## **Chapter 3L**

Specialty Nursing Competencies Perioperative - Cardiac Theatre



Nursing Competency Workbook, 6th Edition

The Royal Children's Hospital (RCH) Nursing Competency Workbook is a dynamic document that will provide you with direction and assist you in your professional development as a nurse working at the RCH. The workbook also provides a record of your orientation and competency obtainment.

Chapter 1

• Includes resources for nurses and is complemented by the Royal Children's Hospital (RCH) New Starter Pack, Hospital Orientation and Nursing Orientation day, to provide an introduction to nursing at the RCH.

Chapter 2

• Generic Nursing Competency Assessment Forms

Chapter 3

• Specialty Nursing Competency Assessment Forms

Appendix 1

• Unit / Department Nursing Orientation

All chapters and appendices are downloadable as pdfs from the Nursing Education Website.

**The RCH Nursing Competency Workbook** developed by Nursing Education with input from specialist nurses at the RCH.

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### Cardiac Surgery (basic principles)

#### **Competency Statement:**

The nurse safely and effectively applies basic principles in the care of patients having cardiac surgery.

#### RCH references related to this competency: http://www.rch.org.au/cardiac\_surg/ http://www.rch.org.au/policy/policies/Medication\_Management\_Policy/ http://www.rch.org.au/pharmacy/medicines-information/ http://www.rch.org.au/rchcpg/hospital\_clinical\_guideline\_index/Pressure\_Injury\_Prevention\_and\_Management/ http://www.rch.org.au/guality/patient\_family\_centred\_care/Patient\_Family\_Centered\_Care/

COMPETENCY ELEMENTS			
K 2 3 4 5	<ul> <li>Discuss anatomy and physiology of the cardio-respiratory system and <i>how this is affected by disease processes</i></li> <li>Discuss the Organ and Tissue Act</li> <li>Explain documentation requirements for cardiac surgery patients</li> <li>Discuss the principles of microbiology and infection control including the implications for post-operative wound infection. Explain the surgical conscience.</li> <li>Describe environmental control during procedures including: <ul> <li>Room temperature</li> <li>Noise level</li> <li>Traffic flow</li> </ul> </li> <li>Discuss pressure area care and prevention measures specifically for patients undergoing long/complex surgery</li> </ul>		
23	<ul> <li>Demonstrate storage, handling and administration of medications used in cardiac procedure in accordance with RCH policy <ul> <li>Adrenalin</li> <li>Papavarine</li> <li>Magnesium Sulphate</li> <li>Euro Collins Solution</li> <li>Plasmalyte</li> <li>Heparin - blocked shunt vs regular</li> <li>Rinsing - autologous or homograft bio-prosthesis</li> <li>Haemostatics agents</li> </ul> </li> <li>Demonstrate patient transfer including safety, privacy, comfort, warmth, regular and invasive monitoring</li> <li>Demonstrate parental support during anaesthetic induction utilising family centre care principles</li> <li>Surgical face masks and goggles</li> <li>Hand hygiene</li> <li>Aseptic technique</li> <li>Surgical scrub</li> </ul>		

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please indicate if there is written feedback or reflections related to this competency in the designated section of the workbook

Nurse Name:

Signature:

Date:

Assessor Name: Signature: Date:

### **Cardiac Surgery Closed Procedure**

#### **Competency Statement:**

The nurse safely and effectively participates in closed procedures in cardiac surgery

#### RCH references related to this competency:

http://www.rch.org.au/cardiac\_surg/Parent\_Info/ http://www.rch.org.au/cardiology/heart\_defects/

сом	COMPETENCY ELEMENTS			
Κ	<ol> <li>Describe common closed procedures performed in cardiac theatres</li> <li>Explain position of scrub nurse and trolley for procedure</li> <li>Discuss patient position</li> <li>State position and set up for defibrillators</li> <li>State types of closed heart surgery – rational of palliative and definitive closed heart surgery.</li> </ol>			
S	<ul> <li>Preparation and set up</li> <li>1. Demonstrate correct set up for closed heart surgery <ul> <li><i>With</i> mayo table</li> <li><i>Without</i> mayo table</li> </ul> </li> <li>2. Demonstrate correct selection of custom packs and additional consumables pertaining to each case</li> <li>3. Check internal sterility indicators and integrity before opening and before using sterile items. Discard items that do not comply with standards and takes correct measures in the event of contamination</li> </ul>			

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### **Cardiac Surgery Open Procedures – Circulating Nurse**

### Competency Statement:

The nurse safely and effectively participates in the role of circulating nurse during open procedures in cardiac surgery

RCH references related to this competency: http://www.rch.org.au/cardiac\_surg/perfusionists/Perfusion\_Department/

COMPETENCY ELEMENTS			
Κ	<ol> <li>Discuss ambient environmental temperature control for patients undergoing open cardiac procedures</li> <li>Identify times when a cardiologist should be paged</li> <li>Discuss work prioritisation in relation to cardio pulmonary bypass (CPB)</li> <li>Discuss the need for the diagnostic treatment during surgery to assist with surgical options</li> <li>Outline the procedure for collection of blood products for transfusion</li> </ol>		
S	<ol> <li>Demonstrate preparation for Trans-oesophageal Echo or Epicardial Echo</li> <li>Demonstrate preparation of environment for an echocardiogram during surgery</li> <li>Prepare CPB cannula requirements in conjunction with Perfusionist</li> <li>Correctly document accurate patient care data electronically and on the cardiac care plan</li> </ol>		

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Nurse Name:	Signature:	Date:

Assessor Name:	Signature:	Date:

### Cardiac Surgery Open Procedures – Instrument Nurse

#### **Competency Statement:**

The nurse safely and effectively participates in the role of instrument nurse during open procedures in cardiac surgery

RCH references related to this competency: http://www.rch.org.au/cardiac\_surg/perfusionists/Perfusion\_Department/

COMPETENCY ELEMENTS			
Κ	<ol> <li>Discuss the various technical aspects of achieving the best practice to provide the optimal perfusion and myocardial protection during any CPB procedures appropriate to each patient.</li> <li>Discuss the time constraints of CPB/cross clamping of aorta and the actions to minimise time taken</li> <li>Outline different diathermy requirements for different stages of dissection</li> <li>Discuss the physiological changes and potential problems for patients being commenced and maintained on CPB. Explain the steps to proceed with surgeon if imminent low output/ cardiac arrest occur.</li> <li>Explain the steps to connect the cannula to the circuit if required to do so in an emergency situation.</li> <li>Discuss the specifics of procedures to prioritise setting up emergent procedures for example redo</li> <li>Explain roles of circulating nurse or 2<sup>nd</sup> scrubbed nurse in the event of a crisis Occurring during surgery</li> </ol>		
S	<ol> <li>Demonstrate correct handling of instruments, sutures and packs</li> <li>Prepare equipment required for commencement of CPB</li> <li>Demonstrate skills providing efficient surgical assistance for knowledge statements mentioned above.</li> <li>Document accurate patient care data electronically and on the cardiac care plan</li> </ol>		

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 Signature:
 Date:

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 Signature:
 Date:

### Cardiac Surgery (Equipment)

#### **Competency Statement:**

The nurse safely and effectively uses and cares for equipment used in Cardiac Surgery.

http://www.rch.org.au/policy/policies/Equipment tracking AeroScout/ http://www.rch.org.au/bme\_rch/equipment/Routine\_Maintenance/

### RCH references related to this competency: <a href="http://www.rch.org.au/surgery/local\_procedures/Instrument\_Loans\_and\_Implants/">http://www.rch.org.au/surgery/local\_procedures/Instrument\_Loans\_and\_Implants/</a>

http://www.rch.org.au/bme_rch/equipment/Repairs/			
COMPETENCY ELEMENTS			
K	3. 4.	Discuss the process for biomedical equipment maintenance and testing Outline the process for reporting faulty equipment Describe the procedure for receiving and using loan equipment, including instruments and implants Explain why an X ray image would be taken in the supine position and the lateral position Identify the location and purpose of the following equipment: a. Pacing Cables b. Pacing Box c. Defibrillators and accessories, inclusive of PICU, Cath Lab d. Cryo ablation e. Nitric oxide cylinders f. Overhead camera g. Surgeons camera h. Fibrillators and leads for non cardioplegic hearts during open hearts procedures i. Sternal saws and chargers j. Manual Schumacker sternal cutters, inclusive of PICU k. 3 <sup>rd</sup> Pump suckers and spare suckers l. ECMO and LVAD location, inclusive of PICU m. Cold storage of emergency Plasmalyte solution of PICU (fridge) n. Intensifier imaging of theatre suite 0. TOE & Epicardial probes, adult & paediatric p. Homograft storage tank – shipper from donor banks q. Cold storage of Tisseel, Bioprostheses and mechanical heart valves r. Dispensing Glutaraldehyde (0.625% for treatment of pericardium) s. MRI reporting t. Cardiobase assessing	
S	1.	Demonstrate the above listed equipment use including set up and selection of appropriate consumables and documentation of data	

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Signature:

Date:

### Cardiopulmonary Bypass (CPB)

#### **Competency Statement:**

The nurse safely and effectively participates in the care of patients on cardiopulmonary bypass (CPB)

#### RCH references related to this competency:

http://www.rch.org.au/cardiac\_surg/perfusionists/Perfusion\_Department/ http://www.rch.org.au/picu/ecls/What\_is\_Extra\_Corporeal\_Life\_Support/

COMF	PETENCY ELEMENTS
Κ	<ol> <li>Explain the following:         <ul> <li>Anatomy &amp; physiology of the heart</li> <li>Fetal Circulation</li> <li>Concepts of CPB</li> </ul> </li> <li>Explain circumstances where CPB may be required and the associated terminology</li> <li>Discuss flow and the selection of aortic and venous cannula</li> <li>Discuss simple to complex conditions         <ul> <li>With CPB</li> <li>Without CPB</li> <li>Palliative repair</li> <li>Definite complete repair</li> <li>Conditions that require extra corporeal life support (ECLS)</li> </ul> </li> <li>Explain strategies to induce hypothermia and regulation of temperature pre, during and post CPB</li> <li>Discuss cardioplegia solutions</li> <li>State the use of heparin in CPB and the reversal drug</li> <li>Define modified ultra-filtration</li> <li>Explain the steps for discontinuation of CPB</li> <li>Discuss the procedure for commencement of pacing and identify pacing modes</li> <li>Discuss pre-emptying complications that can arise during cannulation or decannulation</li> <li>Explain blood gases/ACT in relation to CPB</li> <li>Describe the 'common' language used by surgeons and the perfusionist during procedures.</li> </ol>
S	<ol> <li>Assemble the correct sutures for purse strings (explain variations)</li> <li>Demonstrate division of lines</li> <li>Demonstrate the usage of cardiotomy suckers and the first step to undertake once all circuit lines are secured.</li> <li>Establish the correct size of internal defibrillation paddles</li> <li>Demonstrate preparation to support ECLS</li> <li>Demonstrate the skill require to anticipate complications specific to the surgery being performed at point of care.</li> </ol>

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 Assessor Name:
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 Date

RCH Nursing Competency Workbook - Chapter

### Chest Drain & Underwater Seal Drain (UWSD) Management

#### **Competency Statement:**

The nurse safely and effectively cares for the child who has a Chest Drain with an Underwater Seal Drain (UWSD)

#### RCH references related to this competency:

http://www.rch.org.au/clinicalguide/guideline index/Chest Drain Intercostal Catheter Insertion/ http://www.rch.org.au/rchcpg/hospital clinical guideline index/Chest Drain Management/ http://www.rch.org.au/rchcpg/hospital clinical guideline index/Pleural and Mediastinal Drain Management after Ca rdiothoracic Surgery/

COMPETENCY ELEMENTS			
K	<ol> <li>Describe the anatomy of the chest including the lining of the lungs</li> <li>Identify the mechanic of breathing including negative intrapleural space</li> <li>Identify the location of the proximal end of the chest drain</li> <li>Describe the function of the three chamber UWSD apparatus</li> <li>Provide indications for insertion of a chest drain</li> <li>Explain safety precautions required for a patient with an UWSD</li> <li>Describe the correct procedure for securing the chest drain &amp; dressing of the insertion site</li> <li>Describe the ongoing patient assessment required when a patient has chest drain with UWSD including:         <ul> <li>a. Start of shift checks</li> <li>b. Vital signs</li> <li>c. Pain</li> <li>d. Drain insertion site</li> </ul> </li> <li>Outline the correct procedure for measuring chest drainage</li> <li>Discuss the nursing management for chest drainage losses</li> <li>Describe the indications &amp; procedure for changing the UWSD unit</li> <li>Explain the precautions required for transporting a patient with an UWSD</li> <li>Outline the complications of a chest drain and UWSD</li> </ol>		
S	<ol> <li>Assemble the UWSD chamber for connection to the chest drain (including suction if ordered)         <ul> <li>a. Correct pressures</li> <li>b. Connection to suction – 1 unit</li> <li>c. Connection of 2 units to suction (splitting)</li> <li>d. Wet Unit</li> <li>e. Dry Unit</li> </ul> </li> <li>Using the UWSD apparatus identify how you would determine if the patient has an ongoing air leak</li> <li>Demonstrate the correct method of documenting the chest drainage activity and drainage</li> <li>Demonstrate the correct method for obtaining a specimen from the UWSD unit</li> </ol>		

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Nurse Name:	Signature:	Date:
Assessor Name:	Signature:	Date:

### **Emergency Modalities of Care**

#### Competency Statement:

The nurse provides safe and effective emergency nursing care to facilitate the chest opening procedure

RCH references related to this competency: http://www.rch.org.au/picu\_intranet/quidelines/Cardiac\_call\_out/ http://www.rch.org.au/cardiac\_surg/perfusionists/Perfusion\_Department/

CON	IPETENCY ELEMENTS
Κ	1. Explain the Emergency Modalities of Care and what time critical interventions may be required.
	2. Understand the requirements for Emergency Modalities of Care eg. chest openings, ECMO cannulation (central and/or peripheral), Bridge to Transplant devices for a Circuit Change and arterial and/or venous cut downs.
	3. Discuss reasons why a child may require an emergency chest opening, including specific post of reasons
	<ol> <li>Describe the nursing assessment of a patient who is at risk of imminent cardiac arrest</li> </ol>
	<ol> <li>Detail the emergency nursing management for child requiring an Emergency Modality of Care</li> </ol>
	6. Explain the procedure for calling out the cardiac team.
	7. Outline the preparation for Emergency care procedures in PICU.
	<ul> <li>a. PICU environment including infection control principles</li> <li>b. team members</li> </ul>
	c. child (positioning shoulder roll, exposing neck, groin and chest)
	8. Discuss the instrument nurse role for establishing ECLS
	9. Describe post procedure nursing responsibilities for the child
	10. Explain specific management requirements for the child nursed with an 'open chest'
	11. State documentation required during and following the procedure
	12. Outline the two devices used for the Bridge to Transplant cohort of patients
S	<ol> <li>Prepare the environment and locate equipment from Room 331 in PICU required for emergency procedures, including set up of         <ul> <li>a. Emergency instrumentation trolleys</li> <li>b. Sternal saw preparation (redo and virgin)</li> </ul> </li> </ol>
	<ul><li>c. Diathermy machine and accessories</li><li>d. Surgical headlight</li></ul>
	e. PICU chest drain trolley
	<ul> <li>f. ICU defibrillation/pacing trolley and supplies (inclusive of transoephageal pacing needs)</li> </ul>
	g. Surgical CHG 4% hand scrub to change over scrub sink.
	h. Surgical suction
	<ul> <li>Emergency cut down preparation (trolley equipment, instrumentation, supplies)</li> </ul>
	<ul> <li>J. Locate, retrieve and prepare Cardiac Theatre Epi-cardial Probes in case carts outside Theatre 11</li> </ul>
	k. Locate, retrieve and prepare surgical sealant Tisseel
	I. Prepare requirements for Circuit Change on both ECLS and Bridge to Transplant

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Assessor Name:	Signature:	Date:

### Hypertension (Pulmonary Arterial) - PAH

#### **Competency Statement:**

The nurse safely and effectively cares for a patient with pulmonary arterial hypertension

#### RCH references related to this competency:

http://www.rch.org.au/policy/policies/Medication Management Policy/ http://www.rch.org.au/pharmacy/medicines-information/ http://www.rch.org.au/rchcpg/hospital clinical guideline index/Perioperative management of patients with pulmonary hypertension or cardiomyopathy/

#### COMPETENCY ELEMENTS

		Locate and read the PAH CPG
Γ	2.	Discuss the physiology of PAH
	Oral N	<b>Nedications</b>
	3.	Describe the reason for using Sildenafil in a child with PAH, and state the
	1	dosage and potential adverse reactions. Describe the nursing considerations when administering Sildenafil
		Describe the reason for using Bosentan Monohydrate in a child with PAH and state the dosage of Bosentan and its relationship to patient weight.
		Discuss the potential adverse reactions.
		Explain the effect of Bosentan on the liver function and haemoglobin and nursing management of abnormalities
	8.	Discuss the nursing considerations when caring for the patient at
	0	commencement and increased doses of Bosentan. Outline the guidelines for reconstituting Bosentan tablets
	9.	Outline the guidelines for reconstituting bosentan tablets
	10 11 12 13	<ul> <li>venous Medication – Flolan Infusion</li> <li>Discuss the nursing responsibilities in caring for the patient and their family, who require an Epoprostenol - Flolan infusion</li> <li>Long term CVAD management in relation to site care</li> <li>Daily IV orders &amp; documentation for Flolan infusion</li> <li>Reconstitution of Flolan and instructions on management</li> <li>Discharge planning and family education</li> </ul>
		Term Care
	15	. Describe the implications for the family regarding the ongoing care once discharged home.
	16	Discuss the role of the multidisciplinary team in the ongoing care of child with PAH
	Theat	
	18 19	<ul> <li>Discuss the peri operative nursing management when patients are scheduled for an elective CV line / PICC insertion in theatre. Note medications</li> <li>Describe the complications that may arise during an insertion</li> <li>Discuss the surgical preparation for these scheduled cases.</li> <li>Discuss post-operative management in recovery room phase for non PICU status requirement</li> </ul>

	Prepare the theatre environment and demonstrate equipment required for emergencies that can arise with PAH patients scheduled for lines insertion a. Emergency ECMO trolley either set up or on stand by b. Diathermy machine and accessories c. Surgical headlight
e f c ł	<ol> <li>Pacing needs and supplies including transoephageal pacing needs (state the location)</li> <li>Surgical suction</li> <li>Emergency cut down preparation</li> <li>Defibrillating trolley and supplies – external pads applied</li> <li>Availability of surgical team inclusive of perfusionist for high acuity patients</li> <li>PICU notification</li> <li>Intensifier imaging and supply of clean x ray gowns</li> </ol>

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Assessor Name:	Signature:	Date:	

### Monitoring (Advanced ECG)

#### **Competency Statement:**

The nurse safely and effectively monitors an acutely unwell child fully utilizing the capability of the bedside monitor, central monitoring station and telemetry unit (where utilised)

#### RCH references related to this competency:

http://www.rch.org.au/picu\_intranet/guidelines/ECG\_how\_to\_perform/

сом	COMPETENCY ELEMENTS		
Κ	<ol> <li>List common patient categories which require continuous cardiac monitoring</li> <li>Describe what the ECG trace represents</li> <li>Explain sinus rhythm</li> <li>Describe the different monitor capabilities of a 3 and 5 lead trace</li> </ol>		
S	<ol> <li>Demonstrate correct ECG dot placement for 3 and 5 lead monitoring</li> <li>Demonstrate the entering of patient details into the monitoring system including "Patient Paced" parameter and explain rationale for same</li> <li>Demonstrate changing lead trace (on monitor at bedside and telemetry) and discuss rationale for same</li> <li>Demonstrate change size of ECG trace</li> <li>Demonstrate how to calculate an ECG rate</li> <li>Print a continuous recording of an ECG</li> <li>Recognise the following rhythms         <ul> <li>VT - Ventricular Tachycardia</li> <li>VF - Ventricular Fibrillation</li> <li>AF - Atrial Fibrillation</li> <li>Heart block</li> <li>SVT - Supraventricular Tachycardia - ventricular ectopic</li> </ul> </li> </ol>		

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Assessor Name:	Signature:	Date:

### Pacing Wires – Temporary Non Paced Patient

**Competency Statement:** 

The nurse safely and effectively cares for a non-paced patient with temporary pacing wires **RCH references related to this competency:** <u>http://www.rch.org.au/picu intranet/guidelines/Temporary Epicardial Pacing/</u>

COMP	COMPETENCY ELEMENTS		
Κ	4. 5. 6. 7. 8.	Identify need for and location of Temporary Pacing Wires Distinguish between and identify indications for use of: a. Quad wires (non-redo) and Single (skin / redo) wires b. Atrial and Ventricular wires c Dermal wires Discuss precautions required to ensure electrical safety Discuss the importance of pacing wires in an event of cardiac emergency Discuss the relevance of temporary pacing wires for any permanent pacemaker procedures in theatres. Describe the assessment required for the pacing wire site and dressings. State the precautions prior to removal and rationale for removal on day 4-5 State three complications of removal of Pacing Wires and nursing actions to prevent or detect these Discuss follow up of patient post removal of pacing wires	
S		<ol> <li>Demonstrate the correct way to insert pacing wire ends into the protectors and explain the rationale</li> <li>Demonstrate removal of pacing wires, following Clinical Practice Guidelines</li> </ol>	

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Assessor Name:	Signature:	Date:	

### Pacing Wires – Temporary Paced Patient

#### Competency Statement:

The nurse safely and effectively cares for a paced patient with temporary pacing wires

#### RCH references related to this competency:

http://www.rch.org.au/picu intranet/guidelines/Temporary Epicardial Pacing/

COMP	COMPETENCY ELEMENTS	
Κ	<ul> <li>1.List common reasons for Temporary Pacing</li> <li>2.Distinguish between atrial, ventricular and skin wires</li> <li>3.Discuss correct use of the temporary pacemaker Prescription sheet (MR 116)</li> <li>4.Define the terms "output" and "sensitivity"</li> <li>5.Discuss the following commonly used pacing modes <ul> <li>a. AOO</li> <li>b. DDD</li> <li>c. AAI</li> <li>d. VVI</li> <li>b. State patient safety precautions</li> </ul> </li> </ul>	
	<ul> <li>6. Describe how to assess the effectiveness of pacing</li> <li>7. Identify the following complications, stating the causes and appropriate actions for <ul> <li>c. Failure to sense</li> <li>d. Failure to capture</li> <li>e. Failure to pace</li> <li>f. Competition</li> </ul> </li> <li>8. Describe nursing practice required when a pacing is post - surgery</li> </ul>	
S	<ol> <li>Demonstrate how you would set up a monitor for a patient being paced</li> <li>Complete accurate documentation and observation of pacemaker use, and explain rationale for same</li> <li>Show a temporary pacemaker battery change</li> <li>Demonstrate basic interpretation of pacing read out from pacemaker.</li> </ol>	

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Signature:	Date:
Signature:	Date:

### Fallots Tetralogy – Management of a Cyanotic Spell

#### Competency Statement:

The nurse safely and effectively cares for a patient with Fallots Tetralogy <u>http://www.rch.org.au/cardiology/heart\_defects/Fallots\_Tetralogy/</u> <u>http://www.rch.org.au/cardiology/parent\_info/Fallots\_Tetralogy/</u> <u>http://www.rch.org.au/cardiology/intranet\_resources/Cyanotic\_Episode\_Cardiac\_Origin/</u> <u>http://www.rch.org.au/clinicalguide/guideline\_index/Cyanotic\_Episodes\_Spells/</u>

COMP	PETENCY ELEMENTS
Κ	<ol> <li>Describe anatomy associated with the congenital cardiac defect Fallots Tetralogy</li> <li>Discuss possible medical management for a patient with Fallots Tetralogy</li> <li>Discuss possible surgical management for a patient with Fallots Tetralogy</li> <li>Identify common triggers that may induce a cyanotic spell</li> <li>Describe the physiological changes that may be observed when a 'spell' occurs.</li> <li>Explain monitoring requirements of patient with potential and actual Fallots Tetralogy spells</li> <li>Discuss the complications for this cohort group of patients undergoing induction of anaesthesia</li> <li>Describe the steps that are to be taken should a Fallots Tetralogy spell occurs during induction in theatres</li> <li>Explain the role of the scrub team in preparation of this repair prior to induction of patient.</li> <li>Explain the role of circulating nurse if cardiac arrest is imminent.</li> </ol>
S	1. Demonstrate initial patient management of a cyanotic spell

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