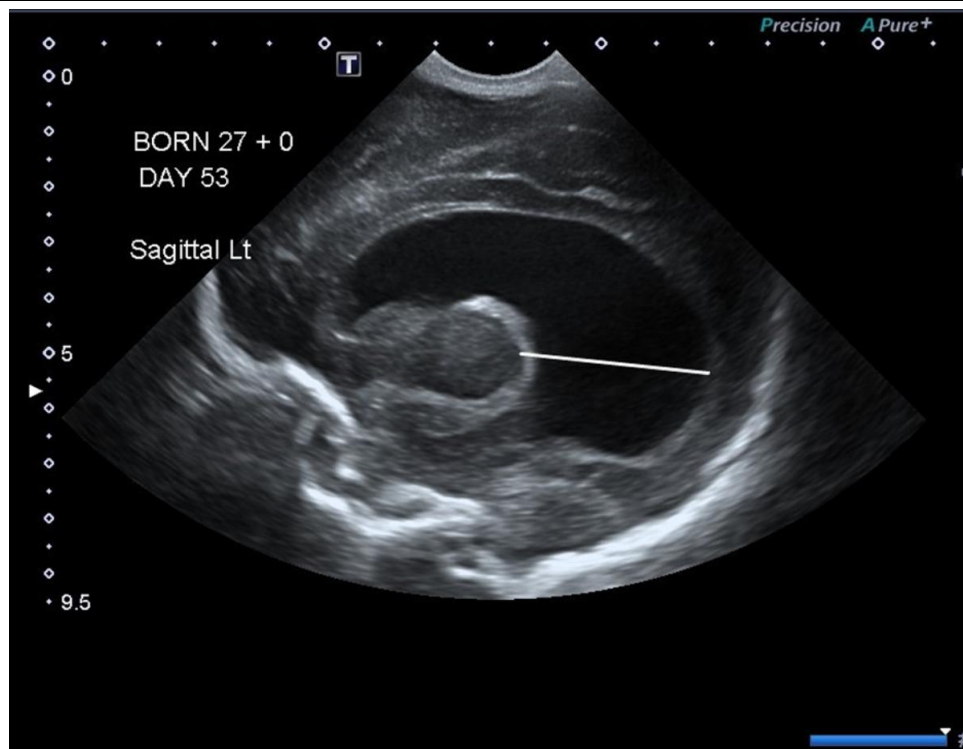


Figure 2: Ultrasound scan in the para sagittal plane showing the thalamo-occipital distance (TOD)

### 3.6.2 Performing Rickham reservoir tap

- Perform hand hygiene.
- Perform a clinical assessment on neonate including palpation of the anterior fontanelle and reservoir.
- Gather required equipment. Clean work surface with disinfectant wipes.
- Open sterile equipment onto aseptic field.
- Proceduralist to perform a surgical hand wash, don sterile gown, gloves and mask.
- Assistant to: provide developmental swaddling and ensure neonate's head remains in a neutral position, administer sucrose 24% if required.
- Proceduralist to:
  - Clean the area over and around Rickham reservoir with 0.5% chlorhexidine + alcohol 70% antiseptic solution (e.g. Surgi-Prep® C). Apply antiseptic solution in a concentric circle, starting from reservoir and moving outward to a 2-5 cm radius outside the reservoir site and allow skin to dry for at least 30 seconds.
  - Place a sterile drape over the site.
  - Insert 25g butterfly needle into the reservoir at a 45° angle to minimise damage to the reservoir.
    - A fresh site for insertion is preferred for every tap. Avoid puncturing the bottom of the reservoir
  - Attach a 20 mL intravenous syringe to the needle and let the CSF fluid drain into the syringe over 10- 15 minutes. **DO NOT FORCEFULLY ASPIRATE.**
    - Monitor for bradycardia or desaturation during the procedure
  - Remove the needle, and apply gentle pressure to the site to prevent CSF leakage
  - Apply small dressing (Tegaderm) to the site
  - Dispose of waste and place sharps into sharps container

- Perform hand hygiene. Clean work surface.
- Send the CSF for biochemical analysis, cell count, microscopy and culture.
- Document procedure in neonate's medical record, including volume of CSF taken, colour, consistency and how the neonate tolerated the procedure.

### 3.6.3 Post-Procedure Monitoring

- Monitor neonate:
  - First 1 hour: Continuous or 15-minute cardiorespiratory monitoring
  - Next 3 hours: Hourly cardiorespiratory and neurologic observations
  - For 4 hours post-procedure:
    - Avoid sudden head lifting or upright posturing
    - Avoid skin to skin care or if planned – to be supervised by bedside nurse with continuous cardiorespiratory monitoring during skin-to-skin care
- Observe site for signs of CSF leaking or bleeding.
- Observe site for signs of infection.

### 3.7 Documentation

- eRIC
- eMR
- NSW Health Consent for Medical Procedure/Treatment (Minors)

### 3.8 Education Notes

- Germinal matrix intraventricular haemorrhage (GM-IVH) is a serious complication in preterm neonates, particularly in neonates born before 28 weeks' gestation.
- Post-haemorrhagic ventricular dilation (PHVD) occurs when the intraventricular blood from severe Intraventricular haemorrhage (IVH) causes obstruction to CSF flow at the level of the aqueduct (non-communicating type) or at the level of the arachnoid granulations (communicating type) where CSF is reabsorbed back into the blood stream. Around 30–50 percent of neonates with Grade III or IV IVH can develop PHVD.<sup>1,2</sup> PHVD carries a poor prognosis in terms of neurodevelopmental impairment.<sup>2</sup>
- Rickham reservoir is a temporising procedure, often used prior to more permanent neuro-surgical procedures (like ventriculi-peritoneal shunt) for management of PHVD as definitive procedures may not be feasible in very small neonates. Also, a subset of patients may not require permanent CSF diversion after initial treatment.<sup>3-6</sup>

### 3.9 Abbreviations

CSF	cerebrospinal fluid	NNP	Neonatal Nurse Practitioner
SCH	Sydney Children's Hospital	HC	head circumference
VI	Ventricular index	AHW	anterior horn width
TOD	thalamo-occipital distance	GM-IVH	Germinal matrix intraventricular haemorrhage



PHVD	Post-haemorrhagic ventricular dilation	IVH	Intraventricular haemorrhage
------	---	-----	------------------------------

### 3.10 Related Policies/procedures

- NSW Health Consent to Medical and Healthcare Treatment Manual 2025
- NSW Health Health Care Records- Documentation and Management PD 2012\_069
- RHW NCC CBR- Antisepsis within the Newborn Care Centre
- SESLHD Aseptic Technique SESLHDPD/271

### 3.11 References

- Wilson D, Kim D, Breibart S. IntraRickham Hemorrhage and Posthemorrhagic Rickham Dilatation: Current Approaches to Improve Outcomes. Neonatal Netw. 2020 May 1;39(3):158-169. doi: 10.1891/0730-0832.39.3.158. PMID: 32457190.
- Whitelaw A, Thoresen M, Pople I. Posthaemorrhagic Rickham dilatation. Arch Dis Child Fetal Neonatal Ed. 2002;86:F72-4.
- de Vries LS, Groenendaal F, Liem KD, Heep A, Brouwer AJ, van 't Verlaat E, Benavente-Fernández I, van Straaten HL, van Wezel-Meijler G, Smit BJ, Govaert P, Woerdeman PA, Whitelaw A; ELVIS study group. Treatment thresholds for intervention in posthaemorrhagic Rickham dilatation: a randomised controlled trial. Arch Dis Child Fetal Neonatal Ed. 2019 Jan;104(1):F70-F75. doi: 10.1136/archdischild-2017-314206. Epub 2018 Feb 10. PMID: 29440132.
- Ventriculomegaly Trial Group. Randomised trial of early tapping in neonatal posthaemorrhagic Rickham dilatation. Arch Dis Child 1990;65:3-10
- El-Dib M, Limbrick DD Jr, Inder T, Whitelaw A, Kulkarni AV, Warf B, Volpe JJ, de Vries LS. Management of Post-hemorrhagic Rickham Dilatation in the Infant Born Preterm. J Pediatr. 2020 Jul 30:S0022-3476(20)30978-1. doi: 10.1016/j.jpeds.2020.07.079. Epub ahead of print. PMID: 32739263.
- Ellenbogen, J., Waqar, M. and Pettorini, B. Management of post-haemorrhagic hydrocephalus in premature infants. 2016. Journal of Clinical Neuroscience, 31, pp.30-34

## 4 ABORIGINAL HEALTH IMPACT STATEMENT DOCUMENTATION

- Considerations for culturally safe and appropriate care provision have been made in the development of this Business Rule and will be accounted for in its implementation.
- When clinical risks are identified for an Aboriginal and/or Torres Strait Islander woman or family, they may require additional supports. This may include Aboriginal health professionals such as Aboriginal Liaison Officers, health workers or other culturally specific services

## 5 CULTURAL SUPPORT

- For a Culturally and Linguistically Diverse CALD woman, notify the nominated cross-cultural health worker during Monday to Friday business hours
- If the woman is from a non-English speaking background, call the interpreter service: NSW Ministry of Health Policy Directive PD2017\_044-Interpreters Standard Procedures for Working with Health Care Interpreters.

## 6 NATIONAL STANDARDS

- Standard 1 Clinical Governance
- Standard 2 Partnering with Consumers
- Standard 3 Preventing and Controlling Infections
- Standard 5 Comprehensive Care
- Standard 6 Communicating for Safety
- Standard 8 Recognising and Responding to Acute Deterioration

## 7 REVISION AND APPROVAL HISTORY

Date	Revision No.	Author and Approval
7.8.2025	1	S Binoy (Neonatal Nurse Practitioner), S Bolisetty (Medical Co- Director), R Jackson (Nurse Educator), E Jacobson (Neurosurgeon, Sydney Children's Hospital Network)
9.10.2025		Endorsed by NCC CBR Committee
13.10.2025	1	RHW BRGC


# Royal Hospital for Women (RHW)

## NEONATAL BUSINESS RULE

Name of Business Rule

RHW CLIN XXXX

### Appendix 1 NSW Health Consent for Medical Procedure/ Treatment (Minors)




SMR020003

Holes Punched as per AS2828.1: 2019

BINDING MARGIN - NO WRITING

NH000008 141124

 <p>NSW Health</p> <p><b>Facility:</b></p> <p><b>CONSENT FOR MEDICAL PROCEDURE / TREATMENT (MINORS)</b></p>	FAMILY NAME	MRN
	GIVEN NAME <span style="float: right;"><input type="checkbox"/> MALE <input type="checkbox"/> FEMALE</span>	
	D.O.B. ____/____/____	M.O.
	ADDRESS	
	LOCATION / WARD	

COMPLETE ALL DETAILS OR AFFIX PATIENT LABEL HERE

**For parents / guardians of minors without capacity**

If in doubt about the capacity of a minor, refer to section 8 of the Consent Manual for more information and/or escalate to a more senior colleague.

**PROVISION OF INFORMATION TO PATIENT** To be completed by Medical Practitioner

I, Dr ..... have discussed with this patient's parent/guardian\* the various ways of treating the patient's present condition including the following proposed procedure/treatment:

(INSERT SITE NAME AND REASONS FOR PROCEDURE OR TREATMENT; DO NOT USE ABBREVIATIONS)

.....

I have informed this **parent/guardian\*** of the nature, likely results and material risks of the proposed procedure/ treatment and of the matters in the section below.

SIGNATURE OF MEDICAL PRACTITIONER

DATE: \_\_\_\_/\_\_\_\_/20\_\_\_\_ TIME: \_\_\_\_:\_\_\_\_

Interpreter\* ..... PRINT NAME SIGNATURE DATE: \_\_\_\_/\_\_\_\_/20\_\_\_\_ TIME: \_\_\_\_:\_\_\_\_ Emp ID/Prov No. ....

**PATIENT CONSENT** To be completed by Parent/Guardian

Dr ..... and I have discussed the present condition of ..... and the various ways in which it might be treated, including the above procedure or treatment:

The doctor has told me that:

- the procedure/treatment carries some risks and that complications may occur;
- an anaesthetic, medicines, or **blood transfusion may be needed**, and these may have some risks;
- additional procedures or treatments may be needed if the doctor finds something unexpected;
- the procedure/treatment may not give the expected result even though the procedure/treatment is carried out with due professional care.

I understand the nature of the procedure/treatment and that undergoing the procedure/treatment carries risks. I have had the opportunity to ask questions and I am satisfied with the explanation and the answers to my questions. I understand that I may withdraw my consent.

I have been told that another doctor may perform the procedure/treatment.\*

☐ I **consent** to the procedure/treatment described above and I also consent to anaesthetics, medicines or other treatments, which could be related to this procedure/treatment for ..... INSERT NAME OF MINOR

**DELETE IF NOT REQUIRED** *This section must be countersigned by your doctor as acknowledgment of refusal.*

While I consent to the above procedure/treatment, after discussing this matter with the doctor, I **refuse consent** for my child to have the following aspects of the recommended procedure or treatment.

INSERT OBJECTION

SIGNATURE OF MEDICAL PRACTITIONER

*I note that the Children and Young Persons (Care and Protection) Act 1998 provides that such treatment may be provided notwithstanding my objection if it is necessary to prevent death or serious injury to my child.*

☐ I consent to a blood transfusion if required.

☐ I **DO NOT** consent to the transfusion of blood or **ANY** blood products. (If blood and/or blood products are refused, medical practitioner is to seek advice from NSW Health Legal and Regulatory Services)

SIGNATURE OF PARENT/GUARDIAN

DATE: \_\_\_\_/\_\_\_\_/20\_\_\_\_

PRINT NAME OF PARENT/GUARDIAN RELATIONSHIP TO CHILD OF PARENT/GUARDIAN

ADDRESS

\* Delete where not applicable

NO WRITING

Page 1 of 1

SMR020003

CONSENT FOR MEDICAL PROCEDURE / TREATMENT (MINORS)