

VENTILATED PATIENT: PATIENT CARE IN CICU - SCH

PRACTICE GUIDELINE[®]

DOCUMENT SUMMARY/KEY POINTS

- The Practice Guideline Care of the Paediatric Intensive Care Patient forms the foundation of all care and must be read in conjunction with this guideline prior to undertaking any aspect of care in CICU.
- Only registered nurses who have satisfactorily completed Clinical Competency Care of the stable ventilated paediatric patient in CICU may independently care for a ventilated infant / child.
- In the case that a registered nurse cannot independently care for a ventilated child, care of the ventilated child must occur under the direct supervision of a registered nurse who has successfully completed clinical competency Care of the stable ventilated paediatric patient in CICU.
- Any concerns or marked changes to the patient's condition should be reported immediately to the NUM 1/Team Leader and appropriate medical officer.

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	Director, Clinical Governance	
Date Effective:	1 st March 2017	Review Period: 3 years
Team Leader:	Clinical Nurse Consultant	Area/Dept: CICU - SCH

CHANGE SUMMARY

- Minor changes to ensure practice is safe and current

READ ACKNOWLEDGEMENT

- The registered nurse is responsible for the assessment, planning and delivery of nursing care to children and infants admitted to the CICU. Therefore, it is recommended that the following guideline is observed by all registered nurses when caring for ventilated infants and children to ensure that alterations in the patient's condition are noted and that safety is maintained.
- Identified staff in CICU are to read and acknowledge they understand the contents of this document.

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	Director, Clinical Governance	
Date Effective:	1 st March 2017	Review Period: 3 years
Team Leader:	Clinical Nurse Consultant	Area/Dept: CICU - SCH

TABLE OF CONTENTS

1	Purpose	4
2	Indications	4
3	Bedside Safety	4
4	General Information	5
5	Care of the Ventilated Patient	5
6	Assessment of Adequate Ventilation	6
7	Ventilator Observations	6
8	Humidification	7
9	Temperature	7
10	Endotracheal Tube Care	8
11	End Tidal CO₂ Monitoring	10
12	Ventilator Alarms	10
13	Complications	11
14	General Nursing Care	11
	Positioning.....	11
	Hygiene	12
	Ventilator Associated Pneumonia (VAP)	12
	Oral Care ¹⁷	12
	<i>For neonates and infants with no teeth:</i>	12
	<i>For children < 6 years old with teeth:</i>	12
	<i>For children > 6 years old with teeth:</i>	13
	Eye Care ¹⁹⁻²¹	13
15	References	14

1 Purpose

The outcome of this guideline is to promote safe nursing care of the infant or child that is intubated and ventilated.

Mechanical ventilation is indicated for many clinical and physiological reasons. It is generally used to correct abnormalities in oxygenation and alveolar ventilation, or to support the respiratory effort of infants and children¹. It also aims to optimise the potential for the restoration of effective breathing patterns and acceptable lung compliance of patients, whilst attempting to minimise and prevent any complications associated with mechanical ventilation².

2 Indications

Primary indications for intubation and ventilation² include but are not limited to:

- Depressed or absent respiratory drive secondary to medications or central nervous system injury.
- Inadequate peripheral neuromuscular function including: phrenic nerve lesions and muscular dysfunction.
- Upper or lower airway obstruction.
- Pulmonary parenchymal disease sufficient to impair gas exchange.
- Airway protection and/or toilet.
- Acute management of increased intracranial pressure.
- As an adjunct in the management of cardiac failure.

3 Bedside Safety

Functioning safety equipment must be readily available at the bedside and checked at the commencement of each shift. The minimum safety equipment requirement at each patient bedside must include:

- Resuscitation equipment - suitably sized Laerdal self-inflating bag and mask, oxygen tubing and peep valve.
- Suction equipment – wall suction set up and functioning with high flow, high vacuum attachment, and set at 80mmHg for ETT suction¹. Appropriate sized suction catheter (size is double that of the ETT) and a yankauer sucker with atraumatic tip.
- Twin-O-Vac system and cylinder – 10,000kPa in cylinder ie ½ , 15L O₂ flow meter and suction tubing.
- Individualised resuscitation chart - checked and signed.

- A ventilator connected to a power source and battery charging with the gas supply set up appropriately. The pre-use check and patient circuit test is to be performed on the ventilator and passed prior to patient use.
- Stethoscope.
- Monitor alarms must always be left on and set at appropriate limits consistent with patient's clinical condition and age.
- The paediatric clinical bedside handover patient checklist is to be completed and countersigned at the beginning of each shift. Additionally at this time, the nursing checklist is to be completed and signed.

4 General Information

This guideline is for use in conjunction with the Maquet Servo-i ventilators, Elysee and Resmed ventilators. All assessments and observations are to be adjusted accordingly to the ventilator in use as well as the mode of ventilation the patient is receiving.

- The specific ventilator circuit must be used with the appropriate ventilator, ensuring the correct procedure and pre-use checks are undertaken when the ventilator is initially setup.
- For infants less than 12kg, a small (infant) circuit (15mm diameter) is to be used. For children 12kg and above a large (adult) circuit (22mm diameter) is to be used.
- Corrugated flexible connectors between the ETT and the ventilator "Y" have a large dead space and should not be used in patients under 10kg unless requested by a medical officer.
- The maximum period of a ventilator circuit usage is seven days. The circuit must therefore, be changed weekly or when visibly soiled or malfunctioning. The settings of the new set-up must mirror those previously prescribed before reattaching the ventilator and circuit to the patient. The changing of the circuit is to be documented on the CICU nursing checklist.

5 Care of the Ventilated Patient

- Intubated and ventilated children are not to be left unattended¹. When the nurse has to leave the bedside, another staff member must be informed and available to supervise.
- A patient with a critical airway or a muscle-relaxed patient must be nursed 1:1 (patient / nurse ratio) and not left unattended. There will be occasions when patients will be under the supervision of a nurse with a 2:1 patient / nurse ratio. This should only occur following discussion with the Team Leader and CICU Director. The supervising nurse must have successfully completed clinical competency: Provides care for a stable ventilated infant /child (Refer to CICU Practice Guideline Care of the patient receiving neuromuscular blockade).

- The bed/cot sides must be raised at all times when the patient is unattended or unless direct care is being delivered.
- At the commencement of each shift, ventilation parameters must be checked, a respiratory assessment of the patient undertaken and ventilator alarms set and checked. This is then appropriately documented on the CICU observation flowchart and the nursing checklist.
- PEEP valves are to be used when hand ventilating patients. The purpose of their use is to ensure the peak pressure the patient is being ventilated at is not exceeded². The recommended pressure limit for the individual patient must be guided by the CICU medical team.
- In order to prevent lung de-recruitment, unnecessary disconnection of the patient from the ventilator must be minimised².

6 Assessment of Adequate Ventilation

The assessment of adequate ventilation is a routine part of nursing care in CICU. The following is a guide of adequate ventilation:

- There is symmetrical and synchronous chest movement³.
- There is equal air entry³. Nurses should auscultate the patient's chest with a stethoscope every 1-4 hours as required.
- The patient's colour³.
- Oxygen saturation and end-tidal carbon dioxide levels are noted⁵.
- Blood gases attended as indicated⁵.
- Inspiratory tidal volumes are being achieved at 5-7mL/kg unless otherwise documented by a medical officer⁴.
- A satisfactory chest x-ray is achieved⁴.

7 Ventilator Observations

- Patient observations should be attended according to both this guideline and [Practice Guideline Care of the paediatric intensive care patient](#).
- Ventilation observations and humidification temperature must be attended hourly and noted on CICU flow chart. Other observations must be individualised to ensure the patient receives adequate observation and documentation of care.
- Any changes made to the ventilation prescription by the team must be noted on the CICU flow chart in red pen
- Oxygen saturation is to be continuously monitored with and documented hourly

- End-tidal carbon dioxide must be continuously monitored and documented hourly unless indicated by the medical officer (Refer to ETCO₂ section within this guideline and [SCH Pulse Oximetry Guidelines](#))

NOTE: The following table is an hourly observation guide in use for the Servo-i ventilators only

Servo-i	MODE	TEMP	FiO ₂	Ti	MV set	PS	PIP	MAP	PEEP (pt)	SENSITIVITY	CMV Set	RATE (pt)	EMV	V _t set	V _t (pt)
PS/CPAP	Y	Y	Y			Y			Y	Y	Y	Y	Y		Y
SIMV PC/PS	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Y
SIMV VC/PS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
PRVC	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y
PC	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y		Y
VC	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y
VS	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y

Y = parameters to record each hour

8 Humidification

- The humidifier should be checked and documented hourly. All humidifiers use a water feed set and 2 litre sterile water flasks and must be positioned above the humidification dome.
- The humidifier and ventilator tubing should be below the level of the infant/child to avoid water accumulation at the elbow connection and accidental drainage into the patient's ETT².
- Condensation should always be present in the expiratory limb of the ventilator circuit. Excess condensation should be minimised and condensation drained 2-4hrly and before repositioning the patient.
- Inspection of the PAL filter should be undertaken at regular intervals. If filter becomes damp, function of the ventilator will be affected therefore it should be changed.

9 Temperature

- The sensor in the circuit needs to be placed away from any direct heat source. Mucociliary transport and lung function is optimised under conditions of a core temperature of 37°C and 100% relative humidity².

- In the mechanically ventilated patient inspired gas needs to be delivered to the lungs at an optimally humidified condition². To achieve this, the humidifier should be set at invasive⁶. This means that gas leaves the humidifier chamber at 37°C and 100% saturated (44mg/L H₂O)⁶.

10 Endotracheal Tube Care

- The position of the endotracheal tube (ETT) should be checked as follows:
 - Auscultation for equal air entry²
 - Symmetrical chest movement²
 - Chest X-ray²
 - End-tidal CO₂
- The ETT tip should be mid-way between the larynx (C3–C4 for infants and C5–C6 for older children and adults) and carina². This means usually the tip is at T1–T3 on the CXR².
- ETT security must be ensured by the application of tape. If the strapping is loose ensure that the ETT is resecured as soon as possible¹. Any mobility of the ETT through the nostril or mouth, or any loosening of the strapping can cause complications¹ (refer to [CICU Practice Guideline ETT strapping in CICU](#)).
- When measuring ETT position, the measurement is taken from the nares if nasally intubated (**or the teeth if orally intubated**), following the radio opaque blue line to the distal end of the tube where the tube connects to the connector (see diagram below). A paper tape measure (10 - 15cm in length) is used. Discrepancies may arise when measuring along different planes of the tube it is therefore important to continue measurements along the same part of the tube.



- Measurements should be checked and documented on the CICU flowchart at the commencement of each shift and when the patient is re-positioned against initial measurements, which are located at the top of each daily CICU flow chart.
- If signs of displacement are detected, then repositioning and re-strapping of the ETT may be indicated, and medical staff should be informed. Document in the patient's progress notes the time and date that medical staff have been informed and any discussion and / or clinical decision.
- Avoid kinking by positioning ETT and ventilator tubing dependant to the patient to minimise traction and the potential for excess condensation to enter the airway.
- Suctioning frequency is to be assessed and performed according to the individual needs of the patient not based on time frequency. ⁷
- It is recommended to use smaller catheters whenever possible, since suction pressure seems to have less influence on lung volume loss than catheter size. ⁸
- Size of suction catheter should only occludes less than 50% of the lumen of the ETT in children and less than 70% in infants. ⁷
- Depth of catheter insertion should be ascertained prior to endotracheal / tracheostomy suctioning and noted on flow chart.
- Suction pressure should be set as low as possible and yet effectively clear secretions as high pressure can cause mucosal damage and atelectasis due to the negative pressure. ⁷
- Duration of the suctioning event should be limited to less than 15 seconds per pass. ⁷
- Under no circumstances should the suction port be applied directly to the nostril or into the nose.

If pressure is higher, no more secretions are removed but the amount of trauma is increased.

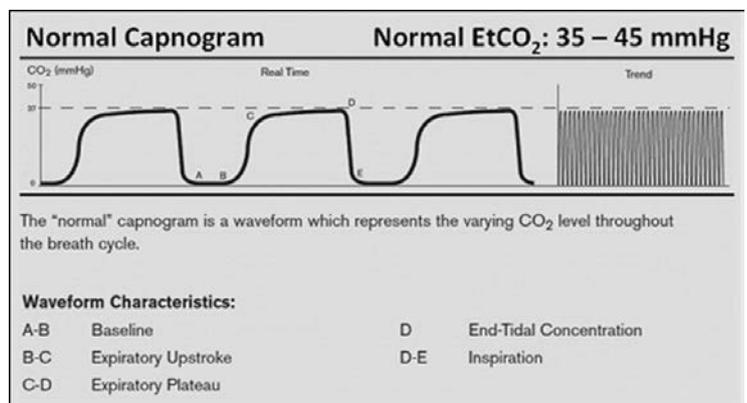
Recommended pressures: 60-80mmHg in *neonates*

80-120mmHg for *older children*

- If a cuffed tube is in place and inflated, measure and document cuff pressures 8 hourly. At this time the cuff should be totally deflated then slowly reinflated to the lowest pressure that will reduce the leak around the tube. Adding additional air to the cuff beyond this point may compromise the vascular supply of the tracheal mucosa. Once the leak is abolished, cuff pressures should be noted and documented.
- If a seal cannot be obtained with a cuff pressure of < 20 cmH₂O a medical officer should be informed.
- If uncuffed tubes are utilised, assessment for the presence of audible air leaks must be undertaken. Air leaks are not uncommon in children, however if compromising tidal volumes, inform medical staff and document appropriately in patient's notes.

11 End Tidal CO₂ Monitoring

- Assessment of the need to use capnography with a specific patient should be guided by the clinical situation. The patient's primary cause of respiratory failure and the acuteness of their condition should be considered.⁹
- Contamination of the monitor or sampling system by secretions or condensate, or obstruction of the sampling chamber can lead to unreliable results. Subsequently it may be necessary to replace the ETCO₂ sensor if these situations arise.
- A normal capnogram has a characteristic appearance that represents the various phases of carbon dioxide elimination in the lungs during exhalation⁹. For practical purposes it should look like a square wave and if this is not the case, it cannot be relied on to give an accurate reflection of arterial CO₂.⁹ Any alteration in the visual waveform may indicate a deterioration in the patient's condition and requires immediate assessment.
- Ensure the appropriate sized suction port is placed in the ventilator circuit proximal to the ETT tube before the ETCO₂ monitoring connector
- If an ETCO₂ sensor is in place, consideration must always be given to the resulting dead-space and the impact of this on the patients respiratory effort.



12 Ventilator Alarms

The following guide for alarm limits on the Servo-i ventilators is to be set and checked upon the commencement of each shift and when an alteration in ventilator settings is made. This is then documented by signing the Nursing Checklist.

Maximum airway pressure: No greater than 5mmHg above the selected peak pressure

Minute Volume: Assess individual patient condition and age appropriate parameters, considering evidence of a leak around ETT/Tracheostomy

Respiratory Rate: Assess individual patient condition and age appropriate parameters. Consider that muscle relaxed and heavily sedated patients should have an alarm set no more than 5bpm above the set rate and a lower limit no less than an age appropriate parameter.

End Expiratory Pressure: Must be set 2cmH₂O below the set PEEP for the lower limit and 2cmH₂O above the set PEEP for the high limit.

Sound level: No less than 20%

Apnoea time: Assess individual patient condition and age appropriate parameters. Apnoea time must be no more than 20 seconds.

13 Complications

- There are many associated complications with intubation and ventilation. A thorough patient assessment and regular observation will assist nurses caring for a patient to identify any complications early¹⁰.
- A useful mnemonic that is beneficial in ascertaining the potential causes of airway / ventilation problems in intubated patients is "DOPE" and may be utilised when an acute deterioration occurs¹¹.
 - D: Displaced ETT**
 - O: Obstructed ETT**
 - P: Pneumothorax**
 - E: Equipment failure**
- Acute desaturation and/or loss of ETCO₂ trace should be regarded as either ventilator malfunction or ETT blockage or dislodgement. Immediate action is to disconnect the patient from the ventilator, hand ventilate and seek assistance¹².

14 General Nursing Care

Meticulous nursing care will maintain the general condition of the infant/child and early recognition of any change in vital signs or other parameters can avert major complications¹³. General nursing care delivered to the child / infant in CICU should be done in accordance with [Practice Guidelines Care of the Paediatric Intensive Care Patient](#) and [Minimum Standard of Observations in CICU](#). The following are extra considerations for patients who are intubated and ventilated:

Positioning

- Unless contraindicated, all patients should be nursed with the head of the bed raised 30°- 45°¹³⁻¹⁴. This allows for the apex of the lungs to expand, assisting the patient's respiratory effort and improving gas exchange¹³.
- Additional benefits include promotion of gastric feeding and enhanced cerebral venous drainage in patients with a raised intra-cranial pressure¹³.
- Patients should be alternated between supine and the two semi-lateral positions 2-4 hourly to prevent the development of pressure areas¹³.
- Patients may be nursed prone only in consultation with the consultant and nursing team leader.
- 2-4 hourly passive limb movements are required for patients who have been sedated or muscle relaxed for longer than 24 hours¹³.
- This assists in maintaining or improving soft tissue and muscle strength and function, as well as decreasing the risk of thrombo-embolism¹³.

- Staff should consider the use of pressure-relieving mattresses for all intubated and ventilated patients.
- The bedside nurse should consult with the physiotherapist if they are unsure of the full range of joint movements.

Hygiene

Maintaining hygiene is an essential component of facilitating the comfort of patients in the CICU, as well as reducing the incidence of hospital-acquired infections¹³.

- 4th hourly cares (eye and mouth care, nappy change and re-positioning) of a patient should occur whether the patient is soiled or not as this will promote skin integrity.

Cares include eye care, mouth care, catheter care, nappy changes and patient re-positioning.

Ventilator Associated Pneumonia (VAP)

Ventilator-associated pneumonia (VAP) is the second most common cause of hospital-acquired infections in paediatric intensive care units¹⁵. The pathogenesis of VAP is thought to be by the bacterial colonisation of the stomach and oropharynx and subsequent pulmonary aspiration of contaminated secretions¹⁶. Mechanically ventilated patients are prone to gastric bacterial colonization due to the widespread use of histamine-2 (H2) receptor blockers and proton pump inhibitors for the suppression of gastric acid secretion and prevention of gastric ulceration¹⁶. Indwelling naso-gastric and naso-jejunal feeding tubes decrease the competence of the lower oesophageal sphincter, therefore, increasing the potential for aspiration¹⁶.

To reduce the risk of patient's developing VAP, oral care must be attended 2-4 hourly.

Oral Care¹⁷

Do not use toothbrush in patients who are coagulopathic or have mucositis due to risk of bleeding.

For neonates and infants with no teeth:

- 2hrly, moisten mouth with a cotton swab soaked in clean water. Paraffin / lanolin based ointment should be applied to the lips to conclude mouthcare.

For children < 6 years old with teeth:

- 12hrly, use a small, soft toothbrush and fluoride toothpaste to brush teeth, tongue and gums to remove dental plaque to assist in the breakdown of mucus and biofilm in the mouth¹⁷. Toothette® suction toothbrush can be utilised to suction excess but **DO NOT rinse the mouth** with accompanying mouth wash.
- 2hrly, moisten mouth with a cotton swab soaked in clean water. Paraffin / lanolin based ointment should be applied to the lips to conclude mouthcare.

For children > 6 years old with teeth:

- 12hrly, use a small, soft toothbrush and fluoride toothpaste to brush teeth, tongue and gums to remove dental plaque to assist in the breakdown of mucus and biofilm in the mouth¹⁷. Toothette® suction toothbrush can be utilised.
- At least 30 mins after brushing teeth, the accompanying alcohol free mouthwash that comes with Toothette® suction toothbrush can be used, suction excess and **DO NOT rinse mouth**.
- 2hrly, moisten mouth with a cotton swab soaked in clean water. Paraffin / lanolin based ointment should be applied to the lips to conclude mouthcare.

Patients' oral and subglottic secretions should be suctioned routinely with the frequency dependent upon secretion production to minimize aspiration of contaminated secretions into lung¹⁸.

Eye Care¹⁹⁻²¹

Patients who are intubated are generally sedated and occasionally muscle relaxed which causes the protective mechanisms of the eye such as the active contraction and relaxation of the eye muscles and their blink reflex to be lost^{19, 20}

- To prevent keratopathy and dryness of the eye, eyelid closure should be maintained.
- Evidence does not show that one method of eye care to be superior although diligent attention to eyelid closure in unconscious/ muscle relaxed patients is prudent.
- Regardless of therapy, corneal abrasions and other ophthalmic complications may develop if eye care therapies are not maintained and monitored.
- All patients must have eye care attended 2-4 hourly and evaluations noted.
- In conscious patients: clean eyes utilising saline and apply polyvinyl alcohol eye drops eg VISTIL™. DO NOT apply lubricating eye ointment.
- In unconscious or muscle relaxed patients: clean eyes utilising saline, apply lubricating eye ointment eg POLY VISC™
- Taping eyes shut should be avoided as it causes may cause skin damage with frequent removal and provide a point of distress to family members.

15 References

1. Kendrick T, Morrison A. Paediatric Considerations in Critical Care. In: Elliot D, Aitken L & Chaboyer W, editors. ACCCN's Critical Care Nursing. Marrickville. Elsevier Australia; 2007.
2. Cuthbertson S, Kelly, M. Support of Respiratory Function. In Elliot D, Aitken L & Chaboyer W, editors. ACCCN's Critical Care Nursing. Marrickville. Elsevier Australia; 2007.
3. Samuels M, Wieteska S, editors. Advanced Paediatric Life Support, The Practical Approach. 5th ed. West Sussex. Wiley-Blackwell; 2005. Chapter 4, Basic Life Support; p.19-33.
4. Davies and Hassell, editors. Children in Intensive Care A Survival Guide. 2nd ed. Philadelphia: Elsevier Ltd; 2007. Chapter 3, Cardiac Care; p.59-110.
5. Higginson R, Jones B. Respiratory assessment in critically ill patients: airway and breathing. British Journal of Nursing. 2009 April; 18(8):456-461
6. Fisher & Paykel Healthcare. Invasive Ventilation [Internet]. 2013. Available from: <http://www.fphcare.com.au/respiratory/adult-and-pediatric-care/invasive-ventilation/>
7. Copnell, B., Dargaville, P.A., Ryan, E.M., Kiraly, N.J., Chin, L.O., Mills, J.F. and Tingay, D.G. (2009) The effect of suction method, catheter size and suction pressure on lung volume changes during endotracheal suction in piglets. Pediatric Research 66(4): 405-410.
8. American Association for Respiratory Care (2010) Endotracheal Suctioning of Mechanically Ventilated Patients With Artificial Airways. Respiratory Care 55 (6); 758-764
9. Kent B, Dowd B. Assessment, Monitoring and Diagnostics. In Elliot D, Aitken L & Chaboyer W, editors. ACCCN's Critical Care Nursing. Marrickville. Elsevier Australia; 2007.
10. Higginson R. The role of the nurse in mechanical ventilation. British Journal of Nursing. 2011; 20(21):1341
11. Mortel M. Invasive Mechanical Ventilation. Human Services Network [Internet]. 2012. Available from: http://intensivecare.hsnet.nsw.gov.au/five/doc/education_packages/saudi/Invasive_Ventilation_LEARNBOOK.pdf
12. Samuels M, Wieteska S, editors. Advanced Paediatric Life Support, The Practical Approach. 5th ed. West Sussex. Wiley-Blackwell; 2005. Chapter 5, Advanced support of the airway and ventilation; p.34-42.
13. Coyer F, Wheeler M, Wetzig S, Couchman B. Nursing care of the mechanically ventilated patient: What does the evidence say? Part two. Intensive and Critical Care Nursing. 2007; 23:71-80. doi:10.1016/j.iccn.2006.08.004
14. Keeley L. Reducing the risk of ventilator-acquired pneumonia through head of bed elevation. British Association of Critical Care Nurses. 2007 Oct; 12(6):287-294. doi:10.1111/j.1478-5153.2007.00247.x
15. Kusahara D M, Friedlander L T, Sorgini Perterlini M A, Pedreira M L G. Oral care and oropharyngeal and tracheal colonization by gram-negative pathogens in children. Nursing in Critical Care. 2012; 17(3):115-122. doi:10.1111/j.1478-5153.2012.00494.x
16. Munro C, Grap MJ. Oral health care in the intensive care unit: State of the science. American Journal of Critical Care. 2004 Jan; 13(1):25-34
17. Cooper, V.B. and Haut, C. (2013) Preventing Ventilator-Associated Pneumonia in Children: An Evidence-Based Protocol. Critical Care Nurse; 33(3): 21- 30
18. Pear S, Stoessel K, Shoemake S. Oral care is critical care: The role of oral care in the prevention of hospital-acquired pneumonia. The Clinical Issue [serial online]. n.d. [cited 2013 Jan 5]; issue 3 Available from: http://www.kchealthcare.com.au/media/74361/16-h0546_08_01_ci_oc.pdf
19. New South Wales (NSW) Health, Intensive Care Coordination and Monitoring Unit. Provision of eye care for the critically ill adult. NSW Health Statewide Guidelines for Intensive Care [Internet]. 2007 [updated 2007; cited 2013, Jan 5]. Available from: <http://intensivecare.hsnet.nsw.gov.au/five/doc/intensive%20care%20collaborative%20guidelines/Eye%20Care%20CPG%20Final%20version.pdf>
20. Sivasankar S, Jasper S, Simon S, Jacob P, George J, Raju R. 2006 Eye care in ICU (intensive care units), Indian Journal Of Critical Care Medicine; 10.1 (Jan-March) on line journal.
21. Sorce, L.R., Hamilton, S.M., Gauvreau, K., Mets, M.B., Hunter, D.G., Rahmani, B., Wu, C. and Curley, M.A.Q. (2009) Preventing corneal abrasions in critically ill children receiving neuromuscular blockade: A randomized, controlled trial. Pediatric Critical Care Medicine 10(2); 171–175

Copyright notice and disclaimer:

The use of this document outside Sydney Children's Hospitals Network (SCHN), or its reproduction in whole or in part, is subject to acknowledgement that it is the property of SCHN. SCHN has done everything practicable to make this document accurate, up-to-date and in accordance with accepted legislation and standards at the date of publication. SCHN is not responsible for consequences arising from the use of this document outside SCHN. A current version of this document is only available electronically from the Hospitals. If this document is printed, it is only valid to the date of printing.